Office for Nuclear Regulation

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Civil Nuclear Reactor Programme

Safety categorisation and classification workstream assessment to inform nuclear site licensing of Hinkley Point C

Assessment Report: ONR-CNRP-AR-12-081
Revision 1
31 January 2013

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ASSESSMENT REPORT

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EXECUTIVE SUMMARY

Background

This report presents the findings of the Office for Nuclear Regulation (ONR) safety categorisation and classification workstream assessment of NNB Generation Company's (NNB GenCo) application, including supporting information and arrangements, for a nuclear site licence at Hinkley Point C. This assessment supports ONR's decision whether to grant a nuclear site licence, or not, for NNB GenCo to install and operate two EPR units at Hinkley Point C.

This report has been produced in line with ONR's overall licensing strategy (Ref. 6) and the safety categorisation and classification Intervention Project Record (IPR): NNB-HPC1-IPR40 (Ref. 7). It informs both ONR's organisational capability intervention, and safety report and the associated substantiation intervention from ONR's licensing strategy.

Assessment and inspection work carried out by ONR

ONR has engaged with NNB GenCo since early 2012 on the safety categorisation and classification workstream, via level 4 meetings, assessment of relevant documentation where available and a licensing safety categorisation and classification intervention in July 2012, to gather sufficient evidence to recommend, or not, granting a nuclear site licence. Within the safety categorisation and classification workstream this engagement had the objective of verifying the following:

- NNB GenCo's approach to safety categorisation and classification is consistent with that agreed in the Generic Design Assessment (GDA).
- Adequate safety categorisation and classification has been carried out given the point in time of the build programme.
- NNB GenCo is able to demonstrate an adequate intelligent customer capability.
- NNB GenCo has suitably qualified and experienced personnel (SQEP) to deliver adequate safety categorisation and classification for the second pre construction safety report (PCSR2) and later.
- Adequate training in safety categorisation and classification has been carried out.
- Robust arrangements have been or are being developed, to apply safety categorisation and classification to support the design development and analysis.

Matters arising from ONR's work

A number of potential areas for improvement have been identified that for this point in the programme are being adequately progressed by NNB GenCo. No significant matters were identified.

Conclusions

In terms of NNB GenCo's competence and capability in the safety categorisation and classification workstream no issues have been identified that preclude me recommending ONR to grant a nuclear site licence for NNB GenCo to install and operate two EPR units at Hinkley Point C.

NNB GenCo has generally made adequate progress in addressing actions raised during ONR interventions within the safety categorisation and classification workstream.

It is noted that due to the safety categorisation and classification approach still being developed to address a GDA issue, NNB GenCo has been unable to make significant progress in this area. However, NNB GenCo appears to be aware of the risks involved in inappropriately classifying systems, structures and components, particularly for the long lead items in advance of the

categorisation and classification methodology being finalised. To address this a number of de-risking activities have been carried out to identify (conservatively) the likely class, which appear adequate to support licensing.

I also reviewed a document submitted to ONR as part of the early batches, relevant to the safety categorisation and classification workstream, and also sampled documentation related to NNB GenCo's de-risking activities. Based on this assessment I consider that these documents are adequate in terms of their scope and content for nuclear site licensing purposes. A number of queries have been raised with NNB GenCo during this assessment that have been adequately addressed for licensing. Any outstanding issues can be dealt with from a permissioning perspective. It is therefore concluded, based on the safety categorisation and classification workstream, that:

- NNB GenCo has demonstrated that there is a high level of confidence that the Hinkley Point C site can support the licensable activity.
- NNB GenCo has demonstrated that it is capable of producing a site specific safety report and relevant design substantiation to support the construction and installation of two EPR units at Hinkley Point C.

Given that the methodology for safety categorisation and classification is still being developed in response to GDA issue GI-UKEPR-CC01 ONR will continue to engage with NNB GenCo to monitor and encourage progress in this area and indeed all other areas of work referred to in this report.

Recommendations

From the perspective of the safety categorisation and classification workstream, I recommend that ONR should grant a nuclear site licence to NNB GenCo to install and operate two EPR units at Hinkley Point C.

LIST OF ABBREVIATIONS

ALARP	As Low As Reasonably Practicable
BMS	(ONR) How2 Business Management System
CNRP	Civil Nuclear Reactor Programme
EPR	The Pressurised Water Reactor developed and trademarked by AREVA
GDA	Generic Design Assessment
HPC	Hinkley Point C
HSE	Health and Safety Executive
IAEA	International Atomic Energy Agency
IPR	Intervention Project Record
NGL	EDF Energy Nuclear Generation Ltd
NNB GenCo	NNB Generation Company
ONR	Office for Nuclear Regulation (an agency of HSE)
PCSR	Pre-construction Safety Report
PCSR2	Second Pre Construction Safety Report
PSA	Probabilistic Safety Analysis
RP	Requesting Party
SAP	Safety Assessment Principle(s) (HSE)
SFAIRP	So far as is reasonably practicable
SQEP	Suitably Qualified and Experienced Personnel
SSC	System, Structure and Component
SSG	Specific Safety Guide
TAG	Technical Assessment Guide(s) (ONR)
TSC	Technical Support Contractor
WENRA	Western European Nuclear Regulators' Association

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Tables

1 INTRODUCTION

1.1 Background

1 NNB Generation Company (NNB GenCo) has submitted its formal application for a nuclear site licence to install and operate two EPR units at Hinkley Point C. The Office for Nuclear Regulation's (ONR) intervention strategy to inform a decision on whether or not a nuclear site licence should be granted to NNB GenCo in respect of Hinkley Point C is set out in Ref. 6.

2 ONR's approach to licensing is informed by interventions that considered the adequacy of NNB GenCo's:

- organisation capability;
- licence condition compliance arrangements;
- safety report and associated substantiation; and
- licensing documentation and ONR's associated legal and statutory consultation due process.

