

**Torness Reactor 2 Periodic Shutdown 2022**  
**Consent to Start-Up Reactor 2 Following Periodic Shutdown**

Project Assessment Report ONR-OFD-PAR-22-005  
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## EXECUTIVE SUMMARY

### Title

Torness Reactor 2 Periodic Shutdown 2022 - Consent to Start-Up Reactor 2 Following Periodic Shutdown.

### Permission Requested

EDF Energy Nuclear Generation Limited (NGL), the operator and licensee of Torness nuclear power station, has written to the Office for Nuclear Regulation (ONR) requesting Consent to start-up Reactor 2 following its 2022 periodic shutdown. The request is in accordance with the licensee's arrangements made under Licence Condition (LC) 30(3).

### Background

The nuclear site license requires the licensee to periodically shutdown any plant or process under LC30. This is to enable examination, inspection, maintenance and testing (EIMT) to take place. ONR has specified under LC30(3) that the licensee is required to seek ONR's Consent before the start-up of a reactor after it is shutdown in compliance with LC30(1). At Torness, reactor periodic shutdowns are every three years, as specified in the Maintenance Schedule preface, which is an approved document under LC28(4).

ONR Consent for Reactor 2 start-up following its last periodic shutdown was given on 13 November 2018 (Licence Instrument 556). Owing to the impact of the Covid-19 pandemic, the licensee submitted a safety justification to extend the operating period of Reactor 2 until no later than 10 June 2022, which ONR agreed to (Licence Instrument 563). The Reactor 2 periodic shutdown commenced on the 7 May 2022.

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

The main requirements ONR seeks to confirm during a periodic shutdown are:

- The EIMT requirements specified in the station's maintenance schedule in support of LC30 have been complied with.
- EIMT has been carried out by Suitably Qualified and Experienced Persons, with an appropriate level of supervision and quality assurance in place commensurate with equipment's safety function.
- Safety issues identified by the licensee during the outage are adequately addressed with suitable and sufficient safety justification provided to allow a regulatory judgement to be made in support of re-start of the reactor and its safe operation until the next periodic shutdown.

The documentation produced by the licensee for the periodic shutdown and the EIMT of structures, systems and components important to nuclear safety has been assessed by ONR specialist inspectors in:

- Graphite
- Structural Integrity
- Electrical Engineering
- Control & Instrumentation
- Mechanical Engineering
- Civil Engineering
- Chemistry
- Site inspections were conducted to confirm work was carried out by competent individuals and to the required quality standards

An inspection by Fire Life Safety and Internal Hazards was also undertaken during the statutory outage. This inspection was not undertaken in support of the Consent to start-up Torness Reactor 2.

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

There are no outstanding issues preventing the return to service of Torness Reactor 2. ONR intervention findings during the periodic shutdown have been recorded in the respective inspection records and reported to the licensee. All matters have now been addressed to allow Consent to start-up Torness Reactor 2. There remain some minor residual issues to be addressed after Torness Reactor 2 start-up and these will be followed up through routine regulatory business.

### **Conclusions**

ONR's inspection and assessment of the Torness Reactor 2 2022 periodic shutdown confirms that the licensee has carried out EIMT in accordance with the requirements of its maintenance schedule. The work has been conducted to the required quality standards by competent personnel. No outstanding issues of significance have been identified by the licensee or ONR that prevent the start-up of Torness Reactor 2 following its periodic shutdown.

### **Recommendation**

I recommend that ONR issues Licence Instrument 565, giving Consent to start-up Torness Reactor 2 following its 2022 periodic shutdown.

