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NNB GenCo proposal to modify the design of Hinkley Point C

ONR Agreement to Category 1 modification: Dry Store impacts on HK building

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EXECUTIVE SUMMARY

Title

ONR Agreement to Category 1 modification: Dry Store impacts on HK building

Permission Requested

NNB Generation Company (HPC) Ltd (NNB GenCo), for the purposes of arrangements made under Condition 20(1) of Schedule 2 attached to Nuclear Site Licence No. 97A to control any modification to the design of the Hinkley Point C (HPC) nuclear installation, currently under construction in Somerset, has requested ONR's agreement to, or acknowledgment of, implementation of the modification as described in the licensee's document titled *'Licence Summary Statement - HPC-NNBOSL-U9-HKX-LSS-100000, Dry Store Impacts on HK Building',* Version 2.0, dated 23 April 2018.

Background

In 2010, NNB GenCo's predecessor company examined the available Interim Spent Fuel Storage (ISFS) technologies to determine the most suitable solution for use at HPC. The preferred option was a wet ISFS technology where the Spent Fuel Assemblies (SFAs) are stored in the Spent Fuel Pool (SFP) inside a separated building. However, a number of new factors led to this decision being reviewed, including changes in the wet storage design considerations, the experience with dry storage gained from Sizewell B (SZB) and an evolving understanding of UK spent fuel management requirements. In 2014, NNB GenCo made the decision to change to a dry canister-based ISFS technology. The decision to adopt the dry storage approach requires changes to the structure of the Fuel Building (HK) and Fuel Building Extension (HKH), as well as to the design and use of associated plant.

Assessment and inspection work carried out by ONR in consideration of this request

The following aspects were sampled during ONR's assessment:

- fault studies aspects associated with:
  - SFP storage capacity for SFA cooling before moving to the ISFS
  - SFA cooling inside the storage and transport containers
  - mitigation of major faults in HK during SFA transfer from the SFP to the storage and transport containers;
- consideration of internal hazards, particularly focused on fuel handling within the fuel building;
- mechanical engineering aspects associated with design changes to and/or change in use of the existing fuel building systems, structures and components:
  - spent fuel mast bridge
  - heavy lift crane
  - spent fuel pool cooling
  - fuel building cooling water
  - fuel building HVAC;
- structural integrity aspects of the storage canister containment boundary;
- radiation protection aspects of the safety case relating to the impact of moving from wet to dry storage of fuel on the fuel building; and
- civil engineering aspects related to modifications to the structures of the fuel building, the ability of the fuel building and its annexe to accommodate the ISFS equipment, the lifting capacity of the heavy lift crane and the haulage transporter, the size of the ISFS building and its location on the plot plan.

Conclusions

Based on the evidence sampled, I am satisfied with NNB GenCo's case for the acceptance of this design change. Although ONR's assessment has identified three Regulatory Issues for follow-up, the relevant ONR technical specialists and the design & safety case delivery lead

are satisfied that these issues can be closed out in due course, and should not prevent ONR giving its agreement under LC 20(1) for this design modification to go ahead.

Recommendation

I recommend that ONR issues licence instrument LI515 giving its Agreement under LC20(1) to NNB GenCo's proposed modification to the design of Hinkley Point C

LIST OF ABBREVIATIONS

ALARP	As Low As Reasonably Practicable
BDB	Beyond Design Basis
BSL	Basic Safety Level (in SAPs)
BSO	Basic Safety Objective (in SAPs)
C&I	Control and Instrumentation
DBA	Design Basis Analysis
DDM	Demande de Modification (decision on modification request)
FDM	Fiche de Modification (modification initiation form)
FICA	Future Intelligent Customer Activities
GDA	Generic Design Assessment
HHK	Spent Fuel Building / Interim Spent Fuel Store
HI-STORM	Holtec International Storage Module
HI-TRAC	Holtec International Transfer Cask
HIC	High Integrity Component
HK	Fuel Building
HKH	Fuel Building Extension
HLC	Heavy Lift Crane
HOW2	(ONR) Business Management System
HPC	Hinkley Point C
HVAC	Heating, Ventilation and Air Conditioning
ISFS	Interim Spent Fuel Storage / Store
ITA	Independent Technical Assessment
LC	Licence Condition
LCU	Local Cooling Unit
LSS	Licence Summary Statement
MPC	Multi-Purpose Canister
NIC	Nuclear Island Concrete
NNB GenCo	NNB Generation Company (HPC) Limited
NSC	Nuclear Safety Committee
ONR	Office for Nuclear Regulation
OPEX	Operational Experience
PCmSR	Pre-Commissioning Safety Report
PCSR	Pre-Construction Safety Report
PSA	Probabilistic Safety Analysis
RC	Reference Configuration
RD	Responsible Designer
RGP	Relevant Good Practice
SAP	Safety Assessment Principle(s)
SDCC	Safety Design Change Committee (NNB GenCo)
SFA	Spent Fuel Assembly
SFMB	Spent Fuel Mast Bridge
SFP	Spent Fuel Pool
SHPR	Secondary Hold Point Report
SSC	Structure, System and Component
TAG	Technical Assessment Guide(s) (ONR)

