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Office for Nuclear Regulation

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Civil Nuclear Reactors Programme

**NNB GenCo: Hinkley Point C Pre-Construction Safety Report 2012 – Assessment
Report for Work Stream C08 Plant Operations**

Assessment Report: ONR-CNRP-AR-13-102
Revision 2
31 December 2013

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EXECUTIVE SUMMARY

Title

NNB GenCo: Hinkley Point C Pre-Construction Safety Report 2012 (HPC PCSR 2012) - Assessment Report (AR) for NNB Work Stream C08 Plant Operations.

Background

This assessment report reviews that portion of the HPC PCSR 2012 that falls within the scope of Work Stream C08 Plant Operations. The assessment has focused on HPC PCSR 2012 Chapter 18, human machine interface, normal operations and abnormal operations, sub-Chapter 6.4, habitability of the control room, and sub-Chapter 12.5, post-accident accessibility.

A final version of the Generic Design Assessment (GDA) Pre-Construction Safety Report (PCSR) issued in November 2012 formed the basis for issue by ONR on 13 December 2012 of a Design Acceptance Confirmation (DAC) for the UK EPR design. The GDA PCSR addressed only the key elements of the design of a single UK EPR unit (the generic features associated with “the nuclear island”) and excluded ancillary installations that a potential purchaser of the design could choose after taking the site location into account.

In contrast HPC PCSR 2012 addresses the whole Hinkley Point C licensed site comprising the proposed twin UK EPR units and all ancillary installations. As the generic features were addressed in the GDA process, assessment has been concentrated on site-specific documentation that has not been formally assessed by ONR previously. The remaining, generic documentation has been copied into PCSR 2012 from an earlier March 2011 GDA PCSR but this has now been superseded by the November 2012 GDA PCSR report. The generic documentation has only been revisited if recent developments have materially affected the case being made.

This AR has been written to support a Project Assessment Report (PAR) that provides ONR with confidence that HPC PCSR 2012 demonstrates suitable progress towards meeting ONR’s requirement for an adequate Pre-Construction Safety Report. It is important to note that HPC PCSR 2012 alone is not sufficient to inform a future ONR decision on whether to permission construction of Hinkley Point C and NNB GenCo intends to submit other supporting documentation. Note also that HPC PCSR 2012 will be superseded by a further site-specific revision (working title HPC PCSR 3) intended to meet the ONR PCSR requirement in full.

Assessment and Inspection work carried out by ONR

An ONR Inspector has reviewed the specified constituent sub-chapters from PCSR 2012. The Inspector has also participated in several level 4 meetings to discuss NNB GenCo’s progress on Work Stream C08 Plant Operations, the outcomes of these meetings are separately reported in other ONR reports.

This report draws together material gathered from the documentation, level 4 meetings with NNB GenCo and relevant inspections. Where appropriate, progress by NNB GenCo on addressing Assessment Findings (AF) that arose from the GDA process are discussed. The report then gives an overall judgement on the adequacy of the material presented in HPC PCSR 2012 relating to Work Stream C08 Plant Operations.

Matters arising from ONR's work

No assessment findings have been identified.

Conclusions

Within the Operations and Maintenance areas HPC PCSR 2012 provides only high level generic principles for operating and maintaining Hinkley Point C and no new material has been included for assessment. ONR accepts that the licensee's arrangements to satisfy all 36 nuclear site licence conditions do not need to be fully developed at this time. However there are areas where the development of the arrangements are required to be sufficiently developed before the start of construction, to ensure that design and procurement activities are properly informed by the operational and maintenance requirements.

Although these arrangements are not reflected within PCSR 2012, as a result of continued level 4 dialogue I have confidence that NNB has sufficient processes in place to ensure that operational and maintenance requirements will be identified and integrated into the relevant design and procurement activities.

Furthermore I consider that from the evidence presented in level 4 meetings, NNB has demonstrated it intends to develop appropriate arrangements for the LCs in these areas. PCSR 3 will be assessed to ensure that it adequately captures the development of these arrangements.

In the area of Emergency Arrangements I conclude that currently there is insufficient information to allow an assessment of the site specific emergency arrangements and hence I judge that PCSR 2012 is deficient in this respect. It is essential that, prior to the start of construction there exists a suitable and sufficient pre-construction safety justification such that the requirements of the emergency arrangements in terms of the facilities etc. and their required protection measures are sufficiently developed to be included in the design.

