Office for Nuclear Regulation

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Deferral of Heysham 1 Reactor 1 Statutory Outage to 28 February 2017

EDF Energy Nuclear Generation Limited (NGL) request for an extension to the operating period of Heysham 1 Reactor 1 by 73 days until the next Statutory Outage in February 2017

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EXECUTIVE SUMMARY

Title

EDF Energy Nuclear Generation Limited (NGL) request for an extension to the operating period of Heysham 1 Reactor 1 by 73 days until the next Statutory Outage in February 2017.

Permission Requested

EDF Energy Nuclear Generation Limited (NGL), the operator (known as the Licensee) of Heysham 1 power station, has requested an agreement from the Office for Nuclear Regulation (ONR) to extend the operating period of Reactor 1 from 18th December 2016 up to 28th February 2017. NGL has identified a target date of 6th February 2017 to commence Reactor 1 shutdown, but has added a contingency to account for any unforeseen circumstances.

This agreement is required by Licence Condition 30(2) of its nuclear site licence.

Background

The periodic shutdown of nuclear reactors operated by NGL is a requirement of Licence Condition 30. At Heysham 1, statutory outages are undertaken at 3-year intervals in accordance with the approved maintenance schedule preface. A key element 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.

ONR's consent for Reactor 1 start-up following its last statutory outage was given on 18th December 2013 (Licence Instrument 581). NGL has submitted a request to ONR to permission an extension of the operating period of Reactor 1 until 28th February 2017. The basis for this request is the conflict of availability of essential contract staff and resources over the Christmas period.

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

ONR specialist inspectors in Structural Integrity, Civil Engineering, Graphite, Electrical Systems, Fuels and Control & Instrumentation Systems assessed the licensee's submitted safety justification, to confirm that there were no issues that would prevent agreement by ONR to the requested operating period extension.

Matters arising from ONR's work

No matters preventing the issue of this Licence Instrument were identified from ONR's assessment of the Licensee's safety justification.

Several ONR inspectors noted the information provided in original EC was not current, was submitted late and did not contain the necessary information to enable ONR to form a judgement on deferral of the statutory outage. Although these shortfalls were addressed promptly in the revised EC, I have recommended that a regulatory issue is proposed to ensure NGL improvement management of their submission of future deferral requests.

Conclusions

ONR's assessment of the Licensee's safety justification together with work by an ONR project inspector, provide confidence that it is safe to operate Heysham 1 Reactor 1 until 28th February 2017.

Recommendation

I recommend that a Licence Instrument is issued to agree to EDF Energy Nuclear Generation Limited extending the operation of Heysham 1 Reactor 1 until 28th February 2017.

LIST OF ABBREVIATIONS

ALARP	As low as reasonably practicable
APEX	Appointed Examiner
CLA	Component Life Assessment
CNS	Civil Nuclear Security (ONR)
EA	Environment Agency
EC	Engineering Change
HOW2	(Office for Nuclear Regulation) Business Management System
HYA	Heysham 1 Power Station
INSA	Independent Nuclear Safety Assessment
LC	Licence Condition
LI	Licence Instrument
NGL	EdF Energy Nuclear Generation Limited
ONR	Office for Nuclear Regulation
PCPV	Pre-stressed Concrete Pressure Vessel
PSSR	Pressure System Safety Regulations

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1 PERMISSION REQUESTED

1. EdF Energy Nuclear Generation Limited (NGL), the operator and Licensee of Heysham 1 nuclear power station, has written to the Office for Nuclear Regulation (ONR) requesting an agreement for an extension of the Reactor 1 operating period up to 28th February 2017. NGL has identified a target date of 6th February 2017 to commence Reactor 1 shutdown, but has added a contingency to account for any emergent operational requirements.

2. This permission is requested under licence condition 30(2) of Heysham 1 power station's nuclear site licence.

2 BACKGROUND

3. Under the nuclear site licence, the licensee has the ability to request an extension to an operating period by submitting a request to ONR. ONR can assess this submission (which includes justification for extending the operating period) and can provide the licensee with an agreement to the extension of the operating period.

4. On 5th December, NGL submitted a request (Ref 1) for permission to extend their shutdown until 28th February 2017. NGL's intention is to begin their outage on 6th February 2017. This is an extension by a period of 73 days which includes a suitable contingency. This was a revised submission to ONR since the original submission had not addressed the implications of the recent fuel failures at Heysham 1 Reactor 2 on the proposed extension to the operating period.

5. NGL have included in its submission a Category 2 Engineering Change (EC) justifying the extension to Reactor 1's operating period. This has undergone an independent nuclear safety assessment (INSA) and the approval statement was provided along with the request letter (Ref 2).

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

6. I have considered NGL's request for ONR agreement to the extension of the Heysham 1 Reactor 1 operating period. I have:

- Utilised the services of ONR specialist inspectors, whom I identified with the support of the site inspector and engineering delivery management group lead, which I considered covered the disciplines necessary to make an informed, proportionate judgement
- Determined the views of the ONR nominated site inspector
- Reviewed supporting information
- Reviewed the Project Assessment Report relating to the return to service of Reactor 1 in 2013 following its periodic shutdown.

