Office for Nuclear Regulation

Heysham 1 Reactor 1 Periodic Shutdown 2020

ONR Agreement for Extension of Operating Period for Heysham 1 Reactor 1

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EXECUTIVE SUMMARY

Title

ONR Agreement for Extension of Operating Period for Heysham 1 Reactor 1.

Permission Requested

EDF Energy Nuclear Generation Limited (NGL) has requested Agreement from the Office for Nuclear Regulation (ONR) to extend the operating period of Heysham 1 Power Station Reactor 1 (R1) by a period of 137 days to no later than 31 October 2020. This request is made in accordance with Licence Condition (LC) 30 (Periodic Shutdown) of the station's nuclear site licence.

Background

Nuclear site licensees are required to comply with conditions attached to the nuclear site licence. LC 30 Clause (1) states that for the purpose of enabling examination, inspection maintenance and testing of any plant or process, the licensee shall, when necessary, ensure that any such plant or process is shutdown in accordance with the requirements of the plant maintenance schedule. LC 30(2) gives ONR the authority to Agree to an extension of a plant's operating period based on an adequate safety justification from the licensee.

The current operating period for R1 will expire on the 16 June 2020. NGL wish to extend this operating period until the 31 October 2020. The outage has previously been the subject of a deferral from the 6 April 2020 to 16 June 2020 due to issues with the fuelling machine and overlap with the outage at Heysham 2. This outage deferral request is due to the impact of the COVID-19 pandemic and indications that supply chain and contractor availability will be affected posing a challenge to the safe execution of the statutory outage.

NGL considered deferral of the statutory outage for an additional 137 days (up to 208 days in total) will not reduce significantly the reliability or availability of nuclear safety systems and will not lead to any significant increase in the frequency of plant faults as initiating events during the extended period of operation.

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

NGL's safety justification for the extension of the operating period of Heysham 1 (R1) until 31 October 2020 was examined by the following discipline specialists; civil engineering, structural integrity, graphite, mechanical engineering, electrical engineering and electrical control and instrumentation.

Following the examination it was decided that no detailed assessments were considered necessary in addition to the evidence provided by NGL.

Matters arising from ONR's work

ONR's assessment did not reveal any nuclear safety concerns that would prevent Agreement to the extension of the R1 operating period by 137 days. The assessment conclusions were supported by evidence that:

- NGL had sought input from relevant suitably qualified and experienced personnel;
- Agreement was reached with the Pressure Systems Safety Regulations (PSSR) competent person regarding any proposed postponements of inspections;
- The outage deferral is supported by NGL's independent nuclear safety assessment (INSA).

Conclusion

ONR's assessment concluded that, NGL has carried out an adequate safety assessment demonstrating the safety of the proposed extension of Heysham 1 Reactor 1 operating period and supported the issue of ONR Agreement to NGL's request.

Recommendation

I recommend that ONR issue Licence Instrument 630 under LC30(2) for Nuclear Site Licence 60 giving ONR's Agreement to extend the operating period of Heysham 1 Reactor 1 until 31 October 2020.

LIST OF ABBREVIATIONS

ALARP	As low as reasonably practicable
EA	Environment Agency
ECCL	Engineering change Commitments, Caveats or Limitations
EIMT	Examination, Inspection, Maintenance and Testing
HGR	Hot Gas Release
HYA	Heysham 1 nuclear power station
HYB	Heysham 2 nuclear power plant
IJCO	Interim Justification for Continued Operation
INA	Independent Nuclear Assurance
INSA	Independent Nuclear Safety Assessment
JCO	Justification for Continued Operation
LC	Licence Condition
MS	Maintenance Schedule
NGL	EDF Energy Nuclear Generation Limited
ONR	Office for Nuclear Regulation
PICA	PSR Identified Corrective Actions
PSSR	Pressure Systems Safety Regulations
R1	Reactor 1
R2	Reactor 2
WSE	Written Scheme of Examination

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1 PERMISSION REQUESTED

1. EDF Energy Nuclear Generation Limited (NGL), the operator and Licensee of Heysham 1 nuclear power station (HYA), has written to the Office for Nuclear Regulation (ONR) requesting Agreement to an extension of Reactor 1's (R1) operating period up to 31 October 2020 under Licence Condition 30(2) (Ref. 1).

2. This ONR project assessment report has been produced to record regulatory views and judgments in consideration of NGL's request for the extension of the operating period for Heysham 1 R1.

2 BACKGROUND

3. The nuclear site licence requires the Licensee to periodically shutdown plant under Licence Condition (LC) 30: Periodic Shutdown to enable examination, inspection, maintenance and testing (EIMT) to take place in accordance with the requirements of its plant maintenance schedule (MS) referred to in LC28(4) EIMT.

4. Requirements of the MS are derived from claims made in the station's safety case (required under LC23: Operating Rules), along with other regulatory requirements, such as Pressure Systems Safety Regulations (PSSR), and requirements from equipment manufacturers.

