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| **Assessment Report** | | | |
| **Unique Doc. ID:** | ONR-NR-AR-22-008 | **Issue No.:** | 1 |
| **Record Reference:** | 2022/23980 | | |
| **Project:** | Sizewell C Licensing | | |
| **Site:** | Sizewell C | | |
| **Title:** | Assessment of the safety case delivery strategy (SC1) associated with an application by NNB GenCo (SZC) Ltd for a Nuclear Site Licence. | | |
| **Nuclear Site Licence No.:** | N/A | | |
| **Licence Condition(s):** | LC14, 20 | | |
| **ONR Assessment Rating:** | Green | | |

Table 1: Step-based document review

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Step | Description | Role | Name | Date | Revision No.[[1]](#footnote-1) |
| 1 | Initial Draft, including identification and mark-up of SNI/CCI | Author |  |  | 1 |
| 2 | Main editorial review | Author |  |  | 1 |
| 3 | Peer Review in accordance with  NS-PER-GD-016 | Peer Reviewer |  |  | 2 |
| 4 | Assessor update / sentencing of comments and return to Peer Reviewer | Author |  |  | 3 |
| 5 | Final editorial / clean draft review | Author |  |  | 3 |
| 6 | Acceptance review in accordance with  NS-PER-GD-016 | Professional Lead |  |  | 4 |
| 7 | Report Sign-off | Author/  Peer Reviewer/ Professional Lead |  |  | 5 |

Table 2: Document acceptance

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Role | Name | Position | Signature | Date | CM9 reference for review |
| Author |  |  |  |  |  |
| Peer Review[[2]](#footnote-2) |  |  |  |  |  |
| Acceptance[[3]](#footnote-3) |  |  |  |  |  |

Table 3: Revision history

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Issue No.: | Date | Author(s) | Reviewed By | Accepted By | Description of Change |
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Table 4: Circulation list

|  |  |
| --- | --- |
| Organisation | Name |
| ONR | HPC Delivery Lead  SZC Delivery Lead  Project Inspector  SZC Site Inspector |
| NNB GenCo (SZC) Ltd | Regulatory Interface Office |

**Sizewell C Licensing**

**Assessment of the safety case delivery strategy (SC1) associated with an application by NNB GenCo (SZC) Ltd for a Nuclear Site Licence.**

Assessment Report Ref.: ONR-NR-AR-22-008

Issue No.: 1

Date: April 2023

# Executive Summary

NNB GenCo (SZC) has applied for a licence for its UKEPR design at Sizewell. This report, alongside other technical assessment reports, respond to seven key questions derived from the *Licensing Nuclear Installations* publication from the ONR.

This report presents the assessment of NNB GenCo’s (SZC)’s safety case *schedule*, and the confidence in which the *structure* of future safety cases will meet ONR expectations.

No findings have been raised from this assessment and it concludes that the safety case strategy as presented by NNB GenCo (SZC) meets ONR expectations and that this supports granting a site licence.

I am satisfied that NNB GenCo (SZC) has demonstrated suitable compliance with the relevant licence conditions, and has provided a schedule, and a suitability developed safety case strategy which supports subsequent construction milestones.

My recommendations are as follows:

* Recommendation 1: I recommend that, from a safety case schedule, LC 14 and LC 20 perspective, ONR grants a Nuclear Site Licence.

# List of Abbreviations

ALARP As low as is reasonably practicable

BSL Basic Safety level (in SAPs)

BSO Basic Safety Objective (in SAPs)

CNI Chief Nuclear Inspector

CNS Civil Nuclear Security (ONR)

FNSC First Nuclear Safety Concrete

HOW2 ONR’s Management System Platform

HPC Hinkley Point C

HSE Health and Safety Executive

IAEA International Atomic Energy Agency

ITA Independent Technical Assurance

JSSR Justification of Site Suitability Report

LC Licence Condition

NIC Nuclear Island Concrete

NOAK Next Of A Kind

NSL Nuclear Site Licence

ONR Office for Nuclear Regulation

PAR Project Assessment Report

PCSR Pre-construction Safety Report

PSA Probabilistic Safety Assessment

PSR Preliminary Safety Report

RGP Relevant Good Practice

SAP Safety Assessment Principle(s)

