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**Burghfield Assembly Technology Centre
Implementation of the Assembly Technology Centre Facility Safety Justification**

Project Assessment Report ONR-OFD-PAR-19-005
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EXECUTIVE SUMMARY

Permission Requested

The Atomic Weapons Establishment plc (AWE) has requested the Office for Nuclear Regulation's (ONR) agreement to implement the Assembly Technology Centre (ATC) Facility Safety Justification (FSJ), in accordance with its arrangements made under Licence Condition (LC) 22(1): Modification or experiment on existing plant.

Background

AWE's ATC facility, located within the nuclear licensed site at AWE Burghfield supports the United Kingdom's nuclear weapons programme. As a result of safety shortfalls identified by a safety case periodic safety review undertaken in 2016, the ATC has produced a modified operational safety case incorporating the changes and safety modifications implemented to address a number of shortfalls resulting from the review. This modified safety case is referred to as the FSJ, which AWE is now seeking ONR's agreement to implement. Its implementation does not permit any physical modifications but will replace ATC's extant operational safety case upon which the review was based and will provide a baseline safety case against which future change control can be assessed.

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

Given the potentially high-dose fault consequences of ATC's activities, I judged it proportionate to obtain ONR specialist inspector advice on the adequacy of the FSJ to demonstrate that operational risks will be reduced so far as is reasonably practicable. I targeted advice from fault studies, internal hazards, human factors and mechanical and civil engineering nuclear safety inspectors.

In accordance with ONR's agreements with other regulatory bodies, I have also consulted with the Environment Agency and Defence Nuclear Safety Regulator.

Matters arising from ONR's work

Based on the evidence sampled and assessed, all specialist inspectors have advised that there are no safety shortfalls that would prevent ONR agreeing to AWE's request to implement the FSJ. Future work will be required to maintain the live safety case, predominately incorporating ongoing improvements resulting from the periodic safety review, which AWE has self-identified within its submission.

The Environment Agency and Defence Nuclear Safety Regulator have both confirmed no objection to ONR agreeing to AWE's request.

Conclusions

Based on the specialist inspectors' advice, I am of the opinion that AWE has provided an adequate safety case that can be implemented to replace ATC's extant operational safety case. Based on the evidence sampled, I consider that AWE has adequately implemented its arrangements made under LC 22(1). In addition, AWE has demonstrated that the FSJ has been subject to an adequate level of independent internal challenge and governance in accordance with its established arrangements.

I also judge that considerable improvements have been made within the FSJ that are consistent with ONR expectations and is therefore an improvement on the extant safety case. The FSJ will also provide a baseline against which future modifications can be controlled and assessed.

Recommendation

In accordance with AWE's arrangements made under LC 22(1), ONR should issue Licence Instrument 539 agreeing to AWE's request to implement the ATC FSJ.

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LIST OF ABBREVIATIONS

ALARP	As low as reasonably practicable
ATC	Assembly Technology Centre
AWE	Atomic Weapons Establishment
DNSR	Defence Nuclear Safety Regulator
EA	Environment Agency
FSJ	Facility Safety Justification
HOW2	(Office for Nuclear Regulation) Business Management System
LC	Licence Condition
NSC	Nuclear Safety Committee
ONR	Office for Nuclear Regulation
PAR	Project assessment report
PRS2	Periodic review of safety (2 nd cycle)
SAP	Safety Assessment Principle(s)
SSC	System, structure and component
UK	United Kingdom

