

Sizewell C Licensing

Assessment of a request by NNB Generation Company (SZC) Ltd for a nuclear site licence to construct and operate a twin EPR™ nuclear power station at Sizewell C

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EXECUTIVE SUMMARY

APPLICATION

On 30 June 2020, NNB Generation Company (SZC) Limited (NNB GenCo (SZC)) applied to the Office for Nuclear Regulation (ONR), under the Nuclear Installations Act 1965 (as amended), for a nuclear site licence to install and operate a nuclear installation at its site located at Sizewell on the coast of Suffolk. The application is in respect of a nuclear installation comprising two thermal neutron reactors, together with any machinery, equipment, appliance, or storage facilities required for the operation thereof, being reactors fuelled with uranium dioxide enriched with isotope U²³⁵ moderated and cooled by water, to be known as the Sizewell C power station.

Granting a nuclear site licence does not give permission for the start of nuclear-related construction. That will require subsequent regulatory permission under a nuclear site licence condition and will be dependent on ONR's satisfaction with the pre-construction safety case. Other permits are required to allow construction to proceed, notably those from the planning authorities and the environmental agencies. This includes a positive decision by the Secretary of State for Business, Energy, and Industrial Strategy, following a recommendation by the Planning Inspectorate, to allow the development to proceed.

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

ONR has conducted its review of the licence application in accordance with published guidance. The principal activities carried out as part of the licensing process include:

- assessment of the applicant's organisational capability and associated arrangements to lead and manage for safety;
- assessment of the site in terms of selection and suitability, including the:
 - establishment of an adequate emergency plan;
 - decommissioning strategies, plans and programmes, and waste management;
 - site boundary definition;
 - applicant's arrangements to provide for security of tenure of the land; and
 - security and safeguards requirements;
- assessment of the applicant's safety report submissions supplied in support of the application;
- assessment of the applicant's arrangements for production of the safety report and the associated substantiation;
- assessment of the applicant's licence condition compliance arrangements; and
- an inspection of the location and marking of the site boundaries covered by the application.

The assessments and inspections form a targeted and proportionate approach to the review of the licence application. ONR sought assurance that NNB GenCo (SZC) has put in place capability and arrangements to ensure control, at the point of licensing, of all activities that could affect safety. ONR recognises that after licensing NNB GenCo (SZC) will continue to develop its arrangements as the corporate and site-based organisations evolve into that required for full operation.

The assessment has been informed by the current activities being undertaken by the applicant, which is focused on building the capability and arrangements required for the nuclear site licence (NSL) company and establishing the enablers for investment in the project. Looking ahead, ONR is not anticipating any significant increase in risk in safety related activities until after the final investment decision (FID).

ONR has also, where appropriate, engaged with relevant third parties on any matters that should be taken into consideration, including the Department for Business, Energy and Industrial Strategy and the Environment Agency prior to completion of this licensing assessment.

MATTERS ARISING FROM THE OFFICE FOR NUCLEAR REGULATION'S WORK

Shareholder agreement

As the licensee should be able to exercise effective day-to-day control over all activities on the licensed site, it is essential there is clarity on how that responsibility can be exercised. ONR's guidance *Licensing Nuclear Installations* states that although a parent company may adopt a strategic role, the licence applicant needs to demonstrate that such a relationship will not be detrimental to safety.

The current shareholder agreement for the development phase of the NNB GenCo (SZC) project places control of key policies relating to safety and security with NNB Holding Company (SZC) Limited, rather than the licence applicant, which is inconsistent with ONR's expectations. These require that control of such policies should rest with the licence applicant prior to licence grant. ONR is aware that the shareholder agreement will be changed in due course to address this matter but will require control of such policies to rest with the licence applicant prior to licence grant.

Marking the licensed site boundary

Subsequent to receiving a nuclear site licence, and during the early stages of the construction schedule, NNB GenCo (SZC) will undertake site preparation, major earthworks and preparation of the formation level for construction of the plant. ONR has accepted that erecting and maintaining nuclear site boundary markings during this stage is impracticable and could expose personnel to an unacceptable risk of injury. ONR is also satisfied that there is no nuclear safety detriment from not fully marking the boundary during this period. There are also practical difficulties in finally marking the boundary while security fences are moved as installation and commissioning progresses for both reactor units. Therefore, ONR has agreed to exclude part 4 of the standard Licence Condition 2 (marking of the site boundary) from the Sizewell C nuclear site licence until such time as it is both safe and practicable to erect and maintain an appropriate means of marking the nuclear site boundary. NNB GenCo

(SZC) has made a commitment to ONR that indicates the latest point within the construction schedule that the NSL boundary will be marked.

Security of tenure

As part of its licensing assessment, ONR seeks confidence that a licensee has security of tenure on its licensed site to carry out all activities through to the end of decommissioning and until there is no danger arising from ionising radiations on the site. ONR's assessment has concluded that NNB GenCo (SZC)'s security of tenure of the land comprising the proposed nuclear licensed site cannot be demonstrated at this point in time. It is noted that NNB GenCo (SZC) has set out proposals for acquiring ownership of the land, and thereby gaining the necessary security of tenure at a later date.

CONCLUSIONS

ONR has reviewed, in accordance with published guidance, NNB GenCo (SZC)'s application for a nuclear site licence to install and operate two EPR™ units at Sizewell. This review has found that NNB GenCo (SZC) has put in place an organisational capability and associated arrangements suitable for licence granting. NNB GenCo (SZC)'s organisational capability is still evolving and must continue to do so as the project progresses; the company has recognised where further development is needed and its commitments to carry this development forward will be monitored by ONR.

However, the current shareholder agreement vests control of key policies with the Holding Company, rather than NNB GenCo (SZC), and consistent with ONR's guidance this would need to be resolved before a licence could be granted.

The review of elements of the safety report against key site-specific criteria related to site licensing found the site to be suitable for the proposed development. NNB GenCo (SZC) will, however, need to carry out substantial further analysis in certain technical areas before ONR would give permission for first nuclear safety-related construction. NNB GenCo (SZC)'s work on the development of the Sizewell C safety report is concluded to be adequate for this stage of the project's development.

ONR considers that NNB GenCo (SZC)'s arrangements for complying with the 36 conditions attached to the standard nuclear site licence are adequate for the point of licensing. Developed compliance arrangements have been put in place where appropriate to support the early design, procurement, construction, and installation phases of the Sizewell C project. ONR will monitor the continued development of the arrangements to ensure they are suitable for later stages of the project.

NNB GenCo (SZC) has demonstrated that the position of the boundaries to the Sizewell C nuclear licensed site can be accurately marked by fences or other appropriate means, and that appropriate signage along the boundary with the adjacent Sizewell B licensed site can be erected.

However, ONR has agreed that it is not safe or practicable to fully mark the Sizewell C site boundary during construction and installation activities. We are satisfied that clause 4 of Licence Condition 2 of the standard set of licence conditions can be

excluded during this period, and that NNB GenCo (SZC) has developed and implemented adequate alternative arrangements to identify and control access to the nuclear licensed site until such time as it is safe and practicable to fully mark the site boundary by fences or other appropriate means.

ONR is satisfied that advice from the Environment Agency and the Department for Business, Energy and Industrial Strategy on matters relating to the prejudice of any legal process under environmental legislation, financial standing of NNB GenCo (SZC) and nuclear liability insurance has not identified any impediment to the granting of a nuclear site licence.

In accordance with Section 19 of the Nuclear Installations Act 1965 (NIA65), the Department for Business, Energy and Industrial Strategy has confirmed that NNB GenCo (SZC) may defer the start of nuclear liability cover until the first nuclear fuel delivery is needed. In compliance with Section 3(5) of NIA65, ONR will include a suitable provision in the nuclear site licence to enable this deferral.

NNB GenCo (SZC) has not been able to demonstrate at this point that it has security of tenure of the land comprising the proposed nuclear licensed site. This needs to be resolved prior to ONR granting a licence.

NNB GenCo (SZC)'s self-assessment of its readiness to receive a nuclear site licence concludes that by the time ONR makes its decision in mid-2022, the company will be ready for the licence to be granted but acknowledges that security of tenure over the Sizewell C site cannot be demonstrated until the freehold, or long leasehold, of the site is acquired.

RECOMMENDATIONS

On the basis of the application submitted by NNB GenCo (SZC) and the findings set out in this report, it is recommended that the Chief Nuclear Inspector informs NNB GenCo (SZC) that:

- i. ONR's assessment concludes that, relative to safety and security significance of the activities currently being undertaken or planned, the application has met almost all the regulatory requirements set out in our guidance. Specifically, ONR is satisfied that NNB GenCo (SZC) has put in place an organisational capability and associated arrangements suitable for licence granting and nothing has been identified regarding the suitability of the site to prevent granting a nuclear site licence.
- ii. However, there are two matters that need to be resolved prior to ONR granting a nuclear site licence. The matters are security of land tenure and the constraints of the current shareholder agreement relating to safety and security.
- iii. ONR is aware that the company has plans to address both above topics but that these cannot be implemented until relevant project financial decisions have been made. Once these have been adequately addressed ONR will carry out a proportionate reassessment of the company's application,



focused on the above outstanding matters and any other relevant licensing issues which we need to assess at that time. That reassessment will take into account the status of the project, specifically the planned further development of the organisation and arrangements, and the nuclear safety and security risks of the activities planned to be undertaken at that time.

LIST OF ABBREVIATIONS

ACP	Accountancy and Control Plan
BEIS	Department for Business, Energy and Industrial Strategy
BTC	Basic Technical Characteristic
CDM2015	Construction (Design and Management) Regulations 2015
CNI	Chief Nuclear Inspector
DA	Design Authority
DCO	Development Consent Order
DWMP	Decommissioning and Waste Management Plan
EPR™	EdF design of pressurised water reactor
FAP	Forward Action Plan(s)
FDP	Funded Decommissioning Programme
FID	Final Investment Decision
GID	Government Investment Decision
HPC	Hinkley Point C
IAEA	The International Atomic Energy Agency
IC	Intelligent Customer
IMS	Integrated Management System
INA	Independent Nuclear Assurance
IRR17	Ionising Radiations Regulations 2017
JSSR	Justification of Site Suitability Report
LC	Licence Condition
LQM	Land Quality Management
MoC	Management of Change
NB	Nuclear Baseline
NGL	EDF Energy Nuclear Generation Limited
NIA65	Nuclear Installations Act 1965
NISR 2003	Nuclear Industries Security Regulations 2003
NNB GenCo (SZC)	NNB GenCo Generation Company (SZC) Limited
NOAK	Next of a Kind

NSC	Nuclear Safety Committee
NSL	Nuclear Site Licence
NSR19	Nuclear Safeguards (EU exit) Regulations 2019
NSSP	Nuclear Site Security Plan
OC	Organisational Capability
OL	Organisational Learning
ONR	Office for Nuclear Regulation
PAR	Project Assessment Report
PBN	Public Body Notification
PCSR	Pre-construction Safety Report
PDO	Project Delivery Organisation
PINS	Planning Inspectorate
REPIR19	Radiation (Emergency Preparedness and Public Information) Regulations 2019
RRO	Regulatory Reform (Fire Safety) Order 2005
SAP	Safety Assessment Principle(s)
SJR	Site Justification Report
SSCD	Summary Safety Case Document
SyAPs	Security Assessment Principle(s)
SZB	Sizewell B
SZC	Sizewell C
TAG	Technical Assessment Guide (ONR)
TCO	Technical Client Organisation
TIG	Technical Inspection Guide
TSO	Technical Service Organisation
WENRA	Western European Nuclear Regulators' Association

TABLE OF CONTENTS

EXECUTIVE SUMMARY.....	2
1 INTRODUCTION	10
2 LICENSING NUCLEAR INSTALLATIONS.....	10
3 THE NNB GENCO (SZC) NUCLEAR SITE LICENCE APPLICATION	13
4 ONR ASSESSMENT	15
5 ASSESSMENT OF THE APPLICANT ORGANISATION	17
6 SITE ASSESSMENT	30
7 THE SAFETY REPORT.....	39
8 LICENCE CONDITION COMPLIANCE ARRANGEMENTS	46
9 THIRD PARTY ENGAGEMENT.....	48
10 EVENTS OF POTENTIAL PUBLIC INTEREST	51
11 APPLICANT'S READINESS.....	53
12 PREPARATION OF LICENCE DOCUMENTATION	54
13 CONCLUSIONS.....	54
14 RECOMMENDATIONS.....	56
15 REFERENCES	58

1 INTRODUCTION

- 1 On 30 June 2020 NNB Generation Company (SZC) Ltd (NNB GenCo (SZC)) applied to the Office for Nuclear Regulation (ONR) for a nuclear site licence (NSL) to install and operate a twin EPR™ nuclear power station at Sizewell C (SZC) in Suffolk. This document reports ONR's assessment of that site licence application. It sets out the general approach that ONR takes when considering any licence application; summarises the principal elements of NNB GenCo (SZC)'s application; presents the findings of ONR's assessment; and concludes with recommendations to ONR's Chief Nuclear Inspector (CNI).

2 LICENSING NUCLEAR INSTALLATIONS

2.1 THE NUCLEAR SITE LICENCE

- 2 The safety of nuclear installations in Great Britain is regulated by ONR primarily through the NSL and the conditions attached to it. Under the Nuclear Installations Act 1965 (as amended) (NIA65) any organisation wanting to install or operate a prescribed nuclear installation is required to hold a NSL. A NSL is granted to a named corporate body and is unique to a defined site. It is granted for an indefinite period and, providing there are no material changes to the basis on which the licence was granted, it can cover the entire lifecycle of a site from installation and commissioning through operation and decommissioning, and to site clearance and remediation.
- 3 Granting a NSL provides ONR with powers which enable it to ensure that future operations are supported by adequate safety cases and are subject to appropriate regulatory permission and oversight. However, the granting of a licence is not itself permission to start nuclear safety-related construction. That requires a regulatory permission under a licence condition, which is based on a substantial pre-construction safety case. Before any construction can commence, additional authorisations are also required from other regulators, notably the planning authorities and the environment agencies, to allow construction and operation. This includes a positive decision by the Secretary of State to permit the issuing of a Development Consent Order, following a recommendation from the Planning Inspectorate.
- 4 Prior to granting a licence, ONR needs to be satisfied, amongst other things, that the applicant's choice of site is suitable for the proposed installation, that it has appropriate security of tenure on the land to be licensed, that it understands the hazards and risks of the activities it proposes to carry out, and that the site safety case is sufficiently developed to demonstrate that these risks can be adequately managed. ONR also needs to gain confidence that the applicant has the organisational capability to lead and manage for safety effectively. This means that ONR must be satisfied with the applicant's

governance arrangements, resources, competencies and management processes before it will consider granting a licence.