**LIST OF ABBREVIATIONS**

ALARP	As low as reasonably practicable
BPGP	Bypass Gas Plant
C&I	Control and Instrumentation
CNSS	Civil Nuclear Security and Safeguards
EC	Engineering Change
EIMT	Examination, Inspection, Maintenance and Testing
EOSR	Early Outage Safety Review
GAP	Graphite Assessment Panel
GBIM	Gas Baffle Inspection Manipulator
IM	Interstitial Manipulator
INA	Independent Nuclear Assurance
INSA	Independent Nuclear Safety Assessment
LC	Licence Condition
LI	Licence Instrument
MS	Maintenance Schedule
NGL	EDF Energy Nuclear Generation Limited
OAP	Outage Assessment Panel
OID	Outage Intentions Document
ONR	Office for Nuclear Regulation
PCPV	Pre-stressed Concrete Pressure Vessel
PSSR	Pressure Systems Safety Regulations
R2	Reactor 2
RTS	Return to Service
SEPA	Scottish Environment Protection Agency
SQEP	Suitably qualified and experienced persons

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## 1 PERMISSION REQUESTED

1. EDF Energy Nuclear Generation Limited (NGL), the operator and licensee of Torness nuclear power station, has asked the Office for Nuclear Regulation (ONR) (Ref. [1]) for Consent to start-up Reactor 2 (R2) after its 2022 periodic shutdown. The request is in accordance with the licensee's arrangements made under Licence Condition (LC) 30(3).
2. This report describes how ONR has regulated the periodic shutdown, the matters considered, decisions made and the basis for giving Consent to start-up Torness R2.

## 2 BACKGROUND

3. The Torness nuclear site licence requires the licensee to periodically shutdown any plant or process under LC30 to enable examination, inspection, maintenance and testing (EIMT) to take place. The Torness Maintenance Schedule (MS) preface, (an approved document under LC28(4)) specifies that reactor periodic shutdowns take place every three years. ONR has specified under LC30(3) (Ref. [2]) that the licensee requires Consent from ONR to start-up a reactor after its shutdown in compliance with LC30(1).
4. ONR Consent to start-up Torness R2 after its last periodic shutdown was given on 13 November 2018 (Licence Instrument (LI) 556). Owing to the impact of the Covid-19 pandemic, the licensee submitted a safety justification to extend the operating period of Torness R2 until no later than 10 June 2022, which ONR agreed to (LI 563).
5. The Reactor 2 periodic shutdown started on the 7 May 2022 and the scope of work planned during the shutdown is set out in the licensee's Outage Intentions Document (OID) (Ref. [3]). The OID sets out the scope of plant inspections, EIMT requirements, plant and pressure circuit inspection strategy and other work to be carried out in support of safety. It also identifies the licensee's arrangements for managing safety and quality during the shutdown.

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

6. The purposes of ONR inspection and assessment activities during a periodic shutdown are to establish that:
  - The EIMT requirements specified in the station's MS in support of LC30 have been complied with.
  - EIMT has been carried out by suitably qualified and experienced persons (SQEP), with an appropriate level of supervision and quality assurance in place commensurate with equipment's safety function.

- Safety issues identified by the licensee during the outage are adequately addressed with suitable and sufficient safety justification provided to allow a regulatory judgement to be made in support of re-start of the reactor and its safe operation until the next periodic shutdown.
7. Based on the scope of work identified in the OID, I judged it proportionate to obtain advice from the following disciplines to support my recommendation to give Consent:
- Graphite
  - Structural Integrity
  - Electrical Engineering
  - Control & Instrumentation (C&I)
  - Mechanical Engineering
  - Civil Engineering
  - Chemistry
8. An inspection by Fire Life Safety and Internal Hazards (Ref. [4]) was also undertaken during the periodic shutdown. This inspection was not undertaken in support of the Consent to start-up R2 and is therefore not reported here. However, no matters of safety significance were identified, and no issues that would impact giving Consent to start-up R2.
9. The inspections and assessments were undertaken in accordance with ONR Technical Inspection and Assessment Guidance. I provided oversight by maintaining an overview of the work undertaken by the ONR specialist inspectors, monitoring periodic shutdown activities, and providing regulatory input as necessary.
10. The following sections provide summaries of the ONR specialist inspectors' inspection and assessment findings for each technical discipline supporting the Torness R2 periodic shutdown. These provide the information and evidence that underpins ONR's considerations and judgement to give Consent to start-up Torness R2.
- 3.1 GRAPHITE**
11. Reference [5] reports the findings of the graphite assessment of the Torness R2 periodic shutdown.
12. The graphite inspector carried out an LC28 inspection during the periodic shutdown to determine the adequacy of the licensee's arrangements for the inspection of the graphite core and peripheral bricks and compliance with these arrangements. The inspector also carried out an assessment of the Torness R2 2022 periodic shutdown inspection results relating to the graphite core and considered whether the results could challenge relevant graphite safety case limits.



