# PROJECT ASSESSMENT REPORT

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**Project:** Heysham 2 – Reactor 7 2015 Outage

**Site:** Heysham 2

**Title:** Nuclear Site Licence No. 60 – Licence Condition 30(2) Extension of Heysham 2 Reactor 7 Operating Period

**Licence Instrument No:** LI 583 Agreement

**Nuclear Site Licence No:** 60

**Licence Condition:** 30(2)

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<th>Role</th>
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² Approval is for publication on ONR web-site, after redaction where relevant
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<td>– Technical Safety and Support Manager</td>
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EXECUTIVE SUMMARY

Title


Permission Requested

EDF Energy Nuclear Generation Limited (NGL), the operator (known as the Licensee) of Heysham 2 power station, requested permission from the Office for Nuclear Regulation (ONR) to extend the operating period of Reactor 7 from 10 November 2014 until no later than 15 March 2015. This request is in line with the Licensee’s responsibility, as set out in Licence Condition 30(2) of its nuclear site licence.

Background

The periodic shutdown (also known as statutory outage) of nuclear reactors operated by NGL is a requirement of Licence Condition 30. At Heysham 2, statutory outages are undertaken at three-year intervals in accordance with the approved maintenance schedule preface. One purpose of these shutdowns is to inspect and maintain systems, structures and components, particularly when these activities cannot be carried out when the reactor is at power.

The Health and Safety Executive (HSE) consent for Reactor 7 start-up following its last periodic shutdown was given on 10 November 2011 (Licence Instrument 519). NGL has submitted a request for ONR Agreement to an extension of the operating period of Reactor 7 from 10 November 2014 until 15 March 2015. The Licensee has presented a safety submission that provides the nuclear safety justification for the extension. The primary safety claim is the nuclear safety systems will not incur any significant decrease in their reliability or functionality, and there will be no significant increase in the risk of an initiating event as a result of the deferral of the statutory outage. The Licensee’s request includes examples of the nuclear safety benefits of deferring the outage.

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

ONR specialist inspectors in Structural Integrity, Civil Engineering, Electrical Engineering, Control & Instrumentation Systems, and Graphite assessed the safety justification written by the Licensee. There were no issues that would prevent Agreement by the ONR to the requested extension of Reactor 7’s operating period.

The Environment Agency has been consulted and does not object to ONR issuing a Licence Instrument giving Agreement to the requested operating period extension. Civil Nuclear Security has also been consulted and have no security concerns regarding the proposed extension.

Matters arising from ONR’s work

No issues preventing issue of this Licence Instrument arose from the assessment of the Licensee’s safety justification by ONR specialist inspectors.

Conclusions

ONR’s assessment of the Licensee’s safety justification, together with the work of the ONR Nominated Site Inspector, provides confidence that it is safe to operate Heysham 2 Reactor 7 to 15 March 2015.
Recommendation

The recommendation from this Project Assessment Report is that ONR issue Licence Instrument 583 giving Agreement to an extension of the operating period of Heysham 2 Reactor 7 from 10 November 2014 to 15 March 2015.
# LIST OF ABBREVIATIONS

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tr>
<td>AGR</td>
<td>Advanced Gas-cooled Reactor</td>
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<td>ALARP</td>
<td>As low as reasonably practicable</td>
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<td>AMS</td>
<td>Asset Management Suite</td>
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<td>HYB</td>
<td>Heysham 2 Power Station</td>
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<td>C&amp;I</td>
<td>Control and Instrumentation</td>
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<td>CNS</td>
<td>Civil Nuclear Security (ONR)</td>
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<td>DMG</td>
<td>Delivery Management Group</td>
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<td>EC</td>
<td>Engineering Change</td>
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<td>HOW2</td>
<td>(Office for Nuclear Regulation) Business Management System</td>
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<td>HSE</td>
<td>The Health and Safety Executive</td>
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<td>INSA</td>
<td>Independent Nuclear Safety Assessment</td>
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<td>LC</td>
<td>Licence Condition</td>
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<td>LI</td>
<td>Licence Instrument</td>
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<td>NGL</td>
<td>EdF Energy Nuclear Generation Limited</td>
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<td>ONR</td>
<td>Office for Nuclear Regulation</td>
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<td>PCPV</td>
<td>Pre-stressed Concrete Pressure Vessel</td>
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<td>PSSR</td>
<td>Pressure System Safety Regulations 2000</td>
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<td>PVCW</td>
<td>Pressure Vessel Cooling Water</td>
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<td>SAP</td>
<td>Safety Assessment Principle(s) (HSE)</td>
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1 PERMISSION REQUESTED