However from level 4 dialogue with NNB I judge that it is aware of the requirements for the development of its emergency arrangements and is actively addressing them. Hence I am confident that the NNB Pre-Operations department will be able to adequately develop its arrangements to support permissioning of the start of construction subject to continued satisfactory progress.

Recommendations

The author of the AR addressing whether HPC PCSR 2012 is adequate to satisfy ONR's requirement for a Pre-Construction Safety Report should note that that from the perspective of Work Stream C08 Plant Operations, HPC PCSR 2012 is deficient due to the absence of a site specific emergency arrangements safety justification, however there is confidence that NNB have suitable processes in place to achieve an adequate PCSR 3 for this Work Stream.

LIST OF ABBREVIATIONS

ALARP	As Low As Reasonably Practicable
AR	Assessment Report
BMS	(ONR) How2 Business Management System
CSJ	Construction Safety Justification
DAC	Design Acceptance Confirmation
GDA	Generic Design Assessment
HSE	Health and Safety Executive
HPB	Hinkley Point B Power Station
HPC	Hinkley Point C Power Station
HPC PCSR 2012	Hinkley Point C Pre-Construction Safety Report 2012
LC	Licence Condition
MCR	Main Control Room
ONR	Office for Nuclear Regulation (an agency of HSE)
PAR	Project Assessment Report
PCSR	Pre-construction Safety Report
PT	Periodic Test
RD	Responsible Designer
SAP	Safety Assessment Principle(s) (HSE)
SOA	State Orientated Approach
SSC	System, Structure and Component
TAG	Technical Assessment Guide(s) (ONR)
WENRA	Western European Nuclear Regulators Association

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1 INTRODUCTION

1.1 Background

1 This report presents the findings of the assessment of that portion of the Hinkley Point C Pre-Construction Safety Report 2012 (HPC PCSR 2012, (Ref. 1)) that falls within the scope of Work Stream C08 Plant Operations.

2 Assessment was undertaken in accordance with the requirements of the Office for Nuclear Regulation (ONR) How2 Business Management System (BMS) procedure AST/003 (Ref. 2). The ONR Safety Assessment Principles (SAP), (Ref. 3), together with supporting Technical Assessment Guides (TAGs), (Ref. 4), have been used as the basis for this assessment.

3 This Assessment report (AR) has been written to support a Project Assessment Report (PAR) that addresses whether HPC PCSR 2012 demonstrates suitable progress towards meeting ONR's requirement for an adequate Pre-Construction Safety Report.

1.2 Scope

4 The scope of this report covers Work Stream C08 Plant Operations. This assessment has reviewed the material in HPC PCSR 2012 Chapter 18, human machine interface, normal operations (including maintenance) and abnormal operations, sub-Chapter 6.4, habitability of the control room, and sub-Chapter 12.5, post-accident accessibility.

5 The Plant Operations Work Stream is a cross-cutting Work Stream which assesses the progress of the Licensee, NNB GenCo in developing suitable arrangements for compliance with the following Licence Conditions (LCs) and hence is primarily a licence compliance Work Stream:

- LC11 Emergency arrangements.
- LC22 Modification or experiment on existing plant.
- LC23 Operating rules.
- LC24 Operating instructions.
- LC26 Control and supervision of operations.
- LC27 Safety mechanisms, devices and circuits.
- LC28 Examination, inspection, maintenance and testing.
- LC29 Duty to carryout tests, inspections and examinations.
- LC30 Periodic shutdown.
- LC31 Shutdown of specified operations.

6 With the exception of LC11, these Licence Conditions are class 2 licence conditions as defined in NNB's Nuclear Site Licence Compliance Matrix (Ref 5), i.e. licensee to make and implement arrangements to support operations prior to commissioning the plant.

7 LC 11 is a class 1 licence condition and hence NNB were required to implement arrangements appropriate to the pre-construction phase of the project at the time of licensing. The adequacy of these arrangements has been assessed separately (Ref: 6) under ONR Work Stream C03 On-site construction activities.

