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ASSESSMENT REPORT

Civil Nuclear Reactors Programme

NNB GenCo: Hinkley Point C Pre-Construction Safety Report 2012 – Assessment Report for Severe Accident Work Stream (B20)

Assessment Report: ONR-CNRP-AR-13-089

Revision 0

Version 2

17 March 2014

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EXECUTIVE SUMMARY

This assessment report (AR) reviews that portion of the Hinkley Point C Pre-Construction Safety Report 2012 (HPC PCSR2012) that falls within the scope of Severe Accident Work Stream. Most of this material lies in HPC PCSR2012 Chapter 16, but other material found in Chapter 6 has also been reviewed together with a supporting document addressing NNB GenCo's response to the accident at Fukushima.

The assessment has been carried out to inform my judgements on the adequacy of the safety case in the severe accident area in respect of Licence Condition 23 (Operating Rules).

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 on "the nuclear island") and excluded ancillary installations that a potential purchaser of the design could choose after taking the site location into account. Certain matters were also deemed to be outside the scope of the GDA PCSR.

In contrast HPC PCSR2012 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 also addressed in HPC PCSR2012. As the generic features were addressed in the GDA process, my focus is on site-specific documentation that has not been formally assessed by ONR previously. The remaining, generic documentation has been copied into HPC PCSR2012 from an earlier March 2011 Consolidated GDA PCSR but this has now been superseded by the November 2012 GDA PCSR report.

It is important to note that HPC PCSR2012 alone is not sufficient to inform a future ONR decision on whether to permission construction of Hinkley Point C. NNB GenCo intends to submit a major revision to HPC PCSR2012 before seeking consent for nuclear island construction which will fully integrate the final GDA PCSR and will be supported by other documentation

In respect of the Severe Accident Work Stream the information presented in HPC PCSR2012 is essentially unchanged from that presented in the Consolidated GDA PCSR in March 2011. Consequently, the assessment of the severe accidents analysis aspects is unchanged from the position reported in the GDA step 4 report for this topic.

Forward work activities are included within HPC PCSR2012. My overall view of the activities identified in relation to the Severe Accident Work Stream is that they appear reasonable. However, I note that they are at a relatively high level and that further detail will be required in due course. This will be progressed through ongoing routine level 4 meetings.

In terms of site specific severe accident analysis I note that the forward work activities include a confirmatory assessment to ensure that the analysis presented in the Consolidated GDA PCSR is adequate for application to HPC, or to specify what additional site specific analysis is required. I also note that the overall risk of a twin-reactor site will be addressed and that the existing GDA severe accident analysis will be reviewed to consider the site specific input parameters for HPC. Completion of this work is important in terms of developing the HPC safety case.

Whilst in general good progress has been made in developing appropriate resolution plans for GDA assessment findings (AF) the draft resolution plan for one assessment finding (AF-UKEPR-CSA-25) required before nuclear island safety related concrete has not yet reached a satisfactory

position. In my view the draft resolution plan for this finding does not give appropriate consideration to the installation of filtered containment ventilation at Hinkley Point C. I have raised this with NNB GenCo and discussions are ongoing to ensure that an adequate safety case for containment pressure control in a beyond design basis severe accident is provided. This issue will need to have been resolved on a timescale compatible with nuclear island safety related concrete.

Although no new information is presented in HPC PCSR2012 in the severe accident area I am generally content that an adequate level of progress is being made in developing the safety case and responding to GDA findings. As noted above, the exception to this is NNB GenCo's response to AF-UKEPR-CSA-25 which in my view does not give appropriate consideration to the installation of filtered containment ventilation at Hinkley Point C. On the basis that this is a significant issue that has yet to be resolved I consider that an Integrated Intervention Strategy (IIS) rating of 4, i.e. "Below Standard", is appropriate.

No new issues or recommendations have arisen from my assessment of PCSR2012.

