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**Licensee request for approval for change in Nuclear Safety Requirement 9 under  
Licence Condition 23 (5)**

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## EXECUTIVE SUMMARY

### Licensee request for approval for change in Nuclear Safety Requirement 9 under Licence Condition 23 (5)

This report reviews the request from Heysham 1 power station to revise (remove and amend) its Nuclear Safety Requirements (NSR) associated with the safety relief valve set pressure range for off-load pressurised refuelling operations. This report summarises ONR's assessment and recommends approval under Licence Condition (LC) 23(5) to permit the NSR to be revised.

#### Permission Requested

EDF Energy Nuclear Generation Ltd (NGL), the licensee of Heysham 1 power station, has requested that the Office for Nuclear Regulation (ONR) should issue an approval under LC 23(5), to replace NSR 9 (Handling of fuel, in-core components and nuclear matter) Issue 1, 19 March 2001 with NSR 9 Issue 2, 3 March 2016.

Specifically this includes removal of reference to the safety relief valve set pressure range for off-load refuelling.

#### Background

NGL complies with LC 23 (Operating Rules) through Technical Specifications (TS), which form the principal means by which it demonstrates compliance with the requisite conditions and limits necessary for safety. NSR constitute top-tier Operating Rules, with amendments to these approved by ONR under LC 23(5). This means that they cannot be amended without ONR's oversight.

ONR system based inspections of the Heysham 1 Additional Fuel Storage Facility (AFSF) storage tubes revealed that the Heysham 1 TS permit off-load pressurised refuelling when this operation is always performed in a depressurised state. This requires a set pressure range for the AFSF safety relief valves that is a significant burden for the site to maintain, considering the regime in which they operate. There is no intention to carry out the activity in the pressurised state; this has resulted in an inconsistency between the station's safety case and the way in which the site chooses to operate in accordance with the NSR.

This proposal will remove references to set ranges on the safety relief valves that are intended for pressurised refuelling from within the station documentation. This is an operational burden as the safety relief valves require a regime of monitoring to check their set pressure range which is set at 52.04 to 54.16 barg. It will also modify the components related to controlling the pressure (the safety relief valves and the pressure regulating valves) in line with the reduced operation pressure (depressurised at 50 mbarg) of the AFSF.

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

ONR's assessment of this submission has been based on the following:

- Assessment of the encompassing Engineering Change proposal, 349763.
- A consistency review of EC 349763 and associated amendments in NSRs and Limits and Conditions of Operation (LCO).
- Sampling of affected Station Operating Instructions and LCOs.
- Verification of the appropriate rigour of the licensee's own processes in respect of these changes. In particular, ensuring appropriate Independent Nuclear

- Safety Assessment has been applied and relevant Nuclear Safety Committee oversight relevant to this category of modification.
- A visit to Heysham 1 site to speak with the AFSF system engineer as part of information gathering to support this assessment.

### **Matters arising from ONR's work**

The work undertaken in this assessment has not identified any regulatory or technical issues or concerns that would prevent ONR issuing approval for the licensee to make the proposed changes to NSR 9.

### **Conclusions**

Based upon ONR's consistency review and sampling of affected documentation, it has been judged that proposed changes are acceptable and should be implemented.

### **Recommendation**

Based on my review and sampling I am content with the proposed amendments to NSR 9. Therefore I recommend that the Deputy Chief Inspector should sign Licence Instrument No. 601. This will modify Approval No. 24 and thus approve EDF Energy Nuclear Generation Ltd request under Licence Condition 23(5) to amend Nuclear Safety Requirement 9, replacing Issue 1, 19 March 2001 with Issue 2, 3 March 2016.