7. Requests for extensions to reactor operating periods are not novel and similar requests have been submitted to ONR for agreement in the past using similar justification. This is very similar to the Hartlepool extension requested earlier this year with the exception of an increased focus on fuel failures following recent events.

8. ONR has undertaken a high level review of NGL's EC356750 Revision 2 (Ref 3) to identify any significant change to the assessed nuclear safety risk. The review identified that the following areas should be subject to a targeted assessment:

- Electrical Engineering
- Control and Instrumentation (C&I)
- Structural integrity
- Civil engineering
- Graphite
- Fuels
- Site inspection (including conventional safety aspects)

9. The decision to proceed using a targeted ONR assessment was agreed within the programme on the basis that it was proportional to the risk and has been used in the past for similar requests and was in line with guidance provided in HOW2.

10. In addition to the nuclear safety assessments, I sought the opinion from ONR's Civil Nuclear Security site inspector to ascertain whether there were any aspects of the extension to the Reactor 1 operating period that may have an impact on ONR's decision. The CNS site inspector had no objections to the extension of the operating period of Reactor 1 (Ref 4).

11. The principle safety claims within the EC were:

- Even with inclusion of the proposed deferral, the Heysham 1 R1 actual period of operation at power since its last statutory outage will be less than 3 years.
- Deferring the statutory outage has minimal impact on known degradation mechanisms and does not create a significant increase in risk;
- There are no time dependant issues in committed inspection programmes of current safety cases which are significantly affected by this proposal (including previous return to service ECs);
- The nuclear safety risk associated with this proposed deferral is As Low As Reasonably Practicable (ALARP);

12. I have provided a summary of the findings from each of the technical specialists identified below.

3.1 ELECTRICAL ENGINEERING

13. The electrical engineering specialist inspector has reviewed (Ref 5) the proposal for deferral and carried out assessment of the EC (Ref 3). Based on the specialist's review of the EC, the proposed deferral of the R1 2016 Statutory Outage should not significantly impact on electrical systems and equipment and does not in their judgement have a significant effect on nuclear safety.

14. The specialist inspector was satisfied that NGL had presented due diligence in identifying the implications of the deferral and consulted the appropriate SQEP resources within the station and wider NGL technical support organisation.

15. The specialist noted the commitment for NGL to assess where maintenance schedule activities are exceeded or may be exceeded at subsequent outages and the commitment to review these at subsequent outages.

16. The specialist concluded that from an electrical engineering perspective, he was satisfied with the claims, arguments and evidence presented in the submission and did not have any objections to the extension of the operating period to the date requested, that is no later than 28th February 2017. The assessment conclusions were based on receipt of full INSA approval which has subsequently been received.

3.2 C&I

17. The C&I specialist inspector reviewed the proposal for deferral and considers that the impact of the deferral on any increase of known degradation mechanisms will be minimal (Ref 6).

18. The inspector therefore concluded that on the basis of the documentation reviewed and the SQEP statements provided they had no objection to the deferral of the Heysham 1 R1 periodic shutdown.

3.3 STRUCTURAL INTEGRITY

19. The Structural Integrity inspector has reviewed the proposal and concentrated on items that have the highest safety significance using knowledge of structural integrity issues at Heysham 1 and Hartlepool based on the structural integrity assessment of the previous outages (Ref 7).

20. The specialist inspector reviewed the Component Life Assessment (CLA) and was satisfied that the latest assessment indicates no components will reach their action levels prior to 2024.

21. The inspector examined the aspects of NGL's creep life review programme. The creep life review identified a number of welds which required inspection at the 2016 outage. Assessment of the operating hours has indicated that due to forced outages, deferral until February 2017 would not invalidate the assessment and therefore the inspector did not expect that the proposed deferral would significantly increase the risk of failure of these welds.

22. The specialist inspector reviewed the impact of the delayed outage on the maintenance schedule activities. Most of the deferred inspections he considered were weld inspections (including high integrity welds on the superheaters), Boiler Closure Unit inspections and flow assisted corrosion inspections. Based on the evidence presented, the inspector judged that the proposed deferral would not significantly increase the risk of failure of these items.

23. The inspector concluded that he was satisfied with the claims, argument and evidence laid down within the licensee's safety case and has not identified any structural integrity issues which would prevent ONR granting agreement to the outage deferral.

3.4 CIVIL ENGINEERING

24. The Civil Engineering Specialist has reviewed (Ref 8) the request for deferral of the Heysham 1 R1 outage and confined his review to the Pre-stressed Concrete Pressure Vessel (PCPV) and its associated Maintenance Schedule (MS) activities (Schedule No. 3.1 and 3.8).

25. NGL has designated an Appointed Examiner (APEX) as the company officer to undertake duties and independent analysis of maintenance schedule activities associated with the PCPV. The specialist is content that the APEX's opinions have been included in the EC.