LIST OF ABBREVIATIONS

AF	Assessment Finding
AR	Assessment Report
BMS	(ONR) How2 Business Management System
CHRS	Containment Heat Removal System
DAC	Design Acceptance Confirmation
ENSREG	European Nuclear Regulators Group
EOP	Emergency Operating Procedures
GDA	Generic Design Assessment
GDAF	Generic Design Assessment Finding
HSE	Health and Safety Executive
Hinkley Point C	HPC
HPC PCSR2012	Hinkley Point C Pre-Construction Safety Report 2012
IIS	Integrated Intervention Strategy
LC	Licence Condition
ONR	Office for Nuclear Regulation (an agency of HSE)
OSSA	Operational Strategy for Severe Accidents
OTS	Operating Technical Specifications
PCSR	Pre-construction Safety Report
RMI	Reflective Metallic Insulation
SAP	Safety Assessment Principle(s) (HSE)
SSC	System, Structure and Component
TAG	Technical Assessment Guide(s) (ONR)

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Table 1: Relevant Safety Assessment Principles Considered During the Assessment

1 INTRODUCTION

1.1 Background

1 This report presents the findings of my assessment of that portion of the Hinkley Point C Pre-Construction Safety Report 2012 (HPC PCSR2012, Ref.1) that falls within the scope of the Severe Accident Work Stream (B20).

2 This Assessment Report (AR) has been written to support a Summary Assessment Report that addresses whether HPC PCSR2012 demonstrates suitable progress towards meeting ONR's requirement for an adequate Pre-Construction Safety Report.

1.2 Scope

3 The scope of this report covers the Severe Accident Work Stream (B20). Most of this material lies in HPC PCSR2012 Chapter 16 (Risk Reduction and Severe Accident Analysis) but other material found in Chapter 6 (Containment and Safeguard Systems), and in a supporting document addressing NNB GenCo's response to the accident at Fukushima (Ref. 5), has also been reviewed.

4 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 on "the nuclear island") and excluded ancillary installations that a potential purchaser of the design could choose after taking the site location into account. Certain matters were also deemed to be outside the scope of the GDA PCSR.

5 In contrast HPC PCSR2012 addresses the whole Hinkley Point C (HPC) licensed site comprising the proposed twin UK EPR units and all ancillary installations. Some matters that were outside the scope of the GDA PCSR are addressed in HPC PCSR2012. As the generic features were addressed in the GDA process, attention has been concentrated here on site-specific documentation that has not been formally assessed by ONR previously. The remaining, generic documentation has been copied into HPC PCSR2012 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.

6 It is important to note that HPC PCSR2012 alone is not sufficient to inform a future ONR decision on whether to permission construction of HPC and NNB GenCo intends to submit other supporting documentation. Note also that HPC PCSR2012 will be superseded by a further site-specific revision intended to fully reflect the final GDA PCSR and other design changes from Flamanville 3 which is the reference design for HPC.

7 It should also be noted that the approach to safety function categorisation and safety system classification agreed during GDA is not fully reflected in HPC PCSR2012 which largely uses the approach employed on Flamanville 3. The integration of the methodology agreed during GDA will be demonstrated in the next revision of HPC PCSR. Consequently I have not given any further consideration to safety function categorisation and safety system classification in my assessment.

8 As part of my assessment I have also reviewed the progress being made by NNB GenCo in addressing the assessment findings raised during GDA in the containment and severe accident area.

1.3 Methodology

- 9 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

10 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

11 The standards and criteria that may be relevant to this assessment are principally the Safety Assessment Principles (SAP), Ref. 3, internal ONR Technical Assessment Guides (TAG), Ref. 4, 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

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

2.2.1 Technical Assessment Guides

13 There is currently no severe accident analysis Technical Assessment Guide.

2.2.2 National and International Standards and Guidance

14 No national or international standards and guidance have been used directly in support of this assessment.

2.3 Use of Technical Support Contractors

15 No Technical Support Contractors have been used in support of this assessment.

2.4 Integration with other Assessment Topics

16 The key interfaces are with the fault studies and chemistry topic areas although there is no specific impact on my assessment. The fault studies and chemistry topic areas are the subject of separate ONR assessment reports.

2.5 Out-of-scope Items

17 The scope of my assessment is identified in Sections 1.2 and 3.1. I have not excluded anything relevant to the Severe Accident Work Stream from this assessment.