3 As part of the safety report and associated substantiation intervention ONR Pre Construction Safety Report (PCSR) technical topic leads were required to develop and carry out an intervention focused on their topic. Safety categorisation and classification is one such topic listed in Appendix C of ONR's Hinkley Point C licensing intervention strategy (Ref. 6).

4 Safety categorisation and classification is a key consideration in the design of a nuclear power plant, and affects design standards, quality assurance testing, claims on reliability, procurement, commissioning/testing, maintenance, Probabilistic Safety Analysis (PSA) and system design etc. ONR Safety Assessment Principles (SAP) (Ref. 2) state: "The effective implementation of defence in depth needs support from a number of general principles and related measures that assure the reliability and capability of the means of achieving the objectives. It is important that structures, systems and components, including software for instrumentation and control, are classified on the basis of their safety significance and are designed, manufactured, installed and then subsequently commissioned, operated and maintained to a level of quality commensurate with their classification."

5 The safety categorisation and classification intervention developed to support licensing is summarised in the Civil Nuclear Reactor Programme (CNRP) Intervention Project Record (IPR) NNB-HPC1-IPR40 (Ref. 7). This assessment report summarises the outcome of the safety categorisation and classification licensing intervention.

6 The assessment was undertaken in accordance with the requirements of the ONR How2 Business Management System (BMS) procedure AST/001 (Ref. 1). The ONR SAPs (Ref. 2), together with supporting Technical Assessment Guides (TAG) (Ref. 3) have been used as the basis for this assessment.

1.2 Scope

7 The scope of this report informs the organisational capability intervention, and the safety report and the associated substantiation intervention outlined in ONR's licensing intervention strategy (Ref. 6).

1.3 Methodology

8 The methodology for the assessment follows ONR BMS document AST/001, Assessment Process (Ref. 1), in relation to mechanics of assessment within ONR.

9 This assessment has been focused primarily on NNB GenCo's capability in the safety categorisation and classification technical area, and NNB GenCo's interface with the Architect Engineer as it is not intended to produce the site specific PCSR until post licensing.

2 ASSESSMENT STRATEGY

10 The intended assessment strategy for the licensing of NNB GenCo with respect to Hinkley Point C for the safety categorisation and classification topic area is set out in this section. This identifies the standards and criteria that have been applied and the scope of the assessment.

2.1 Standards and criteria

11 The relevant standards and criteria adopted within this assessment are principally the SAPs, Ref. 2, internal ONR TAGs, Ref. 3, relevant national and international standards, and relevant good practice informed from existing practices adopted on UK nuclear licensed sites. The key SAPs and relevant TAGs are detailed within this section. National and international standards and guidance, e.g. relevant parts of the International Atomic Energy Agency (IAEA) standards (Ref. 5) and the Western European Nuclear Regulators Association (WENRA) reference levels (Ref. 4), have been referenced where appropriate within the assessment report. Relevant good practice, where applicable, has also been cited within the body of the assessment.

2.1.1 Safety Assessment Principles

12 The key SAPs applied within the assessment are included within Table 1 of this report.

2.1.2 Technical Assessment Guides

13 The following TAG has been used as part of this assessment (Ref. 3):

- T/AST/030 PSA

2.1.3 National and international standards and guidance

14 No national and international standards and guidance have been used as part of this assessment.

2.2 Assessment scope

15 The purpose of this assessment report is to summarise the outcome of the intervention outlined in the IPR NNB-HPC1-IPR40 (Ref. 7) to support ONR's overall licensing strategy. The objectives of the intervention are to conclude whether from the perspective of safety categorisation and classification:

- NNB GenCo has demonstrated adequate arrangements to manage nuclear safety for the point in time at which the licence is to be granted.
- NNB GenCo has demonstrated that there is a high level of confidence that the Hinkley Point C site can support the licensable activity.
- NNB GenCo has demonstrated that it is capable of producing a site specific safety report and relevant design substantiation.

16 Overall, the purpose is to recommend whether ONR should, or should not, grant a nuclear site licence.

17 The anticipated outcomes of the intervention are confirmation that:

- NNB GenCo is capable to develop an adequate approach to safety categorisation and classification.

- The approach agreed in the Generic Design Assessment (GDA) is being/will be applied given the point in time in the build programme (this is required prior to issue of structure, system and component (SSC) procurement specifications).
- NNB GenCo demonstrates an adequate intelligent customer function (including adequate arrangements at the interface with the Architect Engineer).

18 This assessment report will inform the organisational capability lead correspondent's overall assessment report and the PCSR workstream lead correspondent's overall assessment report.

2.2.1 Safety categorisation and classification intervention strategy

19 To address the objectives and anticipated outcomes of the intervention a mixture of level 4 meetings, assessment of safety categorisation and classification deliverables, where available given the point in time in the programme, and interventions have been used to gather evidence to form a judgement on NNB GenCo's deployment of Suitably Qualified and Experienced Personnel (SQEP) resource as well as the effectiveness of its arrangements:

- to produce a safety report that will support NNB GenCo's request for ONR's permission to start safety related construction;
- to ensure the continued evolution of a safety report that supports NNB GenCo's construction and installation programme;
- to ensure that the design of safety related SSCs is compliant with the developing safety report; and
- to control the procurement and manufacture of early activities and long lead items that have the potential to affect safety.

20 Within the safety categorisation and classification workstream this has been interpreted as verifying the following, where possible given the point in time in the build programme:

- NNB GenCo's approach to safety categorisation and classification is consistent with that agreed in GDA.
- Adequate safety categorisation and classification has been carried out given the point in time of the build programme.
- NNB GenCo is able to demonstrate an adequate intelligent customer capability.
- NNB GenCo has SQEP staff to deliver adequate safety categorisation and classification for the second PCSR (PCSR2) and later.
- Adequate training in safety categorisation and classification has been carried out.
- Robust arrangements have been or are being developed, to apply safety categorisation and classification to support the design development and analysis.

