AWE Resubmission of Second Periodic Review of Safety (PRS2) for the Former Uranium Technology Centre (UTC) Main Production Facility

Report of the Findings of Assessment Activities, Conducted by the Office for Nuclear Regulation (ONR), in Respect of its Issue of a Decision Letter to AWE on the Resubmission of AWE's PRS2 for the UTC Former Main Production Facility (A**) at AWE Aldermaston

Project Assessment Report ONR-OFD-PAR-22-003
Revision 1

Published 09/22

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EXECUTIVE SUMMARY

Report of the Findings of Assessment Activities, Conducted by the Office for Nuclear Regulation (ONR), in Respect of its Issue of a Decision Letter to AWE on the Resubmission of AWE's PRS2 for the UTC Former Main Production Facility (A) at AWE Aldermaston**

Permission Requested

No formal request for a permission is associated with licensee submissions under Licence Condition LC 15 ("Periodic Review"), however, the expectation is that the Office for Nuclear Regulation (ONR) will issue a 'Decision Letter' to the licensee based upon its assessment of the licensee's submission.

Background

The A** facility, located on the Aldermaston nuclear licensed site, is a former Atomic Weapons Establishment, AWE Plc production facility within the Uranium Technology Centre (UTC) and consists of several buildings, joined by link corridors, sitting within a secure fenced compound.

As required under LC 15, AWE submitted its second Periodic Review of Safety (PRS2) for A** (then one of its in-service main production facilities) in March 2016. The PRS2 submission was accompanied by a Forward Action Plan (FAP). In September 2016, AWE submitted an updated FAP to ONR, together with a PRS2 As Low As Reasonably Practicable (ALARP) summary document.

The AWE A** PRS2 submission concluded that the facility was safe to continue operations for the next 10 years (i.e. 2016 – 2026), subject to completion of a number of 'fixes' and the production and implementation of a new safety case for A** (known as the Facility Safety Justification, FSJ).

ONR conducted an in-depth assessment of AWE's 2016 PRS2 submission across a range of ONR technical disciplines. The conclusions of this ONR work were communicated to AWE in a 'Decision Letter' in March 2017. In its Decision Letter ONR deferred a firm decision on a future 10 year operational life of the A** facility (i.e. to the end of the 10 year PRS2 period on 31st March 2025). ONR's conclusion, to defer its decision on A**'s PRS2, was due to a number of areas of concern identified by ONR during its assessment of the 2016 PRS2 and its resultant conclusion that the PRS2 as submitted was incomplete. A total of 61 'Recommendations' were identified from the ONR assessment work, which AWE was asked to address. In addition AWE was asked to resubmit its PRS2 for A** to ONR by March 2019.

However, it was judged by ONR in 2017 that the Justification for Continued Operations (JfCO), contained within the PRS2 submission, was adequate for a significantly reduced and well-defined scope of A** operations in the interim period

(i.e. up until March 2019), whilst the 'fixes' programme, FSJ and PRS2 resubmission were developed.

Due largely to resourcing issues, AWE was unable to resubmit its PRS2 for A** to ONR until March 2021, but in the interim period provided ONR with a number of safety justifications and as low as reasonably practicable (ALARP) assessments, to allow a limited scope of operations in A** to continue until final issue of the FSJ and PRS2 resubmission. A fuller chronology and references to specific safety submissions, covering the period from ONR's original 'Decision Letter' in 2017 until resubmission of PRS2 and the FSJ in March 2021, is contained in the body of this Project Assessment Report (PAR).

The PRS2 resubmission report and the FSJ issued to ONR in March 2021 were intended to address the deficiencies identified in the 2016 PRS2 submission. The FSJ and PRS2 resubmission are intended to demonstrate that the risks arising from the A** operations are tolerable and ALARP.

ONR conducted further detailed assessment work, across a number of technical disciplines, on the new safety case (FSJ) for A** during 2021 and a Licence Instrument (LI) permitting AWE to implement the new safety case was issued to AWE in September 2021. In addition, in March 2022 (as required by its own processes) AWE submitted a 'PRS2 Close-out Report' to ONR.

The purpose of this PAR is to report ONR's assessment work, conducted in reaching its conclusions on the adequacy of the licensee's resubmission of PRS2 and on the supporting 'PRS2 Close-out Report'. The PAR underpins ONR's 'Decision Letter' for the PRS2 resubmission.

Assessment and Inspection Work Carried out by ONR in consideration of this request

Due to the significant amount of assessment work ONR has already undertaken of AWE's A** PRS2 submission in 2016 and of the FSJ submitted in 2021, ONR has undertaken a more limited (proportionate) assessment of the 2021 PRS2 resubmission and of its accompanying 2022 'PRS2 Close-out Report'. Accordingly, the following areas were the focus of ONR's assessment work:-

- Sampling to allow a judgement to be made as to the adequacy of the PRS2 and PRS2 Close-out reports themselves.
- An ONR nuclear liabilities specialist inspector has sampled the adequacy of AWE's future Post-Operational Clean-out (POCO) activities for A**.
- AWE's progress against the 61 assessment 'Recommendations' from ONR's assessment of the original 2016 PRS2 submission has been sampled.
- Progress with AWE's 'fixes' declared in its 2016 Forward Action Plan (FAP) has been sampled.
- Progress with closure of the shortfalls identified by AWE in its original 2016 PRS2 submission has been sampled.

Matters Arising from ONR's Work

The only matter identified during ONR's assessment work of the resubmitted PRS2 for the A** facility was a single 'Recommendation' made by ONR's nuclear liabilities specialist inspector which was as follows: .

Nuclear Liabilities Recommendation: The licensee to clearly demonstrate how the related shortfalls will be closed out through provision of a detailed programme of POCO activities.

Conclusions

From the totality of the assessment work ONR has conducted i.e. including the proportionate (limited) sampling work detailed above, as well as the detailed previous ONR assessment work conducted on the original submission of PRS2 in 2016 and on the 2021 FSJ, ONR concludes that an adequate PRS2 has now been submitted by AWE. In addition, ONR is satisfied that the risks in the A** facility are currently being managed ALARP and that a suitable and sufficient future risk reduction programme is in place to further reduce the residual risks and to deliver an adequate POCO and decommissioning programme.