3 LICENSEE'S SAFETY CASE

3.1 HPC PCSR2012 Material Assessed

- 18 The majority of material relating to the Severe Accident Work Stream lies in Chapter 16 (Risk Reduction and Severe Accident Analysis) of HPC PCSR2012. NNB GenCo's safety case, as presented in Chapter 16, has already been described in the relevant Step 4 GDA report (Ref. 6) and is not repeated here.
- 19 I have also considered material presented in Chapter 6 (Containment and Safeguard Systems) of HPC PCSR2012 so far as it relates to the Severe Accident Work Stream.
- 20 In addition I have reviewed a supporting document to HPC PCSR2012 which summarises NNB GenCo's response to the accident at Fukushima (Ref. 5). I have considered this document in my assessment in part because it relates to the severe accident topic area but also because I have a co-ordinating role in terms of ensuring that NNB GenCo responds appropriately to the lessons learnt from the accident at Fukushima and in particular to the Interim and Final Recommendations raised by the Chief Inspector (Ref. 7).
- 21 Ref. 5 is a summary document and does not contain any information that has not already been presented to ONR in response to either the ENSREG stress tests; the Chief Inspector's Recommendations; or the GDA cross-cutting issue relating to the accident at Fukushima (GI-UKEPR-CC-03). As ONR has already described this information in Ref. 8, 9 and 10 respectively, it is not repeated here.

4 ONR ASSESSMENT

4.1 Scope of Assessment Undertaken

22 The scope of the assessment is detailed within Sections 1.2 and 3.1. The assessment below is reported under three headings:

- Chapter 16 – Risk Reduction and Severe Accident Analysis
- Chapter 6 – Containment and Safeguard Systems
- Supporting Reference (Ref. 5) on Response to Fukushima.

4.2 Assessment

4.2.1 Assessment of Chapter 16 – Risk Reduction and Severe Accident Analysis

23 Section 16 of the Head Document (Ref. 11) provides a summary of Chapter 16 of the HPC PCSR2012. In this summary NNB GenCo states that the Chapter 16 sub-chapters are the same as that of the Consolidated GDA PCSR 2011. I have compared the documents provided (Ref. 12 to 18) against the list of documents (Ref. 19) that formed the Consolidated GDA PCSR 2011 and confirmed that they are the same. As there is no new material, I have not assessed Chapter 16 of the HPC PCSR2012. Consequently, the assessment of the severe accident analysis aspects of Chapter 16 is unchanged from the position reported in the GDA Step 4 report (Ref. 6) for this topic.

24 Note, the list of HPC PCSR2012 documents provided under Ref. 1 incorrectly identifies sub-chapter 16.1 (Ref. 12) as being at issue 3. The document actually provided is at issue 6 which is consistent with that provided as part of the Consolidated GDA PCSR 2011. I have confirmed this with NNB GenCo (Ref. 20).

Forward Work Activities

25 The forward work activities required to develop the safety case have been identified by NNB GenCo in Section 16 of the Forward Work Activities document (Ref. 21) and Section 16 of the Head document (Ref. 11). Essentially forward work activities fall into the following areas:

- GDA Findings (GDAF)
- Site specific severe accident analysis.
- GDA out-of scope items
- Fukushima recommendations.

26 With respect to GDAF's the Forward Work Activities document correctly identifies those findings required to be addressed prior to nuclear island safety related concrete. Clearly resolution of these findings has priority in terms of timescales; however, I note that all GDA findings will need to be resolved. Progress on the severe accident GDAF's findings is discussed below.

27 In terms of site specific severe accident analysis the Forward Work Activities document reports that a confirmatory assessment will be completed to ensure that the analysis presented in the Consolidated GDA PCSR 2011 is adequate for application to HPC, or to specify what additional site specific analysis is required. It is also confirmed that this will include any design changes introduced in GDA or through site specific detailed design work and will address the overall risk of a twin-reactor site. I also note that the existing

GDA severe accident analysis will be reviewed to consider the site specific input parameters for HPC, for example, heat sink temperature and core design. Whilst this appears appropriate I note that the activities are only identified at a very high level.