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13. The licensee's intended scope of graphite inspections during the periodic shutdown was:
  - Inspection of a minimum of 20 fuel channels both visually and dimensionally;
  - Trepanning of a minimum of 30 graphite specimens to a depth of 80mm using the Advanced Graphite Trepanning Equipment, with a target of 36 samples;
  - Visual inspection of one control rod channel;
  - Inspection of 3 faces of the peripheral shield wall;
  - Inspection of 8 channels with the Eddy Current Inspection Tool.
14. During inspections the licensee found a circumferential defect in one of the graphite bricks which the Graphite Assessment Panel (GAP) sentenced as bore-initiated. No full-height axial defects were found during the inspections.
15. Also observed during the inspections was cracking around the gas ports in the layer 1 brick in channel Q65. The licensee does not consider that this cracking poses a credible risk to the fuel and that it is unlikely to affect the stability of the channel nor the cooling or movement of the fuel channel. The graphite inspector and a fault studies inspector were content with the evidence provided by the licensee and consider this should not prevent return to service of R2. The graphite inspector notes that the future inspection strategy for channel Q65 has not been agreed and this will be followed up through routine regulatory business (see recommendation 2 below).
16. During the periodic shutdown there was a failure of the inspection manipulator for the peripheral bricks and core restraint. This is discussed further in Section 3.8.3.
17. The inspector concludes that they are content that the findings of the graphite fuel channel inspections do not challenge the existing graphite safety cases and should not prevent the return to service of Torness R2. The inspector has no objection to ONR granting Consent to start-up R2 and their report identifies two recommendations. These are:
  - Recommendation 1: I recommend that the project inspector confirms the Independent Nuclear Safety Assessment (INSA) statement has been made available by the licensee and is in agreement with the views in the Engineering Change document.
  - Recommendation 2: The licensee should explain the inspection strategy for the gas port defects found in Q65 at the next reasonably practicable opportunity. This should include an outline justification for the proposed inspection plan for Q65 and why the risks associated with the cracking in the Q65 gas ports are being maintained ALARP.

18. ONR has subsequently received and is content with the Engineering Change (EC) summarising the findings of the graphite inspections and the associated INSA approval statement (refer to section 3.8.8). Recommendation 2 will be followed up as routine regulatory business following the periodic shutdown (regulatory issue 10872 refers).

### 3.2 STRUCTURAL INTEGRITY

19. Reference [6] reports the findings of the structural integrity assessment of the Torness R2 periodic shutdown.
20. The assessment considered the adequacy of the inspections of welds, pipework, vessels, metallic reactor internal structures and components, main cooling water system and pipe hangers in line with LC28; and compliance with Pressure Systems Safety Regulations (PSSR) 2000 undertaken during the periodic shutdown.
21. The inspector conducted the assessment in three stages:
- pre-periodic shutdown review of the licensee's periodic shutdown intentions proposal and supporting overhaul inspections specification documentation;
  - an ONR inspection at site was undertaken during the periodic shutdown to assess the adequacy of the inspections in progress and how the licensee is complying with the commitments provided in the OID; and
  - monitoring of the Outage Assessment Panel (OAP) minutes throughout the periodic shutdown to identify how the inspections are progressing and how any emergent issues identified are managed and resolved.
22. The inspector was satisfied that pre-periodic shutdown inspection documentation has adequately addressed the requirements of the safety case led maintenance schedules and PSSR inspections. The inspector was satisfied that these inspections have been undertaken in line with the Torness R2 2022 periodic shutdown inspection documentation, and that the licensee has followed corporate procedures in the selection, assessment and sentencing of component inspections and subsequent results.
23. Aside from defects identified in the decay heat boiler pipework (see Section 3.8.3), the licensee did not identify any other significant issues with welds or components inspected under its in-service inspection programme. The inspector therefore judges that the licensee has, where necessary, taken appropriate remedial action to repair or otherwise justify the components for return to service.
24. The structural integrity inspector recommends that ONR should issue the LI to grant Consent for start-up of Torness R2, following the 2022 periodic shutdown providing ONR receives the following information:

