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| ONR Project assessment report  Torness Reactor 2 – Agreement to extend the operating period from 25 July 2025 to 9 February 2026 |



ONR Project assessment report

**Project name**: Torness Reactor 2

**Report title**: Agreement to extend the operating period from 25 July 2025 to 9 February 2026

**Dutyholder/Applicant**: EDF Energy Nuclear Generation Limited

**Authored by**: Project Inspector, ONR

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# Executive summary

**Title**

Torness reactor 2 - agreement to extend the operating period from 25 July 2025 to 9 February 2026.

**Permission Requested**

EDF Energy Nuclear Generation Limited (the licensee) has asked for our agreement to extend the operating period of Torness reactor 2 until no later than 9 February 2026.

**Background**

The nuclear site licence for Torness requires the licensee to periodically shutdown any plant or process under Licence Condition 30 to enable examination, inspection, maintenance and testing to take place. Reactor periodic shutdowns take place every three years, as specified in the maintenance schedule preface, an approved document under Licence Condition 28 (4).

We gave consent to start-up reactor 2 after its last periodic shutdown on 25 July 2022 (Licence Instrument 565) and therefore reactor 2 was required to shutdown on or before 25 July 2025. To deconflict the fleet periodic shutdown programme for 2024/2025, the licensee has produced a safety justification to extend the operating period of reactor 2 until no later than 9 February 2026.

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

Our specialist inspectors from graphite structural integrity, steel structural integrity, electrical engineering, control and instrumentation, mechanical engineering, civil engineering and probabilistic safety analysis have assessed the licensee’s safety justification. No issues were identified that would prevent our agreement to extending the operating period of reactor 2.

The Scottish Environment Protection Agency has been consulted and confirmed that they have no objections to us agreeing to extend the operating period of reactor 2. Our civil nuclear security inspector has also been consulted and has no concerns regarding the proposed extension.

**Matters arising from ONR's work**

There are no outstanding matters arising from our assessments.

**Conclusions**

We have considered the nuclear safety risk associated with the licensee’s request, and have not identified any reasons to prevent us from agreeing to extend the operating period of Torness reactor 2 from 25 July 2025 to 9 February 2026.

**Recommendation**

We should issue Licence Instrument 568 under LC 30 (2) for nuclear site licence Sc. 14, Agreeing to extend the operating period of Torness Reactor 2 from 25 July 2025 to 9 February 2026.

Table 1: List of abbreviations.

|  |  |
| --- | --- |
| Term/Acronym | Description |
| ALARP | As low as reasonably practicable |
| C&I | Control and instrumentation |
| INSA | Independent nuclear safety assessment |
| LARC | Life assessment reference components |
| LC | License condition |
| ONR | Office for Nuclear Regulation |
| PCPV | Pre-stressed concrete pressure vessel |
| PSA | Probabilistic safety analysis |
| PSSR | Pressure systems safety regulations |
| R2 | Reactor 2 |
| SQEP | Suitably qualified and experienced personnel |
| TOR | Torness |

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# Permission requested

1. EDF Energy Nuclear Generation Limited (the licensee) has asked [1] for our agreement to extend the operating period of Torness (TOR) reactor 2 (R2) from 25 July 2025 until no later than 9 February 2026.

# Background

1. The nuclear site licence for TOR requires the licensee to periodically shutdown any plant or process under licence condition (LC) 30 for the purpose of examination, inspection, maintenance and testing. The maintenance schedule preface (an approved document under LC 28 (4)), specifies that reactor periodic shutdowns (referred to as statutory outages) take place after a maximum period of three calendar years following consent to start up after the previous periodic shutdown.
2. We gave consent to start up TOR R2 after its last periodic shutdown on 25 July 2022 (licence instrument 565). Therefore, the next periodic shutdown was due on or before 25 July 2025.
3. In order to de-conflict the periodic shutdown programme for 2024/2025 and minimise the impact of supply chain resource availability, the licensee proposed deferring the periodic shutdowns for Heysham 2, Hartlepool, Heysham 1 and Torness. The revised programme was to designed minimise the overall risk of deferring the four periodic shutdowns. We have already agreed to extend the operating period for reactors at Heysham 2, Hartlepool and Heysham 1.
4. The licensee’s safety justification (EC 376180) [1] presents a systematic review of the plant performance, reliability, material condition and safety case commitments. It concludes that extending the operating period of R2 from 25 July 2025 to no later than 9 February 2026 (199 days) will not lead to a significant increase in the nuclear safety risk.

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

1. In accordance with the regulatory permissioning strategy, our agreement to extend the operating period of TOR R2 has been informed by advice from specialist inspectors in the following disciplines:

* graphite structural integrity;
* steel structural integrity;
* electrical engineering;
* control and instrumentation;
* mechanical engineering;
* civil engineering; and
* probabilistic safety analysis.