28 On a specific point, HPC PCSR2012 reports that the HPC ultimate cooling system (heat sink) will include a degree of diversification by enabling water to be drawn from the main basin of the discharge pond in the event of loss of the normal heat sink. I will expect the planned revision to PCSR2012 to justify that this provides adequate diversity from a severe accident perspective.

29 The Forward Work Activities document also identifies the following as being out of the scope of GDA and confirms that they will be developed during the site specific phase for HPC:

- Operating Technical Specifications (OTS)
- Emergency Operating Procedures (EOP)
- Operational Strategy for Severe Accidents (OSSA) management
- Site-specific radiological consequences.

I note that these items are significant pieces of work, however I currently have no visibility of the plans for completing this work. Noting that the work has been identified in the Forward Work Activities document I will progress this lack of visibility through the ongoing routine level 4 meetings with NNB GenCo.

30 With respect to Fukushima recommendations the Forward Work Activities document states that the resilience enhancements identified in the report “NNB GenCo Response to the March 2011 Accident at Fukushima” (Ref. 5) does not identify any potential enhancements directly related to Chapter 16. Whilst I do not agree with this statement (for example a study into the provision of further systems to control containment over-pressure in an accident is identified in Ref. 5), I note that appropriate activities are identified in Ref. 5.

31 My overall view of the Forward Activities identified in relation to the Severe Accident Work Stream is that they appear reasonable. However, I note that they are at a relatively high level and that further detail will be required in due course. This will be progressed through ongoing routine level 4 meetings.

Progress on Containment and Severe Accident GDA Assessment Findings

32 The GDA step 4 report identified 26 GDAF's to be addressed as part of normal regulatory business before various milestones are reached. The first of these milestones is defined as nuclear island safety related concrete. Within the GDA Step 4 report 14 assessment findings are identified as needing to be addressed before this milestone. NNB GenCo has given priority to developing resolution plans to address these findings. Draft resolution plans for most of these findings have been discussed at level 4 meetings with the NNB GenCo and, although at a high level, in my view generally provide reasonable plans for addressing the GDAF's. Clearly resolution of the GDAF's will depend upon the outcome of the work outlined in the resolution plans.

33 Whilst in general good progress has been made in developing appropriate resolution plans for GDAF's, the draft resolution plan for one assessment finding required before nuclear island safety related concrete has not yet reached a satisfactory position in my view. GDAF AF-UKEPR-CSA-25 states:

The licensee shall provide the available measures to limit the containment pressure, in the event of a severe accident leading to the failure of the CHRS, to prevent uncontrolled radiological releases from the primary containment.

In response to this assessment finding and the Fukushima accident NNB GenCo has proposed that mobile pumps will be provided to enable water to be introduced into the containment via the spray system thereby increasing the time available to restore the Containment Heat Removal System (CHRS). Whilst this provides useful defence-in-depth, my judgement is that additional measures are required.

34 One potential measure to address this GDAF would be to install filtered containment ventilation at HPC. Should the CHRS fail during a severe accident, filtered containment ventilation would provide an engineered means of controlling containment pressure and minimising the release of fission products in comparison to an uncontrolled release due to containment failure. Unfortunately the draft resolution plan for this assessment finding does not, in my view, give appropriate consideration to the installation of filtered containment ventilation at HPC. I have raised this with NNB GenCo and discussions are ongoing to ensure that an adequate safety case for containment pressure control in a beyond design basis severe accident is provided. This issue will need to have been resolved on a timescale compatible with first nuclear island safety related concrete.

35 Whilst not originally identified as needing to be addressed prior to nuclear island safety related concrete NNB GenCo has provided a draft resolution plan Ref. 30) for AF-UKEPR-CSA-07:

The licensee shall demonstrate that the design of insulation and the strainer structures associated with the safety injection system is such that the risk of sump blockage has been reduced to the lowest level reasonably practicable. In particular, the licensee should produce an analysis of the options and justify the choice of insulating technology.