- The INSA certificate for the Return to Service (RTS) EC (EC 371316) should be submitted as part of the licensee's application for consent to RTS to show satisfactory completion of the inspection programme and completion of the work of the OAP.
- A return to service statement from the PSSR Competent Person should be submitted as part of the licensee's application for consent to RTS to show satisfactory completion of the PSSR inspections.
- A demonstration that the inspections not covered by the Appointed Examiner and third-party PSSR Competent Person have been completed satisfactorily. The RTS EC must include a statement from the licensee's second party PSSR Competent Person supporting the fitness for return to service.

25. In support of the request to start-up Torness R2 the licensee has supplied this information to ONR (see Sections 3.8.7, 3.8.10 and 3.8.11) and this recommendation has therefore been closed out.

### **3.3 ELECTRICAL ENGINEERING**

26. Reference [7] reports the findings from an electrical engineering LC28 inspection during the periodic shutdown.
27. The inspectors targeted the planned electrical work being undertaken as part of the R2 statutory outage including the planned electrical EIMT activities from the station's OID and any reactive electrical work emergent from the shutdown. The inspection also targeted a sample of electrical safety aspects related to, contractors' welfare facility installations, tools and equipment for testing for dead and/or live working, and portable electrical equipment.
28. The inspection confirmed that the planned EIMT activities during the shutdown were appropriate and that electrical plant and equipment was being maintained in accordance with the established arrangements. Additionally there were no matters of significant safety concern identified with the electrical safety arrangements that were not already being addressed or are the subject of actions to take corrective measures within the station arrangements.
29. The electrical engineering inspectors considered that from an electrical engineering perspective there were no issues that affect the return to service of Torness R2 from this statutory outage, subject to completion of all the required electrical engineering outage activities (see Section 3.8.6).

### **3.4 CONTROL AND INSTRUMENTATION**

30. Reference [8] reports the findings from a C&I LC22 and LC28 inspection during the periodic shutdown.

31. The inspection focussed on verification that relevant work activities have been carried out in relation to C&I equipment and systems important to safety to confirm they remain fit for their intended purpose at Torness.
32. The inspectors noted a significant improvement in the position regarding the health of the neutron flux detectors which has previously been noted as an area of challenge for the station.
33. The inspectors found examples of good ageing and obsolescence forward planning and management. The plant areas and equipment cubicles inspected were clean, tidy, and free from foreign materials, which demonstrated that good housekeeping practices were being followed. The inspectors considered that NGL employees demonstrated a good level of knowledge of the systems and equipment they were responsible for.
34. The inspectors considered that the commitments made in the Torness R2 OID for C&I equipment and systems important to nuclear safety had been satisfied for those elements of work complete at the time of the inspection. The inspectors considered that for the work activities inspected during the intervention it was generally found that the workmanship applied was adequate and consistent with the standards expected from C&I SQEP.
35. During the inspection the inspectors reviewed the implementation of EC's associated with the quadrant trip hardening project and phased reinforcement of reactor protection equipment. The inspectors considered the modifications and testing to have been satisfactorily completed with the documentation and processes appropriately managed and signed off.
36. The C&I inspectors support ONR giving Consent to start-up R2 following successful completion of the planned maintenance activities.

