## PROJECT ASSESSMENT REPORT

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<td>Project:</td>
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<td>Site:</td>
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<tr>
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<tr>
<td>Author</td>
<td></td>
<td>HM Inspector</td>
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<td>18th Dec 2013</td>
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<td>Reviewer</td>
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AWE Burghfield Site: Project Mensa

Agreement to Commence Installation of the Main Processing Facility (MPF) Building Services & Blast Doors (PCSR-3)

Revision 0
20 Dec 2013
AGREEMENT TO COMMENCE INSTALLATION OF THE MPF BUILDING SERVICES AND BLAST DOORS (PCSR-3)

1.1 AWE plc has requested ONR's Agreement under Licence Condition 19(1) to commence installation of the MPF building services and blast doors (PCSR-3) on project Mensa.

1.2 AWE has undertaken a major project, Project Mensa, to construct a new processing plant at its Burghfield site. The project has been divided into stages. PCSR-1 (Pre-Construction Safety Report 1) included initial site clearance and preparatory works. PCSR-2 was concerned with the civil construction of the Mensa facility. This Project Assessment Report (PAR) reviews PCSR-3 – the safety case submission made to ONR by AWE that covers the next stage of the project including the installation of building services and facility blast doors.

1.3 The Environment Agency and the Defence Nuclear Safety Regulator have confirmed that there are no matters from their perspective that would prevent the issue of Licence Instrument 528.

1.4 The ONR assessment process starts well before formal safety case submissions are made through early engagement with the licensee. This work identifies areas of interest to ONR and informs the review of the formally submitted safety case by the ONR team of specialist assessors from a wide range of disciplines. The purpose of this PAR is to collate the findings from these assessments and makes an appropriate recommendation that either supports, or does not support the issue of the LI to the licensee.

1.5 ONR specialist assessors in all of the disciplines that were involved have identified a number of recommendations that must be followed up and appropriately closed-out by AWE. ONR will monitor progress during our monthly engagements at AWE.

1.6 ONR assessment supports the issue of the Mensa PCSR-3 Licence Instrument. However, in two areas of assessment – EC&I and Internal Hazards – the assessors found that the submitted PCSR-3 safety case was not adequately developed regarding ALARP arguments and substantiation. However, in both of these areas the assessors have agreed that the shortfalls identified do not need to be addressed before the issue of the LI and they have engaged with AWE to establish appropriate Forward Action Plan items that are specific, scoped and programmed. The impact of undertaking this remedial work on the PCSR-3 delivery programme is understood, recorded and includes appropriate hold points. These work programmes will be monitored by ONR routinely and AWE will be required to demonstrate that works preceding PCSR-4, including these Forward Action Plan items, have been appropriately conducted prior to request of a further Licence Instrument. It is therefore the opinion of the Project Inspector that LI528 can be issued to AWE with no overall detriment to nuclear safety.

1.7 The lessons learned during production and approval of the Mensa PCSR-3 safety case should be reviewed for learning following issue of the Licence Instrument and this information should be shared between AWE and ONR.
## LIST OF ABBREVIATIONS

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>ALARP</td>
<td>As low as reasonably practicable</td>
</tr>
<tr>
<td>BSL</td>
<td>Basic Safety level (in SAPs)</td>
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<td>BSO</td>
<td>Basic Safety Objective (in SAPs)</td>
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<tr>
<td>CNS</td>
<td>Civil Nuclear Security (ONR)</td>
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<tr>
<td>DNSR</td>
<td>Defence Nuclear Safety Regulator</td>
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<td>EA</td>
<td>Environment Agency</td>
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<tr>
<td>FAPs</td>
<td>Forward Action Plan items</td>
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<tr>
<td>HOW2</td>
<td>(Office for Nuclear Regulation) Business Management System</td>
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<tr>
<td>HSE</td>
<td>The Health and Safety Executive</td>
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<tr>
<td>IAEA</td>
<td>The International Atomic Energy Agency</td>
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<tr>
<td>LI</td>
<td>Licence Instrument</td>
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<td>LPS</td>
<td>Lightning Protection System</td>
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<tr>
<td>NDA</td>
<td>Nuclear Decommissioning Authority</td>
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<td>ONR</td>
<td>Office for Nuclear Regulation (an agency of HSE)</td>
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<tr>
<td>PAR</td>
<td>Project Assessment Report</td>
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<tr>
<td>PCSR</td>
<td>Pre-construction Safety Report</td>
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<td>PSA</td>
<td>Probabilistic Safety Assessment</td>
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<tr>
<td>PSR</td>
<td>Preliminary Safety Report</td>
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<tr>
<td>RGP</td>
<td>Relevant Good Practice</td>
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<tr>
<td>SAP</td>
<td>Safety Assessment Principle(s) (HSE)</td>
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<tr>
<td>SFAIRP</td>
<td>So far as is reasonably practicable</td>
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<tr>
<td>SSC</td>
<td>System, Structure and Component</td>
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<td>TAG</td>
<td>(ONR) Technical Assessment Guide</td>
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2  PERMISSION REQUESTED