My expectation is that resolution of this finding will result in the adoption of Reflective Metallic Insulation (RMI) for HPC rather than fibrous insulation proposed at GDA. However, the current draft of the resolution plan for this finding does not provide a commitment to adopt RMI. I have raised this with NNB GenCo and a commitment has been provided that the current intent is to install RMI where practicable (Ref. 22). Discussions are ongoing to ensure this is reflected in the resolution plan.

4.2.2 Assessment of Chapter 6 – Containment and Safeguard Systems

36 Chapter 6 of HPC PCSR2012 addresses Containment and Safeguard Systems and is relevant to the Severe Accident Work Stream. I note that the majority of the material in Chapter 6 is the same as that presented in the Consolidated GDA PCSR 2011. The exception to this is Sub-chapter 6.9 which is new for HPC PCSR2012. Sub-chapter 6.9 (Ref. 23) addresses Containment and Safeguards Chemistry and has been assessed by an ONR Chemistry Specialist (Ref. 24). I note that the Head Document states that the information in Sub-chapter 6.9 is drawn from Sub-chapters 5.5 and 18.2 of the Consolidated GDA PCSR 2011. Whilst I have not checked this claim I note that the ONR Chemistry Specialist has concluded that Sub-chapter 6.9 does in fact contain some new information.

37 I have reviewed Chapter 6 in the context of the severe accident topic area and have not identified any severe accident specific issues not already covered by GDA assessment findings. However, I note that the Chemistry Specialist (Ref. 24) considers that further work is required to allow Sub-chapter 6.9 to meet their expectations for a PCSR, whilst

judging that the deficiencies identified do not raise or hide any fundamental nuclear safety concerns.

4.2.3 Assessment of Supporting Reference (Ref. 5) on Response to Fukushima

38 Ref. 5 summarises NNB GenCo's response to the accident at Fukushima and has been provided as a supporting reference to HPC PCSR2012. I have considered this document in my assessment in part because it relates to the severe accident topic area but also because I have a co-ordinating role in terms of ensuring that NNB GenCo responds appropriately to the lessons learnt from the accident at Fukushima and in particular to the Interim and Final Recommendations raised by the Chief Inspector (Ref. 7).

39 The scope of the summary provided in Ref. 5 is given as:

- The NNB GenCo technical review of HPC
- The additional safety evaluation of the UK EPR design carried out by EDF Energy
- NNB GenCo response to the ENSREG Stress Tests
- NNB GenCo response to the Chief Inspector's report
- EDF/AREVA resolution plan for the GDA cross-cutting issue (GI-UKEPR-CC-03) on Fukushima.

40 Given the complexity and cross-cutting nature of Fukushima accident I have reviewed Ref. 5 to ensure that it is consistent with my understanding of the position with respect to the NNB GenCo's response to Fukushima. I have considered each of the above aspects and my view is provided in the following paragraphs.

NNB GenCo Technical Review and EDF Energy Additional Safety Evaluation

41 The NNB GenCo technical review and the additional safety evaluation of the UK EPR design carried out by EDF Energy contributed to the response to the ENSREG Stress Tests, the response to the Chief Inspector's Recommendations and to the GDA cross-cutting issue which are discussed below.

NNB GenCo Response to the ENSREG Stress Tests

42 NNB GenCo's response to the ENSREG Stress Tests is reported in Ref. 25 and is summarised in Ref. 5. I have confirmed that the areas for further consideration identified by NNB GenCo in response to the Stress Tests are correctly described in Appendix A of Ref. 5. ONR's assessment of NNB GenCo's Stress Tests is reported in Ref. 8 which concluded that overall ONR was content with the adequacy of the stress test programme undertaken and that the enhancements identified to strengthen resilience. One Stress Test Finding, STF-58 was raised and remains open:

NNB GenCo should consider further the ability of the site to respond to the partial or complete loss of electrical supplies and the autonomy times of systems without off-site support.

I will monitor NNB GenCo's progress in responding to and closing this finding through routine Level 4 meetings.