21 In addition, assessment of the safety categorisation and classification aspects of a number of key topics (the early batch submissions – see Section 4.3.2.1), where relevant, has been carried out to provide confidence that the site is suitable for the construction and operation of a UK EPR.

2.2.2 Use of technical support contractors

22 No technical support contractors have been used to support this assessment.

2.3 Integration with other assessment topics

23 The nature of safety categorisation and classification means that there are interactions with other technical areas. There have been interactions between safety categorisation and classification, and other technical areas such as PSA, electrical, control and instrumentation, fault studies, mechanical and structural integrity. This is expected to increase as the programme progresses.

2.4 Out-of-scope items

24 The focus of this assessment has mainly been on safety categorisation and classification arrangements as opposed to application of the approach to safety categorisation and classification. This is not unexpected however, given the point in time in the programme and current progress. Given ongoing resolution of GDA issue GI-UKEPR-CC01 (Refs. 18 and 19) it has not been possible to assess application of any agreed methodology for licensing. This aspect is therefore considered out-of-scope for licensing.

3 NUCLEAR SITE LICENCE APPLICANT'S SAFETY CASE

25 NNB GenCo formally applied for a nuclear site licence for Hinkley Point C in letter ONR-HPC-20143R, dated 29 July 2011 (Ref. 8). This was supported by an application dossier (Ref. 9) that supports NNB GenCo's application. ONR agreed (Ref. 11) that this dossier did not need to include a Hinkley Point C site specific PCSR. For the purposes of granting a nuclear site licence ONR indicated to NNB GenCo that it would accept a document that illustrates the structure of the Hinkley Point C site specific PCSR document.

26 Notwithstanding that ONR did not require a Hinkley Point C site specific PCSR as part of the application dossier, ONR expected relevant sections or chapters of the PCSR, to be developed sufficiently to support licence granting, notably around confirmation that the site specific parameters are bounded by the GDA design envelope, with appropriate arrangements in place to address any discrepancies.

27 In order to provide the necessary high level of confidence that the site is suitable for the construction and operation of a UK EPR, NNB GenCo was required to justify a number of key topics including:

- The site is of a sufficient size.
- The site is (or can be) connected to grid supplies.
- There is adequate cooling capability for all normal and fault conditions.
- The environmental conditions will not preclude the use of the site with respect to external hazards.
- The geology of the site will provide a secure long term support to the necessary structures, systems and components.
- The submission will also need to provide a schedule for submission of further PCSR updates or revisions to support subsequent construction milestones.

28 NNB GenCo supplied a number early batch submissions to cover these topics. Elements of the following topics and batches were determined to be relevant to safety categorisation and classification, and hence were assessed to support nuclear site licensing:

- adequate cooling – normal and fault – batch 5 – Ref. 12.

29 In terms of NNB GenCo's approach to safety categorisation and classification, ONR's expectation is set out in the GDA Step 4 cross-cutting report, where Assessment Finding AF-UKEPR-CC-05 states (Ref. 17):

- A future licensee shall fully apply the SF [safety function] and SSC methodologies identified in the GDA PCSR to the developing design for a UK EPR throughout design development.

This has a milestone of "long lead items and SSC procurement specifications". It is therefore not expected that the safety classification and categorisation methodology will have been fully applied by this point in time by NNB GenCo.

30 Furthermore, the approach to safety categorisation and classification is still being developed within GDA. Indeed the following GDA issue was raised in GDA Step 4 cross-cutting report, GI-UK EPR-CC-01 (Refs. 17 and 18):

- The RP [Requesting Party] to demonstrate that the methodology developed and applied for categorising Safety Function and classifying Structures, Systems and

Components is in line with UK and international standards and relevant good practice.

A resolution plan was published by the Requesting Party (Ref. 19). It is currently anticipated that this issue will be addressed late in 2012 prior to ONR issuing a Design Acceptance Certificate for the UK EPR, subject to satisfactory closure of all GDA issues. It is therefore noted that NNB GenCo has not been in a position to apply the agreed safety categorisation and classification methodology up to this point in time. I do not consider this to be an issue for nuclear site licensing and it will form a key part of ongoing ONR engagement with NNB GenCo and in post licensing permissioning.

4 ONR ASSESSMENT

31 This assessment has been carried out in accordance with ONR How2 BMS document AST/001, “Assessment Process” (Ref. 1).

4.1 Scope of assessment undertaken

32 The scope of the assessment has followed the safety categorisation and classification strategy described in Section 2 of this report. The following areas have been considered and are discussed in Section 4.3 of this report:

- NNB GenCo competence and capability:
  - NNB GenCo interaction and oversight with resolution of the GDA issue GI-UK EPR-CC-01 (Section 4.3.1.1)
  - NNB GenCo understanding of ONR’s expectations in terms of safety categorisation and classification (Section 4.3.1.2)
  - NNB GenCo interface with the Architect Engineer (Section 4.3.1.3)
  - application of the design review and acceptance procedure to safety categorisation and classification (Section 4.3.1.4)
  - SQEP arrangements for the safety categorisation and classification workstream (Section 4.3.1.5)
  - hold point control process (Section 4.3.1.6)
- safety report:
  - early batches (Section 4.3.2.1)
  - classification activities (Section 4.3.2.2)

4.2 Interventions with NNB GenCo

33 Given that safety categorisation and classification is not an explicit part of the dossier supporting NNB GenCo’s application for a nuclear site licence, and because of ongoing work within GDA to address GDA issue GI-UK EPR-CC-01, no detailed assessment of safety categorisation and classification deliverables has generally been carried out to form a view on whether from the safety categorisation and classification topic area to recommend, or not, granting a nuclear site licence. Notwithstanding this, a small number of supporting references have been sampled where available, but the recommendation on granting a nuclear site licence is predominantly based on the outcome of the level 4 meetings outlined in Table 2 and an intervention carried at NNB GenCo’s Barnwood office (Ref. 15).