5. For safety case claims for the operation of equipment, these normally relate to potential concern given the presence of damage mechanisms such as creep, fatigue or corrosion. Time-based EIMT requirements are identified in the MS derived safety case requirements to ensure appropriate monitoring of equipment takes place and forewarning of failure can be achieved. Such time-based intervals are referred to as operating periods.

6. The operating period for the two reactors at Heysham 1 is identified in the MS preface, which is an approved document under LC28(4). This requires that each reactor is shut down after a maximum period of three calendar years following the Consent of ONR to the start-up of the reactor after a routine periodic shutdown. The previous start-up Consent Licence Instrument (LI) 612 (Ref. 2) for Reactor 1 is dated 7 April 2017. This required the shutdown of Reactor 1 on or before 6 April 2020.

7. LC 30(2) gives ONR the authority to Agree to an extension of a plant's operating period based on an adequate safety justification from the licensee.

8. NGL previously submitted Heysham 1 Engineering Change EC367102 Version 3 (Ref. 3) as safety justification for extending Reactor 1's operating period up to the 16 June 2020, with the periodic shutdown planned to commence in mid to late May 2020.

9. The reason for this extension request was due to delays in completing post R2 defueling outage activities as a result of the necessity to exchange the west side fuelling machine long travel wheels prior to the start of the R1 statutory outage. Additionally, following the successful injection of oxygen into Reactor 2 in October 2019 as part of the failed fuel mitigation activities, Heysham 1 intended to carry out modifications to the gas circulator IGV differential pressure impulse lines and an outage start date in April 2020 could have resulted in the preparatory activities for the impulse line modifications not being completed in time.

10. Since EC 367102 Version 3 was developed and approved, the impact of the COVID-19 pandemic has become apparent. At the time of writing, EDF-Energy is in phase D of their Company Pandemic Plan, defined in BEG/SPEC/OPSV/EPG/085 (Ref. 4). Phase D is enacted when "the pandemic has or has the potential to have a significant impact upon business continuity including security of supply (i.e. widespread cases of the virus in the UK and/or inside the Company)".

11. Whilst staffing levels at Heysham 1 are being robustly monitored by ONR, the Licensee has indicated that supply chain and contractor availability will be affected significantly in the period considered. It is likely therefore, that the COVID-19 pandemic

will pose a challenge to safe execution of the Statutory Outage if it were to have started on the planned date of 25 May 2020.

12. NGL consider that the deferral of the statutory outage for an additional 137 days (up to 208 days in total) (Ref. 5) will not significantly reduce the reliability or availability of nuclear safety systems and will not lead to any significant increase in the frequency of plant faults as initiating events during the extended period. The safety justification was presented at category 2 which required a formal independent nuclear safety assessment (Ref. 6)

13. It is noted that a refuelling outage was required which commenced on 25 May 2020 for 12 days until 6 June. The NGL proposal considers the reasonable practicability of completing deferred Maintenance Schedule activities within the refuelling outage as part of ALARP optioneering, thereby reducing the period of deferral for these tasks. So, in addition to the normal station checks following trip, additional operations of plant operation immediately post trip have been done during the refuelling outage.

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

14. The NGL safety justification for extending the Heysham 1 R1 operating period focussed on:

- Maintenance, inspection and testing schedule requirements;
- Component life assessment;
- The potential impact of the deferral on degradation mechanisms related to physical parameters such as temperature, irradiation, and pressure;
- Specific commitments made in previous return to service ECs;
- Commitments from previous return to service ECs or Outage Assessment Panels that will be affected by the deferral inspection or maintenance requirements supporting the Steam Release safety case;
- The Hot Gas Release (HGR) / Depressurisation safety cases;
- Planned modifications in support of safety cases;
- Safety case commitments and caveats made to support safety case claims, including justification for continued operation (JCO), interim justification for continued operation (IJCO), Engineering change Commitments, Caveats or Limitations (ECCL), Availability Assessments and Extended Unavailability Reviews;
- Written Schemes of Examination (WSE) for Pressure Systems Safety Regulations (PSSR);
- Environmental Maintenance, Inspection and Testing Schedules (EMITS).

15. ONR specialist inspectors from the ONR Heysham 1 R1 2020 periodic shutdown team examined NGL's safety justification.

- Civil Engineering (Ref. 7);
- Structural Integrity (Ref. 8);
- Graphite (Ref. 9);
- Mechanical Engineering (Ref. 10);
- Electrical Engineering (Ref. 11);
- Electrical Control and Instrumentation (Ref. 12)

16. Following ONR specialist inspector examinations, it was decided that no detailed assessments were considered necessary.