1. The following sections provide summaries of the assessment findings for each discipline.

## Graphite structural integrity

1. Reference [2] reports the findings of our graphite structural integrity review of the licensee’s justification to extend the operating period of TOR R2. The review considered graphite brick cracking predictions and weight loss.
2. On the basis that recent inspection results have been within the licensee's expectations, our inspector was content that there would be negligible risk from brick cracking during the extended operating period. The inspector notes that the collection of trepanned samples from the graphite fuel bricks is important to inform the licensee’s understanding the evolution of weight loss and material properties. The inspector judged that delaying collection of samples during the extended operating period would not represent a reduction in safety.
3. Additionally, the inspector noted that R2 will reach the limit of its steam ingress safety case during the extended operating period and that they are engaging with the licensee on the implementation of a new safety case. The volume of graphite material lost due to oxidation (e.g. weight loss) within the active core is a key limit in the case. This limit is based on modelling of the evolution of weight loss and whilst further trepanned sample data would be beneficial any new data would not be available to support this case even if it was extracted on the original (July 2025) timescales. Therefore, the inspector was content that the deferral will not affect evidence which underpins this safety case.
4. The inspector did not raise any objections to us agreeing to extend the operating period of TOR R2 until 9 February 2026.

## Steel structural integrity

1. Reference [3] reports the findings of our steel structural integrity review of the licensee’s justification to extend the operating period of TOR R2. The review considered the time at power, time dependent aspects of the safety case, safe life crack assessments and Pressure Systems Safety Regulations (PSSR) postponements.
2. The inspector notes that the component life assessments identify a small number of components that will exceed their action levels during the extended operating period. In the inspector’s opinion, this does not present a challenge to the safe deferral of the periodic shutdown but will need to be addressed for the next operating cycle.
3. The inspector was content with the licensee’s approach that there is no requirement to bring forward inspections for lower classification components with known defects or degradation mechanisms. The inspector was satisfied that the licensee has complied with its arrangements for safe life assessments and there were no adverse implications for the extended operating period.
4. The inspector supports the licensee’s judgement, that delaying the programme of feed water valve spindle replacements, will not increase the risk of failure during the extended operating period.
5. The inspector did not raise any objections to agreeing to extend the operating period of TOR R2 until 9 February 2026.

## Electrical engineering

1. Reference [4] reports the findings of our electrical engineering assessment of the licensee’s justification to extend the operating period of TOR R2. The assessment considered the impact of deferred maintenance on nuclear safety significant electrical systems. The inspector was satisfied that:

* equipment performance, reliability, availability and material condition are adequate and will not be undermined by the extended operating period;
* there are no operational or safety case constraints which would prevent the safe extension of the operating period;
* the risk of any relevant electrical systems reaching a performance reliability cliff edge during the extended period has been adequately considered and that risk remains as low as reasonably practicable; and
* the nuclear safety risks associated with extending the operating period are low and consistent in maintaining an overall risk position which is tolerable and as low as reasonably practicable.

1. The inspector was satisfied with the claims, arguments and evidence provided in the licensee’s proposal and did not identify any safety significant shortfalls. The inspector had no objection, from an electrical engineering perspective to agreeing to extend the operating period of TOR R2 until 9 February 2026.

## Control and instrumentation

1. Reference [5] reports the findings of our control and instrumentation (C&I) review of the licensee’s justification to extend the operating period of TOR R2. The review considered:

* whether C&I related statutory outage examination, inspection, maintenance, and testing activities covered by the TOR maintenance schedule has been adequately reviewed by suitably qualified and experienced personnel (SQEP);
* if the potential for the accuracy of C&I systems/equipment important to safety to drift past the point that they are unable to perform their nuclear safety function during the extended period has been considered by SQEP and the risk has been adequately assessed to remain acceptably low;
* the potential for C&I systems/equipment important to safety to reach a reliability cliff edge during the extended period has been considered by SQEP and the risk has been adequately assessed to remain acceptably low; and
* whether further potential C&I related risk reduction measures have been identified and assessed to demonstrate that the risk has been reduced to ALARP.

1. The inspector did not identify any significant issues or shortfalls and did not raise any objections to agreeing to extend the operating period of TOR R2 until 9 February 2026.

## Mechanical engineering

1. Reference [6] reports the findings of our mechanical engineering review of the licensee’s justification to extend the operating period of TOR R2. The review considered valve spindle replacements, statutory examination postponements, reactor internal Life Assessment Reference Components (LARCs) and gas circulators.
2. The inspector did not raise any objections to agreeing to extend the operating period of TOR R2 until 9 February 2026.