2.2 THE LICENSING PROCESS

2.2.1 GENERAL

5 ONR has issued guidance that sets out the approach that is taken when considering an application for a NSL in *Licensing Nuclear Installations* (Ref. 1). This guidance sets out the factors that ONR may take into account when reviewing a licence application and refers to relevant technical assessment guidance. Table 1 summarises the licensing process that ONR follows.

2.2.2 ACTIVITIES CONDUCTED BY OTHER BODIES

6 There are several key enablers for new nuclear development for which ONR is not the competent authority. ONR is not responsible for:

- planning decisions, authorising the construction of a nuclear facility in a particular location, which fall to the relevant national and local planning authorities. In the case of a new nuclear power station the assessment of an application and recommendation in respect of a Development Consent Order (DCO) is made by the Planning Inspectorate (PINS). The final decision on the DCO is made by the Secretary of State. There is no relationship in law between the DCO and licensing processes, however ONR would not give permission for the start of nuclear safety related construction without there being a positive decision by the Secretary of State in respect of a DCO;
- environmental permits for discharges from the site during both construction and operation, which are the responsibility of the Environment Agency; and
- assessment of the need for, or adequacy of, the operator's nuclear liability insurance, the potential licensee's financial standing or the approval of a prospective licensee's funded decommissioning programme (which is required before the start of nuclear safety related construction). These matters are the province of the Department for Business, Energy and Industrial Strategy (BEIS).

2.2.3 ORGANISATIONAL CAPABILITY

7 ONR places considerable emphasis on engaging with prospective site licensees to seek assurance that they have suitable organisational structures, resources and capabilities to manage safety effectively and that they will be able to discharge the responsibilities associated with holding a NSL. ONR therefore engages early and systematically with licence applicants to ensure that they understand regulatory expectations, develop their organisational capability accordingly, and put in place suitable arrangements. In particular,

the licence applicant is required to produce a safety management prospectus which demonstrates how it has established and will continue to develop an organisational capability to lead and manage for safety.

- 8 ONR has set out its expectations regarding licence applicant organisational capability in a suite of Technical Assessment Guides which provide detailed underpinning guidance on organisational capability. These are instrumental in guiding ONR's interactions with a licence applicant and supporting a consistent regulatory approach.

2.2.4 SITE SELECTION

- 9 As part of the planning process under the Planning Act 2008 for nationally significant infrastructure, the Government produced a National Policy Statement for Nuclear Power Generation. The statement lists locations in England and Wales that it has determined are strategically suitable for new nuclear power stations and will apply when decisions are made on applications for development consent. The site at Sizewell listed is one that the Government considered strategically suitable for the location of new nuclear power stations.
- 10 As well as being strategically suitable for a nuclear power station development, prospective sites must also comply with any other government siting policies for nuclear installations. The UK Government responsibility for nuclear siting policy is held by BEIS, but ONR acts on behalf of the Government to administer those policies and is required to take them into account when deciding whether to grant a NSL.

2.2.5 SITE SUITABILITY

- 11 Nuclear site licences are site-specific, and so the licence applicant must identify the site on which it proposes to build a nuclear installation. There are some key aspects on which ONR must be satisfied. These are:
- The safety case must show that the design of a nuclear facility would have sufficient defences against a range of local external hazards, including seismic disturbances and extreme weather events such as flooding.
 - The location must be suitable for the production of an adequate emergency plan in accordance with the licence conditions and Radiation (Emergency Planning and Public Information) Regulations 2019. The proximity of schools, hospitals and other institutions will be considered in the assessment of the feasibility of implementing emergency countermeasures (including possible evacuation of areas around the site).
 - The site must be suitable for the engineering and infrastructure requirements of the facility.

- The proposal must conform with government siting policy (as described above).

2.2.6 SAFETY REPORT

- 12 As explained in *Licensing Nuclear Installations*, although a site-specific safety report (pre-construction safety report) does not need to be in place when a NSL is granted, the applicant will be expected to have agreed with ONR a schedule of post-licensing safety case submissions. These will be needed to support the issuing by ONR of 'licence instruments' that give permission for construction to proceed from one stage to the next. In the case of SZC, as explained later in this project assessment report (PAR), the replication of the design from that being constructed at Hinkley Point C (HPC), means that the safety report referenced in the licence application dossier draws heavily on that for HPC which is already in an advanced stage of development.

2.2.7 LICENCE CONDITION ARRANGEMENTS

- 13 ONR will agree with the applicant a programme for developing adequate licence condition compliance arrangements. Arrangements must be in place for all of the licence conditions, but these are expected to be proportionate and appropriate to the activities that are to be performed. Initially, ONR expects the applicant to focus on putting in place effective arrangements covering activities scheduled to commence as soon as the NSL comes into force. These arrangements will be expected to evolve as plant construction and commissioning proceeds. The agreed development programme needs to satisfy ONR that more detailed arrangements for the balance of the licence conditions will be developed in a timely manner.

2.2.8 LICENCE APPLICANT'S READINESS REVIEW

- 14 Prior to ONR making any decision on granting a NSL, a licence applicant is expected to formally inform ONR that it is ready to receive a licence and that it has satisfied itself that it will be compliant with all licence conditions when the licence is granted.

3 THE NNB GENCO (SZC) NUCLEAR SITE LICENCE APPLICATION

3.1 BACKGROUND

- 15 On 30 June 2020 NNB GenCo (SZC) applied to ONR for a nuclear site licence to install and operate a nuclear installation at a site located at Sizewell on the east coast of England, near Leiston, Suffolk. The application is in respect of a nuclear installation comprising two thermal neutron reactors, together with any machinery, equipment, appliance, or storage facilities required for the operation thereof, being reactors fuelled with uranium dioxide enriched with isotope U²³⁵ moderated and cooled by water and known as the SZC power station. The application was made by letter to the ONR Chief Nuclear

- Inspector (Ref. 2) and was accompanied by a dossier (Ref. 38) comprising the documents detailed in Table 2.
- 16 NNB GenCo (SZC) was incorporated on 28 October 2014 as a private limited company. NNB GenCo (SZC)'s company number is 09284825 and its registered office is at 90 Whitfield Street, London W1T 4EZ.
- 17 As the corporate body that will hold the licence, NNB GenCo (SZC) is required to be in control of all activities conducted under the licence that could affect safety. It must therefore be structured to have responsibility for licensed activities related to the control, design, construction, commissioning, operation, maintenance, and eventual decommissioning of SZC, although it may draw upon technical support from other bodies.
- 18 At the request of NNB GenCo (SZC), ONR engaged with the company prior to the submission of the application to provide advice on the licensing process and regulatory expectations. In discussion with NNB GenCo (SZC), ONR established a series of 'workstreams' addressing all the technical and organisational areas that would need to be assessed for a NSL application. Suitably qualified and experienced ONR technical specialists and inspectors held discussions with NNB GenCo staff, primarily through working level meetings, to offer advice and explain ONR requirements and expectations as the NNB GenCo (SZC) organisation and its arrangements developed.
- 19 During this period ONR established rigorous and robust programme management arrangements that included, amongst other things, programme governance, development and management of risks/issues, programme metrics and identification and tracking of working level actions resulting from the interactions with NNB GenCo (SZC).

3.2 REPLICATION OF HINKLEY POINT C

- 20 To reduce costs and project uncertainty, NNB GenCo (SZC)'s strategy for SZC is to derive value from a 'next of a kind' (NOAK) series effect. This involves duplicating, wherever possible, the HPC plant and adopting a systematic approach to capturing, quantifying, and applying lessons learned to SZC, noting that some aspects of the design cannot be replicated due to site-specific features.
- 21 The replication strategy applies also to documents and arrangements, where those developed for HPC will be drawn upon so far as possible to produce those needed for SZC.
- 22 Although ONR sees benefits in a NOAK approach, it undertook an assessment of the replication strategy proposed by NNB GenCo (SZC), as applied to the design and safety case, to ensure that it fully understood what was proposed and that the advantages in the approach outweighed any potential detriments. This is covered in Section 7.1.
- 23 The application of this replication strategy means that ONR can also draw upon its experience with HPC, and this has allowed our licensing assessment

to focus on those areas where there are differences in design, documentation and organisation compared with HPC.

4 ONR ASSESSMENT

4.1 SCOPE

- 24 In accordance with ONR's published guidance the assessment of NNB GenCo (SZC)'s application has considered four key areas. In summary, these are the organisation, the site, the safety report (site specific submissions for licensing and associated arrangements) and the licence condition compliance arrangements. In addition, our assessments have considered the proposed arrangements for meeting nuclear security requirements and managing conventional health and safety during construction. The full scope and findings of the assessment and inspection activities are set out in subsequent sections of this report.
- 25 Our assessments and inspections have been targeted and proportionate, taking appropriate account of the activity that the applicant will be undertaking and its impact on nuclear safety and security at the point that the licence is granted. ONR recognises that not all resources, arrangements and safety reports to support construction and operation will be in place at the point of licensing, and that NNB GenCo (SZC) will continue to develop its arrangements as the corporate and site-based organisations evolve towards those required for full operation. The key consideration for ONR is that, at the point of licensing, the licensee is in control of all activities that have the potential to affect nuclear safety and security, and has adequate arrangements in place to provide confidence that this will continue to be the case.
- 26 The assessment has been informed by the current activities being undertaken by the applicant; these are focused on building the capability and arrangements required for the nuclear site licence company and establishing the enablers for investment in the project. Looking ahead, we are not anticipating any significant increase in risk in safety related activities until after the final investment decision (FID).
- 27 In preparation for the site licence application, ONR developed a licensing assessment strategy (Ref. 3) which described the working level approach that we would take to inform a decision on whether the licence should be granted. The aims of the strategy were to:
- provide an intervention framework for ONR to advise, and gain confidence in, NNB GenCo (SZC)'s development as a potential nuclear site licence holder; and
 - ensure that ONR manages its engagements with NNB GenCo (SZC) and its regulatory decision-making effectively and efficiently.
- 28 The assessment strategy was supplemented with an assessment framework document (Ref. 4) which set out more detail on the expectations of the ONR

assessment team, including the identification of the relevant assessment workstreams and the format and timing for producing assessment reports. As discussed in the strategy and framework documents, ONR's assessment is divided into several 'cornerstone themes' covering the licence applicant's:

- organisation capability;
- licence condition compliance arrangements;
- safety report and associated substantiation:
 - site specific safety submissions supplied in support of the application; and
 - arrangements for production of the safety report and the associated substantiation required to support procurement, design, construction and installation;
- licensing documentation and ONR's associated legal and other processes, including demonstration of security of tenure of the land;
- arrangements for ensuring compliance with nuclear safeguards and nuclear security regulations; and
- arrangements for compliance with conventional health and safety and fire safety regulations.

29 In accordance with this approach, ONR's assessment was informed by proportionate interventions covering all of the cornerstone themes.

30 The ONR intervention activities themselves constituted a significant number of face-to-face working level and project level meetings between technical specialists and management within ONR and NNB GenCo (SZC), assessment of relevant submitted documentation and inspection of implemented arrangements where appropriate.

31 The assessment topics, associated project reference, and their assignment to an appropriate licensing assessment report are set out in Table 3.

4.2 STANDARDS AND CRITERIA

32 The ONR assessments include the application of relevant standards and criteria. Principally these are, where appropriate, the relevant Safety Assessment Principles (SAP) (Ref. 5), internal ONR Technical Assessment Guides (TAG) (Ref. 6), ONR Technical Inspection Guides (TIG) (Ref. 7), International Atomic Energy Agency (IAEA) standards (Ref. 8), Western European Nuclear Regulators' Association (WENRA) Reactor Harmonization Group Reactor Reference Safety Levels (Ref. 9) and other relevant national and international standards. Specific referenced assessment reports

prepared by the relevant technical specialists identify the standards and criteria that have informed the particular assessment.

- 33 Approval of this PAR indicates that the licensing assessment process as described in *Licensing Nuclear Installations* has been completed in accordance with ONR guidance (Ref. 47), and that ONR has made a recommendation to the Chief Nuclear Inspector (CNI). The decision on whether to forward the recommendation, and the final decision on whether to grant a NSL, will be at the discretion of the CNI.

4.3 REVIEW OF ONR'S APPLICATION OF THE LICENSING PROCESS

- 34 The process of preparation, review, and approval of a PAR within ONR is documented in ONR's management system. This process includes an internal checking process followed by a peer review. Subsequent to a peer review, an acceptance review is undertaken at managerial level.
- 35 When a licensing assessment has been undertaken, the CNI will also review the process and the conclusions that have been reached before making a decision on whether to accept the recommendation in the PAR. This involves an oral presentation to the CNI and other senior ONR staff by the responsible authors of the PAR and major contributing reports, as well as the approving managers. The CNI is able to challenge either the authors or the approvers in any area of the report, both in terms of process and content of the report, and to seek any appropriate review of the report if required.

5 ASSESSMENT OF THE APPLICANT ORGANISATION

- 36 ONR's assessment of NNB GenCo (SZC)'s organisational capability arrangements is detailed in assessment report ONR-NR-AR-22-010 (Ref. 10). This report covers the whole of the organisational capability 'cornerstone', as set out in the SZC licencing strategy (Ref. 3), and is compiled from contributions produced by ONR specialist inspectors covering the following areas:

- governance and assurance
- organisational development
- competency, training and appointments
- quality (including management systems)
- safety culture
- intelligent customer
- design authority
- supply chain management (including long-lead items)
- organisational learning
- independent assurance and advice

The outcomes from each of these assessment areas are summarised in Sections 5.1 to 5.11 below.

- 37 Setting out the context in which the assessments had been undertaken, the organisational capability (OC) report notes that there are two key terms relevant to the assessments:
- Government investment decision (GID), which is the point where the UK Government may opt to invest in the project. Such an investment would enable the project to build further capability prior to any significant increase in activity; and
 - financial close/final investment decision (FID), which is the point where the main investment is expected in the project and where activity/risk will significantly increase.
- 38 The OC report recognises that the organisational capability of the project will continue to mature beyond the point of nuclear site licence grant, noting there are currently ~250 people working on the project with this planned to almost double within the next year. ONR will seek confidence through NNB GenCo (SZC)'s forward action plan (FAP) and ongoing engagement as the project progresses beyond this assessment.
- 39 The OC report notes that NNB GenCo (SZC) began a period of 'shadow working' in early 2022. Shadow working is seen by ONR as an opportunity for a licence applicant to test the adequacy and robustness of its management arrangements as if it were operating under the constraints of a nuclear site licence, allowing it time to refine its arrangements based on learning from experience, and for ONR to gain confidence in the adequacy of implementation.
- 40 The OC report also notes that NNB GenCo (SZC) is developing a delivery model that will utilise a series of alliances to deliver the project, with NNB GenCo (SZC) retaining clear accountability for overseeing the project as an intelligent customer. The principles of this model are:
- NNB GenCo (SZC) will be responsible for specifying requirements, governing, enabling, assuring, and managing the integration of its suppliers and alliances; and
 - within the SZC organisation, the delivery team (known as 'Project Delivery Organisation – PDO') will be responsible for the delivery of the project works against NNB GenCo (SZC)'s defined requirements from design through to handover to the operations team, managing the integration with the supply chain.
- 41 The OC report recognises that the delivery model is evolving and will therefore be part of future regulatory engagement. However, the foundations of this model are explored further in several of the assessment areas covered by the report, particularly with a view to helping define ONR's future regulatory engagement on the project.