NNB GenCo's response to the Chief Inspector's Recommendations

43 NNB GenCo's response to the Chief Inspector's Recommendations (Ref. 7) was presented in Ref. 26. ONR's assessment of this response is provided in Ref. 9 which concluded that NNB GenCo's response to the Chief Inspector's Recommendations

provided an appropriate commitment to implementing the lessons learned from the Fukushima accident and that a reasonable way forward existed to fully address them.

GDA cross-cutting issue GI-UKEPR-CC-03

44 During the Step 4 assessment of the UKEPR a cross-cutting GDA Issue (GI-UKEPR-CC-03) was raised by ONR which stated:

EDF and AREVA are required to demonstrate how they will be taking account of the lessons learnt from the unprecedented events at Fukushima including those lessons and recommendations that are identified in the HM Chief Inspector's interim and final reports.

At the time Ref. 5 was written this issue had not been resolved and consequently the outcome is not reflected in Ref. 5. EDF and AREVA's response to GI-UKEPR-CC-03 has since been assessed by ONR (Ref. 10) which concluded on the basis of the information provided that the GDA Issue was closed. However, Ref. 10 raised seven assessment findings (AF-UKEPR-CC-12 to 18) to be addressed as part of the site specific phase, although none were identified as being required before nuclear island safety related concrete.

45 Following my review I conclude that Ref. 5 provides a useful summary of the status, at the time it was written, of NNB GenCo's response to the lessons learnt from the Fukushima accident. It does not provide any new information that has not already been presented in response to the GDA cross-cutting issue, the ENSREG stress tests or the Chief Inspector's Recommendations; consequently there is no new information to assess.

46 Given the complex and cross-cutting nature of the lessons learnt from Fukushima it is important to ensure that all of the lessons learnt and commitments made are fully implemented. I am monitoring progress in this respect through routine Level 4 meetings. In order to monitor progress NNB GenCo is developing a Fukushima Response Matrix which identifies the various lessons learnt, corresponding actions and the leads within NNB GenCo responsible for the work.

47 Whilst in general NNB GenCo appears to be making reasonable progress in addressing the lessons learnt from Fukushima this will only be possible to judge properly once the Fukushima Response Matrix has been fully developed. I note the intent is to update Ref. 5 at significant milestones in the HPC programme.

4.3 Comparison with Standards, Guidance and Relevant Good Practice

48 As discussed above I have not performed a formal assessment of the information provided in HPC PCSR2012 as it is essentially the same as that already assessed in step 4 of the GDA process. Nonetheless, during my interactions with NNB GenCo at level 4 meetings I have not seen any evidence, other than the exception discussed below, to indicate that in the Severe Accident Work Stream NNB GenCo will not comply with the SAPs listed in Table 1 and relevant good practice. This assumes that the work in the Forward Work Activities document is completed satisfactorily and that the relevant GDA assessment findings are adequately addressed.

49 An exception to this is NNB GenCo's response to AF-UKEPR-CSA-25 which concerns the control of containment pressure during a severe accident. As discussed above, in my view the draft resolution plan for this finding does not give appropriate consideration to the installation of filtered containment ventilation at HPC. In particular I judge that NNB GenCo needs to give consideration to further risk reduction measures (SAP FA.16) in this area to ensure an appropriate level of defence in depth (SAP EKP.3) is achieved and that

relevant good practice is followed. As noted above I have raised this with NNB GenCo and discussions are ongoing to ensure that an adequate safety case for containment pressure control in a beyond design basis severe accident is provided.