- 8 The Plant Operations Work Stream and the assessment of the PCSR has been split into three broad themes, with the Licence Conditions being nominally assigned as indicated below noting that there is significant overlap and interaction between the LCs and themes:
- Operations - LCs 23, 24, 26, 30 and 31.
 - Maintenance - LC 22, 27, 28 and 29.
 - Emergency Arrangements, i.e. Future Operational Emergency Arrangements – LC11.
- 9 This assessment is focused broadly on the adequacy of PCSR 2012 to support:
- The development of operational standards/processes, requirements and documentation including the extent to which these are integrated in the design and procurement process where applicable.
 - The extent to which the maintenance requirements and arrangements have been developed to support compliance with LC28 and inform procurement and design.
 - The development of future operational emergency arrangements particularly those activities which are required before the start of construction.
- 10 A final version of the Generic Design Assessment (GDA) Pre-Construction Safety Report (PCSR) issued in November 2012 formed the basis for issue by ONR on 13 December 2012 of a Design Acceptance Confirmation (DAC) for the UK EPR design. The GDA PCSR addressed only the key elements of the design of a single UK EPR unit (the generic features associated with the “the nuclear island”) and excluded ancillary installations that would take account of the site location. The GDA specifically excluded site specific emergency arrangements.
- 11 In contrast HPC PCSR 2012 addresses the whole Hinkley Point C licensed site comprising the proposed twin UK EPR units and all ancillary installations. Some matters that were outside the scope of GDA PCSR are addressed in HPC PCSR 2012. As the generic features were addressed in the GDA process, attention has been concentrated in this report on site-specific documentation that has not been formally assessed by ONR previously. The remaining, generic documentation has been copied into PCSR 2012 from an earlier March 2011 GDA PCSR but this has now been superseded by the November 2012 GDA report. The generic documentation has only been revisited if recent developments have materially affected the case being made.
- 12 This AR has been written to support a Project Assessment Report (PAR) that addresses whether HPC PCSR 2012 demonstrates suitable progress towards meeting ONR’s requirement for an adequate Pre-Construction Safety Report. It is important to note that HPC PCSR 2012 alone is not sufficient to inform a future ONR decision on whether to permission construction of Hinkley Point C and NNB GenCo intends to submit other supporting documentation including Construction Safety Justifications (CSJs). Note also that HPC PCSR 2012 will be superseded by a further site-specific revision (working title HPC PCSR 3) intended to meet the ONR PCSR requirement in full.
- 1.3 Methodology**
- 13 The methodology for the assessment follows the requirements of the ONR BMS ‘produce assessments’ step in the nuclear safety permissioning process and Ref. **Error! Bookmark not defined.** in particular in relation to mechanics of assessment.
-

2 ASSESSMENT STRATEGY

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

2.1 Standards and Criteria

15 The relevant standards and criteria adopted within this assessment are principally the Safety Assessment Principles (SAP), (Ref. 2), internal ONR Technical Assessment Guides (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 have been referenced where appropriate within the assessment report. Relevant good practice, where applicable, has also been cited within the body of the assessment.

2.2 Safety Assessment Principles

16 The key SAPs which apply to this assessment are included within Chapter 6 of this report.

2.2.1 Technical Assessment Guides

17 The following Technical Assessment Guides are applicable to this assessment (Ref. 3):

- T/AST/035 - Limits and conditions for nuclear safety (operating rules).
- NS-TAST-GD-009 Rev 02 – Examination and Testing of Items Important to Safety.
- T/INS/011 – Issue 001 Site Inspection, planning and enforcement – LC 11 – Emergency Arrangements.

2.2.2 National and International Standards and Guidance

18 The following international standards and guidance are applicable to this assessment:

- Western European Nuclear Regulators' Association (WENRA) safety reference levels for existing reactors issue K Maintenance, In-Service Inspection and Functional Testing, January 2008.

2.3 Use of Technical Support Contractors

19 No technical support contractors were utilised.

2.4 Integration with other Assessment Topics

20 A significant amount of safety case assessment work relevant to the Plant Operations Work Stream themes is covered by the Human Factors and Radiological Protection Work Streams. Any applicable assessment findings from the GDA assessment in these areas will be highlighted and their interaction with the Plant Operations themes explained. Chapter 18.1 Human-Machine Interface is primarily assessed in the B16 Human Factors Work Stream however where this material informs any of this Work Streams themes specific comment will be made.