5.1 GOVERNANCE AND ASSURANCE

- 42 Section 3 of ONR's OC report notes that the business model for the SZC project has matured significantly during the course of ONR's licensing assessment. There is now a clear alignment across the organisation, with a good understanding of the operating model that provides the underpinning. Although there is still a significant amount of work on implementation, the regulatory focus going forward will be on embedding the operating model.
- 43 The report notes that the NNB GenCo (SZC) Board is operating within the constraints of the current shareholder agreement, and that this would need amendment by NNB GenCo (SZC) before licensing.
- 44 The board members interviewed by the ONR OC team recognised the board needs to evolve as the project progresses to the next stage and that this will result in notable changes to the board membership. This review of board composition has been captured in a commitment letter to ONR (Ref. 11).
- 45 The report notes that the ONR OC team was reassured by the existing arrangements for securing core safety capability, which replicate the arrangements at HPC. The ONR team had also gained confidence in the range of mechanisms available to NNB GenCo (SZC) to secure the resources needed at the point of delivery, post FID. Most of these arrangements are agreed in principle and ready for signing once the project moves towards FID.
- 46 With the exception of the present shareholder agreement, which is not acceptable for licensing, this section of the OC report concludes that NNB GenCo (SZC)'s governance arrangements are proportionate for the current stage of the SZC project, and that the company has developed its governance arrangements sufficiently to become a nuclear site licensee, while mindful of the commitments made in the letter to ONR.

5.2 ORGANISATIONAL DEVELOPMENT

- 47 Section 4 of ONR's OC report notes that *Licensing Nuclear Installations* states that a safety management prospectus submitted with the licence application should provide a clear description of the company, its structure and how it intends to operate. It should also include a description of the governance of the organisation, and its management system and staffing arrangements.
- 48 The OC report notes that NNB GenCo (SZC) has instead opted to use a company manual to cover the relevant governance and organisational elements usually contained within a safety management prospectus, and that this had been reviewed against the relevant ONR TAG (NS-TAST-GD-072). Although shortfalls were identified within this version of the company manual, the OC team was content that NNB GenCo (SZC) understands and acknowledges the gaps and has agreed these will be addressed in a later version of the manual to be produced at GID. Noting the manual will need to also incorporate additional changes driven by GID, the OC report accepted the company manual as adequate for this stage, with the clear understanding

- the gaps in the manual are addressed as part of the update and within the agreed timescale.
- 49 The OC report had also looked for clear management arrangements for people processes and was satisfied that these arrangements have been intelligently adopted from HPC. The report noted that setting up an organisation capability committee (OCC) was an important step in NNB GenCo (SZC) becoming a licensable organisation.
- 50 The OC report noted that a licence applicant should have an adequate and up-to-date nuclear baseline (NB) that develops and defines nuclear safety related roles and posts. ONR's expectation is that the NB demonstrates the prospective licensee has suitable and sufficient organisation structures, staffing and competences in place to effectively and reliably carry out those activities which could impact on nuclear safety.
- 51 The OC report notes that the NB submitted in November 2021 was suitable and sufficient, although ONR's assessment had found some areas for improvement. These findings have been incorporated into the NNB GenCo (SZC) FAP, for tracking and closure by the SZC organisational capability committee as part of its ongoing improvements to the NB arrangements.
- 52 The report notes that ONR will seek confidence that a prospective licensee has arrangements for management of change (MoC), in accordance with Licence Condition (LC) 36(2), which requires that the licensee shall make and implement adequate arrangements to control any change to its organisational structure or resources which may affect safety. NNB GenCo (SZC) adopted HPC's MoC process and these were trialled during 2021 allowing for amendments to be made before starting shadow working in January 2022. The report concludes that the MoC arrangements are proportionate to the phase of the project and are sufficiently flexible to enable rather than constrain organisational development.
- 53 In addition, the assessments carried out by the OC team allowed for a determination of the adequacy of NNB GenCo (SZC)'s arrangements for compliance with LC36(1) which requires the arrangements to ensure the licensee has adequate human resources. The OC report concluded that NNB GenCo (SZC)'s arrangements for compliance with LC36 are sufficiently developed for the activities being undertaken to support issue of a nuclear site licence at this time.
- 54 The OC report also notes ONR's assessment of the arrangements between NNB GenCo (SZC) and the Technical Client Organisation (TCO). The TCO is an arrangement consisting of cooperative and co-located working between the Technical Service Organisation (TSO) and design authority functions of NNB GenCo (SZC), NNB Generation Company (HPC) Limited and EDF Energy Nuclear Generation Limited.
- 55 The TSO is a wholly owned subsidiary of EDF Energy. The TSO will provide technical competency for NNB GenCo (SZC)'s organisational capability

requirements in a way that will ensure the licensee retains control and ownership of its design authority and its nuclear baseline.

56 The OC report's overall conclusion for this topic was that NNB GenCo (SZC)'s organisational development function is proportionately developed for the current stage of the SZC project and that its organisational development arrangements are sufficient for it to become a nuclear site licensee.

5.3 COMPETENCY, TRAINING AND APPOINTMENTS

57 The scope of this topic stream covers NNB GenCo (SZC)'s:

- competency framework;
- competency arrangements including the nuclear baseline (NB);
- governance and oversight;
- recruitment and appointment processes; and
- forward strategy for training and on-boarding post FID.

58 Section 5 of the OC report notes that the topic stream had been discussed in level 4 meetings between November 2020 and November 2021, with two dedicated interventions in March 2022.

59 With regard to NNB GenCo (SZC)'s competency framework, the OC report notes that there is a training policy, draft strategy, and a training plan in place. NNB GenCo (SZC) has adopted the existing arrangements from HPC for LC10 (training) and LC12 (duly authorised and other suitably qualified and experienced persons). ONR had conducted a targeted set of engagements which found the qualification of NNB GenCo (SZC)'s technical teams to be appropriate and validated the associated training records. The report notes that the OC team's interactions with NNB GenCo (SZC) staff throughout the licensing assessment process had also provided confidence in the organisation's competency arrangements.

60 The report notes that NB competency compliance (that is, the assessment of NB post holders' role training profiles) is monitored using an Excel spreadsheet which showed compliance to be much lower than the target of 85%, though the data in the spreadsheet needed to be validated manually for all NB posts. A regulatory issue (9031) was raised in September 2021 to address this deficiency.

61 NNB GenCo (SZC)'s evidence for closure of this issue was reviewed in one of the March interventions. This concluded that one aspect of the issue (executive accountability for training and competency) should remain open, with the intention that NNB GenCo (SZC) will make necessary changes by mid-2022. This is set out in the commitment letter (Ref. 11). This open action is not required to be closed prior to the licensing decision.

62 The OC report notes NNB GenCo (SZC)'s intention to set up a project training oversight committee later in 2022 which will report up to the organisational capability committee, thereby providing an additional layer of oversight of

training across the project. It was concluded that lessons have been learnt from HPC in that the setting up of robust and clear governance arrangements is one of the key requirements for driving the right outcomes in this area. The development of the governance arrangements would be a focus of ONR's regulatory engagement post-licensing.

63 The OC report concludes that NNB GenCo (SZC)'s training function is proportionate to the current stage of the SZC project. Shortfalls in the NB competency arrangements have a clear plan to be addressed which are set out in the commitment letter.

64 Based upon the overall assessment of this topic stream the OC report concludes that NNB GenCo (SZC) has developed its arrangements for managing competency, training and appointments sufficiently to become a nuclear site licensee. ONR will seek confidence in the delivery of the relevant parts of the FAP and related activities following any licensing decision.

5.4 QUALITY (INCLUDING MANAGEMENT SYSTEMS)

65 Section 6 of the OC report covers the assessment of quality management, including the licence applicant's management systems. The assessment covered:

- management system arrangements;
- quality performance measurement and reporting;
- document and records management;
- intelligent adoption of processes and procedures;
- learning arrangements;
- quality function effectiveness, resources, capability and competence;
- training; and
- deviation management.

66 The OC report notes that the topic stream had been discussed in level 4 meetings between June 2020 and February 2022, with dedicated interventions in December 2021 and March 2022.

67 The report notes that the structure of NNB GenCo (SZC)'s integrated management system (IMS) is largely based on the current HPC IMS, though NNB GenCo (SZC) has developed new hosting architecture, with the HPC project following suit. Based on learning from HPC, the company has decided that all employees, embedded contractors, and remote contractors will have access to the IMS, reflecting its desire to have one IMS for the totality of the project.

68 The report concludes that the IMS structure and the processes and tools being developed, and the forward plan for development for the system were adequate.



- 69 Turning to NNB GenCo (SZC)'s development of effective quality performance measures and reporting, the report notes that at present this was limited to the development of the IMS. Further definition of key performance indicators, development of dashboards and automated monthly reporting via Power BI is ongoing and will be developed commensurate to the stage of the project.
- 70 Under LC6 (documents, records, authorities and certificates) there is a responsibility on licensees to implement adequate arrangements for the preservation of relevant documents and records. ONR therefore sought assurance that NNB GenCo (SZC)'s arrangements for document and records management are adequate for this stage of the project, that the arrangements will continue to develop in line with project progress, and that there is a defined forward action plan for continuing development of the arrangements.
- 71 As with other elements of the quality workstream, NNB GenCo (SZC) is seeking to intelligently replicate the management systems controls, tools, systems, and processes from HPC to effectively manage all documents and records, including those required under LC6. A key aspect of this approach is the replication of Teamcenter, which is the electronic documents and records management system.
- 72 Overall, the report considers that the arrangements and tools for the management of records were adequate for this stage of the project.
- 73 The report also covered ONR's assessment of NNB GenCo (SZC)'s intelligent adoption of quality management related processes and procedures from the HPC project and found the arrangements in place for procedure adoption are fit for purpose.
- 74 The report notes that there is no single document which illustrates the overall governance of NNB GenCo (SZC)'s quality function, although there is the intention to develop a quality 'Organisational Note', which will fulfil this purpose and this activity is explicitly listed in the FAP. Despite this minor shortfall, the ONR report concluded that the quality governance arrangements are appropriate for licensing.
- 75 The report notes that for the construction phase, NNB GenCo (SZC) will need to have arrangements to ensure non-conformances are identified, reported, and managed to satisfactory closure. In line with the project's replication strategy, arrangements for the management of non-conformances have been adopted from HPC. ONR's OC team judged that these arrangements, although adequate for this stage of the project, will need to be reviewed as the project progresses and the frequency of occurrence of non-conformances increases.
- 76 In summary, the ONR OC report confirms that NNB GenCo (SZC) has:
- implemented adequate management system arrangements, including quality management arrangements;

- developed and implemented adequate records management arrangements via Teamcenter;
- provided evidence of adequate arrangements, documentation, and organisational capability (quality function) during level 4 engagements and interventions; and
- established adequate quality functions to support the organisation.

77 The report concludes that NNB GenCo (SZC)'s quality management arrangements (including those specific to LC6 compliance) are proportionate to the current stage of the SZC project and that these arrangements are sufficient for NNB GenCo (SZC) to become a nuclear site licensee.

5.5 SAFETY CULTURE

78 Safety culture is defined by the IAEA (Ref. 8) as “the assembly of characteristics and attitudes in organisations and individuals which establishes that, as an overriding priority, protection and safety issues receive the attention warranted by their significance.”

79 Section 7 of ONR's OC report provides details of ONR's assessment of NNB GenCo (SZC)'s safety culture. The report notes that safety culture is one of the focus areas for seeking assurance that a licence applicant has suitable and sufficient organisational structures, resources, and competencies to lead and manage safety effectively.

80 NNB GenCo (SZC)'s recently approved culture strategy provides the framework on which the company will develop its culture to ensure that all safety, environmental and security matters receive the attention warranted by their significance. ONR's report concludes that the content of the culture strategy is satisfactory.

81 The report notes that NNB GenCo (SZC) intends to replicate good practice relating to safety culture from HPC. The SZC Performance Improvement Manager regularly attends HPC's 'community of good practice for nuclear safety culture' to identify any applicable learning. The next step will be the creation of a NNB GenCo (SZC) culture steering group and replication of HPC's 'community of good practice'.

82 The report notes that from having interviewed a sample of the NNB GenCo (SZC) leadership team, that there is adequate evidence of senior leadership commitment to safety and a 'right first time' approach.

83 ONR's OC team was satisfied with NNB GenCo (SZC)'s safety culture training materials noting that further development and delivery of safety culture related training is an important area of focus for the next stage of the project. The forward action plan sets the key activities to be completed before FID and also includes a commitment to develop the culture strategy post-FID.

84 The report summarised the ONR assessment findings:

- the company manual clearly articulates overriding priority of nuclear safety and environmental management;
- the NNB GenCo (SZC) culture strategy has been developed;
- NNB GenCo (SZC) uses the same values as HPC, and can demonstrate their mapping to relevant good practice;
- a culture forward action plan has been developed;
- there is evidence of senior leadership commitment; and
- NNB GenCo (SZC) is holding regular safety culture surveys.

85 The report concludes that NNB GenCo (SZC)'s safety culture function is proportionate to the current stage of the SZC project and that the company's safety culture is sufficient for it to become a nuclear site licensee.

5.6 INTELLIGENT CUSTOMER

86 As described in *Licensing Nuclear Installations*, a licensee must be able to demonstrate that it will retain adequate and enduring control of the nuclear safety risks, understand the hazards associated with its activities and how to control them, and have sufficient competent resource within its organisation to be an 'intelligent customer' (IC) for any work it commissions externally.

87 Section 8 of ONR's OC report provides details of ONR's assessment of NNB GenCo (SZC)'s IC capability. The assessment involved level 4 discussions and targeted interventions between April 2020 and February 2022.

88 ONR's assessment sought to determine whether there are suitable governance arrangements in place to allow senior NNB GenCo (SZC) management to gain assurance that the organisation has a suitable core safety and IC capability and that it will be effective and robust in ensuring the safe performance of contractors, as well as providing assurance to the board that the organisation has a suitable IC capability.

89 The assessment also considered the NNB GenCo (SZC) implementation plan which sets out how the approved IC policy is to be implemented. It was noted that the forward plan for this is now owned by the company's IC Oversight Group (whose workings were observed).