1. EdF Energy Nuclear Generation Limited (NGL), the operator and Licensee of Heysham 2 nuclear power station, has written (HYB51002R) (Ref 1) to the Office for Nuclear Regulation (ONR) requesting Agreement to an extension of Reactor 7's operating period to 15 March 2015. This Project Assessment Report considers this request and recommends issuing Licence Instrument 583 giving Agreement to an extension of the operating period to 15 March 2015.

2 BACKGROUND

2. The nuclear site licence requires the Licensee to periodically shutdown plant under Licence Condition (LC) 30. This is to enable examination, inspection, maintenance and testing to take place in accordance with the requirements of its plant maintenance schedule under LC28. At Heysham 2, reactor periodic shutdowns are undertaken triennially, as specified in the Maintenance Schedule Preface, which is an approved document under LC28 (4). Without ONR Agreement to an extension, Reactor 7 is required to shutdown on or before the third anniversary of the last ONR statutory outage start-up Consent date. The previous re-start Consent Licence Instrument (LI) 568 (Ref. 2) is dated 10 November 2011. This would require shutdown of Reactor 7 on or before 10 November 2014.

3. On 22 September 2014, NGL wrote (HYB51002R) (Ref. 1) to ONR requesting Agreement to extend Heysham 2 Reactor 7's operating period to 15 March 2014; an extension of 126 days from 10 November. Attached to the letter was the safety justification that proposed the deferral of the next Reactor 7 statutory outage and presented a justification for its continued operation during the deferred period. This Engineering Change (EC) proposal, EC 348052 version 1, is a Category 2 modification to the reactor; that means the Licensee judges the proposal, if inadequately conceived or executed, might lead to a significant but not serious increase in the risk of a radiological hazard. The EC underwent an independent nuclear safety assessment (INSA), the approval statement for which is contained within an attachment to the request letter (Ref. 1) by NGL’s internal nuclear regulator. They raised one caveat to the proposal associated with the need to present the outcome of the findings Pre-stressed Concrete Pressure Vessel (PCPV) penetrations Pressure Systems Safety Regulations (PSSR) (Ref. 16) to the internal regulator.

4. NGL’s company strategy for Advanced Gas-cooled Reactor (AGR) periodic shutdown management has led to shutdowns across the fleet converging to the autumn / winter seasons. The company asserts that commencing the Reactor 7 shutdown on 10 November 2014 would coincide with poor availability of staff and resources during the Christmas to New Year period. This would contravene NGL corporate procedure, which advises avoiding these periods when planning shutdowns. NGL have a target date of 27 February 2015 to commence Reactor 7 shutdown, but have added a contingency of 17 days against any unforeseen circumstances. The EC proposal therefore justifies deferring the shutdown to no later than 15 March 2015. The maximum period of extension would be 126 days.

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

5. I have considered NGL’s request for ONR Agreement to the extension of Heysham 2 Reactor 7’s operating period as part of my role as the ONR Nominated Site Inspector taking cognisance of the project oversight and delivery of the Project Assessment Report and associated Licence Instrument for consent for the start-up of Reactor 7 following the periodic shutdown. I have followed ONR procedures for delivering a permissioning project, as detailed in HOW2 (Ref. 4). To support my work I have
utilised the services of ONR specialist assessors, whom the Delivery Management Group (DMG) Leads identified and which they considered covered the disciplines necessary to make an informed, proportionate judgement (TRIM 2014/359091 and TRIM 2014/363675).

