



Installation of Mezzanine in Alpha Laboratory

**Agreement to Installation and In-active Commissioning of the Mezzanine Floor in the
Alpha Laboratory**

Project Assessment Report ONR-DFW-PAR-15-017
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EXECUTIVE SUMMARY

Title

Installation and in-active commissioning of the mezzanine floor in the Alpha Laboratory.

Permission Requested

The licensee, Dounreay Site Restoration Limited, has requested ONR Agreement to installation and in-active commissioning of the mezzanine floor in the Alpha Laboratory.

Background

The mezzanine anticipates construction of the proposed Unirradiated Fuel Characterisation Facility (UFCF), whose function is to heat treat and repackage a range of unirradiated fuel stored at Dounreay, prior to its transfer to Sellafield. The UFCF is planned to be constructed on the ground floor of the Alpha Laboratory, and the mezzanine will sit immediately above the UFCF and will support various ancillary equipment associated with the UFCF. The overall project timetable drives DSRL to constructing the mezzanine ahead of the UFCF.

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

An initial consideration of DSRL's request for Acknowledgement of the mezzanine safety case led ONR to a decision to examine civil and structural engineering aspects of this safety case. This assessment led ONR to question aspects of the safety case. DSRL's response has been judged to be satisfactory, though with one remaining issue that will be followed up by the Site/Project Inspector prior to the commencement of mezzanine construction.

Matters arising from ONR's work

Following receipt of ONR assessment comments in May 2015, DSRL reviewed its design approach and identified a number of anomalies despite the design having successfully completed DSRL due process. DSRL carried out a review and the report recommends that a suitable lessons learned synopsis be developed and promulgated. This does not affect the adequacy of the mezzanine design, which was revised and resubmitted after the review. The ONR site inspection team is fully aware of the outcome of the DSRL review and is working with the licensee to ensure appropriate action is taken to prevent a recurrence.

Conclusions

ONR has examined the civil and structural engineering aspects of the mezzanine safety case. DSRL's response to assessment comments are judged satisfactory. One remaining issue will be followed up prior to the commencement of construction.

Recommendation

This project assessment report recommends that Licence Instrument 520 be issued, Agreeing to installation and in-active commissioning of the mezzanine floor in the Alpha Laboratory.

LIST OF ABBREVIATIONS

ALARP	As low as reasonably practicable
CNS	Civil Nuclear Security (ONR)
COP	Cross-ONR Programme (ONR)
DSRL	Dounreay Site Restoration Limited
HOW2	(Office for Nuclear Regulation) Business Management System
ONR	Office for Nuclear Regulation
PCSR	Pre-Construction/Commencement Safety Report
PSR	Preliminary Safety Report
SAP	Safety Assessment Principle(s)
SEPA	Scottish Environment Protection Agency
SFAIRP	So far as is reasonably practicable
UFCF	Unirradiated Fuel Characterisation Facility

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1 PERMISSION REQUESTED

1. The licensee (Dounreay Site Restoration Limited, DSRL) has requested ONR's 'Agreement' under Licence Condition 22(1) to the installation and in-active commissioning of the mezzanine floor in the Alpha Laboratory.

2 BACKGROUND

2. The mezzanine anticipates construction of the proposed Unirradiated Fuel Characterisation Facility (UFCF), whose function is to heat treat and repackage a range of unirradiated fuel stored at Dounreay, prior to its transfer to Sellafield. The UFCF is planned to be constructed on the ground floor of the Alpha Laboratory, and the mezzanine will sit immediately above the UFCF and will support various ancillary equipment associated with the UFCF. The overall project timetable drives DSRL to constructing the mezzanine ahead of the UFCF.
3. The mezzanine is a structural steel frame with a steel floor. Vertical loading is transferred to ground via connections to the existing structure, with the addition of one new foundation to be excavated within the Alpha Laboratory. Horizontal loading is resisted by portal frame action. Horizontal load transfer to the Alpha Laboratory during a seismic event is prevented by maintaining a gap between the two structures.
4. DSRL first raised with ONR the prospect of constructing a mezzanine in the Alpha Laboratory during a site visit in June 2014 (Ref 1).