90 The OC report observed that:

- there is an IC policy in place, closely aligned to ONR's IC TAG (NS-TAST-GD-049);
- there were suitable and sufficient management arrangements in the IMS to underpin the IC policy for the work currently being undertaken;
- all the current nuclear baseline roles require a minimum IC level 2 competency which is embedded within technical role profiles;
- the level 3 competency (IC practitioner) role training profile has been adopted from HPC. It is expected that ~50 posts will be allocated to



this role by the end of 2022. There will be IC practitioner training tailored specifically to board member activities; and

- IC training is provided by HPC and feedback during ONR interviews with staff was that it provides a good grounding in understanding the purpose of IC.

91 The report concluded that NNB GenCo (SZC)'s intelligent customer arrangements are proportionate to the current stage of the SZC project and that the company's IC capability and arrangements are sufficient for it to become a nuclear site licensee.

5.7 DESIGN AUTHORITY

92 Section 9 of ONR's OC report provides details of ONR's assessment of NNB GenCo (SZC)'s design authority arrangements.

93 As described in *Licensing Nuclear Installations*, a licensee should have a formal process to understand and maintain design knowledge and design integrity. That part of the licensee's organisation with the responsibility for, and the requisite knowledge to maintain, the design integrity and the overall basis for safety of its nuclear facilities throughout the full lifecycle of those facilities is termed the Design Authority (DA).

94 For SZC, as with HPC, the DA now sits within a TCO as discussed in Section 5.2 above. All staff within NNB GenCo (SZC)'s technical programme, including the DA, are on the company's nuclear baseline and have allocated roles with associated competency requirements. The DA reports to the SZC Technical Programme Director, who has access to the board through the Engineering and Delivery Director. They also have a direct line to the TSO Managing Director, in order to have suitable influence within the TCO. The OC report observes that NNB GenCo (SZC) has stated that the size and competency of the DA is captured in the nuclear baseline and the competency framework, with a plan to replicate the HPC structure and size (by around 2024).

95 The OC report observes that in most respects the SZC project's DA processes and systems have been replicated from HPC. The TSO, which supports the DA, is shared between the HPC and SZC projects and in future potentially Sizewell B (SZB). The OC report acknowledges that this produces both a benefit in terms of having a pool of resources who can be agile to the peaks and troughs of various projects, but also poses a challenge in terms of how those resources are deployed and kept engaged to ensure they maintain understanding of the bigger picture. The report notes that there is a prioritisation protocol in place to manage competing demands on the same TSO resources from multiple licensees, but that this has yet to be stress-tested.

- 96 The OC report concludes that NNB GenCo (SZC)'s DA is proportionately developed for the current stage of the SZC project and that the company's DA arrangements are sufficient for it to be granted a nuclear site licence.
- 97 However, the report also concludes that the current processes and systems are not adequate to facilitate the required growth of the DA post-licencing and that ONR will need to be satisfied that the relevant parts of the FAP have been delivered prior to any step change in risk.

5.8 SUPPLY CHAIN MANAGEMENT

- 98 Section 10 of the OC report provides details of ONR's assessment of NNB GenCo (SZC)'s supply chain management.
- 99 The report notes that NNB GenCo (SZC)'s strategy is to intelligently replicate HPC's design and supply chain. In replicating the design, NNB GenCo (SZC) claims it can deliver safety case requirements while benefiting from the experience of the replicated HPC supply chain and the efficiencies and improvements made from unit 1 to unit 2 at HPC. NNB GenCo (SZC) claims cost savings from this and from implementing HPC learning.
- 100 The OC report observes that the HPC project has acknowledged weaknesses in its arrangements for supply chain management, notably in manufacturing oversight and management of counterfeit, fraudulent and suspect items. ONR views it as important that the SZC project does not replicate these weaknesses and adopts a better approach.
- 101 The OC report concludes that NNB GenCo (SZC) has arrangements in place to learn about, and address, known weaknesses in HPC's approach and thereby reduce the likelihood of those weaknesses being replicated. The report also concludes that NNB GenCo (SZC) has arrangements in place to intelligently replicate HPC's suppliers and manage any occasions when a different supplier may need to be contracted.
- 102 The OC report confirms ONR's satisfaction with NNB GenCo (SZC)'s:
- incentive scheme for suppliers: under this, all suppliers that have major onsite works will earn their profit on performance. The report notes that the specialist inspector was content that the incentives regime is unlikely to encourage suppliers to take actions detrimental to nuclear safety to maximise financial rewards;
 - intelligent customer implementation: this was demonstrated in two areas: in the procurement of high-integrity long-lead items and in the development of contract specifications;
 - system for devising specifications: under NNB GenCo (SZC)'s intelligent replication strategy most specifications rely upon, and are based upon, those produced for HPC;
 - assessment of supplier capability: NNB GenCo (SZC) will validate supplier capability themselves, taking benefit from the HPC project's

existing qualification and performance data, and performing its own verifications as appropriate. NNB GenCo (SZC) will adopt the HPC approach of cascading capability requirements down the contracting tiers, with responsibility for checking the next tier of sub-contractors placed on the tier above; and

- operational experience process: the company has sourcing strategies for each procurement, and these require it to consider operational experience information from the HPC project.

103 With regard to the procurement of high-integrity long-lead items, the report observes that NNB GenCo (SZC) is acting as an intelligent customer and has improved its capability in response to lessons learned from early activities. The report concludes that the company is currently competent to fulfil the role of intelligent customer for high-integrity long-lead items.

104 The OC report concludes that NNB GenCo (SZC)'s supply chain management, including management of high-integrity long-lead items, is proportionately developed to the current stage of the SZC project, and is sufficiently advanced to allow the grant of a nuclear site licence.

5.9 ORGANISATIONAL LEARNING

105 Section 11 of ONR's OC report provides details of ONR's assessment of NNB GenCo (SZC)'s organisational learning (OL) function. The assessment focused on NNB GenCo (SZC)'s OL strategy and management arrangements, as well as resources, capability and training, alongside leadership of the function. Arrangements for learning from operational experience more widely were also considered.

106 The report notes that to facilitate learning NNB GenCo (SZC) has implemented the 'Insight' computer-based system in conjunction with the HPC project for recording and applying lessons learned. The SZC Insight system includes all learning records from the HPC project. To ensure the effective oversight of learning, NNB GenCo (SZC) has also implemented a learning screening committee sponsored by the Pre-Operations Director, to ensure learning reports are systematically reviewed, and that actions are appropriately owned and addressed.

107 NNB GenCo (SZC) has provided evidence against ONR expectations for this topic stream. In particular: approval of the OL strategy and the completion of a self-assessment with the actions included in the FAP. The report notes that examples were provided of learning reports being raised that an experienced OL board champion is providing support.

108 As a result of the ONR team's engagement with NNB GenCo (SZC) on this topic (including level 4 meetings and a dedicated intervention), it was concluded that the arrangements were not at the level of maturity expected. The shortfalls were captured in regulatory issue 10566, raised in January 2022. One of five actions remains open but is not required to be closed prior

to the licensing decision. This action requires training requirements for the OL roles to be set out in a plan for both staff and contractors.

109 The OC report concludes that NNB GenCo (SZC)'s organisational learning function is proportionate to the current stage of the SZC project, and that it has developed its arrangements sufficiently to become a nuclear site licensee.

110 The report notes that compliance with the OL aspects of LC7 (incidents on the site) were assessed in a separate dedicated intervention and found to be satisfactory. This is reported in the licence compliance assessment report (Ref. 12), and in Section 8 of this PAR.

5.10 INDEPENDENT ASSURANCE AND ADVICE

111 A licence applicant's arrangement for independent challenge and oversight is listed in *Licensing Nuclear Installations* as a focus area for seeking assurance that the applicant has suitable and sufficient organisational structures, resources, and competencies to lead and manage safety effectively. This topic stream is covered in Section 12 of ONR's OC report.

112 ONR's assessment examined whether the licence applicant had established an independent nuclear safety assurance capability that is sufficiently resourced and capable to provide timely advice, and that appropriately influences the organisation.

113 The OC report notes that NNB GenCo (SZC) had an adequate approved strategy and forward plan for the work of its Independent Nuclear Assurance (INA) function. Drawing on interviews with all members of the INA function, ONR was satisfied with the competence and leadership of the INA team.

114 Due to the stage of the project, reporting to directors and senior management as well as monitoring and reviewing INA performance is predominantly in the area of future intention. However, the OC team was satisfied that the INA function is sufficiently developed for the current stage of the project.

115 The report concludes that NNB GenCo (SZC) had put in place an independent assurance and advice function that was proportionate to this stage of the SZC project and that this was sufficient for granting a nuclear site licence.

5.11 ORGANISATIONAL CAPABILITY CONCLUSIONS AND RECOMMENDATIONS

116 The assessment described in the OC report has examined the corporate body/licensee organisation structure, governance arrangements, resources, competence and training, design authority, intelligent customer capability, internal challenge, supply chain management and arrangements for procurement of high-integrity long-lead items.

117 The assessment is based on evidence from interventions and routine level 4 engagements on specific topics and arrangements, including key project

- enabling activities. It also draws on the significant cross cutting interventions carried out by ONR as part of delivery of the ONR integrated intervention plan.
- 118 Based on the assessment, undertaken on a sampling basis, the following conclusions have been reached:
- NNB GenCo (SZC) has adequately implemented its arrangements for compliance with the OC related licence conditions, namely: LC6, LC7, LC10, LC12, LC17 and LC36;
 - the OC considerations identified in the ONR assessment framework (Ref. 7) have been adequately developed;
 - regulatory issues that have been raised by ONR during the assessment process have been satisfactorily addressed, or there is a plan in place to address any outstanding issues;
 - NNB GenCo (SZC) has established comprehensive plans to further develop the capability and arrangements prior to any step-change in the project risk profile;
 - NNB GenCo (SZC) has adequately established and documented (Ref. 11) a series of commitments for items that cannot be addressed until after the conclusion of ONR's assessment; and
 - the shareholder agreement is not acceptable for licence grant.
- 119 Taking these factors into account, with the exception of the shareholder agreement, the report's overall judgement is NNB GenCo (SZC) has developed its organisational capability and arrangements sufficiently to become a nuclear site licensee, while noting the issues contained within the commitment letter.
- 120 ONR will engage with NNB GenCo (SZC) on the delivery of the forward action plan and related activities, which are intended to facilitate the continued development of the organisation and its arrangements prior to any step-change in project risk.

6 SITE ASSESSMENT

6.1 SITE SELECTION

- 121 The choice of the location for a new nuclear power station is a matter for the developer, in this case NNB GenCo (SZC). As explained in *Licensing Nuclear Installations* however, there are overriding government policies on the siting of new nuclear power stations which need to be satisfied by that choice.
- 122 UK Government responsibility for nuclear power station siting policies is held by BEIS. However, ONR acts on behalf of the UK Government to administer those policies and is required to take these into account when deciding whether to grant a nuclear site licence. The UK Government's general position on siting policy is set out in the seventh national report to the Convention on Nuclear Safety (Ref. 13).

- 123 As part of the planning process under the Planning Act 2008 for nationally significant infrastructure projects, the government has produced a national policy statement for nuclear power generation (NPS) (Ref. 14). The statement lists locations in England and Wales that it has determined are strategically suitable for new nuclear power stations and will apply when decisions are made on applications for development consent.
- 124 The NPS lists sites determined by the UK Government to be potentially suitable for the siting of new nuclear power stations in England and Wales before the end of 2025. One of those listed sites is at Sizewell, adjacent to the existing nuclear power stations. The UK Government is currently working on a new NPS to apply to developments with at least one nuclear reactor, with each reactor having an electricity generating capacity of above 1 gigawatt and being deployable before the end of 2035.
- 125 In conformance with its land use planning guidance (Ref. 16) ONR carried out a demographics assessment relating to the proposed SZC nuclear power station (Ref. 15).
- 126 The demographic assessment conservatively included the anticipated increase in local population associated with the site accommodation campus and the workers' caravan park, plus an assumed increase in population due to construction workers living in existing accommodation near to the site.
- 127 ONR's demographics assessment report concluded that even with the additional assumed population during construction, that the SZC site would meet the 'semi-urban' population criterion set out in the government's current siting policies for new nuclear power stations.

6.2 SITE SUITABILITY

6.2.1 SITE JUSTIFICATION REPORT

- 128 *Licensing Nuclear Installations* requires a site justification report (SJR) to be submitted as part of the site application dossier that must show that the design of a nuclear facility would have sufficient defences against a range of local external hazards, including seismic disturbances and extreme weather events such as flooding. It must also show the suitability of the site for the engineering and infrastructure requirements of the facility
- 129 ONR's assessment against the SAPs of the adequacy of the submitted site justification documents is addressed in Section 7 of this report. As discussed there, for SZC the SJR is provided in the form of NNB GenCo (SZC)'s Justification of Site Suitability Report (JSSR). ONR assessed the claims in the JSSR across five specialist areas: civil engineering, mechanical engineering, electrical engineering, internal hazards and external hazards.
- 130 As reported in Section 7, ONR's assessment across each topic area found the justification for site suitability set out in the JSSR and its supporting documents, to be satisfactory.

6.2.2 ESTABLISHMENT OF AN ADEQUATE EMERGENCY PLAN

- 131 LC11 (emergency arrangements) requires a licensee to generate and own an onsite emergency plan. ONR's expectations for NNB GenCo (SZC)'s arrangements for LC11 in respect of emergencies during the construction period, are considered in the licence compliance assessment report (Ref. 12). That report concludes that NNB GenCo (SZC)'s FAP adequately captures the need for the arrangements for responding to an accident or emergency on the site. This includes ensuring that all persons who have duties in connection with such arrangements are properly trained in the performance of such duties and the use of any equipment required to perform such duties. The assessment report concluded that NNB GenCo (SZC)'s arrangements for complying with LC11 are adequate for the purpose of granting a nuclear site licence.
- 132 The Radiation (Emergency Preparedness and Public Information) Regulations 2019 (REPP19) present the legal framework for protection of the public from the effects of radiation accidents within Great Britain. REPP19 places duties on the local authority, in this case Suffolk County Council, to prepare (and if necessary, implement) an offsite emergency plan for dealing with the consequences of any reasonably foreseeable radiation emergency in an area surrounding the site. The extent of that area is determined by the local authority. The local authority is also required to ensure that relevant information is supplied to the affected population in the event of a radiation emergency.
- 133 The existing REPP19 plan for Sizewell takes account of the potential for radiation emergencies at the Sizewell A and B nuclear sites but does not consider the presence of an additional, large number of workers on the SZC construction site. For nuclear licensed sites, ONR is the enforcing authority for REPP19. ONR would therefore need to be assured by Suffolk County Council that the existing REPP19 plan can accommodate the initial construction phase at SZC, or that it can be amended as necessary before the start of significant construction work.
- 134 Following the acceptance by the Planning Inspectorate (PINS) of the DCO application for the SZC development in June 2020, ONR issued a report detailing its emergency planning and demographics assessments relating to the proposed SZC nuclear power station (Ref. 15). The assessments were carried out, in part, to prepare advice to PINS on matters which were judged to be of interest to its examination of the DCO application. To inform the ONR emergency planning assessment, consultation was undertaken with the Suffolk County Council emergency planner responsible for the extant Sizewell REPP19 offsite emergency plan as well as the planning departments of Magnox Ltd for the Sizewell A site, EDF Energy for the SZB nuclear power station and NNB GenCo (SZC) for SZC.