6. Whilst outage deferral is not novel, with similar short duration deferrals being submitted to ONR for Agreement previously using similar arguments, ONR has undertaken a high level review of NGL’s proposal as detailed within Reference 1 to identify any significant change to the assessed nuclear safety risk.

7. The review undertaken by DMG Leads has identified the following areas that should be subject to high level limited assessment:
   - Electrical Systems
   - Control and Instrumentation (C&I) Systems
   - Structural Integrity
   - Civil Engineering
   - Graphite

8. In addition to the nuclear safety assessments identified, I sought the opinion from ONR’s Civil Nuclear Security site inspector to ascertain whether there were any aspects of the extension to the operating period that may have an impact on ONR’s decision to agree to the extension. The CNS site inspector has confirmed that there are no issues from a security perspective that would impact on the decision to agree to the extension of the operating period of Reactor 7 (Ref. 19).

9. I have also taken note of the findings of NGL’s internal regulator’s assessment of the safety case through a review of the INSA comments (Ref. 5) and the INSA approval statement. The INSA Engineer considered the justification for extending the period of operation for each technical area and did not identify any issues that could prevent operation up to the proposed shutdown in February 2015. This statement within the approval was inconsistent with that stated within the EC as well as the letter requesting the agreement to ONR, which both stated the 15th March 2015. I challenged this aspect of the INSA approval and the INSA Engineer explained that it had been an omission on his part and that he was content for extension of the operating period to the 15th March 2015. In addition, the caveat that was raised associated with PSSR was not captured within the INSA Approval, however, it is captured as a commitment within the EC. In order to ensure that these omissions have been captured I requested that NGL write to ONR stating that INSA are satisfied with the extension to the operating period and that the caveat has been adequately captured within their document management system, Asset Management Suite (AMS). Letter HYB32557 (Ref. 6) provides the requisite confirmation.

10. The primary safety claim within the EC is that nuclear safety systems will not incur any significant decrease in their reliability or functionality, and there will be no significant increase in the risk of an initiating event as a result of the deferral of the statutory outage. This claim is underwritten by the following arguments:
   - With the proposed deferral, the HYB R7 period of operation will not exceed the maximum maintenance intervals as specified within the Maintenance Schedule Preface.
   - Deferring the statutory outage has minimal impact on time-dependent degradation mechanisms and does not create a significant increase in risk;
   - There are no time-dependent issues in committed inspection programmes of current safety cases which are significantly affected by this proposal (including previous return to service ECs);
11. The nuclear safety risk associated with this proposed deferral is As Low As Reasonably Practicable (ALARP) due to the impact of reduced resource over the Christmas break should the outage have commenced on the 10\textsuperscript{th} November;

11. Below is a summary of the findings from each of the technical specialists identified by the DMG Leads to perform a limited assessment of the EC.

### 3.1.1 ELECTRICAL ASSESSMENT

12. The limited electrical assessment (Ref. 7) consisted of a Licence Condition 28 review of the electrical engineering aspects of the EC presented by NGL.

13. The assessment of the EC, together with a sample of reference documents to the proposal provided adequate evidence to support the argument that no cliff-edge effects are present. In making the argument, the Licensee has appropriately sought technical advice from both the station and its central technical organisation suitably qualified and experienced persons (SQEP) and considered relevant operational experience from other AGR sites. In addition, the specialist was satisfied that no other electrical system improvements at the station are adversely affected by the proposal.

14. The assessment concludes that, for the electrical engineering aspects, the specialist is satisfied with the claims, arguments and evidence laid down within the Licensee's safety case and recommends that ONR agree to the proposed extension to the operating period of Reactor 7 to the 15\textsuperscript{th} March 2015.