4.3 Assessment

34 This section summarises ONR’s assessment and the conclusions and findings for each of the broad topic areas listed in Section 4.1.

4.3.1 NNB GenCo competence and capability

35 The following sub-sections consider a range of areas to form an overall view on NNB GenCo’s competence and capability in the safety categorisation and classification area.

4.3.1.1 NNB GenCo interaction and oversight with resolution of the GDA issue GI-UK EPR-CC-01

36 As stated in Section 3, the safety categorisation and classification methodology is still being developed in response to GDA issue GI-UK EPR-CC-01. Therefore a key part of NNB GenCo developing its intelligent customer capability in this area is in its interaction with and oversight of the resolution of this issue. This has formed a significant part of discussion with NNB GenCo during the various interventions outlined in Table 2.

37 NNB GenCo's involvement with the GDA safety categorisation and classification issue GI-UKEPR-CC01 has evolved from observer at ONR/Requesting Party level 4 meetings to a more active role, and NNB GenCo has also been involved in the review of a key deliverable from resolution of this GDA issue: "Classification of structures systems and components, NEPS-F DC 557". This review appears to be consistent with NNB GenCo's primary surveillance as related to its design review and acceptance procedure (NNB-OSL-PRO-000035). NNB GenCo also initiated an independent review of this document by Rolls-Royce.

38 Based on the documentation I sampled, including:

- NNB GenCo minutes of meetings attended;
- the NEPS-F DC 557 review plan;
- comments on NEPS-F DC 557 and their closeout;
- internal discussion documents on the use of PSA in the classification process;
- email communication between NNB GenCo, the Requesting Party and ONR (sampled during the July intervention); and
- also discussion on NNB GenCo's approach to safety categorisation and classification,

I am satisfied that NNB GenCo has taken steps to develop its intelligent customer capability in safety categorisation and classification; and that this is adequate in terms of the point in time in the design and build programme, and in terms of licensing.

4.3.1.2 NNB GenCo understanding of ONR's expectations in terms of safety categorisation and classification

39 Notwithstanding that NNB GenCo has not carried out detailed safety categorisation and classification, based on the various interventions I consider post agreement of the GDA categorisation and classification methodology that this should be applied consistently with ONR expectations in line with ONR SAPs and relevant international good practice.

40 Furthermore, although NNB GenCo's proposed approach to safety categorisation and classification is currently not fully in line with ONR's expectations as it is consistent with the proposed approach in GDA (as of July 2012) (for resolution of issue GI-UKEPR-CC01), given the GDA approach is converging towards ONR's expectations I anticipate the application within NNB GenCo will also converge.

41 NNB GenCo generally appears to understand ONR's expectations and intends to fully address GDA Assessment Finding AF-UKEPR-CC-05. Although evidence of this will not be available prior to licensing and indeed will not be presented in the second Pre Construction Safety Report, I consider that NNB GenCo's de-risking activities (to support invitations to tender for long lead items – discussed in Section 4.3.2.2) further support my judgment.

42 Overall, I consider there to be no significant issues relating to NNB GenCo's understanding of ONR's expectations that would preclude me from recommending granting a nuclear site licence.

4.3.1.3 NNB GenCo interface with the Architect Engineer

43 During the July intervention with NNB GenCo (Ref. 15), NNB GenCo provided a clear overview of its interactions with the Architect Engineer. This is mainly through the safety classification working group that consists of both NNB GenCo and Architect Engineer personnel, but also via interactions on the GDA issue as some of the Architect Engineer personnel are part of the GDA Requesting Party. I examined the minutes of the initial working group meeting, terms of reference for the working group (Ref. 15) and also a draft version of the "Design Quality Plan for classification process".

44 In summary, from the perspective of safety categorisation and classification I consider, based on the discussion with NNB GenCo, observation of the Architect Engineer–NNB GenCo interaction during the various interventions (see Table 2), and the documentation sampled, taking account of the point in time in the build programme, that NNB GenCo has an adequate relationship with the Architect Engineer. Notwithstanding this, further oversight will be maintained during permissioning including consideration of observing one of the safety categorisation and classification working group meetings. Overall, I consider there to be no significant issues relating to the interface with the Architect Engineer for licensing.

4.3.1.4 Application of the design review and acceptance process to safety categorisation and classification

45 Formal design review and acceptance has not been applied within the safety categorisation and classification area to date because of limited progress and ongoing resolution of the GDA issue. However, design review and acceptance processes have been applied to related activities, both informally as part of NNB GenCo's review of the GDA document NEPS-F DC 557 and also as part of the review of the de-risking activities (see Section 4.3.2.2); these were sampled as part of the July intervention (Ref. 15).

46 Overall, notwithstanding that limited formal design review and acceptance has been carried out, for this point of time in the programme I consider that NNB GenCo is taking appropriate action to ensure adequate oversight of safety categorisation and classification. There appear to be no significant issues in NNB GenCo's oversight of safety categorisation and classification that would preclude me recommending granting a nuclear site licence.

4.3.1.5 Suitably qualified and experienced personnel arrangements for the safety categorisation and classification workstream

47 There is currently no formal SQEP safety categorisation and classification role within NNB GenCo's competency management arrangements. However, the intention is to include this competency as part of the safety case engineer role. NNB GenCo is currently developing a training module and are currently targeting quarter 3 2012 to roll this out. NNB GenCo has also carried out awareness sessions via technical safety case forum and a lunch time lecture, and formed an internal classification working group composed of key technical disciplines, e.g. control and instrumentation, electrical, mechanical etc.

