Office for Nuclear Regulation

ONR Site Report

EDF Energy Nuclear Generation Limited – Sizewell B

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Report for period: 01 January – 31 March 2023

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Foreword

This report is issued as part of ONR's commitment to make information about inspection and regulatory activities relating to the above site available to the public. Reports are distributed to members for the Sizewell SSG and are also available on the ONR website (http://www.onr.org.uk/llc/).

Site inspectors from ONR usually attend Sizewell SSG meetings where these reports are presented and will respond to any questions raised there. Any person wishing to inquire about matters covered by this report should contact ONR.

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1. Inspections

1.1. Date(s) of Inspection

ONR inspectors made inspections on the following dates during the report period 1 January to 31 March 2023:

- 10 to 12 January
- 8 February
- 28 February to 2 March
- 6 to 9 March
- 14 to 16 March

2. Routine Matters

2.1. Inspections

Inspections are undertaken as part of the process for monitoring compliance with:

- the conditions attached by ONR to the nuclear site licence granted under the Nuclear Installations Act 1965 (NIA65) (as amended);
- the Energy Act 2013;
- the Health and Safety at Work etc Act 1974 (HSWA74); and
- regulations made under HSWA74, for example the Ionising Radiations Regulations 2017 (IRR17) and the Management of Health and Safety at Work Regulations 1999 (MHSWR99).

The inspections entail monitoring the licensee's actions on the site in relation to incidents, operations, maintenance, projects, modifications, safety case changes and any other matters that may affect safety. The licensee is required to make and implement adequate arrangements under the conditions attached to the licence in order to ensure legal compliance. Inspections seek to judge both the adequacy of these arrangements and their implementation.

In this period, routine inspections of Sizewell B covered the following:

- examination, maintenance, inspection and testing;
- modifications to plant, equipment and safety cases.

Members of the public, who would like further information on ONR's inspection activities during the reporting period, can view site Intervention Reports at www.onr.org.uk/intervention-records on our website www.onr.org.uk.

Should you have any queries regarding our inspection activities, please email contact@onr.gov.uk.

Refuelling outage 18

The majority of the inspections during the report period were associated with Sizewell B's refuelling outage, RO18, which is described in more detail in section 4. The main requirements ONR seeks to confirm during a periodic shutdown are:

- Examination, inspection, maintenance and testing (EIMT) activities required in support of the station's safety case have been carried out, by suitably qualified and experienced persons, with an appropriate level of supervision and quality assurance.

- Safety issues identified during the reactor outage have been adequately addressed with suitable and sufficient justification provided to allow a regulatory judgement to be made that start-up of the reactor is safe and will remain safe until the next periodic shutdown.

To this end, inspections were carried out by inspectors from the following disciplines over the course of the outage:

- Civil engineering;
- Structural integrity;
- Mechanical engineering;
- Electrical engineering;
- Control and instrumentation;
- Fuel and core;
- Chemistry;
- Radiation protection.

The inspectors were satisfied that the licensee had carried out EIMT in accordance with the requirements of its maintenance schedule, and that the work was conducted to the required quality standards by competent personnel. They found no issues of significance that would prevent the start-up of the reactor. As a result, ONR issued a consent for restart as described in Section 4.

Heating, ventilation and air-conditioning chillers

The Sizewell B safety-significant heating, ventilation and air-conditioning (HVAC) chillers have been found to have an in-service availability history which is worse than that assumed by the station safety case. These chillers are part of the HVAC systems which maintain acceptable temperatures for safety critical equipment. The licensee is therefore delivering a programme of work to justify replacement of the chiller units at Sizewell B.

In advance of the chiller replacement, a justification for continued operation (JCO) has been produced. This includes temporary measures at Sizewell B to manage the situation should existing chillers fail. The site inspector, supported by a control and instrumentation specialist inspector, carried out an inspection of the implementation of this JCO at the station, ahead of the warmer summer ambient air temperatures.

The inspectors:

- Held discussions with operations duly authorised persons (DAPs) and observed their ability to locate and interpret the relevant tech spec action condition logic and alarm sheets.
- Questioned the DAP's decision-making processes in the case of a room overtemperature and were satisfied that appropriate action would be taken.
- Reviewed technical specifications and their supporting bases associated with safety classified equipment room temperature and found that they reflected the operating rules derived in the safety case.
- Reviewed associated alarm sheets and found that they had been updated in accordance with the JCO, containing appropriate guidance with regards to deploying temporary chillers and isolating non-essential equipment.
- Sampled recently completed maintenance records in order to ensure that the equipment which is claimed in the JCO is being adequately maintained, concluding that appropriate maintenance activities were being undertaken and satisfactorily recorded.

