



PROJECT ASSESSMENT REPORT			
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Site:	Torness		
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Amendment to Nuclear Safety Requirement 4 at Torness Power Station

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Revision 0
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EXECUTIVE SUMMARY

EDF Nuclear Generation Ltd (NGL) complies with Licence Condition 23 [Operating Rules] through Nuclear Safety Requirements (NSR). These are top-tier Operating Rules that are approved by ONR under Licence Condition 23(4) and their amendments are approved by ONR under Licence Condition 23(5).

The first Periodic Safety Review (PSR) at Torness power station included a conservative analysis of the secondary shutdown function that confirmed adequate secondary shutdown assuming that five nitrogen storage vessels are available for second stage nitrogen injection. However, the current NSR4 requires the availability of four nitrogen storage vessels.

The licensee has identified the inconsistency during the second PSR and proposes to resolve it by introducing the conservative requirement for availability of five nitrogen storage vessels with an amendment to NSR4. The proposed modification will increase the reliability of nitrogen supply to the secondary shutdown system, thereby improving the safety of Torness operation.

NGL has requested approval under Licence Condition 23(5) for an amendment to replace the current NSR4 Revision 102 with Revision 103 that requires five nitrogen tanks to be available for the secondary shutdown second stage injection during reactor operation at power. All other aspects of NSR4 remain unchanged.

NGL has submitted to ONR a Category 2 Engineering Change proposal (EC) to support the requested NSR4 modification by a qualitative analysis of the related safety benefit.

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

- A short assessment of the submitted EC, undertaken by a specialist fault studies inspector. This was judged to be proportionate considering the EC category.
- A review of the licensee's Independent Nuclear Safety Assessment report and Nuclear Safety Committee oversight for relevance to the category of the proposed modification.
- A check for consistency between the EC and the requested amendment to NSR4.

The assessment has concluded that each of the three assessment areas has been satisfactorily addressed.

It was recommended that the Deputy Chief Inspector for the civil nuclear reactor programme should sign Licence Instrument No. 538 and thus approve NGL's request under Licence Condition 23(5) to amend NSR 4 by replacing Revision 102 with Revision 103.

LIST OF ABBREVIATIONS

ALARP	As low as reasonably practicable
EC	Engineering Change proposal
INSA	Independent Nuclear Safety Assessment
NGL	Nuclear Generation Limited
NSC	Nuclear Safety Committee
NSR	Nuclear Safety Requirement
ONR	Office for Nuclear Regulation
PICA	PSR Identified Corrective Actions
PSR	Periodic Safety Review
TOR	Torness power station
SSD	Secondary Shutdown

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1 PERMISSION REQUESTED

2. The Licensee - EDF Energy Nuclear Generation Ltd (NGL) has written to ONR in letter NSL/TOR/50534R, dated 21 May 2015 (Ref. 1) to request approval from ONR for an amendment to Nuclear Safety Requirements (NSR) at Torness power station (TOR).
3. NGL has requested approval under Licence Condition 23(5) of an amendment to Nuclear Safety Requirement 4 (NSR4) by replacing its current Revision 102 with an updated Revision 103 (Ref. 2). The proposed NSR4 Revision 103 differs from the current Revision 102 only in the increased number - from four to five - of nitrogen storage vessels available for the secondary shutdown (SSD) system when the reactor is at power.
4. This NSR4 amendment request is supported by the qualitative analysis of the related safety impact, presented in EC (Ref. 3).

2 BACKGROUND

5. The SSD is designed to provide post-trip shutdown and long-term hold-down of the advanced gas-cooled reactor (AGR) in case of failure of the Primary Shutdown System. At both TOR and Heysham 2, the SSD includes the following sub-systems:
 - Nitrogen store including two groups of nitrogen storage vessels.
 - First stage of nitrogen injection that provides a high flow-rate of nitrogen within the interstitial channels of the core causing rapid shut-down of the reactor. The injected nitrogen is supplied from the first group of nitrogen storage vessels.
 - Second stage of nitrogen injection that provides make-up flow-rate of nitrogen within the interstitial channels of the core to keep the reactor subcritical as the originally injected nitrogen may be dispersed in the reactor. The injected nitrogen is supplied from the second group of nitrogen storage vessels (11 in total).
 - A set of bead hoppers that are intended to inject boron beads into the reactor to establish long term hold-down with a significant negative margin to criticality.
6. An assessment performed in 1988 assured sufficiency of four nitrogen storage vessels in the second stage of SSD injection - as stated in the current Revision 102 of NSR4.
7. The first Periodic Safety Review (PSR1) at TOR in 1999 included a conservative analysis that confirmed adequate performance of the second stage nitrogen injection assuming that five nitrogen storage vessels are available. For unknown reasons this result was not reflected in NSR 4 at the time. The resulting inconsistency was subsequently identified in PSR2 (2008) and recorded as PSR Identified Corrective Action (PICA) 4.02.23.
8. The licensee aims to resolve the above inconsistency by amendment to NSR 4 so that availability of five nitrogen storage vessels is required when a reactor operates at power. The EC (Ref. 3) provides a case to support the proposed amendment to NSR4.