### **3.5 MECHANICAL ENGINEERING**

37. Reference [9] reports the findings from a mechanical engineering LC28 inspection during the periodic shutdown.
38. The intervention sampled Mechanical Engineering equipment important to nuclear safety. This includes:
  - gas circulators;
  - reactor safety relief valves;
  - control rod actuators; and
  - lifting equipment.
39. The inspectors considered that the licensee's EIMT of mechanical engineering equipment has adequately demonstrated compliance with LC28. The inspectors further considered that the licensee adequately demonstrated that the Torness maintenance facilities had:

- walkways that were clean and free from obstruction;
- adequate housekeeping and foreign material exclusion controls; and
- adequate tools and spares control.

40. The mechanical engineering inspectors did not identify any matters that would prevent Torness R2 from returning to service.

### 3.6 CIVIL ENGINEERING

41. Reference [10] reports the findings from the civil engineering assessment of the Torness R2 2022 periodic shutdown.

42. The civil engineering assessment considered NGL's Statutory Examination Report which is produced by the Appointed Examiner. The Appointed Examiner is NGL's nominated SQEP responsible for ensuring the provision of in-service inspection and surveillance activities relating to the Pre-stressed Concrete Pressure Vessel (PCPV).

43. The civil engineering assessment considered the findings of the surveillances, inspections and tests of certain key safety related components of the R2 PCPV including:

- Visual inspection of concrete surface condition
- Visual inspection of pre-stressing anchorages
- Tendon residual load tests
- Pre-stressing strand and grease condition
- Strand tensile testing
- Settlement and tilt survey
- Review of embedded strain gauge readings
- Review of vessel concrete temperatures
- Review of reactor coolant leakage
- Review of pressure vessel cooling water leaks
- Top cap deflection survey
- Visual inspection of PCPV support bearings

44. The civil engineering assessment did not find any significant shortfalls in the surveillances and inspections reported by the Appointed Examiner. The Appointed Examiner raised five recommendations to ensure that issues identified by the maintenance, inspection and testing schedule activities are adequately addressed. The civil engineering inspector considered the Appointed Examiner's recommendations to be well founded and appropriate.

45. The civil engineering inspector identified a minor shortfall with respect to incidences of low flow in the Pressure Vessel Cooling Systems, which are suspected to be leading to increased vessel temperatures. As such, the Inspector made the following two recommendations:

- Recommendation 1: NGL should provide evidence to ONR to confirm that the statutory outage activities, associated with the pilecap flow surveys and resetting, have been successfully completed prior to ONR issuing the Licence Instrument to return to service.
  - Recommendation 2: NGL should review its strategy, and associated measures, and update these (as necessary) to ensure that the potential for localised low Pressure Vessel Cooling System flows, and the risk of blockages leading to increased vessel temperatures, are reduced as low as reasonably practicable.
46. The civil engineering inspector is content to support the return to service of the Reactor 2 PCPV for the next operating period of three years subject to the identified recommendations being addressed.
47. The licensee has subsequently confirmed that the pilecap flow surveys and resetting have been successfully completed (Ref. [11]) and the civil engineering inspector has confirmed this information closes out recommendation 1 (Ref. [12]). With regards to the second recommendation the civil engineering inspector is content with this issue being resolved following start-up of Torness R2 as the licensee has confirmed the flow surveys and resetting have been completed. This will be followed up as routine regulatory business through a Level 4 regulatory issue (regulatory issue 10922 refers). The civil engineering inspector has confirmed that they are content for ONR to grant consent to start-up Torness R2 (Ref. [12]).

### 3.7 CHEMISTRY

48. Reference [13] reports the findings from a chemistry inspection during the periodic shutdown. The inspection focused on the adequacy of the licensee's LC28 arrangements with respect to the feedwater chemistry control plant required to maintain adequate chemistry for normal operations, start-up and shutdown.
49. The chemistry inspector judged that the licensee adequately demonstrated compliance with LC28 for the areas sampled. The chemistry inspector considered there to be no findings that could significantly undermine nuclear safety and has no objections to the start-up of Torness Reactor 2.