5 CONCLUSIONS AND RECOMENDATIONS

5.1 Conclusions

- 50 This report presents my assessment of that portion of the HPC PCSR2012 that falls within the scope of the Severe Accident Work Stream. This report has been written to support a Summary Assessment Report that addresses whether HPC PCSR2012 demonstrates suitable progress towards meeting ONR's requirement for an adequate Pre-Construction Safety Report.
- 51 In respect of the Severe Accident Work Stream the information presented in HPC PCSR2012 is essentially unchanged from that presented in the Consolidated GDA PCSR in March 2011. Consequently, the assessment of the severe accident analysis aspects is as reported in the GDA Step 4 report for this topic.
- 52 Forward Activities are presented within HPC PCSR2012. My overall view of the Forward Activities identified in relation to the Severe Accident Work Stream is that they appear reasonable. However, I note that they are at a relatively high level and that further detail will be required in due course. This will be progressed through ongoing routine level 4 meetings with NNB GenCo.
- 53 In terms of site specific severe accident analysis the Forward Work Activities document reports that a confirmatory assessment will be completed to ensure that the analysis presented in the Consolidated GDA PCSR 2011 is adequate for application to HPC, or to specify what additional site specific analysis is required. I also note that the overall risk of a twin-reactor site will be addressed and that the existing GDA severe accident analysis will be reviewed to consider the site specific input parameters for HPC. Completion of this work is important in terms of developing the HPC safety case.
- 54 Whilst in general good progress has been made in developing appropriate resolution plans for GDAF's in the severe accidents area the draft resolution plan for one assessment finding (AF-UKEPR-CSA-25) required before nuclear island safety related concrete has not yet reached a satisfactory position. In my view the draft resolution plan for this finding does not give appropriate consideration to the installation of filtered containment ventilation at HPC. I have raised this with NNB GenCo and discussions are ongoing to ensure that an adequate safety case for containment pressure control in a beyond design basis severe accident condition is provided. This issue will need to have been resolved on a timescale compatible with nuclear island safety related concrete.
- 55 Following my review I conclude that Ref. 5 provides a useful summary of the status, at the time it was written, of the NNB GenCo's response to the lessons learned from the Fukushima accident. It does not provide any new information that has not already been presented in response to the GDA cross-cutting issue, the ENSREG stress tests or the Chief Inspector's Recommendations; consequently there is no new information to assess.
- 56 Whilst in general NNB GenCo appears to be making reasonable progress in addressing the lessons learnt from Fukushima this will only be possible to judge properly once the Fukushima Response Matrix has been fully developed. I note the intent is to update Ref. 5 at significant milestones in the HPC programme.
- 57 Although no new information is presented in HPC PCSR2012 in the Severe Accident area I am generally content that an adequate level of progress is being made in developing the safety case and responding to GDA findings. As noted above, the exception to this is NNB GenCo's response to AF-UKEPR-CSA-25 which in my view does not give appropriate consideration to the installation of filtered containment ventilation at HPC. On

the basis that this is a significant issue that has yet to be resolved I consider that an IIS rating of 4, i.e. "Below Standard", is appropriate.

58 No new issues have been raised in the ONR issues database as a consequence of my assessment.

5.2 Recommendations

59 No recommendations have arisen from my assessment.

6 REFERENCES

- 1 NNB GenCo Submission of HPC PCSR2012, Letter NNB-OSL-RIO-000322, ONR-HPC-20337N, 6 December 2012, TRIM 2013/16143.
- 2 ONR How2 Business Management System. Guidance on Production of Reports, AST/003 Revision 7, September 2013.
- 3 Safety Assessment Principles for Nuclear Facilities. 2006 Edition Revision 1. HSE. January 2008. www.hse.gov.uk/nuclear/SAP/SAP2006.pdf.
- 4 Technical Assessment Guides (TAGs). www.hse.gov.uk/nuclear/tagsrevision.htm.
- 5 NNB GenCo: Hinkley Point C Pre- Construction Safety Report, Response to the March 2011 Accident at Fukushima, HPC-NNBOSL-U0-000-RES-000050, Version 3.0, October 2012. TRIM 2013/16198.
- 6 ONR Assessment Report: ONR-GDA-AR-11-020b Revision 0, 21 November 2011. Step 4 Fault Studies – Containment and Severe Accident Assessment of the EDF and AREVA UK EPR Reactor. TRIM 2010/581403.
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Table 1

Relevant Safety Assessment Principles Considered During the Assessment

SAP No.	SAP Title	Description
EKP.3	Engineering principles: key principles – Defence in depth	A nuclear facility should be so designed and operated that defence in depth against potentially significant faults or failures is achieved by the provision of several levels of protection.
FA.16	Fault analysis: severe accident analysis - Use of Severe Accident Analysis	The severe accident analysis should be used in the consideration of further risk-reducing measures.