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

5. DSRL wrote to ONR on 26 February 2015 (Ref 2) enclosing the following documents:
 - DMR3219 Installation of Mezzanine in Alpha Laboratory;
 - DSSWP(14)P69 UFCF Mezzanine Preliminary Safety Report / Pre-Construction Safety Report / Inactive Pre-Commissioning Safety Report;
 - Support Documentation.
6. The documents were submitted as a Category B modification (as defined in Dounreay procedure PRC 0060, Ref 3). In accordance with Dounreay procedure PRC 0061 (Ref 4) ONR had 28 days from receipt to inform DSRL if we wished to examine the documentation.
7. The Project Inspector requested a scoping assessment from ONR assessment specialists (Ref 5). The outcome of this work states that ONR should assess the civil and structural engineering aspects of the mezzanine safety case. This conclusion was conveyed to DSRL on 26 March 2015 (Ref 6).
8. On 5 May 2015 (Ref 7) ONR conveyed initial assessment views to DSRL. ONR inspectors visited Dounreay on 12 and 13 May 2015 (Ref 8) to assist the assessment. ONR concluded that DSRL's safety case did not provide sufficient information to satisfy certain civil engineering Safety Assessment Principles (SAPs, Ref 9).
9. In order to address these remaining SAPs satisfactorily ONR wrote on 21 May 2015 (Ref 10) requesting additional justification and/or substantiation. DSRL replied on 29 September 2015 (Ref 11) responding to the assessment issues.

10. The assessment specialist's Assessment Report was finalised on 16 November 2015 (Ref 12). The assessment specialist was broadly satisfied that DSRL's design substantiation is now suitable and sufficient and supported the release of the hold point associated with mezzanine construction. The assessment specialist raised six issues of lesser safety significance to be closed out prior to commencement of mezzanine construction.
11. The assessment outcome was conveyed to DSRL on 16 November 2015 (Ref 13). DSRL responded on 18 November 2015 (Ref 14), and the assessment specialist confirmed on 19 November 2015 that the response is broadly satisfactory (Ref 15).
12. One issue remains for resolution during construction. The assessment specialist asked that the anticipated properties of the existing ground beneath the new foundation pad should be verified during construction works; and measures to ensure the stability of fill material beneath the remaining elements of ground floor slab should also be provided. DSRL did not provide a fully adequate response in Ref 14, but ONR recognises that further detail cannot realistically be expected until excavations start. Instead ONR inspectors will liaise with DSRL project staff as the work proceeds and will discuss the matter further. Recommendation.
13. DSRL wrote to ONR on 9 November 2015 (Ref 16) requesting ONR Agreement to construct the mezzanine. This letter was written under the wrong licence condition (LC19 instead of LC22) and requested ONR 'Approval' instead of Agreement. DSRL has now re-applied to ONR for Agreement to construct the mezzanine (Ref 17).

Consultation with ONR regulatory functions

14. The email trail at Ref 18 confirms the outcome of a request to ONR Civil Nuclear Security and Safety Informed Nuclear Security inspectors in March 2015 for advice on the project. No concerns were raised. At that time ONR had intended acknowledging receipt of the mezzanine and not examining the safety case, but after further review ONR decided to examine civil and structural engineering aspects of the safety case. Because of the passage of time, and ONR's decision to examine the safety case rather than simply acknowledge it, the request to CNS was repeated in November 2015, and again no concerns were raised (Ref 19).
15. Similar conclusions have been confirmed in respect of COP Transport (Ref 20), with an update at Ref 21; also in respect of Safeguards (Ref 22) and Conventional Fire Safety (Ref 23). The latter two responses were considered sufficient not to warrant a repeat request for advice.

Consultation with SEPA

16. The email trail at (Ref 24) confirms that SEPA has no objection to ONR's responding to DSRL acknowledging receipt of the mezzanine safety case. Because of the passage of time, and ONR's decision to examine the safety case rather than simply acknowledge it, a repeat request was made to SEPA in November 2014 and again no concerns were raised (Ref 25).

4 MATTERS ARISING FROM ONR'S WORK

17. Following receipt of ONR assessment comments in May 2015, DSRL reviewed their design approach and identified a number of anomalies despite the design having successfully completed DSRL due process. DSRL carried out a review and the report recommends that a suitable lessons-learned synopsis be developed and promulgated (Ref 26). This does not affect the adequacy of the mezzanine design, which was

revised and resubmitted after the review. The ONR site inspection team is fully aware of the outcome of the DSRL review and is working with the licensee to ensure appropriate action is taken to prevent a recurrence.

5 CONCLUSIONS

18. This report presents the findings of ONR's consideration of a request by DSRL to install a mezzanine in the Alpha Laboratory at Dounreay.
19. ONR decided to assess the civil and structural engineering aspects of the mezzanine safety case. This assessment raised concerns to which DSRL has responded satisfactorily, though with one remaining issue that will be followed up by the Site/Project Inspector prior to the commencement of mezzanine construction.
20. I conclude that DSRL has presented a satisfactory safety case to enable installation of the mezzanine to proceed.