- 135 Suffolk County Council confirmed that it had not identified any barriers that would prevent the SZC development being incorporated into the existing Sizewell REPP19 offsite emergency arrangements.
- 136 The ONR land use planning report also notes that NNB GenCo (SZC) had demonstrated to the satisfaction of the ONR SZC site inspector that it had considered the potential external hazards arising from the Sizewell A Magnox site and the SZB EDF Energy site to ensure that the decommissioning operations on the Sizewell A site and operation of the SZB site do not constitute a significant external hazard with regard to safety on the SZC site.
- 137 The report goes on to note that Sizewell A and SZB have demonstrated to the satisfaction of the respective ONR site inspectors that they will work with or are continuing to work with NNB GenCo (SZC) to ensure construction, active commissioning, and subsequent operation of SZC does not constitute a significant external hazard with regard to safety on the Sizewell A and B sites. The co-operation arrangements between the sites are discussed in ONR's licence compliance assessment report (Ref. 12).

6.3 SITE DECOMMISSIONING AND RADIOACTIVE WASTE MANAGEMENT

- 138 ONR SAPs require, amongst other things, that facilities should be designed and operated so that they can be safely decommissioned. Although details of the decommissioning process and the associated safety cases may not be available at the licensing stage, before granting a licence ONR needs to be satisfied that the prospective licensee has developed adequate strategies, plans and programmes for the decommissioning of nuclear plant and facilities and for the treatment and disposal of radioactive wastes (radwaste).
- 139 NNB GenCo (SZC)'s decommissioning strategies, plans and programmes and waste management are covered in ONR's nuclear liabilities regulation topic inspector's assessment report (Ref. 17).
- 140 The focus areas under this topic include:
- arrangements for LC4 (restrictions on nuclear matter on the site) and LC5 (consignment of nuclear matter). Taking lessons learnt from the HPC early construction work, this aspect focused on NNB GenCo (SZC)'s land quality management (LQM) arrangements to ensure, should any land contaminated with radioactivity be identified during construction activities, adequate arrangements are in place for the management of these materials in LC4 and LC5;
 - arrangements for the management of radioactive sources under LC4, which should be consistent with the with the requirements of the Ionising Radiations Regulations 2017 (IRR17); and
 - the Decommissioning Waste Management Plan (DWMP). The DWMP comprises of the technical aspects of the Funded Decommissioning Programme (FDP), a requirement of the Energy Act 2008 for operators of new nuclear reactors (Ref. 18). The DWMP sets out the steps

involved in decommissioning a new nuclear power station and managing and disposing of hazardous (including radioactive) waste and spent fuel. In line with statutory consultee requirements, BEIS requested comments from ONR on the DWMP to ensure it is consistent with regulatory expectations. NNB GenCo (SZC) is replicating the HPC DWMP so far as possible, so ONR's report focuses on differences in the technical aspects of the two plans.

141 The report notes that the FDP, which the DWMP forms part of, does not need to be approved (by the BEIS Secretary of State) for licensing, but approval must be in place for the start of nuclear safety-related construction. Consequently, the approval of the DWMP had no bearing on ONR's assessment for nuclear site licensing, but the report captures two key differences to HPC as a record. These relate to:

- storage of spent fuel on the SZC site (which is proposed to be in a dry storage facility as opposed to a wet store originally proposed for HPC) and the interface with the licensing strategy being implemented on the SZC site; and
- the intermediate level waste (ILW) package selection which has been modified for HPC since the HPC DWMP was published (Ref. 19).

142 The ONR assessment report concluded that:

- NNB GenCo (SZC) has in place adequate arrangements for compliance with LC4 and LC5 at the point of licensing for LQM activities; and
- NNB GenCo (SZC) has in place adequate LC4 and LC5 arrangements in place for licensing for the management of radioactive sources on the SZC site during the early construction activities. These are also consistent with the requirements for compliance with IRR17. Iterations of the arrangements will be required as the radiological risks on the site change and this will be considered as part of routine regulatory engagement post-licensing.

6.4 DEFINING THE SITE BOUNDARY

143 In accordance with its process for the grant of a new NSL, ONR has considered the adequacy of definition of the site boundary and the associated map. The licence compliance assessment report (Ref. 12) describes ONR's assessment of the adequacy of the site boundary definition for SZC.

144 The ONR assessment concluded that the boundary map is adequate and that, on the advice of the SZC site inspector, clause 4 of LC2 (marking of the site boundary) can be excluded initially from the standard set of licence conditions to be attached to the licence. This is consistent with the approach taken for HPC.

Initial Exclusion of LC2(4) from the SZC Nuclear Site Licence

- 145 LC2(4) states “The licensee shall mark the boundaries of the site by fences or other appropriate means and any such fences or other means used for this purpose shall be properly maintained.”
- 146 As has been the case at HPC, there are practical difficulties in marking the nuclear site boundary during construction works as the licensee and its contractors will need to work freely across the boundary between the licensed site and the wider construction site. ONR has therefore accepted that the requirement to erect and maintain markings to the NSL boundary is impracticable and efforts to do so could expose personnel to an unacceptable risk of injury. ONR is also satisfied that there is no nuclear safety benefit from fully marking the boundary during this period. Therefore, ONR has agreed to exclude clause 4 of LC2 from the conditions attached to the nuclear site licence.
- 147 A perimeter fence will surround the wider development site, encompassing the unmarked licence site boundary. There will be no nuclear hazard on the licensed site until late in the commissioning stages of the project when nuclear fuel is brought onto the site.
- 148 As described in the licence compliance assessment report (Ref. 12) ONR has reviewed NNB GenCo (SZC)’s procedure entitled ‘Maintain Nuclear Site Licence Boundary’, which describes the arrangements for complying with LC2. NNB GenCo (SZC) has made a commitment to reinstate the marked boundary before the arrival of the first new fuel on site, which is consistent with a similar commitment made by NNB Generation Company (HPC) Ltd in respect of HPC. At that point ONR will advise the licensee to apply for a variation to its licence requesting ONR to add clause 4 to LC2 and, with it, the requirement to erect and maintain markings to the NSL boundary.
- 149 ONR physically inspected the entire SZC site boundary, including the common boundary between the adjacent nuclear sites to verify that the map provided by NNB GenCo (SZC) for attachment to the licence accurately reflects the intended physical boundary.

6.5 SECURITY OF TENURE

- 150 As set out in *Licensing Nuclear Installations*, as part of its assessment of any site licence application ONR seeks confidence that the licence applicant will have full rights of access to, and control of, the proposed licensed site so that it can satisfy the demands placed on it by the licence and NIA65. The licensing and legal assessment report (Ref. 20) describes ONR’s assessment of NNB GenCo (SZC)’s security of tenure of the land that it has proposed will form the licensed site.
- 151 All the land required by NNB GenCo (SZC), for the proposed nuclear licensed site, is currently owned by EDF Energy Nuclear Generation Limited (NGL). This land includes an area that is currently part of the SZB nuclear licensed

- site. NNB GenCo (SZC) has negotiated an option agreement with NGL (the 'SZC option') which, subject to meeting a number of conditions, will allow NNB GenCo (SZC) to acquire the freehold of the land. One of these conditions is that the NNB GenCo (SZC) Board has taken a final investment decision (FID) to confirm its intention to proceed with the construction of the project.
- 152 NNB GenCo (SZC) has undertaken a thorough review of the titles forming the proposed SZC site and also conducted extensive site visits and enquiries over a number of years and has not identified any formal or informal rights which will impact on the ability to retain sufficient control of the nuclear licensed site. As noted in the ONR assessment report, ONR has also reviewed these titles and is satisfied that they will not impact on NNB GenCo (SZC)'s ability to control the site. The ONR assessment report also notes that NNB GenCo (SZC)'s proposed arrangements for LC3 (control of property transactions) are adequate.
- 153 With regard to the part of the proposed licensed site that is currently within the SZB licensed site boundary, this will be immediately leased back to NGL to allow the SZB facilities contained within that area to continue to be available until they are relocated elsewhere. The release of the SZB land will take place in stages as the facilities are relocated. To allow concomitant incremental increases in the SZC licensed site area, NNB GenCo (SZC) will need to apply for a series of new site licences. The ONR assessment report raised no objections to these proposals.
- 154 The ONR assessment report notes that once the conditions specified in the SZC option have been satisfied (including availability of funds), the option would be exercised by NNB GenCo (SZC) and the freehold of land will transfer from NGL within 20 days. The report notes that freehold ownership of the SZC site would be sufficient to demonstrate that NNB GenCo (SZC) as licensee would have full rights of access to, and control, of the site. The freehold transfer and title deeds would need to be made available for inspection by ONR prior to licence grant.
- 155 Although ONR's assessment report finds that the NNB GenCo (SZC) intentions regarding security of tenure are sound, at the time of assessment, when the transfer of freehold ownership of the required land to NNB GenCo (SZC) will take place remains uncertain. The report provides a commentary on the various steps necessary for NNB GenCo (SZC) to exercise the SZC option but concludes that it is unlikely that the option will be exercised until FID, that is, until sufficient investment funds are guaranteed to allow construction to proceed. The uncertainty regarding the achievement of financial close means that the ONR assessment report concluded that the position on security of tenure was unsatisfactory.
- 156 The report therefore recommended that, given the unsatisfactory position on security of tenure, a nuclear site licence should not be granted to NNB GenCo (SZC) at the present time.

6.6 CONVENTIONAL HEALTH AND SAFETY AND FIRE SAFETY

- 157 Responsibility for the regulation of site safety, including fire safety provisions, on nuclear sites is a core purpose of ONR under the Energy Act 2013. ONR refers to the general health and safety of people on the site as ‘conventional health and safety’, or ‘fire safety’ to distinguish it from its responsibilities for regulating nuclear safety at licensed sites.
- 158 Although not strictly a matter for consideration in ONR’s assessment of NNB GenCo (SZC)’s nuclear site licence application, ONR’s conventional health and safety and fire safety inspectors have reviewed the arrangements that will be put in place by NNB GenCo (SZC) to secure the safety of personnel on both the SZC licensed site and on the wider construction site. These arrangements will need to be in place once the licence has been granted to ensure that conventional and fire safety is properly taken into account by NNB GenCo (SZC) and other dutyholders before construction activities begin.
- 159 The ONR assessment report for both of these topics (Ref. 21) considers the arrangements that NNB GenCo (SZC) has in place to fulfil its client duties as set out in the Construction (Design and Management) Regulations 2015 (CDM2015) to ensure that as the project evolves it is carried out in a way that manages health and safety risks. The report notes that compliance with the Regulatory Reform (Fire Safety) Order 2005 (RRO) is also relevant to both the temporary construction and permanent onsite premises.
- 160 The key assessment activities underpinning this report were carried out by interventions and meetings which have been held over the previous year. The purpose of these interventions was to gain assurance that NNB GenCo (SZC) has met its responsibilities at this early pre-construction phase of the project and has an understanding of how the CDM2015 strategy and arrangements will mature as the site evolves. This assessment also draws on the significant cross cutting interventions carried out by ONR as part of delivery of the ONR integrated intervention plan. It should be noted that construction work currently being undertaken on the land proposed to be part of the nuclear licensed site is low risk and is presently limited to geotechnical, ecological, archaeological and topographic investigations and surveys with small numbers working on site from portacabin offices.
- 161 In line with our enabling approach, ONR has provided advice to NNB GenCo (SZC) during the assessment period and there are actions ongoing to deliver improvements. The assessment found that NNB GenCo (SZC) as the CDM2015 client has demonstrated:
- an adequate understanding of the CDM2015 requirements including roles and responsibilities;
 - there are suitable arrangements in place for the current phase of the project to ensure legal compliance;
 - that the range and scope of pre-construction information is understood;

- the requirements of the content of a construction phase plan are understood; and
- that steps have been taken to ensure that those working on the project have the skills, knowledge and experience to fulfil the roles that they are appointed to undertake, in a manner that secures the health and safety of any person affected by the project.

162 ONR's conventional health and safety inspector concluded that NNB GenCo (SZC) has demonstrated sufficient appreciation, understanding and application of CDM2015. The report noted that fire safety arrangements are replicated from HPC which have been assessed previously as being compliant with the RRO. This area will be subject to regulatory focus after any nuclear licence grant as construction work increases and will be cognisant of any significant design changes which would affect escape routes.

163 Based upon the evidence assessed for NNB GenCo (SZC)'s arrangements in accordance with CDM2015, the report noted that ONR had not identified any shortfalls which would prevent ONR granting the nuclear site licence.

164 In addition, based upon intelligent replication from the HPC site for the application of fire safety arrangements in accordance with the RRO, the report noted that there were no shortfalls which would prevent ONR granting the nuclear site licence.

6.7 SITE SECURITY REQUIREMENTS

165 The security assessment (Ref. 22) describes ONR's civil nuclear security (CNS) assessment in relation to the proposed development.

166 The report summarises the findings of ONR's security inspector's assessment of the arrangements in NNB GenCo (SZC)'s nuclear site security plan (NSSP). The NSSP is the key security document relating to the site licence application.

167 The NSSP is a requirement of the Nuclear Industries Security Regulations 2003 (as amended) (NISR 2003). The purpose of NISR 2003 is to ensure that licensed nuclear sites, nuclear material held on other nuclear premises or in the course of transport, the construction of new nuclear sites adjoining existing operating nuclear sites, sensitive nuclear information and uranium enrichment equipment/software held by the civil nuclear industry, are protected by an effective security regime.

168 On the granting of a nuclear site license, NNB GenCo (SZC) must hold and comply with an approved security plan, aligned with the ONR Security Assessment Principles (SyAPs) and in accordance with the requirements of NISR 2003. The SZC NSSP should present the security arrangements for all stages of the project, from construction through to operations. It is acknowledged that some of the detailed arrangements for the later stages may be subject to change but the dutyholder must provide assurance that these areas are being considered.

169 The security inspector concluded that the security arrangements in the SZC NSSP meet regulatory expectations and has confidence in the licensee's continued compliance with those arrangements. The inspector noted that there were no immediate security concerns which would prevent the granting of a nuclear site licence.

6.8 SAFEGUARDS

170 At this stage of a nuclear project, the engagement of ONR safeguards will be very limited. Consequently, the ONR licensing assessment framework (Ref. 4) did not identify the need for a separate safeguards assessment report. However, a short position statement has been provided by the ONR safeguards team (Ref. 23). This notes that the ONR safeguards team is currently engaging with NNB GenCo (SZC) to ensure nuclear materials accountancy and safeguards arrangements for SZC are adequate and in line with the regulations set out in the Nuclear Safeguards (EU exit) Regulations 2019 (NSR19). NSR19 specifies the regulatory requirements surrounding the provision of relevant safeguards information to ONR safeguards by NNB GenCo (SZC).