4 MATTERS ARISING FROM ONR'S WORK

4.1 EC367102 Proposal for the Deferral of the Reactor 1 2020 Statutory Outage 025R1

17. The primary safety claim made by NGL is that the deferral of the statutory outage for an additional 137 days (up to 208 days in total) will not reduce the reliability or availability of nuclear safety systems significantly and will not lead to any significant increase in the frequency of plant faults as initiating events during the extended period of operation. The licensee states that:

- The potential impact of the deferral on degradation mechanisms related to physical parameters such as temperature, irradiation, and pressure is very low.
- The potential impact of the deferral on other known time-related degradation mechanisms is small, and any increase in risk would be low.
- Safety case commitments and caveats made to support safety case claims, including JCOs, IJCOs, ECCLs, Availability Assessments and Extended Unavailability Reviews, will not be affected by the proposal.
- There are no commitments from previous return to service ECs or Outage Assessment Panels that will be affected by the deferral.
- There are no inspection or maintenance requirements supporting the Steam Release safety case that will be affected by the deferral or where risk cannot be managed.
- There are no activities associated with the Environmental Maintenance Schedule (EMITS) that cannot be deferred.
- There are no MS activities supporting the HGR / Depressurisation safety cases that would be affected by the deferral or where risk cannot be managed.
- There are no active components that would be significantly affected by the delay to the outage start date.
- There are no MS activities supporting other safety cases that would be affected by the deferral or where risk cannot be managed.

18. The risk of continued operation of Heysham 1 Reactor 1 for an additional 137 days (a total of 208 days deferral to the start of the outage) is ALARP. This view is based on:

- The increase in risk is low during the additional operating period.
- There are significant risks associated with not delaying the statutory outage, and limited other options to mitigate those risks.
- Risk reduction measures have been considered and those that are reasonably practicable are being implemented.

4.2 ONR review of outage deferral request

19. Each of the ONR specialist inspectors; civil engineering, structural integrity, graphite, mechanical engineering, electrical engineering and electrical control and instrumentation, examined the NGL safety justification for the outage deferral. Overall the specialist inspectors considered that the deferral would have no, or negligible, impact on nuclear safety and they all supported, or had no objections to Agreeing to the extension to the operating period for R1.

20. Their judgements were supported by the evidence that:

- NGL had sought input from relevant suitably qualified and experienced personnel;
- Agreement was reached with the PSSR competent person regarding any proposed postponements of inspections;
- The outage deferral is supported by NGL's independent nuclear safety assessment (INSA).

21. No concerns were raised by any of the specialist inspectors and the request for the extension of the operating period was considered reasonable.

4.3 Engagement with other Government Agencies

22. The Heysham 1 Environment Agency (EA) site inspector was informed that ONR intended to issue an LI giving its agreement to the extension of R1's period of operation. The EA confirmed that it had no objections to the deferral proposal and ONR issuing an Agreement to extend the R1 operating (Ref. 13).

5 CONCLUSIONS

23. ONR has undertaken assessment of NGL's safety justification for extending the operating period of Heysham 1 Reactor 1.

24. NGL have requested this extension due to the COVID-19 pandemic and the associated restrictions. NGL consider deferral of the statutory outage for an additional 137 days (up to 208 days in total) will not significantly reduce the reliability or availability of nuclear safety systems and will not lead to any significant increase in the frequency of plant faults as initiating events during the extended period of operation.

25. ONR's assessments of the proposed extension to the operating period judged that the outage deferral would have no, or negligible, impact on nuclear safety and supported, or had no objections to, Agreeing to the extension to the operating period.

6 RECOMMENDATIONS

26. I recommend ONR issues Licence Instrument 630 under LC30(2) for Nuclear Site Licence 60, giving ONR's Agreement to extend the operating period of Heysham 1 Reactor 1, so that the periodic shutdown commences no later than 31 October 2020.

7 REFERENCES

1. NSL/HYA/50868 (R). Extension of the Heysham 1 Reactor 1 operating period (CM9 2020/151697).
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3. EC No 367102 Proposal Version 03 – Proposal for the Deferral of the Reactor 1 2020 Statutory Outage 025R1, CM9 2020/63411.
4. BEG/SPEC/OPSV/EPG/085, EDF Company Pandemic Plan CM9 2020/88143
5. EC No 367102 Version 04 Heysham 1 Reactor 1 Statutory Outage 025 Deferral - June 2020 to October 2020: COVID-19 Contingency CM9 2020/151697
6. EDF Nuclear Generation Ltd Milestone Full INSA Approval Statement, CM9 2020/151697
7. ONR-OFD- AN- 20-008 Revision 0, Civil Engineering Assessment of Heysham 1 Reactor 1 Statutory Outage 025 Deferral June 2020 to October 2020: COVID-19 Contingency, CM9 2020/152520
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9. Email from A. Price to S. Thompson RE: Heysham 1 Reactor 1 EC 367102 Revision 01 - Statutory Outage Deferral Proposal - NSL/HYA/50868 (R), 20/05/2020, CM9 2020/1520860
10. Email from K. Hughes-Gill to S. Thompson – HPE CM: Mechanical engineering review of EC 367102, 01/06/2020, CM9 2020/164629
11. Heysham 1 R1 Statutory outage deferral from April 2020 to October 2020 – COVID-19 Contingency - EC 367102 – Revision 1 Version 2, CM9 2020/157842
12. Control and Instrumentation Assessment of the EDF Energy Nuclear Generation Limited Heysham 1 Reactor 1 Statutory Outage 025 June 2020 to October 2020 Deferral – Engineering Change 367102 001, CM9 2020/160587
13. Email from K. Simpson to S. Thompson – RE: Heysham 1 Outage – 26/05/2020, CM9 2020/158318