2.1 AWE plc has requested ONR’s Agreement to commence installation of the Main Processing Facility (MPF) building services and blast doors (PCSR-3).

3  BACKGROUND

3.1 AWE wrote to ONR on the 25th September 2013 [1] requesting ONR’s agreement to commence installation of the Mensa Main Processing Facility (MPF) building services and blast doors. This was supported by the issue of the associated PCSR-3 safety case.

3.2 AWE is currently undertaking a major project, Project Mensa, to construct a new processing plant at its Burghfield site. When completed, the overall Mensa facility will replace existing production capability and provide AWE with new-build plant to modern standards. The Mensa process includes the handling of explosive, radioactive and toxic materials which will be imported, exported and held within the facility as required. The project has been divided into stages. PCSR-1 (Pre-Construction Safety Report 1) included initial site clearance and preparatory works. PCSR-2 was concerned with the civil construction of the Mensa facility. This Project Assessment Report (PAR) reviews PCSR-3 – the safety case submission made to ONR by AWE that covers the next stage of the project including the installation of building services and facility blast doors.

3.3 As indicated above, AWE is using a phased approach to safety submissions that will comprise the overall safety case for the operational Mensa facility, of which PCSR-3 forms one phase. To assess AWE’s work, ONR has considered both the individual safety justifications for each phase, and each phase as part of the overall safety case. Although this report is concerned with PCSR-3, it has considered the submission in the context of the overall project phases.

3.4 Future Mensa project phases comprise installation of process plant and equipment, the commissioning of plant systems and procedures and final transition into an operational facility. During each phase ONR will continue to engage with AWE to secure the protection of people and society from potential hazards associated with Mensa operation. The next planned LI will be for PCSR-4 (installation of process plant and equipment) which is expected to be received around October 2014.

3.5 ONR has consulted with the Defence Nuclear Safety Regulator (DNSR) and the Environment Agency (EA) as part of its consideration of the adequacy of the Mensa PCSR-3 submission.

4  AWE’S ASSESSMENT OF THE MENSA PCSR-3 SAFETY CASE

4.1 Prior to submission of the Mensa PCSR-3 safety case confirmation was sought by AWE from the ONR assessors that actions recorded for completion by this stage had been adequately completed.

4.2 The Mensa PCSR-3 assessment has been undertaken by AWE to underpin the safety arguments associated with installation and operation of the following: -

4.3 Containment systems including
   - Heating, Ventilation and Air Conditioning (HVAC) system
   - Process gas systems
   - Penetrations
   - Door systems

4.4 Process and non-process related services including: -
5 ASSESSMENT AND INSPECTION WORK CARRIED OUT BY ONR IN CONSIDERATION OF THIS REQUEST

5.1 The process employed by ONR in carrying out its permissioning activities is defined in ONR procedures [2]. As in all aspects of its regulatory activities, ONR employs a sampling regime in the assessment of safety cases. Specialist assessors have applied appropriate national and international standards, the appropriate HSE Safety Assessment Principles [3] and ONR Technical Assessment Guides [4]. Their assessment reports are currently being finalised. The findings presented in this report represent the output from interviews held with, and summary statements produced by, each assessor. Interviews were conducted between 16th and 17th of December 2013 and the ‘challenge’ panel comprised the Project Inspector (this PAR author), two ONR Superintending Inspectors (one the approver of this PAR) and a specialist Fault Studies Inspector.