### 3.8 PROJECT INSPECTOR

50. Throughout the periodic shutdown I engaged with the licensee to maintain awareness of the progress of shutdown activities and emergent issues. I also, attended a weekly oversight meeting with the licensee's outage lead team. The weekly meeting covered:
- Overview of the shutdown performance
  - Review of events
  - Progress and critical path

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- Feedback on ONR intervention findings
- Review of issues affecting start-up
- Key outage dates and activities

### 3.8.1 EARLY OUTAGE SAFETY REVIEW

51. I observed licensee's internal nuclear assurance (INA) team on their early outage safety review (EOSR) (Ref. [14]).
52. The early outage review looked at work area standards and working practices. The purpose of the EOSR is to:
- Assist station management in reducing or eliminating undesirable behaviours and conditions which could have an adverse impact on outage success.
  - Identification of performance shortfalls in the early stages of an outage.
  - Identify any Fleet issues for resolution in the longer term.
53. The EOSR focused on nuclear safety (e.g. protected plant, defence in depth) and conventional health and safety (e.g. lifting operations, working at height). A hot debrief was given to the station lead team at the end of each day and significant issues were followed up immediately.
54. At the end of the EOSR feedback was given on positive observations, areas to watch, areas for improvement and fleet level considerations. There were some minor issues identified which were accepted by the station lead team and commitment was given to act on them. There was positive engagement between the INA team and the station lead team.

### 3.8.2 LC26 AND LC30 INSPECTIONS

55. During the shutdown, the site inspector and I conducted on-site inspections against:
- LC 26 - Control and Supervision of Operations (Ref. [15])
  - LC 30 - Periodic Shutdown (Ref. [14])
56. The LC 26 inspection was to confirm the effective implementation of control and supervision arrangements during the R2 periodic shutdown. The inspection focused on the adequacy of commissioning instructions and associated documentation, task handovers, pre job briefing, and the level of supervision required to carry out activities safely. The LC30 inspection was to confirm the effective implementation of the periodic shutdown management arrangements. The inspection targeted periodic shutdown management and maintenance of defence in depth.
57. It was judged that the licensee adequately demonstrated compliance with the requirements of LC 26 and LC 30. There were no findings from these

inspections that could significantly undermine nuclear safety or would prevent the start-up of reactor 2.

### 3.8.3 EMERGENT ISSUES

58. During the periodic shutdown there were a number of routine notifications to ONR in compliance with LC7. None of these were significant and the licensee responded with appropriate levels of investigation, targeted briefs and safety stand-downs.
59. Prior to the periodic shutdown starting there was a known issue with the decay heat boiler feed system. This relates to the decay heat system head tank where the level has been observed to fall below the lower limits for decay heat system operability, as it did on this shutdown and reported to ONR in compliance with LC7. During the periodic shutdown the licensee made a modification that they consider may eliminate or significantly reduce the condenser overspill identified as a potential cause. The licensee has justified this in an EC (Ref. [16]) and the mechanical engineering inspector has not identified any matters in this EC that would prevent start-up of Torness R2 (Ref. [17]).
60. During periodic shutdown inspections of the decay heat boiler feed system the licensee identified unexpected pipework degradation. The licensee replaced the affected Torness R2 pipework and have justified it as suitable to allow return to service of R2 (Ref. [1]).
61. During the periodic shutdown the Gas Baffle Inspection Manipulator (GBIM) and the Interstitial Manipulator (IM) broke down whilst deployed for inspections of the R2 vessel internals. The licensee subsequently recovered the faulted inspection tools from the reactor, and the structural integrity inspector notes that this was sentenced through the OAP as not having a safety impact for return to service (i.e. no damage to R2 vessel internals had occurred and any remnant debris was either removed or judged to be insignificant to continued operation) (Ref. [6]).
62. With regard to inspection of the reactor internal steel components the structural integrity inspector is content from the evidence provided that the licensee has carried out sufficient reactor vessel internals inspections to fulfil the MS requirements (Ref. [6]).
63. The graphite inspector is content with the justification that the licensee has provided for not completing all planned inspections of the R2 peripheral bricks and core restraint using the GBIM. This is based on the footage obtained during this outage prior to GBIM failure and the previous inspection history at Torness and Heysham 2. (Ref. [5]).
64. During the periodic shutdown the licensee investigated an ongoing minor leak of carbon dioxide into the Bypass Gas Plant (BPGP) water cooling system.