SFAIRP So far as is reasonably practicable

SDSR Site Data Summary Report

SSC Structure, System and Component

SSCD#2 Summary Safety Case Document 2

SZB Sizewell B

SZC Sizewell C

TAG Technical Assessment Guide(s) (ONR)

TSC Technical Support Contractor

WENRA Western European Nuclear Regulators’ Association

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Introduction

1. NNB Generation Company (SZC) Ltd (NNB GenCo) applied to ONR on 30th June 2020 for a nuclear site licence to construct and operate a nuclear power station comprising two UK EPR™ reactors at Sizewell C (SZC) in Suffolk.
2. The outcome of ONR’s activities from the nuclear site licence (NSL) assessment which is a Project Assessment Report (PAR), this draws together the views of ONR’s specialist assessors on NNB GenCo (SZC)’s readiness to become a nuclear site licensee. This results in a recommendation to the Chief Nuclear Inspector (CNI) on whether a licence can be granted. This safety case licensing assessment report is one of a number that have informed the PAR [1].
3. ONR’s licensing assessment has followed the guidance in *Licensing Nuclear Installations* [2]*.* The approach to this assessment project was elaborated in the SZC *Assessment Strategy* [3], with guidance on the production of licensing assessment reports set out in the SZC *Assessment Framework* [4]

Background

1. This report presents the findings of the assessment of the safety case strategy as presented in the PCSR Specification [5] provided by NNB GenCo (SZC). Assessment was undertaken in accordance with the requirements of the Office for Nuclear Regulation (ONR) Management System and following guidance in *Licensing Nuclear Installations* [2]*.*

Scope

1. ONR’s assessment is focussed on seven key questions that are based on Licencing Nuclear Installations [2] and ONR’s safety assessment principles [6]. These fall into are two main areas of focus, these being:-

* Current Safety Case Content - The holistic safety case to support licencing consists of a number of documents, including the Justification of Site Suitability Report (JSSR) [5]. This has been assessed for each relevant technical topic in line with the Assessment Framework [3] to assess the adequacy of the design and safety case to support licencing. The outcomes of these assessment are presented within the PAR and are not part of the scope of this report.
* Future Safety Cases - One of the questions drawn from the Licencing Nuclear Installations guidance is related to a schedule for the subsequent safety case releases. This report therefore documents my assessment of how NNB GenCo (SZC) has addressed that question. In addition, to add confidence that the SZC safety case will meet ONR expectations in future iterations, it also assesses how the next main safety case iteration, the Pre-Construction Safety Report (PCSR) will be structured and delivered.

1. This report therefore sits alongside the following assessment reports in addressing these questions and providing input into the PAR [1].

* Internal hazards [7]
* External hazards [8]
* Civil engineering [9]
* Mechanical engineering [10]
* Electrical engineering [11]

1. This report also covers two closely related licence conditions, namely LC 14 and 20.
2. Therefore, the findings and conclusions from the *content* of the current safety case to support licencing has been undertaken by technical topics. This report however focusses on the *structure* and *schedule of delivery* of future safety cases.

Methodology

1. The methodology for assessment follows ONR’s guidance on the mechanics of assessment, NS-TAST-GD-096 [12].

Assessment Strategy

1. The intended assessment strategy is set out in this section. This identifies the scope of the assessment and the standards and criteria that have been applied.

Standards and Criteria

1. The relevant standards and criteria adopted within this assessment are principally internal TAGs [12], relevant national and international standards and relevant good practice informed from existing practices adopted on UK nuclear licensed sites. National and international standards and guidance have been referenced where appropriate within the assessment report. Relevant good practice, where applicable, has also been cited within the body of the assessment.