Recommendations

It is recommended that a PRS2 'Decision Letter' for A** be issued to AWE that accepts that an adequate PRS2 has now been received by ONR. However, it notes that a number of shortfalls and ONR 'Recommendations' remain open, whose closure will be monitored by the relevant ONR site inspector via their routine regulatory interactions with the AWE UTC management team.

Nuclear Liabilities Recommendation: The licensee to clearly demonstrate how the related shortfalls will be closed out through provision of a detailed programme of POCO activities. [Progress against this Recommendation will be monitored via the ONR nuclear liabilities inspector's routine regulatory interactions with the UTC management team].

LIST OF ABBREVIATIONS

ATO	Authority to Operate
AWE Plc	Atomic Weapons Establishment
ALARP	As low as reasonably practicable
DAR	Design Acceptance Review
DBE	Design Basis Event
EMIT	Examination, Maintenance, Inspection and Testing
FAP	Forward Action Plan
FAT	Factory Acceptance Testing
FSJ	Facility Safety Justification
HOW2	(Office for Nuclear Regulation) Business Management System
HP	Hold Point
HPCP	Hold Point Control Plan
JfCO	Justification for Continued Operation
KIT	Keep in Touch
LC	Licence Condition
LI	Licence Instrument
MSR	Modification Safety Report
OI	Operating Instruction
OBT	Objective Based Training
ONR	Office for Nuclear Regulation
PAG	Procedures Approval Group
PAR	Project Assessment Report
POCO	Post-Operational Clean-out
PRS	Periodic Review of Safety
RGP	Relevant Good Practice
SAP	Safety Assessment Principle(s)
SAT	Site Acceptance Testing
SSC	Structure, System and Component
SSFR	Safety System Functional Requirement
TAG	Technical Assessment Guide (ONR)
UTC	Uranium Technology Centre

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Annexes

1 PERMISSION REQUESTED

1. No formal regulatory permissioning is required under Licence Condition, LC 15 ("Periodic Review"), but it is expected that the Office for Nuclear Regulation (ONR) will issue a 'Decision Letter' reporting the findings of its assessment of the licensee's Periodic Review of Safety (PRS) submission.

2 BACKGROUND

2. The A** facility, located on the Aldermaston nuclear licensed site, is a former Atomic Weapons Establishment, AWE Plc, production facility within the Uranium Technology Centre (UTC) and consists of several buildings, joined by link corridors, sitting within a secure fenced compound.

3. As required under LC 15, AWE submitted its second Periodic Review of Safety (PRS2) for A** (then one of its in-service main production facilities) in March 2016 (References 1 and 2). The PRS2 submission was accompanied by a Forward Action Plan (FAP). In September 2016, AWE submitted an updated FAP to ONR (Reference 3) together with a PRS2 as low as reasonably practicable (ALARP) summary document (Reference 4).

4. The AWE A** PRS2 submission (Reference 2) concluded that the facility was safe to continue operations for the next 10 years (i.e. 2016 – 2026), subject to completion of a number of 'fixes' and the production and implementation of a new safety case for A** (known as the Facility Safety Justification, FSJ).

5. ONR conducted an in-depth assessment of AWE's 2016 PRS2 submission across a range of ONR technical disciplines (Reference 5). The conclusions of this ONR work were communicated to AWE in a 'Decision Letter' in March 2017 (Reference 6). In Reference 6, ONR deferred a firm decision on a future 10 year operational life of the A** facility (i.e. to the end of the 10 year PRS2 period on 31st March 2025). ONR's position, that is to defer its decision on A**'s PRS2, was due to a number of areas of concern identified by ONR during its assessment of the 2016 PRS2 and its conclusion that the PRS2 as submitted was incomplete. A total of 61 'Recommendations' were identified from the ONR assessment work, which AWE was asked to address. In addition AWE was asked to resubmit its PRS2 for A** to ONR by March 2019.

6. However, it was judged by ONR in 2017 that the Justification for Continued Operations (JfCO), contained within the Reference 2 PRS2 submission, was adequate for a significantly reduced and well-defined scope of A** operations in the interim period (i.e. up until March 2019), whilst the 'fixes' programme, FSJ and PRS2 resubmission were developed.

7. In March 2019 AWE wrote to ONR to advise that production of the revised PRS2 and FSJ would be delayed until September 2020 (Reference 7). Accordingly, AWE proposed that a JfCO Extension Report would be produced to cover the period from May 2019 – September 2020. Reference 7 also articulated AWE's safety position for the 'gap' from the end of March 2019

until the JfCO Extension Report could be implemented in May/June 2019 (this intervening period would continue to be covered by the JfCO presented in Section 13 of the original PRS2 submission in 2016 – Reference 2).

8. The JfCO Extension Report was issued to ONR in April 2019 (Reference 8). ONR sampled the JfCO Extension Report and subsequently agreed to lifting of the associated Hold Point (HP) on UTC's Hold Point Control Plan (HPCP), Reference 9, but only permitted the conduct of those operations in A** which were within the scope of the JfCO and only until the expected receipt of the PRS2 resubmission and the FSJ in September 2020.

9. The September 2020 target date was also subsequently missed by AWE and a further letter was submitted to ONR by AWE (Reference 10) to explain AWE's position. To justify the gap from the 2019 JfCO Extension to the implementation of the FSJ, a Continued Operations Modification Safety Report (MSR) was submitted in September 2020 (Reference 11).

10. The PRS2 resubmission report and the FSJ were subsequently issued to ONR in March 2021 (References 12 and 13), with the FSJ intended to address the deficiencies identified in the 2016 PRS2 submission. The FSJ and PRS2 resubmission are intended to demonstrate that the risks arising from the A** operations are tolerable and ALARP.

11. ONR conducted further detailed assessment work, across a number of technical disciplines, on the new safety case (FSJ) for A** during 2021 (Reference 14) and a Licence Instrument (LI) permitting AWE to implement the new safety case was issued to AWE in September 2021 (Reference 15). In addition, in March 2022 (as required by its own processes) AWE submitted a 'PRS2 Close-out Report' to ONR (Reference 16).