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1 PERMISSION REQUESTED

1. The Atomic Weapons Establishment plc (AWE) has requested the Office for Nuclear Regulation's (ONR) agreement to implement the Assembly Technology Centre (ATC) Facility Safety Justification (Ref. 1), in accordance with its arrangements made under Licence Condition (LC) 22(1): *Modification or experiment on existing plant* (Ref. 2). In accordance with these arrangements, AWE's request is supported by a Modification Safety Report summarising the scope of the modification and how its implementation will be controlled (Ref. 3).
2. In accordance with AWE's established governance and oversight arrangements (Ref. 4), the safety justification supporting AWE's request has been subject to independent peer review by its internal regulator, which initially identified a number of outstanding recommendations, five of which were assigned the highest safety-significance category. As per these arrangements, AWE has also confirmed that its submission has been subject to consideration and advice from its Nuclear Safety Committee (NSC). The NSC advised that a robust justification was required to demonstrate the risks will be reduced as low as reasonably practicable (ALARP) and the peer review safety significant recommendations must be addressed, and the less safety significant addressed as far as is reasonably practicable before regulatory submission (Ref. 5).
3. The ATC made subsequent improvements to the safety justification, such that the peer review team has either closed or downgraded the five safety significant recommendations (as well as other lesser safety significant ones) and concluded that it is supportive of the safety submission for implementation (Ref. 6). As a result, and following submission of an ALARP justification to the NSC, it advised that it did not require further consideration of the submission (Ref. 7).

2 BACKGROUND

4. AWE's ATC facility, located within the nuclear licensed site at AWE Burghfield supports the United Kingdom's (UK) nuclear weapons programme in support of the UK Governments 'Continuous At Sea Deterrent' policy.
5. In accordance with AWE's arrangements made under LC 15(1): *Periodic review*, the ATC undertook a periodic and systematic review and reassessment of its operational safety case in September 2016 (colloquially referred to as the second cycle periodic review of safety (PRS2)). This was subject to ONR assessment (Ref. 8), which concluded that PRS2 was only adequate to justify continued operations for a further [REDACTED] years (rather than the ten requested) and that physical and administrative safety improvements were required within the [REDACTED] years to allow continued operations until 2026.
6. In summary, five key physical and two key administrative safety improvements were identified and agreed with AWE for implementation within [REDACTED] years of PRS2 to maintain risks ALARP (Ref. 9). One of these administrative safety improvements was the production of a modified operational safety case incorporating the changes and safety modifications implemented to address a number of shortfalls resulting from PRS2. AWE has now completed this safety case (colloquially known and hereon referred to as the Facility Safety Justification (FSJ) (Ref. 10)) and has submitted it to ONR requesting agreement for its implementation. The FSJ does not implement any physical modification but will replace ATC's extant operational safety case upon which the PRS2 was based and will provide a baseline safety case against which future change control can be assessed.

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7. The scope of this project assessment report (PAR) is limited to ONR's judgement on the adequacy of the FSJ for implementation; The implementation of the other physical and administrative improvements are subject to separate AWE proposals and regulatory hold points as identified by AWE's permissioning hold point control plan and agreed with the ONR.
8. ONR's judgement on AWE's progress in implementing PRS2 shortfalls, in conjunction with the conclusion of this PAR will inform ONR's overall regulatory decision on AWE's demonstration that risks can be reduced ALARP for continued operations at ATC beyond [REDACTED] until 2026 (Ref. 11). After 2026, AWE has committed to end nuclear operations in this facility as they will be transferred to the new modern standards ATC facility that is currently under construction (Ref. 12)).
9. This PAR has been produced in accordance with ONR HOW2 guidance (Ref. 13). In accordance with this guidance, the permissioning strategy for this regulatory hold point has been previously agreed with the ONR Weapons sub-division Delivery Lead (Ref. 14).

