

AWE Burghfield Periodic Review of Safety

1. Introduction

This summary report presents the findings of the NII assessment of the AWE periodic review of safety in respect of its nuclear licensed site at Burghfield.

An overview of the purpose of the periodic safety review (PSR) is described, along with the NII assessment process and the outcomes of the interim and final decisions on the PSR.

Whilst there were no immediate concerns for nuclear safety, AWE identified a number of shortfalls as measured against modern standards. The conditions for continued operation, that include the need to design and construct a new facility, are presented along with the key improvements that have been implemented as a result of NII's decision on the adequacy of the PSR that has been produced and the regulatory approach that has been adopted.

2. Purpose of the Periodic Safety Review

The purpose of a PSR [1] is to determine, by means of a comprehensive assessment against modern standards, whether the plants, processes, management, operations and facilities covered by a safety case are safe, and that ageing and other time-related phenomena will not render them unsafe before the next PSR. Where modern standards are not met the PSR should assess the significance of the shortfalls, and identify reasonably practicable improvements. It is NII's policy that licensees carry out such a PSR, as required by LC15, at least every ten years.

It should be noted that a PSR represents the work that is undertaken, not the safety case documentation that results from that work. The documented PSR findings and associated forward programme of work form the basis of a submission to NII and are hereinafter referred to as the 'PSR Submission'. The work done during the PSR should also be reported; including the procedures applied, and may be separate from or incorporated within any new safety case documentation. The requirements of the PSR are to:

- Review the current safety case for an installation to confirm that it remains adequate in the light of modern standards and criteria, changes in technology and knowledge and operating experience.
- Look forward in detail over planned future operations for at least the next ten years to show that there are no foreseeable circumstances that could threaten the ability to maintain safe operation.
- Identify safety deficiencies and deal with them by either making appropriate plant improvements or operating changes, or providing safety justification that no action is needed.
- Ensure that in cases where the plant provides a safety function that cannot be provided by alternative plant, to consider the time needed to design, construct

and commission a replacement plant so that there is no interruption to the safety function should the original plant be found to be unserviceable.

For each PSR there is a date on which NII makes a decision about the adequacy of the licensee's safety review that is used to support future activities associated with the relevant plant. This date is fixed by NII at the ten year limiting date and once set, usually does not change. This is referred to as the 'Decision Date'.

Shortfalls against modern standards are expected to be corrected so far as reasonably practicable and this usually leads to an improvement programme that covers engineering, operating regimes and the documented safety case.

Significant safety improvements should be implemented by the decision date. All other improvements should be completed within a maximum period of two years after the decision date.

The outcome of a comprehensive periodic safety review and satisfactory completion of the forward improvement programme provides adequate justification for the safe operation and management of a facility until the date of the next PSR.

Interim reviews are also carried out and should any safety-related factors emerge subsequently that may raise questions on the continuing validity of the safety case, then NII will require the licensee to resolve the issue.

3. AWE Burghfield Periodic Review of Safety (PRS) Submission

AWE submitted the PRS for AWE Burghfield to NII for review in September 2006 [2]. The PRS categorised the inability of the plant etc. to meet a safety functional requirement (SFR), or departure from modern standards as a shortfall. Those shortfalls with potential to impact upon the ability to satisfy a statutory requirement were classified as deficiencies.

NII's detailed assessment of the PRS determined that the identification of the shortfalls by AWE was comprehensive and that there were no immediate concerns for nuclear safety. NII was content for operations at Burghfield to continue but was concerned with the length of time being taken to address the shortfalls identified in the forward improvement programme.

To secure ongoing improvements to the safety case, processes and plant at AWE Burghfield, an existing strategy of permissioning was enhanced. NII required AWE to seek Agreement to undertake limited defined operational activities and seek further Agreements prior to subsequent operational phases. Prior to each Agreement NII reviews took place to determine whether adequate progress has been made against the forward improvement programme.