## LIST OF ABBREVIATIONS

AFSF	Additional Fuel Storage Facility
ALARP	As low as reasonably practicable
EC	Engineering Change
INSA	Independent Nuclear Safety Assessment
LC	Licence Condition
LCO	Limits and Conditions of Operation
NGL	EdF Energy Nuclear Generation Limited
NSC	Nuclear Safety Committee
NSR	Nuclear Safety Requirement
ONR	Office for Nuclear Regulation
SOI	Station Operating Instructions
TS	Technical Specifications

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## 1 PERMISSION REQUESTED

1. EDF Energy Nuclear Generation Ltd (NGL) has written to the Office for Nuclear Regulation (ONR) in Reference 1 to request ONR Approval under Licence Condition (LC) 23(5) to amend Heysham 1 Nuclear Safety Requirements (NSR), replacing NSR 9 Issue 1, 19 March 2001 with NSR 9 Issue 2, 3 March 2016.
2. These amendments are proposed under Engineering Change (EC) 349763 (Ref. 1. c). Specifically, these proposals include removal of reference to the safety relief valve set pressure range for off-load refuelling.
3. Three tiers of documents are affected, the Approved NSRs, the underlying LCOs and the plant operating instructions (POIs). This encompasses:
  - Amendment of NSR 9.8 (Fuel Storage Facilities) and LCO 9.8.1, specifically table 9.8.1-1.
  - Amendment to a number of POIs as a result of all the above which are referred to as affected documentation in EC349763.

## 2 BACKGROUND

4. ONR system based inspections of the Heysham 1 Additional Fuel Storage Facility (AFSF) storage tubes revealed that the Heysham 1 TS permit off-load pressurised refuelling when this operation is always performed in a depressurised state. This requires a set pressure range for the AFSF safety relief valves that is a significant burden for the site to maintain, considering the regime in which they operate. There is no intention to carry out the activity in the pressurised state, this has resulted in an inconsistency between the station's safety case and the way in which the site chooses to operate in accordance with the NSR.
5. NGL complies with LC 23 (Operating Rules) through TS, which form the principal means by which it demonstrates compliance with the requisite conditions and limits necessary for safety. NSR constitute top-tier Operating Rules, which are approved by ONR under LC 23(5), subsequent amendment requires further ONR approval.

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

6. In forming my judgement of this proposal and whether it should be recommended for Approval, my assessment of this submission has been based on the following:
  - Assessment of the encompassing EC 349763. A short assessment was judged to be proportionate in light of the lower categorisation (Category 2) of the modification.
  - A consistency review of the EC 349763 and associated amendments in NSRs (9.8), LCOs (9.8.1).
  - Sampling of impacted LCO (9.8.1) and POI (0249P1136).
  - Verification of the appropriate rigour of the licensee's own processes in respect of these changes. In particular, ensuring appropriate Independent Nuclear Safety Assessment (INSA) has been applied and relevant Nuclear Safety Committee (NSC) oversight relevant to this category of modification.
  - A visit to Heysham 1 site to speak with the AFSF system engineer as part of information gathering to support this assessment.
7. I have examined NGL's INSA Approval Statement (Ref. 1. b) and consider that it constitutes an independent assessment of the licensee's submission of appropriate rigour and depth.

8. I have also confirmed that changes to associated NSR & LCOs are consistent with the EC and revised TS documents.
9. Impacted POIs have been sampled as follows:

**POI 0249P1136** Buffer Storage Tubes (BST) Primary Cooling System, Primary Circuit Pressure Increase – System on Auto.

Within this POI, I identified references to pressurised refuelling and queried this with the AFSF system engineer. I have been assured by station staff that these references will be changed when the offload depressurised case (EC 352213) is issued but the engineer agreed to make the necessary changes to this document. I do not believe these references would have any considerable impact on the operation of this system as they were notes for the operator to consider, therefore I am content with this course of corrective action.