171 Of the regulatory requirements laid out within NSR19, the most relevant are to do with the provision of the basic technical characteristic (BTC) and the accountancy and control plan (ACP). The aim of ONR safeguards is to ensure that its engagement with NNB GenCo (SZC), in relation to these specific regulations, is both effective and proportionate. A process of timely engagement with NNB GenCo (SZC) has been established to:

- agree nuclear materials accountancy and safeguards arrangements for SZC, including the process and timeline for supplying the BTC and ACP; and
- ensure all statutory safeguards reporting requirements (for example, for formal declarations to ONR safeguards) are met.

172 ONR safeguards considers that NNB GenCo (SZC) has demonstrated a commitment to early and substantive engagement and will continue to engage throughout the development of SZC. It is noted that this engagement is currently well ahead of the relevant statutory requirements and ONR safeguard's judgement is that maintaining it should ensure the safeguards arrangements implemented for SZC are both effective and efficient, and suitably aligned with domestic regulatory requirements. The position statement concludes that there are no safeguards issues that prevent the granting of a NSL.

7 THE SAFETY REPORT

7.1 SAFETY REPORT DEVELOPMENT STRATEGY

173 As discussed in Section 3.2 above, SZC is a next of a kind (NOAK) following on from HPC, meaning that many aspects of the design and safety case are

to be replicated from HPC. NNB GenCo (SZC)'s replication approach has been assessed by ONR (Ref. 24) and found to be generally acceptable.

- 174 The HPC safety case is being delivered in stages in Summary Safety Case Documents (SSCDs). 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 in order to gain confidence that the structure met with ONR's expectations. The general conclusion was that the HPC safety case structure met ONR expectations.
- 175 ONR's assessment of NNB GenCo (SZC)'s strategy for producing the SZC safety report is detailed in the safety case assessment report (Ref. 25). That report notes that NNB GenCo (SZC)'s approach to producing the pre-construction safety report (PCSR) is set out in a specification document (Ref. 26). This specification states that the SZC PCSR will, for the most part, be replicated from HPC SSCD#2 which is due to be assessed by ONR in early 2023. ONR's technical inspectors found the specification to generally meet ONR expectations (Ref. 27).
- 176 ONR's assessment report notes that by the time the SZC PCSR is ready to be assessed by ONR, the HPC safety case on which it is based (SSCD#2) will have been assessed in detail by ONR. An acceptable SZC PCSR will need to be in place before the start of nuclear safety related construction, which is likely to be a number of years following licence grant.
- 177 The ONR assessment report concludes that the proposed overall structure and delivery strategy of the SZC safety report met ONR expectations and that from this perspective the licence can be granted.

7.2 JUSTIFICATION OF SITE SUITABILITY REPORT

- 178 Although there is no requirement for a licence applicant to submit a PCSR as part of the application dossier, as set out in *Licensing Nuclear Installations* a licence applicant is expected to submit a site justification report (SJR) with its licence application. Such a SJR should have been produced in line with the applicant's proposed LC14 (safety documentation) arrangements.
- 179 The SJR is the licence applicant's means to satisfy ONR, prior to a licence being granted, that the proposed site would be suitable for the nuclear installations it wants to install and operate. The SJR is more limited in scope than the PCSR; its purpose is to ensure that site specific geological conditions, the proposed size of the site, local external hazards and the proximity to local populations are compatible with subsequent construction or installation. The SJR reduces the risk of discovering that the site is not suitable after a licence has been granted.
- 180 For SZC, the SJR is provided in the form of NNB GenCo (SZC)'s Justification of Site Suitability Report (JSSR). The introduction to the JSSR states:
- The JSSR is a top tier report that summarises and consolidates the arguments and evidence which provide the required confidence that the

site is suitable for hosting of a twin UK-EPR™ nuclear power station. The depth and level to which the arguments and evidence have been developed in the JSSR and its supporting documents are appropriate and proportionate to the NSL application stage. The JSSR is not a detailed safety case but instead aims to give confidence in the ability to make a safety case in the future. A SZC specific pre-construction safety report (PCSR) will be developed in due course following NSL granting.

181 ONR has developed seven key questions based on *Licensing Nuclear Installations* and the SAPs which ONR expects a site justification report to address. These are set out in the ONR SZC licensing assessment framework (Ref. 4). In the SZC JSSR (Ref. 33) NNB GenCo (SZC) addresses these expectations in the form of the following claims:

- Claim 1: the site is of sufficient size to accommodate all necessary systems to ensure safe operation;
- Claim 2: the site can be connected to electricity grid supplies;
- Claim 3: adequate cooling capability can be provided for all normal and fault conditions;
- Claim 4: there are no external hazards that would preclude the use of the site (including the external hazards presented by SZB to SZC);
- Claim 5: the geology of the site provides secure long-term support to the necessary structures, systems, components; and
- Claim 6: operations on the SZC site will not adversely affect the ability to maintain an adequate safety case for the adjoining SZB licensed site.

182 Assessments of the claims in the JSSR against ONR expectations are set out in a series of ONR assessment reports produced by specialist inspectors covering the following topic areas:

- civil engineering
- mechanical engineering
- electrical engineering
- internal hazards
- external hazards

183 The allocation of topic areas to the assessment of each of the JSSR claims is shown in Table 4. The findings from each topic assessment report are summarised in the following sub-sections.

7.2.1 CIVIL ENGINEERING ASSESSMENT

184 The civil engineering assessment report (Ref. 28) considered that three of the claims above had direct links with the topic area:

- Claim 1: the site is of sufficient size to accommodate all necessary systems to ensure safe operation;



- Claim 3: adequate cooling capability can be provided for all normal and fault conditions; and
 - Claim 5: the geology of the site provides secure long-term support to the necessary structures, systems and components.
- 185 The inspector also examined two other claims for which the topic was considered to have a supporting function:
- Claim 4: there are no external hazards that would preclude the use of the site (including the external hazards presented by SZB to SZC); and
 - Claim 6: operations on the SZC site will not adversely affect the ability to maintain an adequate safety case for the adjoining nuclear sites.
- 186 The report notes that the assessment drew on the JSSR and the supporting references for each claim, plus the output from a number of technical meetings and workshops with NNB GenCo (SZC).
- 187 The conclusions from the assessment are that, from a civil engineering perspective, NNB GenCo has provided sufficient confidence that:
- the site is of sufficient size to accommodate all necessary systems to ensure safe operation, including sufficient size to enable construction;
 - adequate cooling capability can be provided for all normal and fault conditions by modifying the HPC design for the SZC site;
 - civil engineering structure for the sea defence can be sufficiently designed against external hazards;
 - the geology of the site provides secure long-term support to the necessary structures, systems and components with the outlined ground improvement work (engineered fill); and
 - the civil engineering construction activities on the SZC site will be managed and is openly discussed to ensure an adequate safety case for the adjoining SZB site is maintained.
- 188 During the assessment the inspector identified several areas (captured as recommendations) where further information and development is required post-licensing.
- 189 The report concludes by recommending that from a civil engineering perspective a nuclear site licence can be issued to NNB GenCo (SZC).

7.2.2 MECHANICAL ENGINEERING ASSESSMENT

- 190 The mechanical engineering assessment report (Ref. 29) considers two claims that relate to this topic:
- Claim 3: adequate cooling capability can be provided for all normal and fault conditions; and
 - Claim 5: the geology of the site provides a secure long-term support to the necessary structures, systems and components.

- 191 The inspector's assessment drew on the JSSR and supporting references and meetings with NNB GenCo (SZC) and responsible designer, and considered:
- the open circuit cooling water systems, termed the 'heat sink'. These are important to nuclear safety and contain safety classified components;
 - the impact of tidal ranges on the pumping station and weir height designs for SZC;
 - the design of the safeguard buildings' ventilation system. These buildings contain several safety-classified systems and components that operate within certain temperature ranges. The ventilation system provides an important nuclear safety function that relates to cooling; and
 - the effects of seismic events on systems and components.
- 192 The inspector concluded that NNB GenCo has provided sufficient evidence that:
- it can develop an adequate safety demonstration for the heat sink;
 - the safety related ventilation systems can be adequately designed to meet safety case requirements; and
 - the geology of the site should not significantly challenge the seismic qualification of systems or components.
- 193 The inspector noted two areas where further work is required to provide an adequate safety case but was satisfied that these can be adequately addressed post-licensing. The inspector recommended, from a mechanical engineering perspective, a nuclear site licence can be issued to NNB GenCo (SZC).

7.2.3 ELECTRICAL ENGINEERING ASSESSMENT

- 194 The focus of the ONR electrical engineering assessment report (Ref. 30) is on Claim 2 above, that is, whether the site can be connected to electricity grid supplies. However, given the potential for the SZC site environmental conditions to affect equipment design and site layout, the electrical engineering inspector also worked with the other ONR technical disciplines to gain confidence that NNB GenCo (SZC) has appropriately considered the implications on the electrical design of these aspects through the adequacy of Claims 1, 4 and 6 in the JSSR.
- 195 ONR's assessment of the NNB GenCo (SZC) replication strategy of the HPC design (Ref. 24) had concluded that the licence applicant should ultimately be able to present a safety case showing that replication reduced risks so far as is reasonably practicable. However, it also highlighted three areas regarding electrical engineering where further work was required. Two of these relate to the grid connection and were considered as part of the electrical engineering inspector's assessment of Claim 2:



- agreement should be reached with the Office of Gas and Electricity Markets regarding granting derogations to the grid code. If the derogations are not granted the implications should be fully assessed by NNB GenCo (SZC) and any necessary changes made to the replication strategy prior to its implementation; and
- the SZC grid reliability figures should be established and the implications on overall site reliability figures assessed. Following this, any changes required to the replication strategy should be implemented.

196 Following completion of the assessment, the inspector concluded that NNB GenCo (SZC) has provided an appropriately structured case to address each of the relevant claims. The inspector considered that this case is underpinned by evidence appropriate for this stage of the project and gives confidence that the power station will be able to be connected to the Great Britain electricity transmission system and be constructed to meet robust deterministic and reliability claims. The inspector was satisfied that NNB GenCo (SZC) is working with relevant stakeholders to ensure the design of this connection does not compromise the electricity transmission connection to the neighbouring SZB nuclear power station.

197 The report notes one aspect where the inspector did not consider that the evidence provided is consistent with the ONR SAPs. The matter has been raised in a regulatory issue (10822) which does not need to be resolved prior to granting a nuclear site licence. The additional work required to develop the safety case would be an area of ongoing regulatory focus post-licensing.

198 The inspector recommended that, from an electrical engineering perspective, a nuclear site licence can be issued to NNB GenCo (SZC).

7.2.4 INTERNAL HAZARDS ASSESSMENT

199 The internal hazards assessment report (Ref. 31) focused on:

- Claim 1: the site is of sufficient size to accommodate all necessary systems to ensure safe operation;
- Claim 3: adequate cooling capability can be provided for all normal and fault conditions; and
- Claim 6: operations on the SZC site will not adversely affect the ability to maintain an adequate safety case for the adjoining SZB licensed site.

200 The inspector concluded that Claims 1 and 3 have been satisfied in line with relevant good practice.

201 For Claim 6, the inspector notes that there remains work to be done to demonstrate that the claim can be adequately satisfied. This is because the positioning of the SZC turbines presents a possible projectile hazard to SZB in the very unlikely event of a turbine disintegration. The inspector notes that

NNB GenCo (SZC) has committed to undertake robust optioneering, which will include consideration of passive features, to select an appropriate solution and demonstrate that the risks to SZB from turbine disintegration are as low as reasonably practicable. On that basis the inspector was satisfied that the resolution of the optioneering studies can be pursued at the detailed design stage, post-licensing. A regulatory issue has been raised to track progress with this work.

- 202 The inspector concluded that following assessment, the claims arguments and evidence within the JSSR and supporting documents, are adequate to support a nuclear site licence. The inspector therefore recommended from an internal hazards perspective that a nuclear site licence can be issued to NNB GenCo (SZC).

7.2.5 EXTERNAL HAZARDS ASSESSMENT

- 203 The external hazards assessment report (Ref. 32) focused on:
- Claim 1: the site is of sufficient size to accommodate all necessary systems to ensure safe operation;
 - Claim 3: adequate cooling capability can be provided for all normal and fault conditions;
 - Claim 4: there are no external hazards that would preclude the use of the site (including the external hazards presented by SZB to SZC);
 - Claim 5: the geology of the site provides secure long-term support to the necessary structures, systems and components; and
 - Claim 6: operations on the SZC site will not adversely affect the ability to maintain an adequate safety case for the adjoining SZB nuclear licensed site.
- 204 The inspector's assessment was based on examination of the JSSR, the Site Data Summary Report (provided as part of the licence application dossier, Ref. 34) and supporting documentation provided by NNB GenCo (SZC).
- 205 The inspector notes that the HPC design envelope is considered an appropriate comparison, given the intention to replicate the HPC design so far as possible. The inspector's assessment considered whether the licence applicant had adequately addressed each of the above claims and demonstrated that the site is suitable from an external hazards' perspective by:
- the intrinsic nature of the site and its geographical location;
 - demonstrating that the site-specific external hazards demand is bounded by the HPC design envelope; and
 - demonstrating that the site and/or HPC design can be modified to effect adequate levels of protection or mitigation against the site-specific external hazards demand.

- 206 The inspector concluded that the documentation provided to support the licence application was well structured and allowed for assessment of site-specific external hazards. Having sampled that information, the inspector was satisfied that each of the above claims had been adequately addressed.
- 207 The assessment made a number of recommendations for further work which would be followed-up with NNB GenCo (SZC) as normal business post-licensing.
- 208 The inspector concluded by recommending that from an external hazards perspective a nuclear site licence can be issued to NNB GenCo (SZC).

7.3 ARRANGEMENTS FOR PRODUCTION OF SAFETY REPORT AND SUBSTANTIATION

- 209 Arrangements for production of a safety report and associated substantiation are invested in a specific condition attached to the NSL (LC14). The following section of this PAR reports on the assessments that ONR has undertaken of the adequacy of all required licence condition arrangements from a licensing perspective, including LC14. This concludes that all licence condition arrangements, from a licensing perspective, are adequate.