12. The purpose of this Project Assessment Report (PAR) is to report ONR's assessment work, conducted in reaching its conclusions on the adequacy of the licensee's resubmission of PRS2 and on the supporting 'PRS2 Close-out Report'. The PAR hence underpins ONR's 'Decision Letter' for the PRS2 resubmission.

3 ASSESSMENT AND INSPECTION WORK CARRIED OUT BY ONR IN CONSIDERATION OF THIS REQUEST

13. Due to the significant amount of assessment work ONR has already undertaken of AWE's A** PRS2 submission in 2016 and of the FSJ submitted in 2021 (see References 5 and 14), ONR has undertaken a more limited (proportionate) assessment of the 2021 PRS2 resubmission (Reference 12) and of its accompanying 2022 'PRS2 Close-out Report' (Reference 16). It was agreed with the ONR Delivery Lead (Reference 17) that the following areas would be the focus of ONR's assessment work:-

- The PRS2 and PRS2 Close-out reports themselves have been sampled in order to make a judgement as to the adequacy of these reports.
- An ONR nuclear liabilities specialist inspector has sampled the adequacy of AWE's future Post-Operational Clean-out (POCO) activities for A**.
- AWE's progress against the 61 assessment 'Recommendations', from ONR's assessment of the original 2016 PRS2 submission, has been sampled.
- Progress with AWE's 'fixes' declared in its 2016 Forward Action Plan (FAP) has been sampled.
- Progress with closure of the shortfalls identified by AWE identified in its 2016 PRS2 submission has been sampled.

3.1 SAMPLING OF PRS2 RESUBMISSION AND OF PRS2 CLOSE-OUT REPORT

3.1.1 PRS2 RESUBMISSION (REFERENCE 12)

14. Reference 12 was compared with the requirements of the relevant ONR Technical Assessment Guide (TAG), Reference 18 for Periodic Safety Reviews (referred to as Periodic Reviews of Safety, PRS, by AWE).

15. The key requirements of a PRS (as described in Reference 18) and AWE's compliance against these requirements is summarised in Table 1 below.

Table 1 – Summary of A PRS2 Resubmission Compliance with Reference 18**

TAG 50 (Reference 18) Requirement	A** PRS2 Resubmission	Comments
Determination of scope of current and future operations.	The scope of operations for the remaining period of PRS2 is clearly defined (focusing on hazard and risk reduction prior to handover to decommissioning in 2026). The PRS2 resubmission is primarily based on the new FSJ which is aligned to the future scope of operations. A future operations section in the resubmitted PRS2 adequately describes the plans for the facility for the next 10 years and beyond. Any future operations that are outside the scope of the currently permitted reduced operations will be permissioned via AWE's LC 22 processes (e.g. the reinstatement of a process for material passivation). Those actions required to reduce the dominant risk in the facility have been adequately identified and described in the resubmission document.	Only those operations required to ensure the continued safety and security of the facility and its materials will be undertaken. Risk reduction is also in the scope of the facility programme to maintain an ALARP position. Manufacturing in A** has ceased and the production areas are and will remain non-operational. ONR is satisfied that this PRS requirement is being met.

TAG 50 (Reference 18) Requirement	A** PRS2 Resubmission	Comments
The adequacy of operating instructions and procedures has been reviewed.	The PRS2 resubmission is primarily based on the FSJ. As a part of FSJ implementation a new suite of Operating Instructions (OI) is being written and is undergoing due UTC governance via a Procedures Approval Group (PAG). Objective Based Training (OBT) is under parallel development to support the roll-out of the new OIs.	ONR is satisfied that this PRS requirement is being met.

TAG 50 (Reference 18) Requirement	A** PRS2 Resubmission	Comments
The adequacy of maintenance requirements and spares availability etc. has been reviewed.	As part of the FSJ work, multiple techniques have been used for formal hazard identification to provide a complete and comprehensive list of hazards and the grouped faults have been analysed to identify the safety functions associated with each fault group and the number and class of safety measures required to demonstrate deterministic safety. Safety measures in place have been identified for each fault group and have been compared with the deterministic requirement. Engineered safety measures have been identified as Safety Systems and Components (SSC) with the Safety System Functional Requirements (SSFR) identified against the required safety performance. Engineered safety measures have also been consolidated into an Engineering Schedule and the SSCs required to safely operate the facility have been identified in the Engineering Schedule and their extant Examination, Maintenance, Inspection and Testing (EMIT) activities have been referenced.	ONR is satisfied that this PRS requirement is being met.

TAG 50 (Reference 18) Requirement	A** PRS2 Resubmission	Comments
The adequacy of maintenance requirements and spares availability etc. has been reviewed – continued.	The Design Acceptance Review (DAR) reports have reviewed the existence and suitability of the associated EMIT Schedule entries and the associated Maintenance Instructions (MI). Shortfalls are being resolved during FSJ implementation work via the production of a comprehensive new set of MIs (currently in production) which will cover the required SSCs. The EMIT Schedule is to be updated based on the Engineering Schedule.	See previous page.
The list of potential faults and hazards identified in the safety case against extant operations has been reviewed for adequacy.	As noted in the cell above multiple techniques have been used for formal hazard identification to provide a complete and comprehensive list of hazards and these have then been analysed as per AWE Corporate guidance.	ONR is satisfied that this PRS requirement is being met.
Reviews and updates of fault analysis and substantiation of claims has been undertaken.	See cell above.	ONR is satisfied that this PRS requirement is being met.

TAG 50 (Reference 18) Requirement	A** PRS2 Resubmission	Comments
The appropriateness of best practice against facility operations has been determined.	The resubmitted PRS2 presents a comprehensive review against modern standards to determine that the claims made in the safety case are valid for the future operations until March 2025 and that the claims are supported evidentially.	ONR is satisfied that this PRS requirement is being met.
Solutions to shortfalls have been identified.	The safety assessment work conducted for FSJ has driven out shortfalls in the facility safety provisions versus the requirements. The ALARP strategy for the facility sets out key elements to reduce facility risks for the ongoing operations. It is a continuation of the PRS strategy tailored to address the shortfalls associated with the reduced scope of facility operations and the revised fault group assessments. Shortfalls not closed out by an equivalent PRS2 shortfall are categorised as 'required' and sentenced to optioneering, simple assessment or direct action. All the shortfalls and ALARP Issues have been amalgamated into an ALARP Issues list which is used to track progress to closure.	ONR is satisfied that this PRS requirement is being met.