5.2 ONR's regulation of the project has been in accordance with the ONR/DNSR Integrated Intervention Strategy for the AWE Programme. Early engagement has been undertaken since June 2011 when the Licence Instrument for Mensa PCSR-2 was issued until the formal application for the PCSR-3 Licence Instrument was submitted in September 2013. Early engagement activities have included proportionate and targeted assessment of safety documentation, site licence condition compliance inspections, and technical meetings with AWE’s project teams. As part of ONR’s routine interventions we have provided advice and comments to AWE. Technical queries have been closed out through the issue of the safety documentation, or separately through responses to specific intervention findings.

5.3 This report pulls together the findings from ONR’s assessment of the Mensa PCSR-3 safety case, taking into consideration knowledge gained during early engagement and following receipt of the formal submission. The associated Licence Instrument comprises the formal response to AWE from ONR.

5.4 In addition ONR has consulted with the Defence Nuclear Safety Regulator (DNSR) and the Environment Agency (EA) before making a decision as to the adequacy of the Mensa PCSR-3 submission.

5.5 The assessment process has had input from a team of specialist ONR assessors from a wide range of disciplines which are summarised below.

5.6 Civil Engineering

5.6.1 Following formal assessment of the Mensa PCSR-3 submission the Civil Engineering Assessor concluded that whilst a number of items have still to be justified by contractor designed elements, he did not believe that these are irresolvable. He is therefore satisfied with the claims and arguments presented within the Licensee’s safety case provided that...
the outstanding items are placed on the Forward Action Plan for close out prior to PCSR 4. Areas requiring developed designs include the facility stack and internal barriers.

5.7 Criticality

5.7.1 The Criticality Assessor has reviewed the Mensa PCSR-3 safety case and found that there are no matters presented that require formal criticality assessment. AWE has agreed with ONR that this element of the safety case will be presented in PCSR-4.

5.8 Electrical, Control & Instrumentation (EC&I)

5.8.1 Following formal assessment of the Mensa PCSR-3 submission the EC&I Assessor observed that within the scope of the assessment, valid claims and arguments have been generally presented by the licensee. However, whilst a number of basic assessment expectations were met, weaknesses were identified in the quality of the submission relating to the substantiation of EC&I-based safety systems. Additionally, the design of two significant safety systems was found to lack maturity owing to outstanding considerations relating to the functionality of EC&I control and protection systems.

5.8.2 In response to initial feedback to the Licensee from ONR, significant supplementary information has been developed by AWE and presented to ONR. The Licensee has provided technical notes that significantly develop confidence that completion of outstanding substantiation work is not likely to result in major modifications to overall protection concepts for the facility, or to the systems in question. However, some changes to proposed EC&I components and system architecture are anticipated, and the provision of additional components (for example, additional monitoring of interlock functionality) may be required in some cases.

5.8.3 AWE has proposed Forward Action Plan (FAP) items that the assessor considers are likely to result in adequate justification and substantiation for mature designs during the execution phase of PCSR-3, the timescale for delivery of which is considered to be reasonable. The FAP items have demonstrated that any shortfalls in substantiation are recognised by AWE and that a clear commitment has been made to develop the system designs and provide sufficient substantiation.

5.8.4 The EC&I assessor does not accept the safety case as presented for Mensa PCSR-3. However, he considers that the information provided subsequent to the main submission does develop confidence that AWE will be able to develop and support the design of the EC&I safety systems without having foreclosed options.

5.9 External Hazards

5.9.1 The arguments regarding the resilience of the Mensa facility to external hazards were presented and reviewed during the preceding safety case submission (PCSR-2). The ONR External Hazards Assessor has reviewed the Mensa PCSR-3 submission and has not found any matters requiring additional assessment.

5.10 Fault Studies

5.10.1 The Fault Studies assessment concluded that the overall approach to fault and hazard identification, the identification of Safety Functional Requirements, the application of Design Basis Assessment (DBA) methodology and the safety classification of the key safety provisions is generally appropriate for the scope of PCSR-3 and meets expectations based on the ONR SAPs. The Fault Studies assessment therefore supports the issue of the LI for Mensa PCSR-3.