8 LICENCE CONDITION COMPLIANCE ARRANGEMENTS

- 210 ONR attaches 36 conditions to the standard NSL that, in the main, require the licensee to make and implement adequate arrangements which best suit its business; these may change as the installation progresses through its life from initial design to final decommissioning.
- 211 ONR's assessments of NNB GenCo (SZC)'s licence condition arrangements are detailed in the LC compliance assessment report from the nominated site inspector for SZC (Ref 12).
- 212 The site inspector notes that ONR agreed early in the assessment that NNB GenCo (SZC) would focus on fully developing the licence conditions which apply to the early design, procurement, construction and installation phases of the SZC project.
- 213 The report also notes that ONR's assessments of NNB GenCo (SZC)'s development and implementation of some licence conditions are covered in a number of other ONR assessment reports (see Table 3).
- 214 The assessments followed ONR's licensing assessment strategy and framework (Refs. 3 and 4) and were informed by a programme of working level meetings and inspections which examined:
- NNB GenCo (SZC)'s compliance matrix and compliance thread for each licence condition part;
 - the company's communication of arrangements to relevant NNB GenCo (SZC) personnel including training;

- implementation of arrangements, where appropriate; and
- the outcome of the company's self-assessment activities.

215 The LC compliance assessment report made the following observations:

- ONR has accepted that erecting and maintaining nuclear site boundary markings during construction is impracticable and is not necessary for safety or security purposes. Therefore, ONR has agreed to exclude clause 4 of LC2 (marking of the site boundary) from the SZC NSL until such time as it is safe and practicable to erect and maintain an appropriate means of marking the nuclear site boundary.
- NNB GenCo (SZC)'s approach to compliance with LC7 (incidents on the site) has been to intelligently replicate the arrangements from HPC as well as taking learning from NGL experience. NNB GenCo (SZC) was able to demonstrate acceptable arrangements in relation to LC7 screening, which enables the review of the learning reports. Related to LC7, ONR's OC assessment report (Ref. 10) noted that NNB GenCo (SZC) has provided evidence against ONR expectations for organisational learning.
- As part of its arrangements for compliance with LC19 (construction or installation of new plant) NNB GenCo (SZC) has proposed a list of hold points for both the start of construction and subsequent construction stages. ONR and NNB GenCo (SZC) have achieved an acceptable degree of consensus on the proposed list which is considered to be acceptable for the purposes of granting a licence. ONR has advised NNB GenCo (SZC) that it intends to use its primary powers under LC19 of the NSL to require that NNB GenCo (SZC) seeks ONR's permission to proceed beyond the hold point related to start of nuclear safety related construction;
- During the design, construction, and commissioning phases, NNB GenCo (SZC) will need sufficient, competent and trained staff to act as an 'intelligent customer' for the products and services it commissions from its supply chain. As discussed in the ONR OC assessment report (Ref. 10) ONR expects NNB GenCo (SZC)'s LC10 (training), LC12 (duly authorised and other suitably qualified persons) and LC36 (organisational capability) to be robust and flexible enough to cope with the evolving competence and training requirements of its organisation as the project progresses through each phase of the project.
- NNB GenCo (SZC) recognises that throughout the project phases, including construction, installation and commissioning, the hazards and risks to site personnel will change and this will inform the development of its emergency arrangements. NNB GenCo (SZC) has put in place an overarching emergency preparedness policy and the documents for compliance with LC11 which are based upon intelligent replication of the HPC LC11 arrangements. This approach ensures that

the emergency arrangements will develop in line with a clear framework and guiding policy.

- NNB GenCo (SZC)'s FAP captures the requirement for all persons who have duties in connection with emergency arrangements to be properly trained in the performance of their duties including the use of any equipment required to perform such duties. NNB GenCo (SZC)'s FAP captures the need for it to demonstrate its response to an off-site emergency at an adjacent licensed site in the early stages of site preparation.

216 As detailed in *Licensing Nuclear Installations* ONR expects the licence applicant to have produced its site justification report in line with the applicant's proposed LC14 arrangements. Assessment reports from other ONR inspectors (Refs. 28 and 32) confirm that, based on engagements with the licence applicant, the arrangements for production of the site justification report were acceptable.

217 On the basis of the ONR site inspector's own assessments and those undertaken by other members of the assessment team, ONR's licence compliance assessment report concluded that NNB GenCo (SZC)'s arrangements for complying with the standard conditions attached to the NSL are adequate for the purposes of granting a licence.

218 ONR's licence compliance assessment report recommended that:

- ONR accepts that NNB GenCo (SZC) has developed adequate arrangements for compliance with those conditions attached to the standard NSL required for design, procurement, manufacture, construction and installation of two EPR™ units at SZC;
- ONR should exclude clause 4 of the standard LC2 (marking the licensed site boundary) until such time as it is both safe and practicable for NNB GenCo (SZC) to mark the site boundary by fences or other appropriate means;
- ONR accepts NNB GenCo (SZC)'s commitment to the timely development and implementation of detailed arrangements for compliance with those conditions attached to the standard NSL required for commissioning, operation and decommissioning; and
- ONR accepts that the status of NNB GenCo (SZC)'s arrangements for complying with the 36 conditions attached to the standard NSL is adequate for the purposes of granting a nuclear site licence.

9 THIRD PARTY ENGAGEMENT

9.1 MANDATORY CONSULTATION WITH THE ENVIRONMENT AGENCY

219 NIA65 places a requirement on ONR to consult the appropriate environment regulator before granting a new NSL. This is to ensure that granting the

licence will not conflict with the relevant environment regulator's environmental protection responsibilities or prejudice any legal process under the Environmental Permitting Regulations (England and Wales) 2016 (as amended), or other environmental legislation. For SZC the environment regulator is the Environment Agency. The arrangements for consultation are set out in a Memoranda of Understanding between ONR and the Agency (Ref. 35).

- 220 ONR has consulted the Environment Agency in respect of the licence application from NNB GenCo for HPC (Ref. 36).
- 221 The Environment Agency has confirmed (Ref. 37) that any granting of a NSL to NNB GenCo (SZC) is consistent with its principles for the protection of the environment and that it does not believe that it will prejudice any legal process under the Environmental Permitting (England and Wales) Regulations 2016.

9.2 PUBLIC BODY NOTIFICATION

- 222 Section 3(4) of NIA65 gives ONR the discretionary power to direct an applicant for a NSL to inform public bodies of the application and to invite them to make representations to ONR with respect to the proposed use of the site under the licence. The purpose of this 'public body notification' (PBN) process is to allow public bodies who may have statutory duties in relation to the site to be informed of the licence application and to advise ONR whether their duties might be affected by the licensable activities. This enables ONR to consider whether there is a need to amend any of the licence conditions that are normally attached to the NSL.
- 223 However, the power under Section 3(4) is specifically excluded for a nuclear power station by Section 3(8) "where a consent under Section 36 of the Electricity Act 1989 is required for the operation of the station (or would be required but for an order under the Planning Act 2008 granting development consent for the site". Under the Planning Act 2008 nuclear power stations such as that proposed for SZC are nationally significant infrastructure projects and under the planning consent process prospective developers are now required to seek a DCO, which must be approved by the Secretary of State following a recommendation from PINS. The wide-ranging consultation requirements on applicants for a DCO under the Planning Act render the need for PBN superfluous.

9.3 APPROVED FUNDED DECOMMISSIONING PROGRAMME

- 224 For new nuclear power stations, the Energy Act 2008 requires operators to have in place an approved funded decommissioning programme (FDP). The FDP requires operators to make adequate arrangements for covering the cost of decommissioning the site and managing any operational or decommissioning wastes and must be approved by the BEIS Secretary of State before first using the site for activities that need to be licensed. BEIS guidance interprets this point as the start of pouring concrete for any buildings

on site which have nuclear safety significance. As discussed in Section 6.3 above, the FDP does not therefore need to be approved at the point of licensing. However, once any NSL has been granted and before permissioning the start of nuclear safety-related construction, ONR would seek confirmation from BEIS that any requirements which are placed on the operator by the provisions of the Energy Act 2008 can be met.

9.4 NUCLEAR LIABILITY INSURANCE

225 The licensee is required to provide cover for third-party claims up to limits prescribed by NIA65 and for the arrangements to be approved by the Secretary of State. In the case of SZC, BEIS is responsible for the review of the adequacy of the licensee's cover, which may be provided by insurance, indemnity, or other approved means. A NSL may, with the consent of the Secretary of State, include provision regarding the time from which such cover is to apply. For example, this may be linked to the point at which nuclear fuel is to be brought onto the site for the first time.

226 Unless provision has been made for a deferral of cover as described above, cover must be in place when the new NSL comes into force. ONR sought confirmation from BEIS that NNB GenCo (SZC) had made appropriate arrangements for liability cover. BEIS confirmed to ONR that NNB GenCo (SZC) made a request for a deferral of cover until it is ready to bring nuclear fuel onto the SZC site for the first time.

227 The licensing and legal assessment report (Ref. 20) addresses the deferral of nuclear liability cover.

228 BEIS has advised ONR that NNB GenCo (SZC)'s request for deferral has been granted by the Secretary of State (Ref. 46). It is conditional, amongst other things, on NNB GenCo (SZC) posting on an appropriate website, the time when the deferral is to be replaced by insurance or other means.

229 In compliance with Section 3(5) of NIA65, ONR would include a suitable provision in the nuclear site licence to enable this deferral.

9.5 JUSTIFICATION

230 Justification is a principle of radiation protection embodied in successive European Basic Safety Standards Directives. It requires member states to ensure that the benefits of using ionising radiations in a particular practice outweigh the detriment to health that may be caused. The requirements for Justification were translated into UK law by the Justification of Practices Involving Ionising Radiation Regulations 2004 (SI 2004/1769). For nuclear power stations the BEIS Secretary of State is the justifying authority.

231 In accordance with *Licensing Nuclear Installations* ONR requires the licence applicant to indicate whether any proposed activities involving radiation are already justified or if they are in the process of being so.

232 NNB GenCo (SZC) indicated in its licence application documents (Ref. 38) that the Secretary of State had issued a legal instrument in 2010 in accordance with the regulations in respect of the generation of electricity by the EPR™ reactor.

233 The Justification Decision (Generation of Electricity by the EPR Nuclear Reactor) Regulations 2010 SI No. 2844, states:

“By these Regulations the Secretary of State made a justification decision in accordance with the Justification of Practices involving Ionising Radiation Regulations 2004. The 2004 Regulations implement Article 6(1) and (2) of Council Directive 96/291 Euratom laying down basic safety standards for the protection of health of workers and the general public against the damage arising from ionising radiation.”

234 This Justification Decision is in respect of the “EPR Practice”, which is defined as the class or type of practice which is the generation of electricity from nuclear energy using oxide fuel of low enrichment in fissile content in a light water cooled, light water moderated thermal reactor known as EPR. ONR is satisfied that the design proposed for construction at SZC is covered by this Justification Decision.

9.6 FINANCIAL STANDING

235 The licensing and legal assessment report (Ref. 20) describes the engagement with BEIS in respect of financial standing of NNB GenCo.

236 ONR sought confirmation from BEIS of the financial standing of the licence applicant. BEIS responded (Ref. 46) that it is not aware of any issues that they would wish to draw to ONR’s attention relating to the licence applicant’s financial standing.

10 EVENTS OF POTENTIAL PUBLIC INTEREST

237 This section summarises ONR’s position regarding some events relating to other countries’ EPR™ reactors and pressurised water reactors that have been in the news recently and which have prompted media and public interest. They are discussed here to provide public reassurance that these matters have been noted and considered by ONR in relation to the proposed SZC nuclear power station. ONR has considered these matters and they would be subject to continued regulatory focus post-licensing. These, and any other examples of relevant international operating experience that may emerge, would need to be taken into consideration by NNB GenCo (SZC) and the response assessed by ONR as appropriate as part of permissioning activities post any NSL grant. We are satisfied that the examples discussed below do not affect our decision-making with respect to the SZC licensing application.

10.1 FUEL ISSUES IN TAISHAN EPR™

- 238 The nuclear power station at Taishan in China consists of twin-EPR™ reactors, the first of which started commercial operations in December 2018. In June 2021, China's Ministry of Ecology and Environment issued a statement that an increase in the concentration of radioactive gases in the primary circuit of unit 1 was likely to have arisen from a few damaged fuel rods (Ref. 45). The operating company shut the reactor down in late July 2021 to carry out maintenance, find the cause of the fuel damage and replace the damaged fuel. The inspections reported fuel rod clad damage leading to the increased concentration of radioactive gases in the primary circuit of unit 1, enhanced corrosion on the upper parts of some fuel assemblies and localised fuel assembly grid wear.
- 239 The cause of the fuel issues have been investigated by the Chinese authorities and by the French fuel manufacturer, with a view to determining whether changes may be necessary in the fuel design or elsewhere within the reactor coolant circuit. ONR continues to monitor the situation. We have also been engaging with the relevant regulatory authorities in China, Finland, and France to ensure that all have a consistent understanding of the cause of the failures and to discuss learning for all the EPR™ plants.
- 240 Based on recent engagements with the Chinese regulator and the HPC licensee there is now a good understanding of the direct causes that led to the fuel issues at Taishan. This understanding is being used to inform modifications to the design of the HPC fuel assemblies to prevent fuel rod clad failures, enhanced corrosion and fuel assembly grid wear, as were observed in Taishan unit 1. One of the main changes is to reduce the susceptibility of the fuel assembly grid springs to stress corrosion cracking, which was determined to be a direct cause of the failures observed in Taishan.
- 241 NNB GenCo (HPC) has outlined proposed fuel modifications to us. The safety case for the change is still under development and we expect this to be submitted for assessment. As with all safety significant modifications, the proposals will be rigorously assessed by our expert inspectors. Only if we are satisfied that the proposed modifications meet our regulatory expectations, will permission be given for the changes to be implemented.
- 242 Fuel is not expected to be delivered to the HPC site for several years, therefore we are content that any design modifications can be made prior to delivery of that fuel. Our current regulatory strategy is such that HPC will not be able to bring fuel onto site or load fuel into the reactor without our permission, which will have to be supported by an adequate safety justification. We expect this to include consideration of any prior operational experience gained from EPR™ reactors elsewhere, allowing any learning from Taishan to be appropriately implemented. The proposed SZC development is a number of years behind that at HPC, so in the event that a nuclear power station is deployed, a solution to the problem would be

expected to be in place well before fuel for the SZC reactors would need to be ordered.

10.2 CORROSION ISSUES IN FRENCH NUCLEAR POWER STATIONS

243 EdF France, the operator of the French fleet of pressurised water reactors, confirmed in May 2022 (Ref. 40) that ultrasonic examinations had detected stress-related corrosion in pipework of a number of the reactors. No pipework had failed, and the operator is taking steps to address the issue and to ensure the plants can continue to operate safely. All the French reactors have been operating for at least 10 years.

244 ONR has been in contact with the French nuclear regulator to gain an understanding of the issue and potential implications for both the SZB pressurised water reactor and the EPR™ designs. As detailed work is still ongoing there are no definitive answers. Stress corrosion cracking (SCC) occurs under certain conditions, that depends on the stress in the material from manufacturing processes (such as welding and heat treatment), the applied load on the system/component, the material properties and the operating environment (controlled by water chemistry). If one of these factors are removed the component will not be susceptible to SCC. These conditions are all better understood and controlled compared with the past, hence the likelihood of this affecting the EPR™ is judged to be lower than for older reactors, including the N4 fleet in France.