TAG 50 (Reference 18) Requirement	A** PRS2 Resubmission	Comments
The PRS should review and justify the continuing adequacy of the licensee's organisation including changes to the organisational structure or resources available to it which may affect safety.	The resubmission adequately discusses future staffing requirements and the definition of the nuclear baseline roles and the provision of resilience to support the baseline roles required to implement the FSJ. Retention of the required skills and staff to operate the ageing facility is discussed along with UTC's readiness reviews prior to process restarts and a staffing plan and training matrix.	ONR is satisfied that this PRS requirement is being met.
The PRS should consider the need for and availability of appropriate storage facilities for radioactive waste and the identification of a suitable waste disposal route. This may include consideration well beyond the normal 10 year window and would need to consider the longevity of any storage proposal and the potential need for additional storage capacity and associated waste treatment facilities.	Waste management is adequately addressed in the PRS2 resubmission with the typical operational and maintenance wastes discussed. A strategy is in place to remove bulk process material from the facility and to introduce this into a new longer term storage facility.	ONR is satisfied that this PRS requirement is being met.

TAG 50 (Reference 18) Requirement	A** PRS2 Resubmission	Comments
As decommissioning becomes imminent the PRS needs to address a detailed decommissioning plan, its integration with waste management strategies and the decommissioning safety management system.	See Section 3.2 below.	See Section 3.2 below.

19. ONR is satisfied that the content of the PRS2 resubmission report meets the key requirements of the relevant ONR TAG (i.e. Reference 18), which in turn meets the key international requirements for periodic safety reviews.

3.1.2 PRS2 CLOSE-OUT REPORT (REFERENCE 16)

20. As required by AWE's own procedures, a PRS2 close-out report (i.e. Reference 16) was submitted to ONR on 23 March 2022. This document was duly sampled as part of ONR's sampling of the overall PRS2 resubmission and as agreed with the ONR Delivery lead in Reference 17.

21. Recognising that the PRS2 for A** can only be closed when it has been demonstrated that all shortfalls identified by the PRS2 process have been successfully closed, the purposes of Reference 16 were stated by AWE to be to demonstrate that the shortfalls:-

- Have been addressed as per the original Forward Action Plan (FAP).
- Will be addressed as part of restarting operations under the new FSJ.
- Are associated with operations that are not currently permitted within the FSJ, and hence are not contributing to facility risk. These operations include enablers for material removal/export in future and are not required to start yet.

22. The PRS2 close-out report hence summarises the closure of the PRS2 shortfalls up to January 2022 and shows the transfer of the remaining PRS2 shortfalls to the UTC Improvement Plan.

23. Reference 16 satisfactorily demonstrates that for the shortfalls which are still open, (i.e. those described by the second and third bullets in the list immediately above), there are no reasonably risk reduction measures ahead of closure and hence justifies that these shortfalls should be managed via the UTC Improvement Plan. The 76 open shortfalls (as of January 2022 – reduced to 75 by June 2022) have hence been moved to the UTC Improvement Plan thus permitting PRS2 closure.

24. Reference 16 provides a summary table (reproduced as Table 2 below) which summarises the position with respect to the closure status of the total of 910 A** PRS2 shortfalls as of January 2022. [Note this Table has been slightly updated as of June 2022 since one further Category 2 shortfall has been closed since January 2022].

Table 2 – Summary of Closure of PRS2 Shortfalls as of January 2022

Shortfall Category	Shortfalls Complete and Closed	Shortfalls Open	Total
1	399	25	424
2	130	26	156
3	230	22	252
4	76	2	78
Total	**835**	**75**	**910**

25. However, an update has been provided by AWE as of the end of June 2022, (References 19 and 20), which shows for each of the 75 open shortfalls in the above table what the route to closure is and the anticipated closure date i.e.

- The closure of three shortfalls (Nos. 1, 4 and 7) relies upon the production of a POCO Safety Justification Strategy (due later in 2022).
- Closure of four shortfalls (Nos. 2, 3, 5 and 6) relies upon completion of overpack work due for completion in 2025. ONR is already maintaining routine oversight of the totality of this project via monthly engagements with the associated AWE project team.
- One shortfall (No. 8) requires the restoration of space extract to one of the old production boxline areas in the A** complex. Work is progressing well and it is hoped this shortfall can very soon be closed.
- Closure of 17 shortfalls (Nos. 9 – 25) relies upon completion of the documentation associated with completion of the structural improvements work (the ‘fixes’) identified by PRS2 back in 2016. As reported in Section 3.4 below, the structural work is now complete and beneficial use has been claimed for each of the ‘fixes’. Generation of the documentation required to close these shortfalls is now well advanced and the contractor is being actively encouraged by AWE to complete the documentation as quickly as possible, allowing prompt closure of these 17 shortfalls.

- Shortfall 26 (work on the gantry) is still to be completed and this shortfall hence remains open.
- Shortfalls 27, 28 and 30 (3 of), relate to a future LC 22 submission to reinstate a former process in the facility – scoping of rectification work for issues discovered during baseline commissioning. Scoping work to address the commissioning reservations is progressing but is yet to be completed and hence these shortfalls remain open.
- Shortfall 29 (1 of) – testing work on some modifications to a former process glovebox, as a part of reinstatement of this process in the facility – this work has not yet been completed and will be closed as a part of the installation work following completion of the testing.
- Shortfalls 31 – 67 (37 of) – all these shortfalls cannot be closed until reinstatement of a former facility process via an LC 22 submission to ONR. The anticipated date of submission is as yet to be confirmed but is likely late 2022/early 2023 (see Section 3.4 below).
- Shortfalls 69 – 73 (5 of), all are human factors shortfalls associated with the reinstatement of a former process in the facility and it is expected that each of these shortfalls will be closed as a part of commissioning of of this former process in due course.
- Shortfalls 74 – 76 (3 of) relate to human factors shortfalls related to waste operations. AWE (UTC) has confirmed that whilst the Procedures Approval Group, PAG, reviews are complete, closure still awaits Authority To Operate (ATO) holder readiness reviews, although opportunities are being sought by UTC to accelerate this work.