10. The modification was duly noted, in accordance with the licensee's LC 23 arrangements, at the 8<sup>th</sup> October 2015 NSC. There was no specific comment or concern raised pursuant to the submission.
11. As this is a Category 2 submission, I judged that a brief assessment was appropriate to permission this modification. I sampled the safety case (EC349763) and concluded the case was based on sound engineering principles, retaining its defence in depth by utilising the same safety devices and by altering the operational range of the safety relief valves to reflect the refuelling operations of the station in a depressurised state. This requires replacement work (Safety Relief Valve internals and the Pressure Regulating Valves) which is dependent on this permission and the licensee expects this will improve the reliability of the system, by installing new pressure regulating valves selected from a reputable manufacturer and used across all EDF sites and by lowering the pressure of safety relief valves to a pressure more representative of the possible fault scenarios.
12. I requested several documents and raised several questions related to the submission by the licensee and received adequate responses to my queries (Ref. 2 and Ref. 3). The documents I requested included; Issue 1 of NSR 9, the appendices to EC349763 and several of the references from EC349763. I sampled all of these documents and judged that the references and appendices were appropriate supporting information. I reviewed Issue 1 of NSR 9 and the proposed changes and found these to be consistent with the recommendations of the EC. Most of the questions I asked were to clarify content of the EC349763, for instance, I asked for details of the general usage of the buffer fuel storage tubes. The response was that 31 of the 32 tubes can be used for storage and all of these are used all of the time and occasionally the tube will be empty with a short shield plug sealing the tube. There are currently 11-off failed fuel stringers in the AFSF.
13. I visited site to discuss the NSR 9 amendment and its associated EC 349763 in more detail (Ref. 4). It was also an opportunity to discuss the responses to my initial questions in more detail. Further information was requested as a consequence of this engagement and this was sent after the meeting by the AFSF system engineer (Ref. 5). As an example, during sampling one of the references of EC349763, I could not follow the argument for why the fault scenarios are bounded by a dose band 2 release. I asked the AFSF system engineer to provide information and evidence for why the fault scenarios are bounded as dose band 2. I was provided with responses to all my further queries and I am satisfied with these responses. For the query on dose band 2 release, this is discussed in the interim safety case which is reference 16 of EC349763 which states that dose band 2 has been assessed for risk of oxidation for dropped and damaged fuel.

#### **4 MATTERS ARISING FROM ONR'S WORK**

14. There were no matters arising from ONR's work relating to this Approval request.

#### **5 CONCLUSIONS**

15. Based upon my consistency review and sampling of impacted documentation, I have judged that proposed changes are acceptable and should be implemented.

#### **6 RECOMMENDATIONS**

16. Based on my review and sampling I am content with the proposed amendments to Nuclear Safety Requirement 9. Therefore I recommend that the Deputy Chief Inspector should sign Licence Instrument No. 601 which will modify Approval No. 24 and thus approve EDF Energy Nuclear Generation Ltd request under Licence Condition 23(5) to amend Nuclear Safety Requirement 9, replacing Issue 1, 19 March 2001 with Issue 2, 3 March 2016.

## 7 REFERENCES

1. TRIM 2015/480433 – EDF - CNRP - NSLHYA50785(Y) - LC 23(5) - Request for Approval under Licence Condition 23(5) Amendment to Nuclear Safety Requirements - 14 December 2015
  - a) EDF Energy NGL Nuclear Safety Committees Minutes of the Meeting Held at Sizewell B on 8<sup>th</sup> October 2015
  - b) Heysham 1 – INSA Approval Statement – EC No. 349763 000
  - c) Heysham 1 – EC349763 000 Proposal Version no. 07 – Reduction of Additional Fuel Storage Facility CO<sub>2</sub> Primary Cooling Circuit Maximum Operating Pressure
2. TRIM 2016/56720 – Documents requested (by ONR to EDF NGL) for NSR 9 amendment for HYA AFSF 8<sup>th</sup> February 2016
3. TRIM 2016/56720 and 2016/67069 – Response to questions: NSR 9 amendment for HY1 AFSF pressure modification 8<sup>th</sup> February 2016
4. TRIM 2016/67739 - NGL – CNRP – Contact Record - 15 - 325 - Visit to Heysham 1 to speak to the AFSF system engineer about the NSR 9 modification 12th Feb 2016
5. TRIM 2016/97750 – Heysham 1 – Request for approval of NSR 9 change for AFSF – response from queries following site visit 3<sup>rd</sup> March 2016