48 During the July intervention (Ref. 15) I sampled the planned internal training material: training needs assessment, how this integrates with NNB GenCo's competence management arrangements, and the draft slides (both safety case principles and level 2

training). NNB GenCo also noted that an awareness brief had been provided to staff. In general, given that GDA issue GI-UKEPR-CC01 has not yet been resolved I consider that NNB GenCo's current approach and progress is reasonable. I will consider examining this in more detail as part of permissioning once this GDA issue has been addressed.

49 The Architect Engineer has also developed training for its staff that NNB GenCo has agreed to review to ensure this will meet UK expectations as part of it demonstrating its intelligent customer capability. Action 1353-EDF (see Table 3) refers to this:

- NNB GenCo to carry out a review of the Architect Engineer classification training material.

Based on the interventions with NNB GenCo I consider that NNB GenCo has developed sufficient understanding of the Architect Engineer's capability through the working group and other interactions, that this action can be addressed post licensing.

50 Overall, based on interactions with NNB GenCo, the progress being made and the point in time in the programme I consider the steps currently being taken by NNB GenCo are adequate in relation to nuclear site licensing.

4.3.1.6 Hold point control process

51 The role of safety categorisation and classification in NNB GenCo's hold point process has been discussed. Although given the point in time in the programme I do not expect evidence to be currently available to demonstrate adequate consideration of sufficient safety categorisation and classification in the hold point process, it is clear that this will be a key consideration as an enabler in the release of relevant hold points.

52 Overall, no issues as regards the hold point process have been noted for licensing, but this is a key area for future early engagement. As part of the permissioning strategy ONR will consider sampling the role of safety categorisation and classification within the relevant enablers to release hold points; this is also likely to form part of the permissioning interventions for many of the technical workstreams.

4.3.1.7 Summary

53 It is noted that only limited progress has been made in the safety categorisation and classification area to date, mainly as a result of ongoing work to address GDA issue GI-UKEPR-CC01. Notwithstanding this, based on the interventions outlined in Table 2:

- NNB GenCo has taken steps to develop its intelligent customer capability in safety categorisation and classification and that this is adequate in terms of the point in time in the design and build programme, and in terms of licensing.
- I consider there to be no significant issues relating to NNB GenCo's understanding of ONR's expectations that would preclude me from recommending granting a nuclear site licence.
- NNB GenCo has an adequate relationship with the Architect Engineer.
- NNB GenCo is taking appropriate action to ensure adequate oversight of safety categorisation and classification.
- The steps currently being taken by NNB GenCo for ensuring SQEP staff are adequate in relation to nuclear site licensing.
- No issues as regards the hold point process have been noted for licensing.

54 In terms of NNB GenCo's competence and capability in the safety categorisation and classification workstream no issues have been identified that preclude me recommending ONR to grant a nuclear site licence for NNB GenCo to install and operate two EPR units at Hinkley Point C.

4.3.2 Safety report

55 The following subsections summarise my assessment and findings of NNB GenCo's safety substantiation. As stated in ONR's licensing intervention strategy, for the purpose of granting a licence ONR agreed that NNB GenCo's nuclear site licence application dossier need not include a site specific PCSR. Given this, only very limited aspects of the site specific PCSR have been delivered to ONR. In line with the licensing strategy (Ref. 6) my assessment has been of the following two aspects from the perspective of safety categorisation and classification:

- whether NNB GenCo has demonstrated that there is a high level of confidence that the Hinkley Point C site can support the licensable activity; and
- whether NNB GenCo has demonstrated that it is capable of producing a site specific safety report and relevant design substantiation to support the construction and installation of two EPR units at Hinkley Point C.

56 I have sampled a number of the early batch submissions, where relevant to safety categorisation and classification, in line with ONR's expectations (Ref. 11), and a number of the early classification activities. The outcome of this is summarised in the following subsections.

4.3.2.1 Early batches

57 ONR expects relevant sections or chapters of the PCSR to be developed sufficiently to support licence granting, notably around confirmation that the site specific parameters are bounded by the GDA design envelope, with appropriate arrangements in place to address any discrepancies.

58 In terms of safety categorisation and classification I have considered the following batch: batch 5, adequate cooling – normal and fault (Ref. 12). This batch does not take account of the revised safety categorisation and classification methodology that is being developed to support resolution of GDA issue GI-UKEPR-CC01, and the classification presented follows the French approach, which was noted in GDA (Ref. 17) to not meet UK expectations. As a result of this the query in Table 4 of this report was raised. This was also discussed during a specific level 4 meeting in relation to batch 5 (Ref. 20). It is noted that NNB GenCo recognise this limitation in batch 5 (Ref. 12) and state:

- "The heat sink structures, systems and components (SSCs) are categorised according to their safety function and significance. The safety classifications presented in this report are consistent with the French classification system developed for the EPR. A new safety classification system based on UK nuclear practice is being adopted for HPC [Hinkley Point C] through the GDA PCSR process and the high-level correspondence between the two classification systems is indicated in this report."

59 A detailed assessment of the safety categorisation and classification has therefore not been possible at this stage. Indeed safety categorisation and classification will not be fully implemented using the revised agreed methodology until post PCSR2, at the end of 2013.

60 Although safety categorisation and classification consistent with ONR expectation has not yet been implemented I do not consider this to be a significant shortfall in terms of granting a nuclear site licence. Firstly, NNB GenCo appears to sufficiently understand UK expectation (for the purpose of granting a nuclear site licence). Secondly, this does not provide evidence that the Hinkley Point C site cannot support the licensable activity; and lastly, I consider the activities being undertaken in this area, for example the de-risking activities (see Section 4.3.2.2), are sufficient to demonstrate that NNB GenCo is capable of producing a site specific safety report and relevant design substantiation to support the construction and installation of two EPR units at Hinkley Point.