26. The specialist considered the effect of the deferral on PCPV tendon replacement, noting that a number of tendons are due for replacement during the forthcoming periodic shutdown. The specialist considered the history of the tendon corrosion for

this reactor and was content that any small increase in risk of wire breakages will not significantly impact on nuclear safety due to the significant margins in the design.

27. The specialist therefore considered that NGL has given adequate consideration to the potential safety implications (if inadequately conceived or executed) of the proposed deferral and has no objections to the proposed extension of the operating period of Reactor 1.

3.5 GRAPHITE

28. The graphite specialist inspector has reviewed (Ref 9) the graphite core aspects of the proposal to defer the Heysham 1 Reactor 1 outage by 73 days. The specialist inspector judged that there is sufficiently large margin on the proposed limit of core irradiation that this deferral will not significantly impact on the nuclear safety requirements of the Reactor 1 core.

3.6 FUEL

29. The fuels specialist reviewed (Ref 10) the initial proposal from NGL (Revision 001) and judged it to have shortfalls the basis that it did not address the recent relevant information on the fuel failures on Heysham 1 Reactor 2.

30. Following queries to NGL and the subsequent update to the EC (Revision 002), the fuel specialist is now satisfied that NGL have adequately considered the fuel aspects on the outage deferral with updated information in the EC and confirmation from the fuel SQEP that the deferral will not have any significant impact on fuel integrity.

3.7 SITE INSPECTION

31. The site inspector has reviewed (Ref 11) the proposal for deferral and judged that there are no current plant issues on site that would prevent ONR from granting its agreement to the extension.

3.8 COMMITMENTS MADE WITHIN THE EC

32. There were no outstanding commitments within the latest provided EC submission.

3.9 OTHER GOVERNMENT DEPARTMENT LIAISON

33. The views of the nominated Environment Agency Site Inspector were sought over the proposed extension to the operating period of Reactor 1 and they did not have any objections. (Ref 12).

4 MATTERS ARISING FROM ONR'S WORK

34. There are no nuclear safety significant issues arising from the assessment of the Licensee's safety justification by ONR inspectors, or the EA inspector which would preventing ONR granting agreement for the deferral of the Heysham 1 Reactor 1 statutory outage up to the 28th February 2017.

35. Several assessors noted the information provided in original EC was not current, was submitted late and did not contain the necessary information to enable ONR to form a judgement on deferral of the statutory outage. Although these shortfalls were addressed promptly in the revised EC, I have recommended that a regulatory issue is proposed to ensure NGL improve management of their submission of future deferral requests.

5 CONCLUSIONS

36. Following ONR's assessment of the Licensee's safety justification, I judge that NGL has provided sufficient confidence that it is safe to defer the Heysham 1 Reactor 1 statutory outage up to 28th February 2017.

6 RECOMMENDATIONS

37. 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 1 Licence Instrument 611.
- Signs Heysham 1 Licence Instrument 611, an Agreement under Licence Condition 30(2) to extend the operating period of Reactor 1 from 18th December 2016 up to 28th February 2017.
- Signs this Project Assessment Report approving its release for publication, after redaction where appropriate.
- Acknowledges that a regulatory issue (level 3) is proposed to ensure NGL improve management of their submission of future deferral requests.

7 REFERENCES

1. NGL Heysham 1 – HYA 50810Y – Extension of Heysham 1 Reactor 1 operating period – 05 December 2016 – TRIM 2016/476804
2. INSA statement for the proposal to defer the 2016 statutory outage of Reactor 1 at Heysham 1 (EC 356750 000 Version No. 2) – TRIM 2016/476804
3. Heysham 1 Statutory Outage 023 Deferral EC 356750 000 Proposal Version No. 02 – TRIM 2016/476804
4. Heysham 1 Reactor 1 2016 outage deferral – CNS consultation – TRIM 2016/482356
5. Heysham 1 Reactor 1 2016 Statutory Outage Deferral – Electrical Engineering Note – TRIM 2016/477414
6. Heysham 1 Reactor 1 2016 outage deferral – C&I assessment TRIM 2016/477847
7. File Note, Heysham 1 Power Station, Reactor 1 Deferral of 2016 Outage, Structural Integrity Assessment TRIM 2016/476799
8. Heysham 1 Reactor 1 2016 deferral – civil engineering assessment – TRIM 2016/465091 and 2016/477353
9. Heysham 1 Reactor 1 outage 2016 deferral – graphite assessment – TRIM 2016/477687
10. OFP EDF NGL EC 356750 Heysham 1 HYA R1 Outage 023 deferral – Fuel and Core Assessment Note – TRIM 2016/475544
11. Heysham 1 Reactor 1 2016 outage deferral – E-mail from Site Inspector to Project Inspector – TRIM 2016/483235
12. Heysham 1 Reactor 1 2016 outage deferral – EA response – TRIM 2016/482900