The investigation was unsuccessful in identifying the source of the leak and resolving the issue. The licensee has justified this in an EC (Ref. [18]) and the chemistry inspector has not identified any matters in this EC that would prevent R2 from returning to service (Ref. [19]).

#### **3.8.4 START-UP MEETING**

65. The start-up meeting (Ref. [20]) was held on 23 June 2022 and was chaired by the Torness Strategic Outage Manager. A briefing pack (Ref. [21]) was submitted in advance of the meeting with verbal updates provided during the meeting. The meeting also included a plant walkdown of completed and ongoing significant periodic shutdown work packages. The actions from the meeting have been closed out. No issues that would prevent the re-start of R2 were identified although it was noted that some of the emergent issues required resolution prior to start-up (the emergent issues are discussed in Section 3.8.3).

#### **3.8.5 START-UP LETTER**

66. The Station Director has asked ONR for Consent to restart Torness R2 under LC30(3) (Ref. [1]). The Station Director has confirmed that the reactor and associated plant is in a satisfactory state for a further period of operation subject to completion of a small number of activities that are required before, or as part of, return to service.

#### **3.8.6 MAINTENANCE SCHEDULE EXCEPTIONS LIST AND SAFETY JUSTIFICATION**

67. The licensee's request for ONR's Consent to start-up Torness R2 following periodic shutdown states that the EIMT specified in the OID are now complete, with the exceptions detailed in Reference [1] and that these will be completed before, or as part of, return to service. The licensee notes that a number of reactor internal inspections will not be completed, as justified in the RTS EC (Ref. [1]) and discussed in Section 3.8.3. Based on the evidence from ONR's interventions and assessments, I am content that the licensee has complied with their plant maintenance schedule requirements.

#### **3.8.7 RETURN TO SERVICE EC 371316**

68. The licensee's justification to return Torness R2 to service following the in-service inspections and associated assessments is set out in EC 371316 (Ref. [1]). It confirms that all modifications, maintenance, repairs and adjustments necessary for the safe return to service of the reactor have been carried out. This is supported by the INSA approval statement (Ref. [1]).

### **3.8.8 GRAPHITE CORE INSPECTIONS EC 371622**

69. The licensee's justification to return Torness R2 to service following the graphite core inspections is set out in EC 371622 (Ref. [1]) which is supported by the INSA approval statement (Ref. [1]). It confirms that the inspection of the graphite core has been completed in accordance with the MS requirements and the GAP has confirmed that the results are within the accepted boundaries of the graphite safety case.
70. The graphite inspector has reviewed the INSA statement for EC 371622 and is content that it satisfies the intent of recommendation 1 in Section 3.1 (Ref. [22]). The inspector concludes that recommendation 1 can be considered resolved and that the conclusions within their graphite assessment of the Torness Reactor 2 2022 periodic shutdown remain valid.

### **3.8.9 APPOINTED EXAMINER STATEMENT CONCRETE PRE-STRESSED PRESSURE VESSEL**

71. The licensee has submitted the results from the statutory examinations of the PCPV as specified in the written scheme of examination and the station MS (Ref. [1]).
72. The report confirms that all of the activities required during the periodic shutdown by the MS to monitor the pre-stressed concrete of the PCPV are complete. Based on completion of the MS inspection activities and monitoring undertaken during the operating period the Appointed Examiner concludes that the PSSR Statutory Examination is complete and that the Torness R2 PCPV is fit for continued operation until the next scheduled Statutory Examination due in 2025.

### **3.8.10 APPOINTED EXAMINER STATEMENT ON REACTOR PENETRATIONS EXAMINATIONS**

73. The licensee has submitted the inspection results of the thorough examination for the Torness R2 PCPV penetrations (Ref. [1]).
74. All of the penetrations inspected were confirmed as being in a satisfactory condition, with no significant challenges to integrity identified. The Appointed Examiner has confirmed the suitability of the system of PCPV penetrations on R2 for continued service for the maximum interval permitted by the written scheme of examination.