### 3.1.2 CONTROL AND INSTRUMENTATION ASSESSMENT

15. The limited C&I assessment (Ref. 8) sampled the licensee's submission, the proposed outage intentions document (Ref. 9) and discussed the deferral with station's safety systems engineer. He judged that, as far as C&I safety systems are concerned, no-cliff edge effects are likely to occur through the proposed deferral and that no C&I safety system improvements at the site are adversely affected by the proposal.

16. The assessment considered that the licensee provided adequate evidence to support the argument that no cliff-edge effects were present. In making the argument the licensee has appropriately sought technical advice from both the station and its central organisation SQEP and considered relevant operational experience from other AGR sites. In addition the ONR specialist recognised that non-outage related maintenance schedule activities such as function tests, calibration and freedom of movement checks are to be performed during the period of extension, as appropriate.

17. In conclusion, from a C&I engineering aspect, the specialist was satisfied with the claims, arguments and evidence presented in the submission and that no C&I safety system improvements at the site are adversely affected by the proposal and therefore recommends that ONR agree to the proposed extension to the operating period of Reactor 7 to the 15\textsuperscript{th} March 2015.

### 3.1.3 STRUCTURAL INTEGRITY ASSESSMENT

18. A limited structural integrity assessment (Ref. 10) of the proposal has been undertaken and it concluded that there was a persuasive argument and the extension could be suitably justified from a structural integrity perspective with no obvious areas of concern. It stated that the conclusion is contingent on satisfactory close out on the two commitments made in the EC as both were directly related to the structural integrity justification. One of these related to the re-assessment of the damage to certain Life Assessment Reference Components in the Boilers; the other to the endorsement of
the pressure systems examination postponements by a third party PSSR competent person appointed by the site.

19. The structural integrity specialist is content to support the proposal provided that the two commitments have been closed out. He noted that the endorsement of a postponement by the PSSR competent person is a specific legal requirement in Regulation 9(7) of the PSSR, and would not expect ONR to be in a position to grant agreement to an extension of the operating period of Reactor 7 until that endorsement was in place. The postponement by the PSSR competent person has been provided by Bureau Veritas UK Ltd and is contained within Reference 22.

3.1.4 CIVIL ENGINEERING ASSESSMENT

20. The limited civil engineering assessment (Ref. 11) considered the following documentation as part of the assessment:

- Previous “28 day report” for PCPV R7 2011 Outage (Ref. 12)
- ONR assessment of the 2011 SUS – (Ref. 13)

21. The civil engineering specialist also discussed the proposed extension to the operating period of Reactor 7 with an Appointed Examiner (APEX) and requested his surveillance summary to support the extension.

22. The assessment considered a number of civil engineering elements of the safety case including the PCPV and support structure, reactor coolant, pressure vessel cooling water (PVCW), and top cap deflection. The outcome of the assessment concluded that either the testing and monitoring were not affected by the extension given that they were not outage dependent or that the evidence from the previous outage coupled with known plant conditions was sufficient to warrant extending the operating period.

23. The conclusion of the assessment confirms that the proposed extension to operation will not affect the integrity of the PCPV and therefore recommends that ONR agree to the proposed extension to the operating period of Reactor 7 to the 15th March 2015.

3.1.5 GRAPHITE ASSESSMENT

24. The limited graphite assessment (Ref. 14) confirmed that there was no technical objection to the extended operation of Reactor 7 as Heysham 2 has limited graphite cracking at present and it is very unlikely that they will be approaching any limiting condition by the time of the statutory outage. As a result a delay of a few months is immaterial.