From the evidence sampled during the inspection, the inspectors judged that the implementation of the measures identified in the HVAC JCO was adequate and that the chiller issues were being adequately managed locally at the station.

3. Non-Routine Matters

Licensees are required to have arrangements to respond to non-routine matters and events. ONR inspectors judge the adequacy of the licensee's response, including actions taken to implement any necessary improvements.

There were two matters of particular note during the period, both of which were concerned with the return of the reactor to power at the end of the outage.

When restarting the reactor, the operators first need to raise the temperature and pressure of the primary circuit, before then going critical.

There are a number of tests that are done at this time, because they can only be done either with the primary circuit intact again (i.e. with the reactor pressure vessel head back on) or with the primary circuit pressurised (to various degrees).

Two such tests revealed problems with valves on two different systems, which required rectification by the licensee and led to a delay in the restart of the reactor. ON was informed by the licensee of both issues, and was kept apprised of efforts to resolve them. ONR is satisfied with the steps taken by the licensee, and considers that at no point was there a threat to nuclear safety.

Reactor vessel head vent system valves

The reactor vessel head vent system is a manually operated system which allows the operator to reduce the pressure in the primary circuit during a fault scenario by venting the primary circuit into a tank inside containment. There are two separate head vent lines, and a pair of valves provides isolation for each line. During testing, one of the pair of valves on one of the lines failed to operate correctly. The site brought in the valve manufacturer, who was able to fix the valve.

Reactor coolant system pressure isolation valves

The Sizewell B primary circuit operates at high pressure. Several safety systems interface with the primary circuit to inject water into the primary circuit at lower pressures, either during outages or in fault conditions. As these systems are designed for much lower pressures they normally need to be isolated from the primary circuit to prevent leakage or overpressure. This isolation is achieved through the use of a set of non-return valves, collectively termed 'Reactor Coolant System (RCS) Pressure Isolation Valves'.

All RCS Pressure Isolation Valves need to be tested for leakage prior to returning the reactor to power following an outage. One of these RCS Pressure Isolation Valves experienced high leakage when tested at the end of RO18 (all the other RCS Pressure Isolation Valves passed their leakage testing). To fix the valve, the reactor

was depressurised in accordance with the technical specifications. Station staff then intrusively examined and repaired the valve in question.

4. Regulatory Activity

ONR may issue formal documents to ensure compliance with regulatory requirements. Under nuclear site licence conditions, ONR issues regulatory documents, which either permit an activity or require some form of action to be taken; these are usually collectively termed ‘Licence Instruments’ (LIs) but can take other forms. In addition, inspectors may take a range of enforcement actions, to include issuing an Enforcement Notice.

The following LIs, Enforcement Notices and Enforcement letters have been issued during the period:

- Consent 561. Sizewell B’s operating cycle lasts approximately 18 months, after which it is required to shut down so that it can be refuelled. When refuelling is undertaken, some of the fuel assemblies (around one-third) are replaced with new ones. The existing fuel assemblies are returned to the core in a rearranged array to ensure optimum fuel utilisation.

  To continue to operate safely and reliably the reactor plant requires regular EIMT. Continuous improvement also requires plant upgrades to be implemented where deemed to be reasonably practicable. Whilst some of these activities can safely take place when the reactor is operating at power, many of them require the reactor to be shut down. The refuelling outages at Sizewell B provide the opportunity for undertaking such activities.

  The requirement to shut down periodically for the purposes of EIMT is captured in LC 30. LC 30(1) states that “when necessary for the purpose of enabling any examination, inspection, maintenance or testing of any plant or process to take place, the licensee shall ensure that any such plant or process shall be shut down in accordance with the requirements of its plant maintenance schedule referred to in Condition 28”. LC 30(3) further states that “The licensee shall, if so specified by ONR, ensure that when a plant or process is shut down in pursuance of paragraph 1 of this condition it shall not be started up again thereafter without the consent of ONR”.

  The reactor at Sizewell B was shut down on 17 February 2023 for its eighteenth refuelling outage, RO18. ONR carried out inspections throughout the outage, as described in Section 2, on the basis of which it issued LI 561 to provide its consent to restart the reactor, as required by LC 30(3).

Table 1: Licence Instruments and Enforcement Notices Issued by ONR during this period

Date	Type	Ref. No.	Description
25/04/23	Consent	561	Consent to the start up of the Sizewell B reactor

Reports detailing the above regulatory decisions can be found on the ONR website at http://www.onr.org.uk/pars/.

5. News from ONR

For the latest news and information from ONR, please read and subscribe to our regular email newsletter 'ONR News' at www.onr.org.uk/onrnews.

6. Contacts

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