AWE continued to make adequate progress in addressing the PRS forward improvement programme until July 2007 when the Burghfield site experienced severe disruption due to widespread flooding of the site. Whilst an assembly / disassembly capability was maintained, all operational work on the licensed site was suspended whilst work to recover from the flood was instigated. This had a

significant impact on PRS improvement programme. NII recognised the extenuating circumstances at Burghfield and therefore, due to the quantity of work outstanding, took the unusual step of issuing an Interim Decision on the PRS in September 2007. After careful consideration, NII set out its Interim Decision on the future safe operational life of the facility as follows:

- It was confirmed there were no immediate concerns for nuclear safety.
- Operations could continue subject to current permissioning regimes.
- Permissions would be granted subject to continued satisfactory progress against the improvement programme.

In December 2008 AWE presented a Case for Continued Operation (CfCO). NII's detailed assessment of the case confirmed that AWE had made significant progress against the improvement programme. This case was sufficient for NII to lift the requirement for AWE to seek permission to proceed with its operational work phases; and this was formally communicated to AWE on 30th April 2009 [3].

In August 2009 AWE prepared a PRS close out report that summarised the status of all identified shortfalls in the forward improvement programme for the Burghfield facility.

In response, NII concluded that the facility was adequately safe and that normal operations could continue whilst the remaining work items were carried out to agreed timescales. In accordance with licence condition 15 Periodic Review of Safety, NII's expectation is that the next PRS is carried out within ten years of the submission date for the original PRS, (September 2006).

Additionally, a fundamental aspect of AWE's justification of the PRS to NII was a commitment to construct a replacement facility, to undertake assembly/disassembly operations, by 2015. Hence, NII confirmed that it was content for the continued operation of the facility up to 2016, subject to the following requirements:

- (i) Satisfactory progress being maintained on the forward improvement work programme which AWE has committed to deliver.
- (ii) Continuing adequate results being demonstrated from the regular examination, inspection, maintenance and testing programme that support the normal operations of the facility.
- (iii) Satisfactory progress against the key milestones identified to ensure delivery of the replacement assembly/disassembly facility.

4. AWE Burghfield PRS Improvement Programme

4.1 Safety Case Aspects

The PRS identified a number of shortfalls in the extant Facility Safety Case (FSC); therefore AWE undertook to prepare a completely new 'modern standards' FSC rather than remedy the shortfalls in the extant FSC. The regulatory strategy was therefore to undertake early engagement with AWE on the new safety case, and to

focus on any major areas of uncertainty which could affect both the PRS and the new safety case. NII concluded that the challenge provided by our early engagement resulted in an improved approach both in the PRS and in the new safety case.

The Revised Burghfield Assembly FSC was completed and presented to AWE's Nuclear Safety Committee (NSC) in September 2007. The NSC conditionally endorsed the Safety Case on the understanding that the facility returned with the implementation plan and with confirmation that all the relevant safety justifications and actions had been completed. This case was presented to NSC on 26th February 2008 and subsequently endorsed.

From a number of targeted inspections, NII concluded that the submission was comprehensive. Implementation of the new safety case was staged over a period of months and used the new Company Safety Procedure CSP 880, which covers Safe Operating Envelope, Limits and Conditions and Engineered Systems supporting Nuclear Limits and Conditions. NII had monitored AWE's production of this CSP for many months and we welcomed AWE's decision to ensure that the Burghfield FSC was implemented using this revised procedure. As part of NII's routine compliance and targeted inspection, NII was able to establish that the implementation of these new arrangements had resulted in the generation of revised Operating Rules and Operating Instructions for the facility. NII therefore concluded that implementation of the new Burghfield FSC represented a significant advancement in managing the overall risk of operations at Burghfield.

4.2 Design of Existing Facility Structures

There were some fundamental aspects of the design of the existing structures which cannot easily be rectified through a programme of remedial works. The concrete structures of some more modern structures have been demonstrated, by calculation, to withstand normal and hazard loads and to comply with modern standards. However, there are areas of the concrete structures which cannot be inspected. The justification of the integrity of these elements is based on engineering judgement. It is the opinion of NII specialist inspectors that, based on recent civil engineering practice, the condition of the concrete elements of the buried structures is likely to be good. This is based on normal design practice to design structures for a life of approximately 50 years and evidence from recent inspections of similar structures being demolished.