Safety Assessment Principles (SAPs)

1. This assessment has not been undertaken against any specific SAPs.

Technical Assessment Guides (TAGs)

1. The following TAGs have been considered as part of this assessment [12]:

ONR’s TAG 51 (NS-TAST-GD-051 Revision 7 - Nuclear Safety Technical Assessment Guide [13]

National and International Standards and Guidance

1. The following international standard have been used as part of this assessment:

* IAEA General Safety Requirements, GSR Part 4, 2016, “Safety Assessment for Facilities and Activities” [14]
* Safety of nuclear power plants: design, SSR-2/1 (Rev 1) [15]; and,
* Safety of nuclear power plants: commissioning and operation, SSR2/2 (Rev 1) [16]

Use of Technical Support Contractors

1. There were no technical support contractors used as part of this assessment.

Integration with Other Assessment Topics

1. The following topic areas reviewed the NNB GenCo (SZC) PCSR Specification [5] and provided feedback for this assessment :-

* Chemistry [17]
* External Hazards [18]
* Internal Hazards [19]
* Electrical [20]
* C&I [21]
* Civil [22]
* Fault Studies & Severe Accident [23]

1. This assessment sits alongside a number of technical assessment that have addressed the questions based on ONR’s interpretation of Licencing Nuclear Installations [2]. The conclusion from this assessment, and from the other technical areas is reflected directly within the PAR which supports the licencing decision.

Out of Scope Items

1. The following items are outside the scope of the assessment.

* An assessment of the *content* of the safety case as presented for licencing. This is being undertaken by the topics and is captured within the PAR.
* Assessment findings which were raised at GDA and are relevant to SZC have been discussed with NNB through this phase of work, however there is no requirement for these to be closed to enable a nuclear site license to be granted, and engagements will continue post licencing. This is therefore excluded from this report.

NNB GenCo (SZC) Submission

PCSR Specification

1. One key question outlined in ONR’s interpretation of Licencing Nuclear Installations [2] is related to the need to provide a schedule for submission of further PCSR updates or revisions to support subsequent construction milestones.
2. Consistent with Licensing Nuclear Installations, it was not necessary for NNB GenCo (SZC)’s application dossier to include a site-specific PCSR; the PCSR will be needed to support nuclear safety related construction activity well after the licence has been granted, therefore, in order to present their safety case strategy, NNB GenCo (SZC) produced a Pre‑Construction Safety Report (PCSR) Specification [5] which outlines NNB GenCo (SZC)’s approach to delivering the safety case.
3. The report covers the following areas:-

* Project Overview and Current Phase
* Summary of the Overall Safety Report Strategy
* High Level Scope of the PCSR
* Purpose of this Specification
* Purpose and Objectives for the PCSR
* High Level Summary of Activities
* Relationship of the PCSR to Plant Configuration
* HPC Project / HPC Safety Report
* Adjacent Site / Safety Case
* Licence Conditions
* Detailed scope of the PCSR
* Activities which the PCSR Supports
* Exclusions from the scope of the PCSR
* Constrained activities within the scope of future safety justification / submissions
* Nuclear safety issues and categorisation
* Approach to nuclear safety justification
* Safety Report Claims
* Claim Structure
* SZC PCSR Claim adaptations from HPC SSCD#2 and associated maturity
* PCSR Inputs
* NSDAPs and Safety Case Manual
* Key Areas for Development and Key Risks
* Structure and presentation of the PCSR

1. As SZC is a Next Of A Kind (NOAK) following on from Hinkley Point C (HPC), many aspects of design, procedure and also safety case is to be replicated from HPC. NNB GenCo (SZC)’s arrangements for replication have been assessed by ONR and found to be generally acceptable. However, further work will be required post-licensing to develop the safety case such that it can be demonstrated that risks associated with the design are reduced ALARP.
2. The SZC Safety Report claim structure will be based on that of the HPC Staged Summary Safety Case Document 2 (SSCD#2) which is due to be assessed by ONR in early 2023. However, SZC will be at an earlier project development stage compared with HPC. The SZC PCSR will therefore be produced to seek regulatory permission for the First Nuclear Safety Concrete (FNSC) and Nuclear Island Concrete (NIC) hold points rather than the start of commissioning, and has inherent differences due to the site characteristics, interfacing plants, and other design developments.