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1 PERMISSION REQUESTED

1. NNB Generation Company (HPC) Ltd (NNB GenCo), for the purposes of arrangements made under Condition 20(1) of Schedule 2 attached to Nuclear Site Licence No. 97A to control any modification to the design of the Hinkley Point C (HPC) nuclear installation, currently under construction in Somerset, has requested (Ref. 1) ONR's agreement to or acknowledgment of implementation of the modification as described in the licensee's document titled *'Licence Summary Statement - HPC-NNBOSL-U9-HKX-LSS-100000, Dry Store Impacts on HK Building',* Version 2.0, dated 23 April 2018 (Ref. 2).

2. This project assessment report (PAR): summarises ONR's assessment of NNB GenCo's proposal to modify the design of the HPC EPR; records ONR's judgement of the impact of the modification upon nuclear safety; and responds to NNB GenCo's request. It has been produced in accordance with ONR HOW2 guidance (Ref. 3).

2 BACKGROUND

2.1 Change to dry spent fuel storage

3. In 2010, NNB GenCo's predecessor company examined the available Interim Spent Fuel Storage (ISFS) technologies to determine the most suitable solution for use at HPC. The preferred option was a wet ISFS technology where the Spent Fuel Assemblies (SFAs) are stored in the Spent Fuel Pool (SFP) inside a separated building. However, a number of new factors led to this decision being reviewed, including changes in the wet storage design considerations, the experience with dry storage gained from Sizewell B (SZB) and an evolving understanding of UK spent fuel management requirements. In 2014, NNB GenCo made the decision to change to a dry canister-based ISFS technology. The decision to adopt the dry storage approach requires changes to the structure of the Fuel Building (HK) and Fuel Building Extension (HKH), as well as to the design and use of associated plant.

4. The dry storage operations include the transfer of spent fuel assemblies from the SFP to a multi-purpose canister (MPC), and the placement of the Holtec International Storage Module (HI-STORM) containing the loaded MPC on its designated location for a maximum of 120 years' interim storage in the Interim Spent Fuel Store (HHK). The MPC is placed inside a Holtec International Transfer Cask (HI-TRAC) to transport it from HK to HHK.

5. The MPC is a stainless steel cylinder that is used to safely contain up to 24 SFAs. This provides the confinement barrier, maintains sub-criticality of the fuel and enables cooling. Once backfilled with helium and sealed, the cooling is passive. The MPC lid also provides shielding for the operators on the spent fuel cask transfer machine.

6. The HI-TRAC is a steel transport cask with an internal cavity to house an MPC. It carries the MPC during transfer between buildings, provides shielding to the operators, and protection to the MPC during loading and transfer operations.

7. The HI-STORM is a concrete storage cask with an internal cavity for placement of an MPC in HHK. It provides shielding to the operators and public, and protection to the MPC during interim storage.

2.2 Reason for HK building design modifications

8. The dry storage process requires the SFAs to be cooled for a longer time in the SFP (~10 years) than does the wet storage process (~7 years). This means that a greater number of refuelling outages are performed before the first ISFS campaign can be carried out for the dry storage solution compared with wet storage (8 refuelling outages for dry storage compared with 6 for wet storage assuming an 18-month cycle time). This means that the equilibrium number of SFAs in the SFP is greater for dry storage than for wet, hence a requirement for plant modifications to facilitate additional SFA capacity in the SFP.