61 In terms of NNB GenCo's response to the query raised, I consider this to be adequate for nuclear site licensing; Table 4 includes a summary of the status of this comment and an assessment of its adequacy.

62 Overall, from the perspective of safety categorisation and classification, I consider the scope and content of the batches to be adequate in terms of nuclear site licensing given the point of time in the overall programme. Notwithstanding this, further detailed assessment of safety categorisation and classification will be carried out to support permissioning.

4.3.2.2 Classification activities

63 As discussed above, due to ongoing work within GDA, very limited safety categorisation and classification activities have been carried out to date or will be before 2013. However, based on the interventions with NNB GenCo (see Table 2), NNB GenCo is aware of the risks involved in inappropriately classifying SSCs, particularly the long lead items, in advance of the methodology being finalised. Therefore, NNB GenCo has carried out a number of de-risking activities, particularly for such long lead items and where not obviously class 1, for example SSCs within the turbine hall.

64 During the intervention in July 2012 (Ref. 15) I sampled NNB GenCo's de-risking activities in two areas: turbine hall contract and power transmission contract. For the turbine hall, the conventional island systems, structures and components are generally non-classified in France.

65 In terms of the turbine hall contract I sampled the de-risking meeting minutes from 23 February 2012 (T-DPNN-12-0201), output of the NNB GenCo 'MODEM' technical analysis process and the surveillance plan for the turbine hall contract (NNB-OSL-PLN-006078). In general no significant issues were identified, with NNB GenCo providing sufficient evidence of taking a conservative approach to classification ahead of finalisation of the GDA methodology. It was clear that the NNB GenCo safety categorisation and classification lead had been involved in this process. However, the surveillance plan did not explicitly identify the safety categorisation and classification role and the following action was agreed (see Action 1401-EDF in Table 3):

- NNB GenCo to revise the surveillance plan for de-risking the turbine hall contract to provide evidence of explicit consideration of safety classification. Future de-risking surveillance plans should also explicitly highlight classification input.

66 For the power transmission contract I sampled various relevant documentation, including evidence of the de-risking meeting, NNB GenCo review of legacy contract (HPC-NNBOSL-AU-GEV-ASS-000001) and the additional technical specification. Again no significant issues were noted.

67 In both cases the range of input from both the Architect Engineer and NNB GenCo appeared reasonable. There was also acceptable evidence, for this point in time in the

build programme, of NNB GenCo understanding the GDA issue and taking due account of UK needs in the de-risking activity. In terms of licensing I consider that NNB GenCo has demonstrated an adequate intelligent customer capability and that there are no significant issues that would preclude me from recommending granting a nuclear site licence.

68 The de-risking activities will be considered in more detail as part of permissioning, in particular their adequacy to support enablers to release relevant hold points.

4.3.2.3 Summary

69 NNB GenCo has not yet carried out any formal safety categorisation and classification as the methodology is still being developed in resolution to GDA Issue GI-UKEPR-CC01. Therefore current safety case documentation, i.e. the early batches, still reflects the French methodology. However, NNB GenCo appears to be taking appropriate steps in advance of this methodology being finalised to de-risk its early activities, for example those related to the long lead items.

70 Based on the interventions with NNB GenCo, including sampling some of the de-risking activities:

- I consider that the documents sampled are adequate in terms of their scope and content for nuclear site licensing purposes.
- Queries raised with NNB GenCo during this assessment have been adequately addressed for licensing.
- I consider that any outstanding issues can be dealt with from a permissioning perspective.

71 No issues have been identified that preclude recommending granting a nuclear site licence.

4.3.3 Actions raised in level 4 interactions

72 Table 3 summarises all actions that have been raised within the safety categorisation and classification workstream level 4 meetings and remain open (August 2012). I do not consider that any of these actions are licensing issues and their closure will be progressed with NNB GenCo on permissioning timescales.

73 Overall, NNB GenCo has generally made adequate progress in addressing actions raised during ONR interventions within the safety categorisation and classification workstream.

5 CONCLUSIONS AND RECOMENDATIONS

5.1 Conclusions

74 This report presents the findings of the ONR safety categorisation and classification workstream assessment of NNB GenCo's application, supporting information and arrangements for a nuclear site licence at Hinkley Point C. This assessment supports ONR's decision whether to grant a nuclear site licence, or not, for NNB GenCo to install and operate two EPR units at Hinkley Point C.

75 This report has been produced in line with ONR's overall licensing strategy (Ref. 6) and the safety categorisation and classification IPR: NNB-HPC1-IPR40 (Ref. 7). It informs both ONR's organisational capability intervention, and safety report and the associated substantiation intervention from ONR's licensing strategy.

76 Based on the interventions carried out and preliminary assessment of available documentation, and taking account of the point in time in the build programme, the following key conclusions are made in terms of nuclear site licensing:

- NNB GenCo has taken steps to develop its intelligent customer capability in safety categorisation and classification and this is adequate in terms of the point in time in the design and build programme, and in terms of licensing.
- I consider there to be no significant issues relating to NNB GenCo's understanding of ONR's expectations that would preclude me from recommending granting a nuclear site licence.
- NNB GenCo has an adequate relationship with the Architect Engineer.
- NNB GenCo is taking appropriate action to ensure adequate oversight of safety categorisation and classification.
- The steps currently being taken by NNB GenCo for developing SQEP staff are adequate in relation to nuclear site licensing.
- No issues as regards the hold point process have been noted for licensing.
- NNB GenCo has generally made adequate progress in addressing actions raised during interventions with ONR within the safety categorisation and classification workstream.

77 In terms of NNB GenCo's competence and capability in the safety categorisation and classification workstream no issues have been identified that preclude me recommending ONR to grant a nuclear site licence for NNB GenCo to install and operate two EPR units at Hinkley Point C.