ONR Assessment

Scope of Assessment Undertaken

1. As discussed in paragraph 5, ONR has developed seven key questions which NNB has then developed as claims in its JSSR to address. In order to ensure full assessment coverage, but to also be targeted and proportionate, the questions were linked to specific topic streams. This alignment was outlined in the SZC assessment framework [4]. This assessment therefore addresses only those questions relevant to this topic steam (SC1).
2. The table below shows the questions and their alignment to the relevant topic streams.

|  |  |  |
| --- | --- | --- |
| # | Licensing Questions | Topic Stream |
| 1 | The site is of a sufficient size [to accommodate all necessary systems to ensure safe operation] | Civil Engineering  External Hazards  Internal Hazards |
| 2 | The site can be connected to [electricity] grid supplies. | Electrical |
| 3 | There is adequate cooling capability for all normal and fault conditions | Mechanical Engineering  Civil Engineering  Internal Hazards  External Hazards |
| 4 | The environmental conditions would not preclude the use of the site with respect to external hazards. | External Hazards |
| 5 | The geology of the site will provide a secure long term support to the necessary structures, systems and components. | Civil Engineering  External Hazards |
| 6 | The [NSL] submission would also need to provide a schedule for submission of further PCSR updates or revisions to support subsequent construction milestones | Safety Case |
| 7 | That operations of the site will not adversely affect the safety case for any adjoining nuclear licensed site | Internal Hazards (main)  External Hazards |

Table - Allocation of topics to Licencing Questions

1. For question 6 in Table 1 - Allocation of topics to Licencing Questions which is safety case related, the question is a relatively simple one for NNB GenCo (SZC) to show compliance with as this just requires a schedule of safety case submissions. However, in order to add confidence to the overall safety case development, and how this is being replicated from the HPC SSCD#2 submission, I decided to extend this assessment to cover how the HPC SSCD#2 safety case will be replicated, and NNB GenCo (SZC)’s general approach to this.
2. This assessment therefore covers the general principles set out in NNB GenCo (SZC)’s PCSR specification [5]. The specification lists all the sub-chapters of the PCSR and indicates if these sections will be replicated, new, or updated.
3. Each of the ONR assessment topic areas was asked to undertake a high level review of the PCSR specification [5], and to focus on the allocation for each area of the report to gain confidence that:-

* The allocation of the section is correct
* The status of the section at that point (if replicated) will provide enough evidence to support the related hold point.

1. NNB’s internal independent technical assurance function (ITA), which is part of NNB GenCo (SZC)’s Independent Nuclear Assurance function had undertaken a detailed review of the PCSR [24] which was shared with the ONR topic leads. In order to help facilitate ITA’s role in internally regulating the project, and to avoid duplication, I decided not to raise the same concerns that ITA had raised, rather, I would seek updates from ITA on the progression of any issues. This is due to the rigor of the ITA assessment, and subsequent discussions with the ITA team both in one-to-one meetings, and also in topic level 4 meetings where ITA has attended and provided robust challenge. Furthermore, the ITA function has been the subject of assessment as part of the organisational capability cornerstone [25] which found the function to be “proportionally developed” and “effective”.

Assessment

1. Section 1.2.1, Table 1 within NNB GenCo (SZC)’s PCSR Specification [5] lists the SZC safety reports which will support each of the hold points. This shows a progressive plan of safety cases developing to deliver the case to support the relevant hold point. I am content that this schedule of submissions is proportionate and aligns with the relevant hold points. This table and supporting text directly answers the question that this assessment is fundamentally assessing. However, as discussed in the scope, I decided that this assessment should gain further confidence in the overall application of replication to the safety case.
2. The HPC safety case is being delivered in stages in Summary Safety Case Documents (SSCD’s). The first of these documents (SSCD#1) was a “skeleton” safety case that presented the structure for the future safety case and this was the subject of ONR assessment [26] in order to gain confidence that the structure met with ONR’s expectation. This was undertaken by all the safety specialisms and the general conclusion was that the safety case structure met ONR expectations. The conclusion stated that:-

*“Through the topic area assessments, ONR concludes that the stated objective of supporting the transition from PCSR3 has been broadly met in that an appropriate safety report structure is presented in skeleton format with claims and information presented within each of its sub-sections. However, due to the immature/ incomplete nature of the material presented in SSCD#1 the evidence to determine whether the shortfalls identified in PCSR3 have actually been addressed will not generally be available until ONR receives SSCD#2 and later versions of the safety case.*