2.5 Out-of-scope Items

21 The following items are outside the scope of the assessment:

- Detailed technical assessment of the operability and maintenance requirements of individual systems.

- Operational Chemistry Control which is assessed in Work Stream B13 Reactor Chemistry.
- Human Factors considerations which are assessed in Work Stream B16 Human Factors.
- Emergency Arrangements during the construction phase which is assessed in Work Stream C03 On-site construction activities.

3 LICENSEE'S SAFETY CASE

3.1 HPC PCSR 2012 Material Assessed

22 The three themes of this assessment were informed by the following sections of PCSR 2012.

3.1.1 Operations

- Chapter 18.2 Section 1 Principles of Normal Operation.
- Chapter 18.2 Section 2 Normal Operating Procedures.
- Chapter 18.2 Section 3 Design and Operating Limits and Conditions.
- Chapter 18.3 Sections 1 – 3 Abnormal Operation.
- Chapter 18.1 Section 8 Procedure Development.

3.1.2 Maintenance

- Chapter 18.2 Section 4 Periodic Testing.
- Chapter 18.2 Section 5 In-Service Inspection and Maintenance.

3.1.3 Emergency Arrangements:

- Chapter 18.3 Section 4 Emergency Preparedness.
- Chapter 12.5 Post Accident Accessibility.
- Chapter 6.4 Habitability of the Control Room.

3.2 Review of Changes from GDA PCSR in PCSR 2012

3.2.1 Operations

3.2.1.1 Chapter 18.2 Section 1 Principles of Normal Operation

23 This Chapter sets out high level principles for operations, the detailed assessment of which predominantly lies in the applicable specialist safety case areas. However I note:

- There has been no change in the information submitted in the GDA PCSR.

3.2.1.2 Chapter 18.2 Section 2 Normal Operating Procedures

24 This Chapter sets high level principles which a licensee should follow when developing its operating procedures and is supplemented by information in Chapter 18.1. I note:

- There has been no change in the information submitted in the GDA PCSR or the supporting information in Chapter 18.1 which presents the human factors case for procedure development.
- The existence of the following GDA assessment finding AF-UKEPR-HF-48 "The licensee shall justify the design of procedures for application on the EPR".

3.2.1.3 Chapter 18.2 Section 3 Design and Operating Limits and Conditions

25 This Chapter sets out high level generic principles which are used as a basis for defining the operating rules. I note:

- There has been no change in the information submitted in the GDA PCSR which has been previously assessed during GDA.

3.2.1.4 Chapter 18.3 Sections 1 – 3 Abnormal Operation

26 This chapter details the state orientated approach to emergency operation. I note:

- There has been no change in the information submitted in the GDA PCSR in this section.
- The existence of the GDA assessment finding AF-UKEPR-HR-48 “The Licensee shall substantiate that the State Orientated Approach (SOA) procedures ensure that claimed safety actions are reliably completed within the timescales required by the safety case”.
- The existence of the following GDA assessment finding AF-UKEPR-HF-48 “The licensee shall justify the design of procedures for application on the EPR”.

3.2.2 Maintenance**3.2.2.1 Chapter 18.2 Section 4 Periodic Testing (PT)**

27 This Chapter describes high level principles which a licensee should follow when developing its periodic test programme and covers the following main topics:

- General Principles for PT Production.
- General Process for PT Production.
- Rules and Requirements for PT.
- GDA/Licensee Documentation Boundary.

28 There has been no change in the information submitted in the GDA PCSR in this section.

3.2.2.2 Chapter 18.2 Section 5 In-Service Inspection and Maintenance

29 This Chapter describes the high level principles which a licensee should follow when developing its Maintenance Programme

30 I note here has been no change in the information submitted in the GDA PCSR in this section.

3.2.3 Emergency Arrangements**3.2.3.1 Chapter 18.3 Section 4 Emergency Preparedness**

31 Site specific emergency arrangements were excluded from GDA and hence the GDA PCSR submission included only high level generic arrangements. This section sets out the general regulatory framework and cross references applicable SAPs and WENRA reference levels. In addition it defines the main broad requirements of any sites emergency organisation. There has been no change in sub-Chapter in PCSR 2012 and hence no site specific information has been provided.