5.10.2 A number of shortfalls were identified during the ONR assessment of PCSR-3 within the DBA. These have been clarified with AWE and the majority have been resolved. A
number of items remain ongoing; in particular, those associated with dropped loads and explosive safety. AWE has placed work with its design house to resolve these and it is considered that an appropriate way forward has been taken. Identified recommendations are required to be closed-out by PCSR-4 and ONR's on-going monitoring of this project will ensure that this is achieved.

5.10.3 Operator self-rescue, external rescue and emergency response following an event require further development but it was judged that there is sufficient information to be confident that the potential impact on the design of building services is minor and therefore does not preclude support for PCSR-3. It is expected by ONR that these aspects will be addressed for the PCSR-4 submission and ONR’s ongoing assessment will ensure that this is achieved.

5.11 Human Factors (HF)

5.11.1 Overall the Human Factors Assessor is satisfied with the claims, arguments and evidence laid down within the Licensee’s safety case and considers that it would be acceptable to permission installation of the services on this basis.

5.11.2 The HF analysis undertaken to identify claims on operators for PCSR 3 has been particularly successful and the quantified assessment of claims made on operators within Mensa is predominantly conservative. However, while it is evident that AWE has applied itself to the problem of HF substantiation within Mensa PCSR 3 the substantiation offered does not always support the claims fully. Further work in this area is identified as a FAP.

5.11.3 The Mensa project has integrated HF into the design and assurance process for the PCSR 3 stage in a structured manner that covers key expectations for Human Factors Integration (HFI) yet through an oversight the HFI Plan has not been updated at PCSR 3 to better reflect the detail of the PCSR stage than was available at PCSR-2. Update of the HFI Plan is an identified FAP item.

5.12 Internal Hazards

5.12.1 The Internal Hazards Assessor found that the submitted PCSR-3 did not present a suitable ALARP case to address the consequence of unmitigated fire within some areas of the facility and on this basis does not accept the presented safety case. However, he concluded that development of an appropriate ALARP case was viable. To this end there has been significant engagement with AWE and a number of associated FAPs have been developed for delivery prior to PCSR-4. These FAPs are well defined, indicating that the issues are recognised, and represent a clear commitment by AWE to address the identified shortfalls in the submission within a clear and acceptable time frame. Nothing has been identified that would be expected to foreclose options.

5.13 Mechanical Engineering

5.13.1 The Mechanical Engineering Assessor has no objection to the issue of the Mensa PCSR-3 LI providing that a number of FAPs are addressed prior to PCSR-4. These are identified as specific recommendations within the assessment and relate principally to enhancements required to the presented substantiation of engineering components and systems.

5.13.2 AWE’s progress against the identified FAPs will be monitored to completion by ONR.

5.14 Radiological Protection

5.14.1 The Radiological Protection Assessor’s overall conclusion on the Licensee’s submission is that the Licensee has completed sufficient substantiation of the facility’s design and fabrication specification to allow ONR to sustain a decision to permission PCSR-3.
5.14.2 However, there remain a number of substantiation arguments that will need to be developed prior to PCSR-4 submission and in a way that does not foreclose any ALARP decisions that subsequently need to be taken. The Author is confident that the Licensee has both the capability and intent to remedy these matters. Progress will be monitored by ONR.

5.15 **Seismic/Shock Loading**

5.15.1 The Seismic Assessor concludes that there are no matters that would prevent the issue of a Licence Instrument to proceed with works defined under PCSR-3. However, further work is required by AWE to underpin arguments presented in PCSR-3 regarding components of the ventilation system and substantiation of the doors. This work is specified as FAPs and will be monitored to completion by ONR.

5.16 **Waste & Decommissioning**

5.16.1 The Waste & Decommissioning Assessor has identified that there is some outstanding work that needs to be completed, but has judged that the omissions do not preclude the issue of a licence instrument for the MENS PCSR-3.

5.16.2 Recommendations are made within the assessment for AWE to implement geometries, surface finishes and procedures that facilitate decontamination should a contamination event occur. These recommendations will generate actions that will be placed upon AWE that will be monitored for appropriate closure by ONR.