*Additionally, there are specific areas that topic inspectors found require attention from NNB GenCo in order to ensure that the future safety report can effectively provide ONR with the evidence and confidence to support permissioning points. These observations can be found within the various assessment reports.”*

1. The PCSR specification states that the SZC PCSR will be, in the majority, replicated from SSCD#2 which is due to be assessed by ONR in early 2023. The specification describes the process by which NNB GenCo (SZC) will undertake this, and it lists all the sections of the safety case and categorises each section stating which will be replicated, updated, or which new sections will be created. The ONR technical leads were asked to undertake a proportionate assessment of the PCSR specification. The focus of this was on the overall safety case strategy, and also to review the list of sections to gain confidence that NNB GenCo (SZC) had correctly identified which sections will be replicated, updated etc.
2. A list of comments was collocated and sent to NNB GenCo (SZC), who then provided responses [27]. The comments were generally specific to the technical areas and were related to when key information would be available, and if this information will be available when the PCSR is produced. There were no comments related to the strategy or structure of the proposed safety case. These comments did not impact the assessment of the safety case structure or schedule of submissions and they will therefore be followed up post licensing as part of normal regulatory business within the relevant topic steams.
3. When the SZC PSCR is assessed, the safety case structure will have already been assessed twice. Firstly when ONR assessed the SSCD#1 submission [26] and then when ONR assess the SSCD#2 submission (due in 2023). In ONR’s assessment of SSCD#1 it found no major gaps were in the structure of the case. This, along with the assessment undertaken in this report gives me with sufficient evidence to base my judgement on.

Comparison with Standards, Guidance and Relevant Good Practice

1. ONR’s TAG 51 (NS-TAST-GD-051 Revision 7 - Nuclear Safety Technical Assessment Guide [13] provides a guide to inspectors when assessing safety cases, this in turn references the following international standards:-

* IAEA General Safety Requirements, GSR Part 4, 2009, “Safety Assessment for Facilities and Activities” [14]
* Safety of nuclear power plants: design, SSR-2/1 (Rev 1) [16]; and,
* Safety of nuclear power plants: commissioning and operation, SSR2/2 (Rev 1) [15].

1. As discussed previously, the SZC safety case structure, as detailed in the specification, will replicate the structure and relevant sections of the HPC SSCD#2 safety case, which is an evolved version of SSCD#1 with the same structure. Therefore, as the structure of the HPC Safety case has already been assessed in the assessment of SSCD#1 [26] and no significant gaps were found then it would not be proportionate to undertake a detailed assessment of the safety case structure at this point.

Summary

1. Section 1.2.1, Table 1 within NNB GenCo (SZC)’s PCSR Specification [5] lists the SZC safety reports which will support each of the hold points. I am content that this addresses the specific question that this report is primarily assessing against.
2. In the reviews undertaken by the topic areas there were no major concerns about the allocation of the sections, but there were a number of comments raised about topic specific deliverables and timescales. None of the comments were related to the safety case structure or the proposed schedule of submissions.
3. HPC SSCD#2 will be the subject of a further ONR assessment which will be undertaken before the delivery of the SZC PCSR. Therefore, I take confidence that the structure, claims and the majority of the content of the SZC PCSR (where replicated) will already have been assessed by ONR. This will be an area of regulatory focus post-licensing decision and we will engage with SZC to ensure they are taking the learning on board.
4. Due to the nature of replication, and that this has been the subject of ONR assessment [28] a detailed assessment of the proposed safety case structure was not proportionate in this assessment as this has already been undertaken as part of the assessment of HPC SSCD#1 [29] and although there were areas of improvement required, the overall structure and delivery of the case met ONR expectations.
5. The safety case strategy for replicating the HPC SSCD#2 meets my expectations and produce an adequate PCSR. This PCSR will have a sufficient regulatory footprint though the assessment undertaken on HPC.