26. A justification has been provided in Reference 16 as to why delays in the closure of these shortfalls are ALARP and ONR judges these arguments to be adequate. ONR is content that progress to ultimate closure of these relatively few remaining shortfalls can be adequately monitored via its routine regulatory interactions with the UTC management team.

27. Finally, it should also be noted that as a consequence of production of the new FSJ post the PRS2 submission in 2016, a further series of shortfalls were identified (a total of 631). The large number of additional shortfalls, raised through the FSJ production, reflects the improved rigour of the FSJ assessments and supporting assessments, and also the contribution from the newly produced criticality safety assessments. However, these additional shortfalls are outside of the PRS2 process but it can be reported that by the end of June 2022 (Reference 20), 169 remain open (162 have been closed and 300 are ‘tolerated’) with progress continuing to be made in closing these remaining 169 additional shortfalls. ONR is continuing to monitor progress in this area via its routine regulatory interactions with the UTC management team.

3.2 SAMPLING OF POCO ACTIVITIES FOR A**

28. An ONR nuclear liabilities specialist inspector has targeted Post-Operational Clean-out activities and has sampled (Reference 21) the following documents:

- "PRS2 Resubmission Report", Issue 3, March 2021 – Reference 2.
- "PRS2 Close Out Report", Issue 4, March 2022 – Reference 16.
- FSJ – Facility ALARP Report, R1AAVO-1203932420-20, Issue 4, March 2021.

29. The PRS2 Resubmission Report and the FSJ, on which the PRS2 is based, exclude POCO activities. However, AWE considers the FSJ a sound basis for future POCO activities in accordance with its LC22 arrangements and has identified specific activities required to enable POCO to commence within the PRS2 period. The Facility ALARP Report provides a high-level programme for these enabling activities; progress is monitored and reported routinely.

30. The PRS2 Resubmission Report and Close Out Report identify a number of shortfalls where timescales for closeout are linked to POCO. The PRS2 Close Out Report identifies the need for a detailed programme for risk reduction from POCO progress to be developed by the AWE Delivery Partner.

31. Whilst the PRS2 does not go into detail on the POCO activities required, ONR is content that the requirement for POCO within the period has been adequately recognised within the submission. However, to clearly demonstrate how the POCO-related shortfalls will be closed out in a timely manner, AWE should produce the detailed Programme for POCO activities.

Nuclear Liabilities Recommendation: The licensee to clearly demonstrate how the related shortfalls will be closed out through provision of a detailed programme of POCO activities.

3.3 SAMPLING OF CLOSURE STATUS OF ASSESSMENT RECOMMENDATIONS FROM ONR ASSESSMENT OF PRS2 – 2016

32. Following on from its assessment of the original PRS2 submitted by AWE for the A** facility in 2016 (see Reference 5), a total of 61 assessment 'Recommendations' were recorded by ONR, which AWE was asked to address in a resubmission of PRS2 (see Reference 6). Annex 1 summarises the progress AWE has made (as of June 2022) in addressing these 'Recommendations' and provides references to acceptance by individual ONR assessors that their assessment recommendations have been closed to their satisfaction.

33. It can be seen from Table 1 that only 5 'Recommendations' remain to be closed as of June 2022. For the remaining open 'Recommendations' there has been dialogue between the relevant ONR specialist inspectors and the UTC Safety Case Manager to ensure that a mutually acceptable and appropriate route to closure of each 'Recommendation' has been agreed between ONR and AWE. Accordingly, the relevant ONR specialist inspectors will now monitor progress against the agreed forward action plans and progress will also be tracked by appropriate ONR Regulatory Issues until such time as all of these 5 remaining open 'Recommendations' have been closed.

This approach hence provides for a pragmatic yet robust means of ensuring the resubmitted PRS2 can be closed whilst still retaining regulatory focus on those open 'Recommendations'.

3.4 PROGRESS WITH PRS2 – 2016 'FIXES'

34. At a routine 'Keep in Touch' (KIT) meeting, held with representatives of the AWE UTC management team on 7/6/2022 (see Reference 22) progress was reported against the key 'fixes' required by ONR from its assessment of PRS2 in 2016. This progress can be summarised as follows:-

- Buildings and structures – for four of the buildings forming the A** complex (along with their linking corridors). AWE was required by ONR to increase the Design Basis Event (DBE) withstand (for seismic and wind events) to that commensurate with a DBE with a 1 in 10,000 year return frequency. AWE has reported that all the structural steelwork required to deliver this increased performance has now been installed and beneficial use has been claimed in all cases. The roof strengthening steelwork and new gantry support steelwork for the roof strengthening of one of the A** buildings has also been completed and the new roof structure has been installed. All work has hence been completed to ONR's satisfaction.
- Stacks – ONR required 4x A** building stacks be strengthened to the same DBE withstand as the buildings and structures (see immediately above). This work has been completed to ONR's satisfaction.
- Flood relief trench – ONR required AWE to construct a flood relief trench to protect the main A** stores and the A** Transit Bay against design basis flooding. This work was completed to ONR's satisfaction a few years ago.
- Flooding – groundwater modelling – the construction of the flood relief trench was intended to protect A** from topographical flooding but it was recognised that there were other flooding mechanisms, which could pose a challenge to the A** facility. Accordingly, UTC conducted detailed groundwater modelling to better understand this challenge and implemented a number of flood risk mitigation projects (e.g. removal of rainwater drain lines running inside the building in the fissile material storage area) to the satisfaction of ONR.
- Garage and Waste Bay Annex – it was recognised during AWE's assessment work that collapse of these structures in a seismic or wind event had a potential to impact adversely on nuclear safety significant areas of A**. Accordingly, AWE agreed to the demolition of these structures. Again this work was completed to ONR's satisfaction some years ago.
- Finely divided fissile material – at the time of submission of AWE's initial PRS2 for A** (2016), it was recognised that there was a significant quantity of fissile material in finely divided form that was stored in unsatisfactory conditions, leaving it vulnerable to flooding and/or seismic events. ONR required AWE to ensure that the risks

posed by this material be reduced. AWE has since moved all such vulnerable material to modern standard safes (which are resistant to flooding/seismic events) prior to eventual passivation of the material via the reinstatement (via AWE's LC 22 arrangements) of a former process in the facility. ONR is satisfied with this position. [It is noted that all 'bird-cage' storage for fissile material has been removed from the facility as per ONR recommendations].