5.17 **EA and DNSR Input to the Assessment**

5.17.1 DNSR has confirmed that they are content that the LI for Mensa PCSR-3 be issued. As ONR has done, DNSR has required that clarification of outstanding design/process detail is provided to FAP items that have been discussed and agreed with AWE.

5.17.2 The EA have confirmed that they are satisfied with the comprehensive parts of the Mensa PCSR-3 submission from AWE that address environmental issues.

6 **MATTERS ARISING FROM ONR’S WORK**

6.1 In the majority of areas the ONR assessors are supportive of the issue of the PCSR-3 LI based upon the submitted safety case. However, the ONR assessment of Mensa PCSR-3 has resulted in a number of recommendations being raised by all assessors that must be followed up and appropriately closed-out by AWE.

6.2 In two areas of assessment – EC&I and Internal Hazards – the assessors found that the submitted PCSR-3 safety case was not adequately developed regarding ALARP arguments and substantiation. However, in both of these areas the assessors have agreed that the shortfalls identified could be addressed and have engaged with AWE who have established appropriate Forward Action Plan items. Whilst I accept that the identified shortfalls are significant to the overall safety case for operation of the facility and require resolution I believe that it is appropriate to issue the PCSR-3 LI to AWE for the following reasons: -

- The scope of the shortfalls is clearly understood by AWE following ONR engagement and can be closed-out during the further development of the safety case for PCSR-4.
- A clear programme for delivery of the remedial actions has been presented by AWE that addresses the shortfalls and does not challenge future project permissioning from an ONR perspective.
• The impact of addressing the shortfalls upon the delivery schedule of works under PCSR-3 has been specified, recorded and is understood. Appropriate hold points have been identified such that continued focus on nuclear safety can be maintained.

• AWE progress against identified actions is monitored on a monthly basis by ONR, so progress against FAPs is visible and can be managed.

• The Mensa construction phase comprises four PCSRs; PCSR-1 to PCSR-4. As part of PCSR-4 submission ONR requires that AWE reviews the work undertaken during the three preceding phases to ensure that the construction phase has delivered a safe plant. A further LI from ONR will be required by AWE to undertake the works identified in PCSR-4. This provides ONR with a formal method of ensuring that all work identified for closure during the construction phase, including associated FAPs, has indeed been appropriately closed-out.

• No nuclear inventory will be present in the facility until the active commissioning phase which is after PCSR-4.

• Resolution of shortfalls is not anticipated to be foreclosed by installation work undertaken during this phase.

7 CONCLUSIONS

7.1 This report presents the findings of the ONR project inspector for the weapons programme. The following conclusions are made:

7.2 It is the opinion of the ONR Project Inspector that the ONR assessment team has not identified any matters that should prevent the issue of the LI agreeing to commencement of installation of the MPF building services and blast doors (PCSR-3) on project Mensa. As such I am satisfied that the associated Licence Instrument – LI528 – should be issued to AWE.

7.3 AWE has responded positively to matters raised by ONR during their assessment of the submitted Mensa PCSR-3 safety case. The output from this engagement has been a clear delivery plan to address identified shortfalls.

7.4 FAPs have been identified in the description of work being permissioned in the LI application and can and will be effectively managed by AWE with close scrutiny from ONR.

7.5 Progression of works under the preceding construction phases, including PCSR-3, will be formally reviewed by ONR at the point of submission of the Mensa PCSR-4 safety case.

8 RECOMMENDATIONS

8.1 LI 528 agreeing to the commencement of installation of the MPF building services and blast doors (PCSR-3) on project Mensa should be issued to AWE.

8.2 The lessons learned during production and approval of the Mensa PCSR-3 safety case should be reviewed following issue of the Licence Instrument and this information should be shared between AWE and ONR.
9 REFERENCES

1 Request for Agreement to release BNLS Hold Point MEN7.11 to commence installation of the MPF building services and blast doors
AWE Letter ref ONR 019-031 18th December 2013.

2 ONR How2 Business Management System. Purpose and Scope of Permissioning.

3 Safety Assessment Principles for Nuclear Facilities. 2006 Edition Revision 1. HSE.