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

10. The ATC's proposed operations could potentially result high-dose fault consequences. I therefore judged it proportionate to obtain ONR nuclear safety specialist inspector advice on the adequacy of the FSJ to demonstrate that operational risks can be reduced ALARP. I targeted advice from the following specialist areas, which was initially agreed as part of formalising the regulatory permissioning strategy for this request (Ref. 14):
 - Fault studies
 - Internal hazards
 - Human factors
 - Mechanical engineering
 - Civil engineering
11. Following initial consideration of AWE's proposal, I targeted the above disciplines given that the FSJ identifies controls that have significant reliance on:
 - The adequacy of the fault analysis underpinning their identification, specifically for the dominant internal (i.e. nuclear fire and dropped load/impacts) and external hazards (i.e. lightning, environmental loadings and facility impacts/insults);
 - Procedures and suitably qualified and experienced operators;
 - Civil and mechanical engineering systems, structures and components (SSCs) to deliver principal safety functions.
12. To initiate the regulatory engagement on AWE's proposed activity, an initial intervention was held between AWE and relevant regulatory bodies that focussed on clarifying regulatory understanding of AWE's request, the supporting FSJ and facility layout (Ref. 15). It also provided an opportunity to advise AWE on areas of regulatory focus.
13. In accordance with the ONR/Environment Agency (EA) Memorandum of Understanding (Ref. 16), I have consulted with the EA whether it had any objections on environmental grounds to ONR agreeing to AWE's request. The EA has confirmed that it has no objection (Ref. 17).

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14. Similarly, in accordance with the ONR/Defence Nuclear Safety Regulator (DNSR) Letter of Understanding (Ref. 16), I have consulted with the DNSR whether it had any objections to ONR agreeing to AWE's request. The DNSR has confirmed that it has no objection (Ref. 18).
15. Noting the ONR/ Health & Safety Executive's (HSE) Memorandum of Understanding (Ref. 16), I have not consulted with their specialist Chemicals, Explosives and Microbiological Hazards Division (CEMHD) for the handling of explosives on the site. This is on the basis that it has recently undertaken intervention on the Burghfield site and issued a variation of the explosives site licence under the Explosive Regulations 2014 (Ref. 19).

4 MATTERS ARISING FROM ONR'S WORK

16. The process employed by ONR in carrying out its permissioning activities is defined in ONR procedures (Ref. 13). As in all aspects of its regulatory activities, ONR employs a sampling regime in the assessment of safety cases. Specialist discipline inspectors have applied relevant legislation, national/international standards, ONR Safety Assessment Principles (SAPs) (Ref. 13) and Technical Assessment Guides (Ref. 13). Having sought ONR specialist assessment advice on claims, arguments and evidence presented within AWE's proposal, their advice and conclusions are summarised as follows.
17. The Fault Studies Inspector has undertaken an assessment of AWE's submission, predominately focussing on a sample of fault sequences to gain confidence in the revised outputs and the adequacy of the individual ALARP justifications (Ref. 20). In conclusion, the inspector judges that the fault analysis is consistent with ONR expectations and relevant good practice (RGP), specifically the relevant SAPs. The inspector has not identified any issues that would prevent ONR agreeing to AWE's request.
18. The inspector did raise a recommendation to seek assurance from DNSR on AWE's implementation on the required analysis for warhead safety. DNSR has subsequently provided this for implementation of the FSJ (Ref.'s 18 & 21).
19. The Internal Hazards Inspector has undertaken an assessment of AWE's submission, predominately focussing on the analysis of risk posed by a nuclear fire in a number of key operational areas and the subsequent safety claims on the SSCs providing fire containment (Ref. 23). In conclusion, the inspector judges that AWE has made significant progress toward updating the safety case that complies with modern standards and a number of relevant ONR SAPs. Based on the above, the Internal Hazards Inspector has not identified any issues that would prevent ONR agreeing to AWE's request.
20. The inspector did advise that further progress is required on implementing the Internal Hazards shortfalls resulting from PRS2 and raised associated recommendations to enable ONR to confirm that the risks will remain ALARP during continued operations. I judge that these do not impact implementation of the FSJ and are therefore outside the scope of AWE's request.
21. The Human Factors Inspector has undertaken an assessment of AWE's submission and advised that a detailed assessment was not required (Ref. 24). This was on the basis that the FSJ does not implement any physical modifications to the facility nor modify any of the operations within it. Based on the above, the inspector has not identified any issues that would prevent ONR agreeing to AWE's request.