3.2.3.2 Chapter 12.5 Post Accident Accessibility

32 This Chapter is primarily addressed in the B14 Radiation Protection Work Stream, however I note:

- There has been no change in the information submitted and previously assessed in GDA PCSR.

- The existence of the GDA assessment finding AF-UKEPR-RP-17: “The licensee shall provide a safety case to identify access requirements to specific components/pieces of equipment that will require maintenance and repair during the post-accident phase, and to identify potential doses to workers carrying out those maintenance / repair activities and to demonstrate that they are ALARP. This shall be completed before fuel on-site”.

3.2.3.3 Chapter 6.4 Habitability of the Control Room

33 This Chapter is primarily addressed in the B14 Radiation Protection Work Stream however I note:

- There has been no change in the information submitted and previously assessed in the GDA PCSR.
- The existence of the GDA assessment finding AF-UKEPR-RP-16 “The licensee shall provide an ALARP justification for occupancy of the main control room immediately post accident if the ventilation system has failed. This shall be completed before fuel on-site”.

3.2.3.4 Emergency Preparedness – Additional Considerations

34 Site specific emergency arrangements are not detailed within PCSR 2012, this means that there is no evidence of consideration of site specific emergency arrangements against the Weightman Interim (Ref. 7) and Final Report (Ref. 8) recommendations within PCSR 2012.

4 ONR ASSESSMENT

35 This assessment has been carried out in accordance with ONR HOW2 BMS policy (Ref. **Error! Bookmark not defined.**).

4.1 Scope of Assessment Undertaken

36 The scope of the assessment is as stated in section 1.2.

4.2 Assessment

4.2.1 Operations and Maintenance

37 The adequacy of the relevant safety case information covering the maintenance and operations theme has previously been assessed during the GDA process and no new information has been presented in HPC PCSR 2012

38 In the areas of operations and maintenance, NNB GenCo is not currently required to develop detailed arrangements for compliance with the associated Group 2 LCs. Hence I am satisfied that the high level generic principles within HPC PCSR 2012 are generally acceptable and I understand that at the time of its publication, NNB GenCo would have had nothing to add to the information provided in GDA. However, there are areas where ONR expects Plant Operations to be engaged via it's arrangements to ensure that operability and maintainability requirements are informing the early design and procurement activities.

39 Areas of interest to ONR include:

- Inclusion of operations requirements in design and procurement activities such as isolation standards and component locking requirements.
- Plant Preservation and Maintenance during construction arrangements.
- General operability requirements/learning from experience.
- Adequacy of the development of the compliance arrangements for Licence Conditions.

40 As such during ongoing level 4 dialogue it has been established that in the operations area NNB has:

- Made good progress with the development of their arrangements for compliance with LCs 23 and 24 (Ref. 9).
- Demonstrated that there appear to be no fundamental reasons why the state orientated approach would be unacceptable to ONR (Ref. 10).
- Engaged with the responsible designer to ensure that UK specific learning and good practice are being included in the design (Ref. 11).
- Developed a robust operational documentation production strategy (Ref. **Error! Bookmark not defined.**).
- Developed an Operations Execution Plan which aims to ensure that the Plant Operations requirements are effectively integrated into the wider project schedule and regularly reviewed (Ref. **Error! Bookmark not defined.**).
- Reviewed and approved Engineering Guidelines for use by the responsible designer (RD) to ensure that the RD uses these standards to standardise their approach to the design and procurement of equipment with regards to

considerations such as piping colour standards, isolation standards etc... (Ref. **Error! Bookmark not defined.**).

41 Within the maintenance area ONR has carried out a review of the high level principles within HPC PCSR 2012 (Ref. 12) which will be used to further inform ongoing level 4 dialogue. The key conclusion from this review being that the high level generic principles appeared to be generally in line with ONR SAPs and relevant good practice as a basis for the development of NNB's compliance arrangements within the maintenance area. In addition during ongoing level 4 dialogue ONR have observed that:

- NNB has actively engaged with ONR to discuss the development of their arrangements in this area and ONR conclude that the progress is satisfactory (Ref. **Error! Bookmark not defined.**).
- NNB has developed a high level maintenance strategy document which is in the process of being further developed to provide greater clarity on it's compliance arrangements for LC28 (Ref. **Error! Bookmark not defined.**).
- NNB has recognised the need to develop arrangements for plant preservation and maintenance during construction and have commenced the development of these arrangements to ensure they are in place prior to the start of construction (Ref. **Error! Bookmark not defined.**).