Licence Condition Compliance

LC 14 – Safety Documentation

* + - 1. Relevant Parts of Prospective Licensee’s Safety Case

1. This licence condition isn’t directly addressed within the licensee’s safety case, however, the JSSR and the Site Data Summary Report (SDSR) are themselves safety documentation and therefore provided ONR with examples of the implementation of the LC 14 arrangements. An intervention was undertaken that assessed the processes which NNB used to produce the documents, and assessed if the processes had been sufficiently used when the documents were created.
   * + 1. Interventions

The following intervention took place related to LC 14:

* 29 November 2021 - Licence Condition 14 Licensing Intervention [30]
  + - 1. Summary of compliance

1. The intervention found a number of areas where the evidence did not align with SZC’s arrangements for LC 14, this resulted in the ONR giving an AMBER rating for the intervention.
2. ONR therefore raised a L4 issue (RI-10605) to track the work programme that NNB GenCo (SZC) will undertake to ensure improvements to their process. This issue was subsequently closed.
3. Therefore, I consider NNB GenCo’s (SZC) arrangements for compliance with LC 14 are sufficiently developed for the activities being undertaken to support issue of a nuclear site licence at this time.

LC 20 – Modification to design of site under construction

* + - 1. Relevant Parts of Prospective Licensee’s Safety Case

1. Compliance with this licence condition isn’t directly addressed within the safety case documents submitted for the licencing process. This has therefore been the subject of interventions and interactions for ONR to gain confidence in the licensees LC 20 arrangements.
   * + 1. Interventions
2. The following intervention took place related to LC 20:

* 27 October 2021 - Replication Intervention [31]
* 30 November 2022 – LC 20 Intervention [32]
  + - 1. Summary of compliance

1. The focus of the first intervention [31] was replication, however, this is closely linked to NNB GenCo (SZC) managing changes to the design and therefore covered the processes that support NNB GenCo (SZC)’s LC 20 arrangements. This was then followed by a dedicated intervention on LC 20 [32].
2. As with many of the LC arrangements, SZC is largely duplicating HPC, however, in this case the main difference is that there is a pre-modification process which screens modifications to ensure they don’t have a disproportionate impact on replication. Once a modification is passed through this process, the next phase is replicated from HPC.
3. Both of these steps are covered by specific processes and have related documentation. These are covered in detail within the contact records from the two interventions [31] [32] and are therefore not duplicated here.
4. In summary, both interventions were rated GREEN by ONR, with only a small number of actions taken by NNB GenCo (SZC).
5. Therefore, I consider NNB GenCo’s (SZC) arrangements for compliance with LC 20 are sufficiently developed for the activities being undertaken to support issue of a nuclear site licence at this time.

ONR Assessment Rating

1. My rating for this assessment is GREEN. Although areas have been identified that require further work, NNB GenCo (SZC) has been able to demonstrate suitable compliance with the relevant licence conditions, and has provided a schedule, and a suitability developed safety case strategy which supports subsequent construction milestones.

Conclusions and Recommendations

Conclusions

1. This report presents the findings of my assessment of the SZC safety case strategy.
2. To conclude, I am satisfied that NNB GenCo (SZC) has demonstrated suitable compliance with the relevant licence conditions, and has provided a schedule, and a suitability developed safety case strategy which supports subsequent construction milestones.

Recommendations

1. My recommendations are as follows:

* **Recommendation 1:** I recommend that, from a safety case schedule, LC 14 and LC 20 perspective, ONR grants a Nuclear Site Licence.

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|  |  |
| --- | --- |
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1. CM9 revision to be identified upon completion of activity and incorporation of any changes to document. [↑](#footnote-ref-1)
2. Where required in accordance with [NS-PER-GD-016](https://how2.prod.onr.gov.uk/CtrlWebIsapi.dll/D2B97868F9C04F9F97117C7B56DFC8B7.cwl?__id=webFile.save&doc=3B55AFB1AFAC46B48A5EF6D7C306666C&dpt=1&save=1). [↑](#footnote-ref-2)
3. Hard-copy of document signed-off, CM9 version updated with authors / approver / acceptor names and dates and record finalised [↑](#footnote-ref-3)