3.1.6 COMMITMENTS MADE WITHIN THE EC

25. There were two commitments identified within the EC:

- “Commitment 1 – DA (HYB/TOR SCDB) to review the conclusions of the reassessments of Boiler LARCs 36, 47, 48, and 68 prior to September 2014, to confirm whether or not the damages for these components are predicted to exceed unity prior to the 2017 statutory outage. If the reassessments do not demonstrate that the damages for these components are predicted to remain below unity prior to the 2017 outage, then DA (HYB/TOR SCDB) and SAG should consult on whether or not it is safe to defer the statutory outage.”
“Commitment 2 – Station to obtain formal acceptance by the Third Party Independent Insurers Competent Persons to endorse postponement of the WSE inspections.”

26. I have sought confirmation that the Commitments have been completed (Ref. 15) and station have confirmed this to be the case for both elements (Refs, 18 and 21). I am therefore content that the commitments made have been resolved to my satisfaction.

3.2 OTHER GOVERNMENT DEPARTMENT LIAISON

3.2.1 ENVIRONMENT AGENCY

27. The views of the Environment Agency Site Inspector were sought over the proposed extension to the operating period of Reactor 7 and they do not believe there are any projects with significant environmental implications which will be adversely affected by the extension to the operating period Reactor 7 so do not have any objections. (Ref. 17)

3.3 REGULATORY CONSIDERATIONS

28. NGL have requested an extension to the operating period of Heysham 2 Reactor 7 under the correct licence condition LC30 (2).

29. NGL’s justification to extend operation of Reactor 7 at Heysham 2, EC348052, has undergone the company’s due process for a Category 2 submission in the production, review and authorisation of the statutory outage deferral justification.

30. NGL’s justification to extend operation of Reactor 7 at Heysham 2 has been assessed by specialist assessors within ONR who have not identified any matters of nuclear safety significance arising from extending the operating period of Reactor 7. No specialist inspector has objected to Agreeing to the extension of the operating period.

31. The Agreement requested by NGL requires the issue by ONR of a non-routine Licence Instrument. The wording for non routine Licence Instrument LI 583 has been reviewed by the Treasury Solicitor’s office (Ref. 20) and the Licence Instrument has been confirmed as acceptable.

32. Heysham 2 has an Approved Maintenance Schedule (MS) Preface under LC28 (5) and Agreement under LC28 (7) to extend maintenance intervals, which enable them to manage the extension of operating period. The Executive granted the Approval with LI 23 issued in March 2001 and the Agreement with LI 21 issued in October 1996.

4 MATTERS ARISING FROM ONR’S WORK

33. No issues preventing issue of this Licence Instrument arose from the assessment of the Licensee’s safety justification by ONR specialist inspectors.

5 CONCLUSIONS

34. I judge that NGL has made an adequate justification for an extension of Heysham 2 Reactor 7’s operating period from 10 November 2014 to 15 March 2015 based on:

- NGL’s safety case presented in EC 348052 version 1 having satisfactorily completed company due process.
- NGL’s safety case having INSA approval with the one caveat adequately addressed by Station and closed through AMS.
- Assessment of the deferral safety justification by ONR specialist inspectors.
6 RECOMMENDATIONS

35. I recommend that the Superintending Inspector;

- Signs this Project Assessment Report to confirm acceptance for the technical and regulatory arguments that justify issuing of Heysham Licence Instrument 583.
- Signs Heysham Licence Instrument 583, which grants the ONR's Agreement under Licence Condition 30(2) to extend the operating period of Reactor 7 from 10 November 2014 to 15 March 2015.
- Signs this Project Assessment Report approving its release for publication, after redaction where appropriate.
7 REFERENCES


12. NGL - Heysham 2 Power Station - 2011 Statutory Examination of the Pre-stressed Concrete Pressure Vessel of Reactor 7 - E/REP/BNCB/0335/HYB/11 Revision 000, NGL, February 2012, TRIM 2012/77257.


15. Heysham 2 Reactor 7 2015 Outage R715. Email seeking confirmation that commitments within EC348052 have been completed, ONR, 30 September 2014, TRIM 2014/363712.