42 This dialogue in both the operations and maintenance areas has given ONR confidence that NNB GenCo Pre-Operations is addressing early requirements within these areas which are required to be in place before the start of construction and are appropriately developing their compliance arrangements for the associated Licence Conditions.

4.2.2 Emergency Preparedness

43 I consider that that high level information provided detailing the generic approach to developing an emergency plan is broadly in line with ONR guidance and expectations. However given the lack of any information detailing the site specific emergency arrangements ONR is unable to assess their adequacy

44 I judge that I am unable to assess whether the Weightman Interim and Final report recommendations have been properly considered in the area of emergency arrangements.

45 Noting the requirements of the Weightman Final Report recommendation FR-3, "Structures, systems and components needed for managing and controlling actions in response to an accident including plant control rooms...should be capable of operating in the conditions, and for the duration, for which they could be needed, including possible severe accident conditions". I consider that NNB need to consider the potential effects of a release from Hinkley Point B (HPB) concurrent with the loss of Main Control Room (MCR) ventilation as detailed in GDA assessment finding AF-UKEPR-RP-16 "The licensee shall provide an ALARP justification for occupancy of the main control room (MCR) immediately post accident if the ventilation system has failed. This shall be completed before fuel on-site".

46 With regards to GDA assessment AF-UKEPR-RP-16 described above and GDA assessment finding AF-UKEPR-RP-17: "The licensee shall provide a safety case to identify access requirements to specific components/pieces of equipment that will require maintenance and repair during the post-accident phase, and to identify potential doses to workers carrying out those maintenance / repair activities and to demonstrate that they are ALARP. This shall be

completed before fuel on-site". I consider that both of these GDA findings should be developed proportionately to enable an assessment to be made prior to start of construction on whether there is any potential for them to require significant design changes.

47 The fact that HPC PCSR 2012 does not provide the required justification to support construction of the emergency facilities is recognised by NNB who have taken steps to address this.

48 During ongoing level 4 dialogue I note that NNB has:

- Developed a robust strategy which demonstrates how the various elements which contribute to an overall safety justification will be identified in a structured and systematic way and integrated to provide a comprehensive safety justification for the facilities and arrangements for responding to emergencies, "Strategy for the production of NNB emergency arrangements design philosophy" (Ref. 13).
- Committed to scheduling the various activities within this strategy to ensure that these are integrated within project milestones to ensure that sufficient discussion and agreement with ONR, is achieved before any project milestones which may limit design changes are passed as recorded in my intervention report dated 15 October 2013 (Ref 14).
- Recognised the requirement to produce of an overarching summary document, demonstrating how each of the Weightman recommendations within the emergency preparedness area have been addressed (Ref. 15).

49 Overall while there is definitive lack of information within PCSR 2012 itself on emergency arrangements there is very good engagement by the NNB Pre-Operations group with ONR, and they have made significant progress in developing their arrangements.

50 I note however that until sufficient information on the design of the emergency arrangements and the facilities to support them is available, ONR will be unable to make an effective judgement on their acceptability. This means that there remains a risk that in these areas changes to the design may yet be required should NNB not be able to provide an adequate safety justification (Ref. **Error! Bookmark not defined.**).

4.3 Comparison with Standards, Guidance and Relevant Good Practice

51 Given that the information detailed in HPC PCSR 2012 refers to generic high level principles and has previously been presented I am satisfied that no new assessment is appropriate.

5 CONCLUSIONS AND RECOMENDATIONS

5.1 Conclusions

5.1.1 Operations and Maintenance

52 HPC PCSR 2012 provides only high level generic principles for operating and maintaining Hinkley Point C and no additional safety documentation was included for assessment. I recognise that the applicable LCs (Operations – LCs 23, 24, 26, 30 and 31, Maintenance - LCs 22, 27, 28 and 29), have been categorised by NNB as being class 2 licence conditions and hence are not required to be fully developed at this time. However there are areas where the development of the arrangements are required to be sufficiently developed before the start of construction to ensure that design and procurement activities are properly informed by the operational and maintenance requirements.