78 I have also reviewed a relevant document submitted to ONR as part of the early batches, relevant to the safety categorisation and classification workstream, and also sampled documentation relating to NNB GenCo's de-risking activities. Based on this assessment I consider that these documents are adequate in terms of their scope and content for nuclear site licensing purposes. A number of queries have been raised with NNB GenCo during this assessment that have been adequately addressed for licensing. Any outstanding issues can be dealt with from a permissioning perspective. It is therefore concluded, based on the safety categorisation and classification workstream, that:

- NNB GenCo has demonstrated that there is a high level of confidence that the Hinkley Point C site can support the licensable activity.

- NNB GenCo has demonstrated that it is capable of producing a site specific safety report and relevant design substantiation to support the construction and installation of two EPR units at Hinkley Point C.

79 It is noted that the methodology for safety categorisation and classification is still being developed in response to GDA issue GI-UKEPR-CC01 and ONR will continue to engage with NNB GenCo to monitor and encourage progress in this area and indeed all other areas of work referred to in this report.

5.2 Recommendations

80 My recommendation is as follows:

- From the perspective of the safety categorisation and classification workstream, I recommend that ONR should grant a nuclear site licence to NNB GenCo to install and operate two EPR units at Hinkley Point C.

6 REFERENCES

1 *ONR How2 Business Management System. Assessment Process.* AST/001 Issue 4. HSE. April 2010. www.hse.gov.uk/nuclear/operational/assessment/index.htm.

2 *Safety Assessment Principles for Nuclear Facilities.* 2006 Edition Revision 1. HSE. January 2008. www.hse.gov.uk/nuclear/SAP/SAP2006.pdf.

3 *Probabilistic Safety Analysis*, T/AST/030 Issue 03. HSE. February 2009. www.hse.gov.uk/nuclear/operational/tech_asst_guides/index.htm.

4 *Western European Nuclear Regulators' Association. Reactor Harmonization Group. WENRA Reactor Reference Safety Levels.* WENRA. January 2008. www.wenra.org.

5 *Safety of Nuclear Power Plants: Design. Safety Requirements.* International Atomic Energy Agency (IAEA) Safety Standards Series No. NS-R-1. IAEA. Vienna. 2000.

6 *NNB GenCo Ltd's Application for a Nuclear Site Licence to Install and Operate two EPR Reactor Units at Hinkley Point, ONR Intervention Strategy*. ONR. February 2012. TRIM 2012/61973.

7 *CNRP Intervention Project Record. NNB GenCo – Hinkley Point C – licensing: safety categorisation and classification*. NNB-HPC1-IPR40. ONR. April 2012. TRIM 2012/139087.

8 *Application for Nuclear Site Licence for Hinkley Point*. ONR-HPC-20143R. NNB GenCo. July 2011. TRIM 2011/503357.

9 *NNB Genco Nuclear Site Licence Application Dossier*. NNB GenCo. July 2011. TRIM 2011/442090.

10 *Specification for the Pre-Construction Safety Report PCSR2 for Hinkley Point C*. HPC-NNBOSL-U0-000-SPE-000002 Issue 2. NNB GenCo. February 2012. TRIM 2012/118830.

11 *NNB GenCo Ltd's Application for a Nuclear Site Licence to Install and Operate two EPR Reactor Units at Hinkley Point, Specialist Assessment of Key Topics for NSL Granting*. ONR. February 2012. 2012/62323.

12 *Pre-construction Safety Report: Submission of Batch 5:* Hinkley Point C (HPC) Cooling Capability. ONR-HPC-20185N. NNB GenCo. February 2012. TRIM 2012/61317.

13 *NNB GenCo, Hinkley Point C, Safety Categorisation and Classification, 13 March 2012*. Contact Report. ONR-HPC-CR-12-013. ONR. March 2012. TRIM 2012/134200.

14 *NNB GenCo Level 4 Safety Classification Meeting, 24 May 2012*. Intervention Report. ONR-NNB GenCo-IR-12-116. ONR. June 2012. TRIM 2012/252918.

15 *Safety categorisation and classification intervention, 5 July 2012*. Intervention Report. ONR-NNB GenCo-IR-12-154. ONR. July 2012. TRIM 2012/293621.

16 *GDA EPR Classification CC01 L4 progress meeting, 26 July 2012*. Contact Report. ONR-GDA-CR-12-050. ONR. August 2012. TRIM 2012/302689.

17 *Step 4 Cross-cutting Topics Assessment of the EDF and AREVA UK EPR™ Reactor*. Assessment Report. ONR-GDA-AR-11-019. November 2011. TRIM 2010/581499 www.hse.gov.uk/newreactors/reports/step-four/technical-assessment/ukepr-cct-onr-gda-ar-11-032-r-rev-0.pdf

18 *EDF and AREVA UK EPR GDA, GDA Issue, Categorisation and Classification of Systems Structures and Components*. GI-UKEPR-CC-01 Revision 1. ONR July 2011. www.hse.gov.uk/newreactors/reports/step-four/gda-issues/gda-issue-gi-ukepr-cc-01.pdf

19 *Resolution Plan for GI-UKEPR-CC01*. GI-UKEPR-CC01-RP. June 2011. www.hse.gov.uk/newreactors/reports/step-four/final-res-plans/resolution-plan-gi-ukepr-cc-01.pdf

20 *Level 4 meeting: PCSR2 Early Submission Batch 5 - Heat Sink Summary Document, 17 July 2012*. Intervention Report. ONR-NNB GenCo-IR-12-156. ONR. July 2012. TRIM 2012/296241.

21 *Response to ONR comments on PCSR2 Early Submissions (Batch Documents) to support Nuclear Site Licence (NSL) granting for Hinkley Point C (HPC)*. ONR-HPC-20253N. NNB GenCo. July 2012. TRIM 2012/296050.