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22. The inspector did advise that further progress is required on implementing the human factors shortfalls resulting from PRS2 and raised an associated recommendation to inspect this at an appropriate time to enable ONR to confirm that the risks will remain ALARP during continued operations. I judge that this does not impact implementation of the FSJ and is therefore outside the scope of AWE's request.
23. The Mechanical Engineering Inspector has undertaken an assessment of AWE's submission, predominately focussing on the adequacy of the mechanical engineering SSCs to deliver their safety function for two of the five physical safety modifications implemented as a result of PRS2 findings and incorporated into the FSJ (Ref. 25). These are associated with two items of mechanical handling equipment used as part of the process.
24. In conclusion, the inspector is satisfied that AWE has adequately substantiated and implemented these modifications as reflected in the FSJ and RGP, specifically the ONR SAPs. Based on the above, the inspector has not identified any issues that would prevent ONR agreeing to AWE's request.
25. The inspector did advise that these modifications have only been implemented in one of a number of [REDACTED]. Therefore they raised a recommendation for AWE to confirm that the modifications have been adequately implemented in a [REDACTED] before that specific [REDACTED] can be used for continued operations beyond [REDACTED]. I judge that this does not impact implementation of the FSJ and is therefore outside the scope of AWE's request.
26. The Civil Engineering Inspector has undertaken an assessment of AWE's submission, predominately focussing on whether the claims made in the FSJ relating to civil engineering assets are adequately justified (Ref. 26). In conclusion, the inspector considers that the FSJ provides an effective articulation of risks associated with the current civil engineering assets and their vulnerabilities to a range of credible internal and external hazards in accordance with relevant ONR SAPs. With consideration of all the relevant factors, the inspector also accepts that most ongoing operational risks associated with the civil engineering assets have been reduced ALARP predominantly through the use of procedural operating rules. Based on the above, the Civil Engineering Inspector has not identified any issues that would prevent ONR agreeing to AWE's request.
27. The inspector did raise a number of recommendations to provide ONR further confidence that risks associated with the condition and function of the civil engineering assets will be maintained ALARP during continued operations; and, address a shortfall resulting from PRS2. These are associated with examination, inspection, maintenance and testing arrangements and, enhancement of localised protection in specific areas. I judge that these do not impact implementation of the FSJ and are therefore outside the scope of AWE's request.
28. All recommendations have been communicated to the ONR site inspector responsible for advising on ONR's overall regulatory decision on continued operations until 2026 to ensure they are adequately addressed within the required timescales (Ref. 22).

5 CONCLUSIONS

29. Based on the evidence sampled, addressed and subsequent specialist inspectors' advice, I am of the opinion that AWE has provided an adequate safety case that can be implemented to replace ATC's extant operational safety case. All specialist inspectors have advised that there are no safety shortfalls that would prevent ONR agreeing to AWE's request and as such, I consider that AWE has adequately

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implemented its arrangements made under LC 22(1). In addition, AWE has demonstrated that the FSJ has been subject to an adequate level of independent internal challenge and governance in accordance with its established arrangements, which provides additional regulatory confidence.

30. Future work will be required to maintain the live safety case, predominately incorporating ongoing improvements resulting from PRS2 which AWE has self-identified within its submission; however, I consider that considerable improvements have been made within the FSJ that are consistent with ONR expectations and is therefore an improvement on the extant safety case. The FSJ will also provide a baseline against which these future modifications can be controlled and assessed.
31. The specialist inspectors identified that further progress is required on implementing some shortfalls resulting from PRS2 and raised associated recommendations, the purpose of which is to enable ONR to confirm that the risks will remain ALARP during continued operations beyond [REDACTED]. I consider that these recommendations do not impact implementation of the FSJ and are therefore outside the scope of AWE's request and this PAR.
32. All recommendations have been communicated to the ONR site inspector responsible for advising on ONR's overall regulatory decision on continued operations until 2026 to ensure they are adequately addressed within the required timescales (Ref. 22).

6 RECOMMENDATIONS

33. In accordance with AWE's arrangements made under LC 22(1) (Ref. 2), ONR should issue Licence Instrument 539 (Ref. 27) agreeing to AWE's request to implement the ATC FSJ (Ref. 1).

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