- Replacement to and/or modification of a number of fissile material movement trolleys – this work is now largely completed with only the safes transfer trolley still outstanding. However, only Site Acceptance Testing (SAT) remains to be completed for the safes area trolley and this work is currently (as of June 2022) being deconflicted from other work in the facility but is not currently impacting the nuclear safety risk in the facility. ONR is content with this position.
- Reinstatement of a process in A** to allow passivation of material as an overall facility risk reduction measure and to allow the future requirements for the future Material Handling Store to be met. As of June 2022, work on the baseline commissioning of the process glovebox itself has been completed, but 126 commissioning 'reservations' have been raised (of which 34 require engineering assessment of additional scope to be included in the fixes of the glovebox). A lack of engineering support to UTC has impeded the production of a total scope of work, which is required before contractors can be engaged on site to commence the required safety upgrades to the process. As of June 2022 additional resource had been procured, which should enable progress on this project going forward. Issues also remain around delays to manufacture of the new glovebox windows and the detailed design duration on another key component also has a potential to introduce further delays to the project. ONR is now monitoring progress as a part of its routine regulatory interactions with the UTC management team.
- Reinstatement of a further process in A** to allow some fissile material to meet the required specifications for export. As of June 2022, the manufacturing and Factory Acceptance Testing (FAT) of the electrical systems for this process has been completed and additional testing was due to take place in June 2022. Work is due to commence on site to make the required safety upgrades to the glovebox, circa June 2022. ONR is continuing to monitor progress with this project via its routine regulatory interactions.
- HEPA filter changes – A** has 13 discrete active ventilation systems, all of which are served by HEPA filters that haven't been changed for many years. Current work is concentrating on changing out the filters that serve one of the processes to be reinstated in A** (ventilation system 4). New filters are in manufacture and on-site works, to install the new filters, are due to commence circa August 2022. Experience gained during this project will be fed forward into a strategy for HEPA filter changes on the other 12 active ventilation systems in A**. (See

also 'Recommendation 1 in Annex 1 where it is noted that ONR will continue to monitor progress with HEPA filter changes in A** via its routine regulatory engagements). In addition, work is ongoing across A** to better characterise the fissile material holdings of all the HEPA filters in the facility. ONR is monitoring progress in this area via its routine regulatory interactions with UTC.

35. In ONR's opinion adequate progress has been made with the required 'fixes' since the submission of the original PRS2 for A** in 2016 with the bulk of the projects having been successfully completed. Those projects that are still lagging (see above) have experienced challenges that are understood by ONR and ONR will continue to closely monitor these projects through to completion. In summary, ONR is content that the 'fixes' have been adequately addressed by AWE.

4 MATTERS ARISING FROM ONR'S WORK

36. The only matter identified during ONR's assessment work of the resubmitted PRS2 for the A** facility was a single 'Recommendation' made by ONR's nuclear liabilities specialist inspector which is as follows: .

Nuclear Liabilities Recommendation: The licensee to clearly demonstrate how the related shortfalls will be closed out through provision of a detailed programme of POCO activities. [Progress against this Recommendation will be monitored via the ONR nuclear liabilities inspector's routine regulatory interactions with the UTC management team].

5 CONCLUSIONS

37. From the assessment work ONR has conducted including the proportionate (limited) sampling work detailed above, as well as the detailed previous assessment work conducted on the original submission of PRS2 in 2016 and on the 2021 FSJ, ONR concludes that an adequate PRS2 has now been submitted by AWE. ONR is also satisfied that the risks in the A** facility are currently being managed ALARP and that a suitable and sufficient future risk reduction programme is in place to further reduce the residual risks and to deliver an adequate POCO and decommissioning programme.

6 RECOMMENDATIONS

38. It is recommended that a PRS2 'Decision Letter' for A** be issued to AWE that accepts that an adequate PRS2 has now been received by ONR. However, it notes that a number of shortfalls and ONR 'Recommendations' remain open, whose closure will be monitored by the relevant ONR site inspector via his routine regulatory interactions with the AWE UTC management team.

39. **Nuclear Liabilities Recommendation**: The licensee to clearly demonstrate how the related shortfalls will be closed out through provision of a detailed

programme of POCO activities. [Progress against this Recommendation will be monitored via the ONR nuclear liabilities inspector's routine regulatory interactions with the UTC management team].

7 REFERENCES

1. AWE Letter to ONR, "LC15 - Submission of A** Facility's Periodic Review of Safety (PRS2)," Unique No. ALD 71037R (CM9 2016/147633).

2. MER-820-00871, Issue 3, "A** Facility Periodic Review of Safety Submission Report", March 2016, AWE. [Not available on CM9 due to security classification of document].

3. MER-820-000872, Issue 3, "Forward Action Plan", September 2016 (CM9 2016/394198).

4. MER-820-000873, Issue 03, "A** Facility Periodic Review of Safety: PRS ALARP Summary Report", (CM9 2016/473856).

5. ONR-OFP-PAR-16-026 – Project Assessment Report, "Assessment of the Periodic Review of Safety for the A** Facility at Aldermaston," 31st March 2017 (CM9 2022/14678).

6. ALD71091R – "A** Periodic Review of Safety: Decision Letter Following ONR Assessment of the Periodic Review of Safety," 31/3/2017 (CM9 2017/131304).