Table 1

Relevant Safety Assessment Principles considered during the assessment

SAP No.	SAP Title	Description
ECS.1	Engineering principles: safety classification and standards Safety categorisation	The safety functions to be delivered within the facility, both during normal operation and in the event of a fault or accident, should be categorised based on their significance with regard to safety.
ECS.2	Engineering principles: safety classification and standards Safety classification of structures, systems and components	Structures, systems and components that have to deliver safety functions should be identified and classified on the basis of those functions and their significance with regard to safety.
ECS.3	Engineering principles: safety classification and standards Standards	Structures, systems and components that are important to safety should be designed, manufactured, constructed, installed, commissioned, quality assured, maintained, tested and inspected to the appropriate standards.
ECS.4	Engineering principles: safety classification and standards Codes and standards	For structures, systems and components that are important to safety, for which there are no appropriate established codes or standards, an approach derived from existing codes or standards for similar equipment, in applications with similar safety significance, may be applied.
ECS.5	Engineering principles: safety classification and standards Use of experience, tests or analysis	In the absence of applicable or relevant codes and standards, the results of experience, tests, analysis, or a combination thereof, should be applied to demonstrate that the item will perform its safety function(s) to a level commensurate with its classification.
FA.14	Fault analysis: PSA – Use of PSA	PSA should be used to inform the design process and help ensure the safe operation of the site and its facilities.

Table 2

Interventions carried out related to the safety categorisation and classification topic

Date	Topic	Intervention report TRIM reference
13 March 2012	Safety categorisation and classification keep-in-touch meeting	2012/134200
24 May 2012	GDA EPR Classification CC01 L4 progress meeting	N/A – see related letters EPR 70421N (2012/224913) and EPR 70422R (2012/259235)
24 May 2012	Level 4 meeting – safety classification meeting	2012/252918
5 July 2012	Safety categorisation and classification intervention	2012/293621
26 July 2012	GDA EPR Classification CC01 L4 progress meeting	2012/302689

Table 3

Outstanding safety categorisation and classification actions as of July 2012[2]

Action ID	Action	Status
1353-EDF	NNB GenCo to review the Architect Engineer Classification Training Material	ONGOING – NNB GenCo has arranged to carry out this activity. Progress is considered adequate for licensing.
1401-EDF	NNB GenCo to revise the surveillance plan for de-risking the turbine hall contract to provide evidence of explicit consideration of safety classification. Future de-risking surveillance plans should also explicitly highlight classification input.	ONGOING – This is ongoing and will be examined further during permissioning. Progress is considered adequate for licensing.

[2] Actions tracked via TRIM 2010/613203.

Table 4

Comments on early batch submissions

Batch/Comment	Comment	NNB GenCo response	Status for licensing[3]
Batch 5			
1	Whereas a new safety classification system is being developed, in order to address a GDA issue, and the report states that a new version of the report will be provided at PCSR3, prior to construction, that will incorporate this, the overall basis of the classification is not clear. For example, a number of the systems are claimed to be not safety classified, or have a low safety classification, but there is no discussion on the basis of these claims. Furthermore, it is not clear whether the new classification approach will change any of the conclusions in this report or the	The UK-EPR Safety Classification methodology for SSCs is based on three steps: • Identification of the Safety Functions, and categorisation of said safety functions based on the relative significance to nuclear safety (Cat A, B or C). In this context, "significance to nuclear safety" means the importance to delivering one or more of the 3 fundamental safety functions (criticality; cooling; containment). • Identification of the systems (or groups of systems) which deliver these functions, and classifying them, based on their importance to delivering the function. (Class 1, 2 or 3). See figure below: • The final step is to apply the classification to the system, and break it down into the component parts, such that individual components are classified. Note, if a system is class 1, not all of the components may be important to delivering the class 1 requirements of the system. Some components may play no role at all and failure would not impair the system. Therefore, they may be classified at a lower class (see diagram below).	CLOSED – NNB GenCo's response when taken with sampling the derisking activities is considered adequate for licensing.

[3] Comments raised for licensing will be considered during the development of the safety categorisation and classification permissioning strategy.

Table 4

Comments on early batch submissions

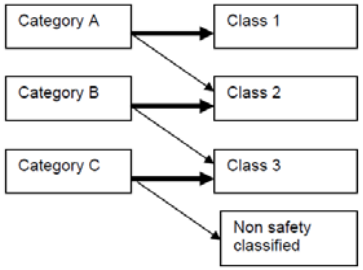
Batch/Comment	Comment	NNB GenCo response	Status for licensing[3]
	design of the heat sink. I don't believe this to be a major issue, but NNB GenCo should make the implications of this change clear.	The figure below presents a simplified illustration of the relationship between categories and classes.  GDA will not provide a complete list of categorised functions or classified systems. The main safety systems on the nuclear island (i.e. those covered in GDA) will be classified, but a lot of the site-specific SSCs will not be. The AE have developed a process to implement the classification methodology to HPC. This process is governed by CNEN/SNE and the AE/NNB Classification Working group. The aim is to deliver a complete list of categorised functions and classified systems by the end of 2013. In the interim, we will need to review and place contracts (or review design deliverables) for SSCs which will not be formally classified in the UK-EPR context. For these situations, a separate workstream of "de-risking" is being carried out. This de-risking activity is not to decide the final classification of the SSCs, it is to identify the highest classification that the SSC could have. This ensures that the FA3 classification is not simply assumed and also that a	

Table 4

Comments on early batch submissions

Batch/Comment	Comment	NNB GenCo response	Status for licensing[3]
		supplier is not selected who (if the class is upgraded) does not have the capability to design to such a standard. The de-risking activities must be completed before signing of contract.	