53 Although these arrangements are not reflected within HPC PCSR 2012, as a result of continued level 4 dialogue I have confidence that NNB has sufficient processes in place to ensure that operational and maintenance requirements will be identified and integrated into the relevant design and procurement activities.

54 Furthermore I consider that from the evidence presented in level 4 meetings NNB has demonstrated that it is appropriately developing compliance arrangements for the LCs in these areas. It is anticipated that PCSR 3 will adequately capture the development of these arrangements.

5.1.2 Emergency Arrangements

55 I conclude that currently there is insufficient information to allow an assessment of the site specific emergency arrangements and hence I judge that HPC PCSR 2012 is currently deficient in this respect. It is essential that prior to the start of construction there exists a suitable and sufficient pre-construction safety case such that the requirements for the emergency arrangements in terms of their facilities etc... and their required protection measures are clear.

56 However I conclude that during ongoing level 4 dialogue NNB have demonstrated that they are aware of the requirements for the development of their emergency arrangements and are actively addressing them. Hence I am confident that the NNB Pre-Operations department will be able to adequately develop their arrangements to support permissioning of the start of construction subject to continued satisfactory progress.

5.2 Recommendations

57 ONR will continue its dialogue with NNB GenCo Pre-Operations with the aim of ensuring that:

- Operations and maintenance requirements are informing the design and procurement specifications and that these processes are represented in PCSR 3.
- PCSR 3 is revised to reflect the development of the operations and maintenance arrangements specific to HPC.
- The documented arrangements for the maintenance and preservation of plant during construction are developed and in place prior to the start of construction.

- PCSR 3 includes site specific details of the emergency arrangements including details of the proposed facilities and their resilience features at a level of detail which supports consent for start of construction of the Nuclear Island.
- CSJ-01 demonstrates that adequate consideration has been given to the Emergency Arrangements design philosophy, in order to support consent to pass the First Nuclear Safety Concrete Hold Point either directly or by referencing suitable supporting documentation.

6 TABLE 1 – RELEVANT SAFETY ASSESSMENT PRINCIPLES CONSIDERED DURING THE ASSESSMENT

SAP No.	SAP Title	Description
AM.1	Accident management and emergency preparedness	A nuclear facility shall be so designed so that it meets the needs of accident management and emergency preparedness.
EMT.1	Engineering principles: maintenance, inspection and testing: Identification of requirements	Safety requirements for in-service testing, inspection and other maintenance procedures and frequencies should be identified in the safety case
EMT.2	Engineering principles: maintenance, inspection and testing: Frequency	Structures, systems and components important to safety should receive regular and systematic examination, inspection maintenance and testing
EMT.4	Engineering principles: maintenance, inspection and testing: Validity of equipment qualification	The validity of equipment qualification for structures, systems and components important to safety should not be unacceptably degraded by any modification or by carrying out of any maintenance, inspection or testing activity
EMT.5	Engineering principles: maintenance, inspection and testing: Procedures	Commissioning and in-service inspection and test procedures should be adopted that ensure initial and continuing quality and reliability
EMT.6	Engineering principles: maintenance, inspection and testing: Reliability claims	Provision should be made for testing, maintaining, monitoring and inspecting structures, systems and components
EMT.7	Engineering principles: maintenance, inspection and testing: Functional testing	In-service functional testing of systems, structures and components important to safety should prove the complete system and the safety related function of each component.
EMT.8	Engineering principles: maintenance, inspection and testing: Effect of internal/external events	Structures, systems and components important to safety should be inspected and/or re-validated after any internal or external event that might have challenged their design basis
EAD.2	Engineering principles: ageing and degradation Lifetime margins	Adequate margins should exist throughout the life of a facility to allow for the effects of materials ageing and degradation processes on structures, systems and components that are important to safety.
FP.7	Emergency Preparedness and response	Arrangements must be made for emergency preparedness and response in case of nuclear or radiation incidents.
RP.2	Accident Conditions	Adequate protection against exposure to radiation and radioactive contamination in accident conditions, should they occur, should be provided in those parts of the facility to which access needs to be gained. This should include prevention or mitigation of accident consequences.

7 REFERENCES

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