7. ONR 015-099 – "UTC A** PRS2 Resubmission, Revised Submission Date, Hold Point Control Plan (HPCP) HP80", 21st March 2019 (CM9 2019/91209).

8. MER-820-007320, NSC/3831, Issue 3, "Extension to A** PRS2 – Justification for Continued Operations Report," 29/4/2019 [Not available on CM9 due to security classification of document].

9. ONR Decision Record, ONR-OFD-DR-19-004 – "Implementation of A** Justification for Continued Operations (JfCO) Extension Report," 3/6/2019 (CM9 2019/139395).

10. ONR200-115 – "UTC – A** PRS2 Resubmission, Revised Submission Date Hold Point Control Plan (HPCP) HP 80," 29/9/2020 (CM9 2020/290115).

11. MER-821-000662, NSC/4253, Issue 3, "UTC, A** Safety Case Modification Safety Report for Continued Operations," 9/9/2020 (CM9 2020/290115).

12. R1AAVO – 1002947249-20, Issue 3 – "Periodic Review of Safety (PRS) 2 Resubmission", March 2021 [Document not available on CM9 due to security classification].

13. R1AAVO-1203932420-23, Issue 2 – "Facility Safety Justification (FSJ)", March 2021 [Document not available on CM9 due to security classification].

14. ONR-OFD-PAR-21-004 – "Implementation of the UTC Facility Safety Justification", September 2021 (CM9 2021/52136).

15. ALD71131 – "Agreement to Modify the A** Safety Case by Implementation of a Modern Standards Facility Safety Justification in Accordance with the Company Arrangements Made Under LC 22", 7/9/2021, (CM9 2021/65351).

16. MER-820-010627, NSC/4724 – "A** Second Periodic Review of Safety – PRS2 Closeout Report and Associated ALARP Position Statement for A**," Issue 4, March 2022 (CM9 2022/27685).

17. ONR-OFD-DR-21-081 – "ONR Permissioning Decision Record – ONR Proposed Assessment Strategy for Issue of Decision Letter to AWE Following its Resubmission of PRS2 for A** in 2021," 7/2/2022 (CM9 2022/8426).

18. NS-TAST-GD-050, Revision 8 – "Nuclear Safety Technical Assessment Guide – Periodic Safety Review (PSR)," October 2020. http://www.onr.org.uk/operational/tech_asst_guides/index.htm

19. E-mail – "PRS2 Resubmission etc.", 6/6/2022 (CM9 2022/39660).

20. E-mail – "Shortfall Closure," 30/6/2022 (CM9 2022/40418).

21. E-mail – "AWE UTC PRS2 Resubmission – NLR Assessment", 5/7/2022 (CM9 2022/40426).

22. ONR-OFD-CR-22-167 – "Office for Nuclear Regulation (ONR) Meetings with AWE UTC Personnel during June 2022 Site Inspection Week," 7 June (CM9 2022/36965)

Appendix 1
Status of 61 ONR 'Recommendations' from ONR Assessment of A** PRS2 – 2016

(Note – Fuller descriptions of each Recommendation can be found in Table 3 of Reference 16)

Recommendation No.	ONR Technical Discipline	Closure Status (June 2022)	Related CM9 Closure Refs	Outstanding Work Required and Anticipated Recommendation Closure Date
1	Mechanical Engineering	Open - see Note 1	N/A	TBC
2	Chemical Engineering	Open – see Note 2	N/A	To be closed upon satisfactory reintroduction of a former process in A** via issue of an LI under LC 22. Date as yet TBA.
3	Civil Engineering	Closed	ONR-OFD-CR-18-342	N/A
4	Civil Engineering	Closed	See Note 3	N/A
5	Civil Engineering	Closed	ONR-OFD-CR-18-342	N/A
6	Civil Engineering	Closed	2022/28537	N/A
7	Civil Engineering	Closed	ONR-OFD-CR-18-342	N/A
8	Criticality Safety	Closed	2021/51374	N/A
9	Criticality Safety	Closed	2021/51374	N/A
10	Criticality Safety	Closed	2021/51374	N/A
11	Control and Instrumentation	Closed	2021/52314	N/A
12	Control and Instrumentation	Closed	2021/52314	N/A
13	Control and Instrumentation	Closed	2021/52314	N/A
14	Control and Instrumentation	Closed	2021/52314	N/A
15	Control and Instrumentation	Closed	2021/52314	N/A

Recommendation No.	ONR Technical Discipline	Closure Status (June 2022)	Related CM9 Refs	Outstanding Work Required and Anticipated Recommendation Closure Date
16	Control and Instrumentation	Closed	2021/52314	N/A
17	Control and Instrumentation	Closed	2021/52314	N/A
18	Control and Instrumentation	Closed	2021/52314	N/A
19	Control and Instrumentation	Closed	2021/52314	N/A
20	External Hazards	Closed	2022/7126	N/A
21	External Hazards	Closed	2022/7126	N/A
22	External Hazards	Closed	2022/7126	N/A
23	External Hazards	Closed	2022/7126	N/A
24	External Hazards	Closed	2022/7126	N/A
25	External Hazards	Closed	2022/7126	N/A
26	External Hazards	Closed	2022/7126	N/A
27	External Hazards	Closed	2022/7126	N/A
28	External Hazards	Closed	2022/7126	N/A
29	External Hazards	Closed	2022/7126	N/A
30	External Hazards	Closed	2022/7126	N/A

Recommendation No.	ONR Technical Discipline	Closure Status (June 2022)	Related CM9 Refs	Outstanding Work Required and Anticipated Recommendation Closure Date
31	Fault Studies	Closed	2022/4860	N/A
32	Fault Studies	Closed	2022/4860	N/A
33	Fault Studies	Closed	2022/4860	N/A
34	Fault Studies	Closed	2022/4860	N/A
35	Fault Studies	Closed	2022/4860	N/A
36	Human Factors	Closed	2021/56591	N/A
37	Human Factors	Closed	2021/56591	N/A
38	Human Factors	Closed	2021/56591	N/A
39	Human Factors	Closed	2018/26741	N/A
40	Human Factors	Closed	2018/14924	N/A
41	Human Factors	Closed	2021/46978	N/A
42	Human Factors	Closed	2019/263845	N/A
43	Internal Hazards	Closed	2022/27741	N/A
44	Internal Hazards	Open – See Note 4	See 2022/40384	TBC
45	Internal Hazards	Open – See Note 5	See 2022/40384	TBC
46	Internal Hazards	Open – See Note 6	See 2022/40384	TBC
47	Internal Hazards	Closed	2022/27741	N/A
48	Mechanical Engineering	Closed	2022/32369 (See also closure statement for RI 5957)	N/A
49	Mechanical Engineering	Closed	2022/32369 (See also closure statement for RI 5957)	N/A