3 ASSESSMENT WORK CARRIED OUT BY ONR

9. ONR's assessment of the licensee's submission was focused on the following areas:
10. A short assessment (Ref. 4) of the Category 2 EC (Ref. 3) that supports the safety benefit from the NSR4 amendment. A short assessment was judged to be proportionate considering the straightforward character and the category of the EC.
11. Verification of appropriate INSA assessment (Ref. 5) and relevant Nuclear Safety Committee oversight (Ref. 6) relevant to this category of modification.
12. A review of the EC (Ref. 3) consistency with the proposed NSR4 amendment (Ref. 2).

4 MATTERS ARISING FROM ONR'S WORK

13. The Category 2 EC (Ref. 3) was subject to a limited assessment from a fault studies point of view (Ref. 4) that came to the following conclusions:
- The EC (Ref. 3) presents sufficient support to the proposed amendment of NSR 4.
 - The claims, arguments and evidence are logically arranged and provide confidence that the proposed amendment of NSR 4 complies with the safety case.
 - The absence of ALARP analysis is acceptable considering the risk reduction that should be derived from the proposed amendment to NSR 4 in terms of increasing the safe hold-down time provided by the second stage SSD nitrogen injection.
 - In terms of fault studies the EC (Ref. 3) is fit for its intended purpose and provides grounds for ONR's Approval of the proposed amendment to NSR4.
14. I have examined NGL's INSA Approval Statement (Ref. 5) and consider that it represents an appropriate independent assessment of the Licensee's submission.
15. I note that the EC (Ref. 3) has been subject to a NSC discussion in accordance with the licensee's Licence Condition 22 arrangements without any outstanding caveats (Ref. 6).
16. I have also confirmed that the proposed change in the text of NSR 4 (Ref. 2) is consistent with the supporting EC (Ref. 3).

5 CONCLUSIONS

17. I have concluded that the licensee's submission has addressed each of the three assessment areas to provide a satisfactory level of confidence.

6 RECOMMENDATIONS

18. I recommend that the Deputy Chief Inspector for the civil nuclear reactors programme should sign Licence Instrument No. 538 and thus approve NGL's request under Licence Condition 23(5) to amend NSR 4 by replacing Revision 102 with Revision 103.

7 REFERENCES

1. TRIM 2015/196826 EDF NGL Torness NSL/TOR/59534R - Request for Approval under LC 23(5) - Amendment to Nuclear Safety Requirements – 21 May 2015
2. TRIM 2015/196826 – Attachment 5 EDF NGL Torness - Current (Revision 102) and Proposed (Revision 103) text of NSR 4 Rector control and protection.
3. TRIM 2015/196826 – Attachment 4 EDF NGL Torness - Cat. 2 Engineering Change Proposal EC No. 355070 001, Proposal Version No.: 0101, SSD System - Safety Case Update and Clarification, and Revision of NSR 4, April 2015.
4. TRIM 2015/226050 Assessment Note for Torness (TOR) Power Station – Category 2 EC – NSR4 amendment proposal for Approval under LC23(5) – I. Stanev – Aug. 2015.
5. TRIM 2015/196826 – Attachment 2 EDF NGL - INSA review of EC No. 355070 001, Proposal Version No.: 01, Tornes SSD System - Safety Case Update and Clarification, and Revision of NSR 4, May 2015
6. TRIM 2015/196826 – Attachment 3 EDF NGL - Extract of Nuclear Safety Committee minutes relating to amendment of Torness NSR 4, April 2015.