245 However, if the HPC design did need to be refined in the light of the current investigations, there is time to implement the learning for HPC and SZC. The welding which occurs on site has not yet started and for SZC the components are not yet manufactured. The welding process, heat treatment and the welding material can be changed if the learning shows it is needed. ONR will continue to monitor the outcome of the French investigations to ensure that any necessary actions are taken in respect of both SZB and the HPC and SZC plants.

246 For HPC (and SZC) ONR will ensure that this learning is adequately understood, and any necessary action taken to implement learning such that the risk of SCC is minimised, and the reactors are demonstrated to be safe to operate.

11 APPLICANT'S READINESS

247 NNB GenCo (SZC) shared with ONR the scope and acceptance criteria of the review of its readiness to receive a NSL (Ref. 39). ONR had no comments to make on the proposals.

248 The results of the review were presented to the May 2022 meeting of NNB GenCo (SZC)'s Nuclear Safety Committee (NSC) for the committee's consideration and advice. In addition, NNB GenCo (SZC)'s Independent Nuclear Assurance (INA) had carried out an independent assessment of the

company's readiness for receipt of a licence and had reported this in the form of a concurrence statement which was also considered by the May 2022 NSC.

249 NNB GenCo subsequently provided ONR with the final review report and the INA concurrence report (Ref. 42). The review concluded that subject to the completion of some outstanding actions, notably achieving security of tenure of the land, the company is ready to receive a nuclear site licence, and this was supported by the concurrence report. These conclusions were affirmed in a presentation to ONR by the company's executive team on 25 May 2022 (Ref. 43).

12 PREPARATION OF LICENCE DOCUMENTATION

250 ONR's licensing and legal lead has prepared a draft licence ready for issuing in the event that the CNI decides to grant a licence to NNB GenCo (SZC). The form of the licence follows that issued for HPC. Licence number 104 has been provisionally allocated for this.

251 The licence has been drafted to permit the installation of:

- two thermal neutron reactors, being reactors designed to be fuelled with uranium dioxide of low enrichment in the isotope U²³⁵ moderated and cooled by water, together with any machinery, equipment, appliance, or storage facility required for the operation thereof.

252 This description is consistent with the practice justified by the Secretary of State in the Justification Decision (Generation of Electricity by the EPR™ Nuclear Reactor) Regulations 2010 (SI No 2844) (see Section 9.5 above).

253 In addition, the licence would include a provision permitting a deferral of nuclear liability insurance cover until the licensee is ready to bring new fuel to the site for the first time (see Section 9.4 above).

254 All of the standard 36 licence conditions would be attached to the licence with the exception that part 4 of LC2 is excluded. This would have required the licence to mark the licensed site boundary from the point of licensing, but ONR accepts that this is unnecessary while the site is under construction (see Section 6.4 above).

255 If it is decided to grant the licence, then before it is issued the prepared licence documents would be subject to review by ONR's legal advisors as necessary.

13 CONCLUSIONS

256 This PAR presents the findings of ONR's assessment of NNB GenCo (SZC)'s application for a nuclear site licence to install and operate two UK EPR™ units at SZC.

257 This PAR summarises ONR's assessment in relation to the following key areas:

- licence applicant's organisation
- suitability of the site



- proposals for the safety report
- development of licence condition arrangements
- third party engagement

258 The PAR also acknowledges NNB GenCo (SZC)'s readiness review and summarises the work undertaken by ONR in preparation of the licence documentation.

259 ONR's conclusions from its assessment of each of these areas are summarised below.

13.1 CONCLUSIONS ON THE LICENCE APPLICANT ORGANISATION

260 ONR engaged with NNB GenCo (SZC) to seek assurance that it has put in place an organisational capability that will enable it effectively to discharge the obligations associated with holding a NSL. As part of this work, ONR examined NNB GenCo (SZC)'s organisational structures, governance, resources and competencies, and the underpinning arrangements.

261 As discussed in Section 5 of this PAR, ONR found that NNB GenCo (SZC) has put in place an organisational capability and associated arrangements suitable for licence granting. However, NNB GenCo (SZC)'s organisational capability is still evolving and must continue to do so as the project progresses; the company has recognised where further development is needed and its commitments to carry this development forward will be monitored by ONR.

13.2 CONCLUSIONS IN RELATION TO THE SITE

262 No issues were identified in relation to population demographics that would give rise to concerns for granting a NSL for the SZC site.

263 Co-operation and consultation between NNB GenCo (SZC) and relevant dutyholders as required by REPP19 has been established. This dialogue is important in ensuring the continued adequacy of the existing REPP19 offsite plan for the Sizewell sites. No issues have been identified from a REPP19 perspective that would give rise to concerns for granting a NSL.

264 ONR has not identified any issues from the radioactive waste management and decommissioning perspective that would give rise to concerns for granting a NSL for the SZC site.

265 The site boundary and map satisfactorily meet the criteria in ONR's guidance.

266 NNB GenCo (SZC) has not been able to demonstrate at this point that it has security of tenure of the land comprising the proposed nuclear licensed site. This needs to be resolved prior to granting a licence. The applicant's self-assessment concludes that although the company should be ready for the licence to be granted in mid-2022, it will not be able to demonstrate the required certainty regarding security of tenure at that time.

13.3 CONCLUSIONS ON THE SAFETY REPORT

267 ONR considers that the elements of the safety report set out in the licence applicant's Justification of Site Suitability Report to be satisfactory for licensing. NNB GenCo (SZC) will, however, need to carry out substantial further analysis in certain technical areas before ONR would give permission for the start of nuclear safety-related construction.

13.4 CONCLUSIONS RELATING TO LICENCE CONDITIONS

268 ONR considers that NNB GenCo (SZC)'s arrangements for complying with the 36 conditions attached to the standard nuclear site licence are adequate for licence grant. ONR will monitor the company's continued development of its arrangements to ensure they are suitable for later stages of the project.

13.5 CONCLUSIONS ON THIRD PARTY ENGAGEMENT

269 Advice obtained from the Environment Agency and BEIS in matters relating to the prejudice of any legal process under environmental legislation, financial standing of NNB GenCo (SZC) and cover for nuclear liability has not identified any impediment to the granting of a NSL or any other matters that ONR needed to take into consideration.

270 BEIS has agreed that the start of nuclear liability cover can be deferred until the licensee is ready to bring fuel to the site for the first time. To allow this, ONR would insert a suitable provision in the NSL in compliance with Section 3(5) of NIA65.

14 RECOMMENDATIONS

271 On the basis of the application submitted by NNB GenCo (SZC) and the findings set out in sections 3 to 12 of this report, it is recommended that the Chief Nuclear Inspector informs NNB GenCo (SZC) that:

1. ONR's assessment concludes that, relative to safety and security significance of the activities currently being undertaken or planned at this time, the application has met almost all the regulatory requirements set out in our guidance. Specifically, we are satisfied that NNB GenCo (SZC) has put in place an organisational capability and associated arrangements suitable for licence granting and nothing has been identified regarding the suitability of the site to prevent granting a nuclear site licence.
2. However, there are two matters that need to be resolved prior to ONR granting a nuclear site licence. The matters are security of land tenure and the constraints of the current shareholder agreement relating to safety and security.
3. ONR is aware that the company has plans to address both above topics but that these cannot be implemented until relevant project financial decisions have been made. Once these have been adequately addressed ONR will carry out a proportionate reassessment of the company's



application, focused on the above outstanding matters and any other relevant licensing issues which we need to assess at that time. That reassessment will take into account the status of the project, specifically the planned further development of the organisation and arrangements, and the nuclear safety and security risks of the activities planned to be undertaken at that time.

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Table 1: Regulation of new nuclear sites - step-by-step licensing and permissioning process

Step	Responsibility	
	Licensee / Applicant	ONR
1. Preparing to be a licensable organisation	<ul style="list-style-type: none"> ■ Establish corporate body ■ Develop organisational capability ■ Develop management arrangements 	Advise applicant
2. Creation and collation of licence application dossier	<ul style="list-style-type: none"> ■ Identify prescribed installations to be licensed ■ A Site Justification Report (SJR) produced in line with the licence applicant’s LC14 arrangements. This should be based on suitable and sufficient characterisation of the site; use information consistent with the licence applicant’s development consent/planning application; and, for a development consent application, cover matters for which the Planning Inspectorate may liaise with, or rely on us. ■ A proposal to deliver a schedule of safety submissions leading to a site-specific preconstruction safety report (PCSR). ■ Develop organisational capability, company structures, governance and procedures, and document them in: ■ Safety Management Prospectus (including security elements drawn from SyAPs strategic enablers and selected other principles) which describes: 	Advise applicant

Step	Responsibility	
	Licensee / Applicant	ONR
	<ul style="list-style-type: none"> ■ organisation structure ■ core capability ■ employment model ■ intelligent customer ■ design authority ■ internal challenge ■ nuclear safety and security governance ■ supply chain strategy ■ company manual which describes corporate governance arrangements ■ nuclear baseline which defines nuclear safety and security related roles and posts ■ LC compliance arrangements ■ emergency arrangements ■ nuclear safety committee terms of reference ■ definition of site and arrangements to demonstrate security of tenure ■ map of the proposed site and details of local demographics 	
3. Licence application	<ul style="list-style-type: none"> ■ Submit written application to ONR’s Chief Nuclear Inspector. ■ Include prescribed installations to be licensed and application dossier. ■ Notify SoS for BEIS. 	<ul style="list-style-type: none"> ■ Acknowledge receipt. ■ Establish project governance and project management arrangements.

Step	Responsibility	
	Licensee / Applicant	ONR
4A. Nuclear site licence assessment	<ul style="list-style-type: none"> ■ Continue to develop organisational capability, arrangements, safety case and other (security) submissions. ■ Agree position on nuclear liability insurance with BEIS. ■ Prepare funded decommissioning programme and submit it to the SoS for BEIS. 	<ul style="list-style-type: none"> ■ Assess site, organisation, facility safety case submissions; adequacy of licence condition compliance arrangements and implementation where appropriate; security of tenure and security arrangements Prepare assessment reports. ■ Decide whether it is a public body. ■ Notification is required prior to grant of licence. If yes, issue NIA 1965 section 3(4) direction to licence applicant.
4B. Consultation	<ul style="list-style-type: none"> ■ Respond to our direction under NIA 1965 section 3(4) to notify public bodies having duties in relation to the site (may not apply to civil power reactors). 	<ul style="list-style-type: none"> ■ Consider responses from public bodies ■ Formally consult relevant environment agency as required by NIA 1965 section 3(13). ■ Consult BEIS on applicant's financial standing and nuclear liability insurance arrangements. ■ Prepare licence and consult Government Legal Department; factual check by licensee.
5. Granting a site licence	<ul style="list-style-type: none"> ■ Formally confirm readiness to receive licence. 	<ul style="list-style-type: none"> ■ Produce licensing report and peer review. ■ Chief Nuclear Inspector's review of the licensing report recommendations and matters arising to grant nuclear site licence.

Table 2: Sizewell C Nuclear Site Licence application dossier contents

Part	Title	Number	Rev
Part 1	1.0 Head Document	100200212	004
	1.1 Glossary of Terms	100387476	001
Part 2	2.0 Company manual	100200192	003
	2.1 Nuclear Baseline	100200200	
Part 3	3.0 Management System Manual	100200202	002
	3.1 Memorandum and Articles of Association	https://beta.companieshouse.gov.uk/company/09284825/	
	3.2 Nuclear Safety Policy	100200165	001
	3.3 Environmental policy	100200170	001
	3.4 Health and Safety Policy	100200187	001
	3.5 Security Policy	100200168	001
	3.6 Intelligent Customer Policy	100200173	002
	3.7 Quality Policy	100200193	001
	3.8 TOR for NSC	100197655	001
Part 4	4.0 NSL Compliance Matrix	100200248	004
Part 5	5.0 Forward Work Plan for SZC Licence Application	100200229	003
Part 6	6.0 SZC Nuclear Site Licence Area- NSL boundary.	SZC-SZ0100-XX-000-DRW-100104	draft
	6.1 SDSR	SZC-NNBGEN-XX-000-REP-100022	002
	6.2 JSSR	SZC-SZC-NNBOSL-XX-000-REP-100006	001
	6.3 Sizewell C Operational Site Layout Assumptions for DCO	SZC-SZ0100-XX-000-DRW-100004 (rev 5)	Rev 5
	6.4 Sizewell C List of Buildings	SZC-SZ0100-XX-000-REP-100039 (rev 1)	Rev 1

Table 3: Licensing assessment topics and reports


Assessment Report no.	Topic Stream (From Master Interface List)	Topic	Related LC(s)
AR1	SLC 1	Emergency Arrangements	11
	SLC3	Plant operations, maintenance and commissioning	21, 24, 26, 28, 29, 30, 31
	SLC4	Construction/Site Management	2, 8, 9, 16, 19
	SLC6	Nuclear safety Committee	13
	SC22	Site selection and suitability 	
AR2	SC4	Internal Hazards	10, 12, 14
AR3	SC5	Civil Engineering	10, 12, 14
AR4	SC6	External Hazards	10, 12, 14
AR5	SC10	Essential Electrical	10, 12, 14
AR6	SC14	Mechanical Engineering (Heat Sink)	10, 12, 14
AR7	SC1	Safety Case Delivery Strategy	14, 20
AR8	OC1	Design Authority	17
	OC2, OC3 (covering OC6), OC4	Intelligent Customer, Organisational Development, Corporate Governance	17, 36
	OC5 and OC7	Quality (including Management Systems) and Supply Chain Management	6, 17, 25
	OC8 (combined SLC2)	Organisational Learning, Culture and Incident Reporting	6, 7, 17
	OC9	Training, SQEP and Appointments	10, 12
AR9	SLC8	Conventional Health and Safety (including Fire Safety)	
AR10	S1	Physical, Information and Personnel Security	
AR11	LPL1, LPL2, LPL4	Legal, Security of tenure, BEIS interactions and Safeguards	1, 3
AR12	PM2a	Replication	
AR13	SLC5	Management of Nuclear matter/Liabilities	4, 5, 32

Table 4: Allocation of ONR topic areas for site suitability assessments

Licensing Features	Topic Stream
The site is of a sufficient size [to accommodate all necessary systems to ensure safe operation]	Civil Engineering External Hazards Internal Hazards
The site can be connected to [electricity] grid supplies.	Electrical
There is adequate cooling capability for all normal and fault conditions	Mechanical Engineering Civil Engineering Internal Hazards External Hazards
The environmental conditions would not preclude the use of the site with respect to external hazards.	External Hazards
The geology of the site will provide a secure long-term support to the necessary structures, systems and components.	Civil Engineering External Hazards
That operations of the site will not adversely affect the safety case for any adjoining nuclear licensed site	Internal Hazards (main) External Hazards