For a nuclear installation it is NII's opinion that the licensee should take all reasonably practicable steps to ensure the integrity of structures deterministically. The licensee has taken reasonably practicable steps to secure structural information, however the results of the trial work as part of this are inconclusive. NII concurred with the licensee's decision that it is not practicable to do more work in this area. Hence, whilst NII has concluded that the condition of the structures provide no immediate concerns for nuclear safety, the anticipated shortfall in compliance with demonstrating requirements to modern standards will only be fully addressed by the construction of the new facility.

AWE has already put in place a programme of works to replace the existing facilities with a new facility built to modern standards. NII has concluded that the licensee has provided an adequate justification that the risks of operating the existing facility are tolerable and ALARP until the new facility becomes available, currently 2015.

4.3 Loading Bay Lifting Equipment Replacement

A major piece of work resulting from the PRS involved replacement of lifting equipment and a modification programme to update a loading bay building. A staged safety campaign was applied and, depending upon progress with the remediation programme, NII required AWE to request permission to undertake certain specific operations. The lifting equipment and building modifications were subject to detailed assessment by NII. NII concluded that the structural modifications to the building and replacement lifting equipment meet modern standards and adequately support the safety case. Assessment of the mechanical handling aspects concluded that the modifications to the handling system had removed the potential for failures and that this has eliminated a significant hazard from these operations. It was also established that the design of the lifting equipment has sufficient margin to give confidence that risks are ALARP.

Completion of this work was an important milestone in the facility, as the replacement of the lifting equipment and building modifications are seen as a significant step forward in reducing the overall risk at Burghfield.

4.4 Other PRS Shortfalls

An in-depth assessment of the shortfalls identified by AWE was undertaken by a team of NII specialist inspectors. Specific work packages were put in place by AWE to address a number of the identified shortfalls. AWE's progress in addressing these shortfalls was monitored by NII over several months as part of NII's routine inspection programme during which a number of specific technical issues were raised by NII.

Close out of the identified shortfalls was summarised in AWE's Case for Continued Operation for the Burghfield facilities. This case provided an auditable link from the original identified shortfall through to the modification on the plant which was intended to rectify the specific shortfall. Additionally, AWE provided a clear statement justifying the adequacy of the modification in being able to address the shortfall. For each fault sequence the case provided a description of the Safe Operating Envelope of the facility, identified the associated safety systems and safety related systems, and their classification and categorisation. This work demonstrated to NII that AWE had further developed their arrangements to meet the requirements of Licence Conditions LC27 (Safety Mechanisms Devices and Circuits) and LC28 (Examination, Inspection, Maintenance and Testing); furthermore, this work resulted in reliability targets that were used to produce new maintenance schedules and refine existing schedules.

All of the principal changes have been completed. A programme of work is currently ongoing to implement a number of Availability, Reliability and Maintainability (ARM) fixes, as well as some security modifications. NII is satisfied that these do not have

a significant impact on nuclear safety, but have arisen as a result of the PRS and are expected to improve the overall reliability of facility operations.

In early 2009, a review by AWE of the future operational strategy led to further assessment and remediation work to demonstrate that risks from future operations would be ALARP. As a result of this ALARP review, shortfalls which were not within the original scope of the PRS have been identified.

Further outstanding recommendations and work packages have been identified as a result of this review, which will be taken forward in accordance with the Facility's Forward Action Plan Programme. The timescale provided by AWE in its close out report is acceptable to NII. NII fully supports the approach taken to address the outstanding packages of work and will monitor this programme as part of routine site inspection activities to ensure that the timescales are met.

5. Conclusions

NII has concluded that the periodic review of safety for the AWE nuclear licensed site at Burghfield has been comprehensive. It is confirmed that the facility is adequately safe and that normal operations can continue until the next periodic review of safety is due in 2016. In the meantime, NII will continue to ensure that AWE proceeds with its commitment to construct a replacement facility to undertake assembly/disassembly operations by December 2015.

6. References

1. HSE/NSD Technical Assessment Guide Periodic Safety Reviews (PSRs) T/AST/050 - Issue 3
2. AWE Burghfield PRS Submission, EDMS1/800E0A7D/B/LS/SC0100, Issue 1, dated 25 September 2006.
3. PAR 017/2009 – Decision to Lift Current Permissioning Regime at AWE Burghfield. TRIM Ref 2009/152891.