### **3.8.11 APPOINTED EXAMINER STATEMENT PSSR**

75. The licensee has submitted a statement with respect to the inspections performed in accordance with PSSR during the periodic shutdown from their independent third party PSSR Competent Person (Ref. [1]), (Bureau Veritas). The statement confirms that following the examinations there are no changes

to plant operating conditions or reductions in inspection intervals as referred to in the PSSR written schemes of examination.

76. A recent ONR intervention has highlighted a shortfall with regards to PSSR compliance at Hartlepool and Heysham 1. The licensee has confirmed that they have reviewed these findings for Torness and have identified one plant item that required a new written scheme of examination and that this item has been inspected for R2 [23].

### **3.8.12 STATION INA CONCURRENCE**

77. INA has provided an interim concurrence statement (Ref. [1]) which concludes that no issues that present a threat to start-up or continued operation of R2 have been identified. The statement notes that an outstanding activity is completion of the INSA for the RTS EC.
78. The INSA statement for the RTS EC has been provided to ONR (see Section 3.8.7) and I am therefore content that this activity has been completed.

### **3.8.13 CIVIL NUCLEAR SECURITY AND SAFEGUARDS**

79. In addition to the nuclear safety assessments identified, I sought the opinion of ONR's Civil Nuclear Security and Safeguards (CNSS) site security inspector, to understand if there were any aspects of the periodic shutdown that may impact on ONR's decision to give Consent to start-up Torness R2. The CNSS inspector confirmed (Ref. [24]) that there were no objections or issues that would impact on the decision to give Consent to start-up Torness R2.

### **3.8.14 ENGAGEMENT WITH OTHER GOVERNMENTAL AGENCIES**

80. Before giving Consent, it is established practice to notify other competent regulatory authorities of ONR's intention to ensure there are no specific objections that may compromise other regulatory requirements. The Scottish Environment Protection Agency site inspector was informed that ONR intended to issue an LI giving its Consent to the start-up of Torness R2 and they confirmed that they had no objections (Ref. [25]).

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

81. There are no outstanding matters arising from the inspection and assessment work carried out by ONR that would prevent granting Consent to start-up R2 after its 2022 periodic shutdown.
82. Residual issues that do not prevent ONR granting Consent to start-up Torness R2 will be followed up through normal regulatory business.

## **5 CONCLUSIONS**

83. Based on the evidence gathered from ONR's intervention and assessment activities for the Torness R2 2022 periodic shutdown, together with the claims, arguments and evidence presented by the licensee in its request for Consent to start-up Torness Reactor 2, I am satisfied that:
- The EIMT requirements specified in the station's MS in support of LC30 have been complied with.
  - EIMT has been carried out by SQEP, with an appropriate level of supervision and quality assurance in place commensurate with equipment's safety function.
  - Safety issues identified by the licensee during the shutdown have been adequately addressed with suitable and sufficient safety justification that relevant safety case limits and conditions are not challenged.
84. I am therefore content that all necessary work has been completed, subject to the outstanding activities that are required before, or as part of, return to service (Ref. [1]). The licensee has committed to completion of these activities at the appropriate time and the remaining information will be reported to ONR in the 28-day report, or in specific documents that are not required prior to giving Consent.
85. In conclusion, no matters of concern have been identified that would prevent ONR giving Consent for Torness R2 to start-up following its 2022 periodic shutdown.

## **6 RECOMMENDATIONS**

86. I recommend that ONR issues Licence Instrument 565, giving Consent to start-up Torness Reactor 2 following its 2022 periodic shutdown.

## 7 REFERENCES

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- [19] E-mail from Chemistry Inspector, FW: EC 371777 - BPGP Leak, 19 July 2022, 2022/43377.
- [20] ONR-OFD-CR-22-230, Torness Reactor 2 2022 Outage – Start-up meeting, 2022/42353.
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