Recommendation No.	ONR Technical Discipline	Closure Status (June 2022)	Related CM9 Refs	Outstanding Work Required and Anticipated Recommendation Closure Date
50A	Mechanical Engineering	Closed	2022/32369 (See also closure statement for RI 5957)	N/A
50B	Mechanical Engineering	Closed	2022/32369 (See also closure statement for RI 5957)	N/A
50C	Mechanical Engineering	Closed	2022/32369 (See also closure statement for RI 5957)	N/A
50D	Mechanical Engineering	Closed	2022/32369 (See also closure statement for RI 5957)	N/A
51	Mechanical Engineering	Closed	2022/32369 (See also closure statement for RI 5957)	N/A
52	Mechanical Engineering	Closed	2022/32369 (See also closure statement for RI 5957)	N/A
53	Mechanical Engineering	Closed	2022/32369 (See also closure statement for RI 5957)	N/A
54	Mechanical Engineering	Closed	2022/40735	N/A
55	Nuclear Liabilities	Closed	2022/40426	N/A

Recommendation No.	ONR Technical Discipline	Closure Status (June 2022)	Related CM9 Refs	Outstanding Work Required and Anticipated Recommendation Closure Date
56	Nuclear Liabilities	Closed	2022/27633	N/A
57	Nuclear Liabilities	Closed	2022/27633	N/A
58	Nuclear Liabilities	Closed	2022/27633	N/A
59	AWE Planning and FAP	Closed	Evidence pack provided by AWE – see CM9 2022/32745	N/A
60	AWE Planning and FAP	Closed	See Reference 12	N/A
61	AWE Planning and FAP	Closed	Evidence pack provided by AWE – see CM9 2022/32745	N/A

Notes

1. Mechanical Engineering – “AWE should determine the ALARP position for its HEPA filters across the A** facility.” AWE has provided MER-100-068425. This underpins the optioneering and ALARP recommendation for ventilation system 4 in A**. ONR is content that adequate improvements have been identified in installing new HEPA filters and safe change cartridges along with removing old filters for this system. However, AWE is yet to identify an ALARP position for the remaining 12 ventilation systems. The systems are complex and designs differ, therefore, the solution proposed my not be appropriate for all systems.

   AWE has agreed to provide a ventilation strategy (see CM9 2022/38111) that will identify how it intends to reintroduce the other 12 ventilation systems. However, AWE has agreed with ONR’s view that it would be inappropriate to restart systems containing ageing HEPA filters without appropriate substantiation, which would be challenging to demonstrate. Accordingly, the ONR mechanical engineering assessor has recommended that Action 2 within Regulatory Issue 5115 is closed, as an ALARP position has been identified through appropriate optioneering for ageing HEPA filters. However, Recommendation R1 should remain open. An additional Level 4 Regulatory Issue has been raised (No. 10879) that requires AWE to provide and implement a ventilation strategy. This should consider the ALARP solution for the remaining 12 systems. The ONR

mechanical engineering specialist owns this issue and will lead in ongoing engagement monitoring the AWE response.

2. Chemical Engineering - “AWE to perform a review of its Chemical Engineering Limits and Conditions in A**. Closure of this Recommendation is awaiting the LC 22 submission to ONR for reintroduction of a former process within A** and the limits and conditions associated with this process. The LC 22 submission is unlikely to be received until late 2022/2023 but ONR continues to monitor progress via its routine monthly engagements with the UTC management team.

3. Civil Engineering – “AWE should review and where necessary revise its arrangements for undertaking civil, structural and architectural inspections and for reviewing and recording the results from these and for managing any defects arising from these by March 2018.” The ONR Regulatory Issue that this Recommendation sat within was closed by the assessor and hence this Recommendation has been **closed**.

4. Internal Hazards – “AWE should identify areas where the fire loading has the potential to challenge the safety case and for any areas identified, AWE should demonstrate suitable controls are in place.” Residual PRS2 shortfalls in this area remain to be addressed i.e. AWE needs to advise on its implementation plan of sealing open penetrations, with priority focus being given to areas with high fire loading; and confirm timescales. The ONR Internal Hazards Inspector is continuing to engage with the AWE UTC Safety Case Manager to ensure this Recommendation is satisfactorily closed in a timely manner.

5. Internal Hazards – “AWE should demonstrate consideration of a fully developed facility fire including building collapse, using any results to justify and demonstrate fire compartmentation.” A robust demonstration of the Systems Structures and Components (SSC) is still required i.e. AWE needs to substantiate the fire withstand capability of SSCs. Some rooms in A** exceed the fire withstand capability. Accordingly, ONR has questioned what other fire protection measure are in these higher risk rooms? Completion of this action will close R45. and the ONR Internal Hazards Inspector is continuing to engage with the AWE UTC Safety Case Manager to ensure this Recommendation is satisfactorily closed in a timely manner.

6. Internal Hazards - “AWE should demonstrate that the fire modelling used to support the safety case is appropriate and adequate.” AWE’s closure statements did not address the Recommendation and a suitable justification is hence still required. To close R46, ONR is seeking clarification of AWE’s justification for using the various fire methodologies and why it is suitable and valid for the scenarios considered. The justification should acknowledge any limitations and what AWE has used to check margins / sensitivities. AWE will advise of timescales for delivery. The ONR Internal Hazards Inspector is continuing to engage with the AWE UTC Safety Case Manager to ensure this Recommendation is satisfactorily closed in a timely manner.