6 RECOMMENDATIONS

21. The project assessment report recommends that ONR issues Licence Instrument 520 Agreeing to the installation and in-active commissioning of the mezzanine floor in the Alpha Laboratory.
22. The project assessment report further recommends that the ONR follows up the remaining issue arising from the civil and structural engineering assessment, identified in paragraph 12 above. During construction, the Site/Project Inspector should liaise with DSRL project staff to establish (a) how DSRL will verify the properties of the existing ground beneath the new foundation pad, and (b) the measures to ensure the stability of fill material beneath the remaining elements of ground floor slab.

7 REFERENCES

1. ONR Intervention Report number ONR-DNE-IR-14-003, Dounreay site visit 16 to 19 June 2014. 2014/250946.
2. DSRL letter D/ONR/513R dated 26 February 2015. Submission of a Category B modification under 28 day rule. Installation of Mezzanine in Alpha Laboratory. 2015/77942.
3. DSRL procedure PRC 0060, entitled 'Categorisation of Facilities, Package Movements, Modifications and Experiments', Issue 4, dated November 2013. 2015/113907.
4. DSRL procedure PRC 0061, entitled 'Modifications and the production and clearance of Safety Case Documentation', Issue 9, dated July 2014. 2015/113891.
5. Project Inspector email to assessment specialists and regulatory leads, 27 February 2015. Early warning of the arrival of mezzanine PSR/PCSR/PCmSR and request for advice. 2015/113056.
6. ONR letter DNE71923N dated 26 March 2015. Acknowledges receipt and notifies DSRL that we wish to assess the civil and structural engineering aspects of the safety case. Construction of the mezzanine should not proceed without formal Agreement. 2015/116537.
7. ONR email to DSRL dated 5 May 2015, conveying initial civil and structural engineering assessment views. 2015/165698.
8. ONR Contact Record number ONR-DFW-CR-15-024, Dounreay site visit 12 to 13 May 2015. 2015/182309.
9. *Safety Assessment Principles for Nuclear Facilities*. 2014 Edition Revision 0. November 2014. <http://www.onr.org.uk/saps/saps2014.pdf>.
10. ONR letter DNE71928R 21 May 2015. Confirmation of the assessment points raised by ONR by email on 5 May and verbally at the 13 May meeting. 2015/188724.
11. DSRL letter D/ONR/592N dated 29 September 2015. Responds to assessment points raised in DNE71928R. 2015/368788.
12. ONR Assessment Report ONR-DFW-AR-15-011 dated 16 November 2015. 2015/409955.
13. ONR email to DSRL dated 16 November 2015. Conveys assessment outcome and seeks a response. 2015/430353.
14. DSRL response of 18 November 2015 to ONR assessment outcome of 16 November 2015. 2015/435941.
15. Assessment views on adequacy of DSRL response. 2015/437053.
16. DSRL letter D/ONR/603R dated 9 November 2015. Requests ONR Approval to mezzanine construction. Withdrawn by D/ONR/605R, Ref 17. 2015/428721.
17. DSRL letter D/ONR/605R dated 16 November 2015. Revised request for ONR Agreement to mezzanine construction. 2015/433454.
18. Email response from CNS dated 23 March 2015 confirming no comments with proposal to construct mezzanine. 2015/112884.
19. Email response from CNS dated 5 November 2015 re-confirming no comments with proposal to construct mezzanine. 2015/416158.

20. Email response from COP Transport dated 12 March 2015 confirming no comments with proposal to construct mezzanine. 2015/113707.
21. Email response from COP Transport dated 5 November 2015 re-confirming no comments with proposal to construct mezzanine. 2015/415596.
22. Email response from ONR Safeguards dated 9 March 2015 confirming no comments with proposal to construct mezzanine. 2015/90344.
23. Email response from ONR Fire Safety Inspector dated 2 March 2015 confirming no comments with proposal to construct mezzanine. 2015/79702.
24. Email from SEPA dated 20 March 2015 confirming no comments to ONR acknowledging receipt of the mezzanine safety case; that is raising no objection to construction. 2015/112844.
25. Email from SEPA dated 18 November 2015 re-confirming no objection to construction. 2015/435958.
26. Emails from DSRL dated 14 and 18 September 2015 conveying outcome of review of design approach. Respectively 2015/343837 and 350948.