## Civil engineering

1. Reference [7] reports the findings of our civil engineering review of the licensee’s justification to extend the operating period of TOR R2. The review considered the pre-stressed concrete pressure vessel (PCPV) and associated maintenance schedule routines, including surveillances, inspections and tests of safety related components.
2. The inspector was satisfied that the licensee has adequately demonstrated that the PCPV is sufficiently free from defects that its safety function is not impaired, there is adequate margin to allow for any ageing and degradation processes during the extended operating period and the requirements of the PSSR have been met. Overall, the inspector was satisfied that the condition of the PCPV and support structure is satisfactory and will remain so during the extended operating period.
3. The inspector did not raise any objections to agreeing to extend the operating period of TOR R2 until 9 February 2026.

## Probabilistic safety analysis

1. Reference [8] reports the findings of our probabilistic safety analysis (PSA) review of the licensee’s justification to extend the operating period of TOR R2.
2. The review considered the licensee’s PSA of the risk associated with extending the operating period and the supporting sensitivity study. The inspector agrees with the licensee’s conclusion that the increase in risk is very small and it is not considered reasonably practicable to attempt to mitigate it further.
3. Based on the extant low plant based fault and hazard risk at TOR and the small, predicted increase, the inspector did not raise any objections to agreeing to extend the operating period of TOR R2.

## Independent nuclear safety assessment

1. The licensee categorised its justification to extend the operating period of TOR R2, as a category 2 modification. In accordance with the licensee’s arrangements, the engineering change has completed due process [9] and has been subject to independent nuclear safety assessment (INSA) [10], no commitments requiring review were made.

## Civil nuclear security and safeguards

1. Our security site inspector has confirmed [11] that they have no objections to agreeing to extend the operating period of TOR R2.

## Engagement with other governmental agencies

1. Before issuing a licence instrument, it is established practice to notify other competent regulatory authorities of our intention to ensure that there are no specific objections that may compromise other regulatory requirements. The Scottish Environment Protection Agency have confirmed [12] that they have no objections to us agreeing to extend the operating period of TOR R2.

# Matters arising from ONR’s work

1. There are no outstanding matters arising from our assessment and inspection work.

# Conclusions

1. We have considered the nuclear safety risk associated with the licensee’s request to extend the operating period of TOR R2, from 25 July 2025 to no later than 9 February 2026.
2. Our judgement has been informed by advice from our graphite structural integrity, steel structural integrity, electrical engineering, control and instrumentation, mechanical engineering, civil engineering and probabilistic safety analysis specialist inspectors. Based on their assessments we are satisfied that:

* the licensee has provided a valid reason to request to extend the operating period of TOR R2; and
* nuclear safety systems will not incur any significant decrease in their reliability or functionality, and there will be no significant increase in the risk of an initiating event.

1. In conclusion, we have not identified any reasons that would prevent us agreeing to extend the operating period of TOR R2 from 25 July 2025 to 9 February 2026.

# Recommendations

1. We should issue Licence Instrument 568 under LC 30 (2) for nuclear site licence Sc. 14, Agreeing to extend the operating period of Torness Reactor 2 from 25 July 2025 to 09 February 2026.

# References

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| [1] | *NSL-TOR-50793 - Request to extend the operating period of Torness reactor 2 until 9 February 2026. ONRW-2019369590-20508.* |
| [2] | *Graphite integrity inspector’s advice on Torness reactor 2 extension of operating period, ONR, email dated 6 June 2025. ONRW-2019369590-21610.* |
| [3] | *Structural integrity inspector’s advice on Torness reactor 2 extension of operating period, ONR, email dated 10 June 2025. ONRW-2019369590-21709.* |
| [4] | *ONR Assessment Report, Electrical engineering assessment of the proposal for the deferral EDF Energy NGL Torness Reactor 2 2025 statutory outage (S13R2), ONRW-2126615823-7733.* |
| [5] | *Control and instrumentation inspector’s advice on Torness reactor 2 extension of operating period, ONR, email dated 9 July 2025. ONRW-2019369590-22321.* |
| [6] | *Mechanical engineering inspector’s advice on Torness reactor 2 extension of operating period, ONR, email dated 26 June 2025. ONRW-2019369590-21893.* |
| [7] | *ONR Assessment Report, Civil engineering assessment of agreement to extend the operating period of Torness reactor 2 to 9 February 2026. ONRW-2126615823-7848.* |
| [8] | *Probabilistic safety analysis inspector’s advice on Torness reactor 2 extension of operating period, ONR, email dated 12 June 2025. ONRW-2019369590-21632.* |
| [9] | *AMS approval, EC 376180 Revision 00. ONRW-2019369590-20542.* |
| [10] | *INSA Approval Statement, EC 376180 Revision 00. ONRW-2019369590-20554.* |
| [11] | *ONR security inspectors - notice of no objection to Torness reactor 2 extension of operating period - email dated 9 June 2025. ONRW-2019369590-21628.* |
| [12] | *Scottish Environment Protection Agency - notice of no objection to Torness reactor 2 extension of operating period - email dated 9 June 2025. ONRW-2019369590-21627.* |