9. The design of the Spent Fuel Mast Bridge (SFMB) needs to be modified to allow it to access the additional cells in the SFP which were not required for the wet storage solution. Following an optioneering process, NNB GenCo decided to include an additional 'jib' hoist on the SFMB to supplement the main mast. This jib hoist will be able to access cells at the edges of the SFP and will mean that sufficient cells can be accessed to allow the 10 years cooling time required for dry storage.

10. The dry storage canister is larger than the wet storage equivalent (24 rather than 12 SFAs in each) and so the loading pit penetration needs to modified to be of a larger diameter in order to allow docking. In addition, the recess in the ceiling of the HK Loading Hall which houses the mechanism for lifting and retaining the spent fuel canister/cask lid needs to be enlarged because of the greater diameter of the dry storage lid compared with the wet storage lid.

11. The heat loads generated into the HK building are greater for dry storage as compared with wet storage, and the HK building HVAC system must be able to accommodate this. Provision has therefore been made by inclusion of two additional Local Cooling Units (LCU) (each of 15 kW capacity) such that the heat load is managed.

2.3 Proposed HK modifications

12. The key design changes within the modifications that impact on nuclear safety principles are as follows:

Changes to plant

- SFP storage racks - a larger capacity is required compared with wet storage.
- SFMB –to be modified to allow access to the additional cells in the SFP which were not required for the wet storage solution.
- Spent Fuel Pool Loading Pit Penetration – the loading pit penetration needs to be of a larger diameter in order to allow docking with the dry storage canister.
- Biological Lid Handling Station – the recess in the ceiling of the HK Loading Hall (needs to be enlarged because of the greater size of the dry storage lid compared with the wet storage lid.
- Aircraft Protection Shell Penetrations – additional penetrations are required for pipework to supply cooling equipment and inert gas.
- Adapter Ring – a new piece of equipment is required to serve as the interface between the SFP loading pit penetration and the MPC in the HK Building.

Changes in use of existing plant

- Heavy Lift Crane (HLC) – the dry storage canister is heavier than the wet storage equivalent and therefore the loads carried by HK building HLC are greater.
- HK building cooling water – the main safety functions are maintained by different means for the dry storage solution as compared with the wet storage solution. This entails provision of cooling water from systems of the appropriate reliability and capacity.
- HK building HVAC – the HK building HVAC system must be able to accommodate increased heat loads compared with the wet storage system.
- HK building available space – Additional equipment is needed to perform the dry storage operations in HK including cooling/drying/welding equipment. It must be ensured that there is sufficient space for this in HK at the times when it is required.
- HKH building usage **–** equipment related to cooling of the dry storage process is located in the HKH building.

13. The overall design change has been designated by NNB GenCo as nuclear safety Category 1. This means that NNB GenCo has judged that it is a modification that affects nuclear safety which results in a significant alteration to a fundamental safety

principle or basic safety requirement, or that could result in a serious increase in risk of a radioactive hazard if inadequately conceived or implemented.

14. A Licence Summary Statement (LSS) has been prepared in line with NNB GenCo's LC 20 arrangements (see Section 3.3 below). The purpose of the LSS is to provide confidence that the design is sufficiently mature such that it can be included within the reference configuration. The LSS notes that the operational need date for the full ISFS process is approximately 12 years after the Start of Generation based on the planned duration of cooling of fuel in the SFP after final withdrawal from the reactor. This difference of operational requirements means that various strategies for completion of the ISFS design life cycle remain available, and the final decision on those elements can be made at a later date.

15. It should be noted that the overall ISFS process involves SSCs beyond those covered by the scope of the LSS, e.g. SSCs related to HHK, and the portable equipment which will be brought into HK and HKH at the time of a dry storage campaign. The scope of the LSS therefore considers these other SSCs only in so far as there is sufficient physical space in HK, and that provision has been made to supply them with services (for example, cooling water or HVAC) to carry out their function.

3 ASSESSMENT CARRIED OUT BY ONR IN CONSIDERATION OF THE REQUEST

3.1 Scope

16. ONR has already undertaken a comprehensive assessment of the licensee's Pre-Construction Safety Report, PCSR3 (Ref. 4) as well as 'supplementary' safety submissions that support the release of certain construction hold-points (Ref. 6). These supplementary safety submissions include the Nuclear Island Concrete (NIC) Report (which justified the suitability of the current design to support release of the NIC hold point) and the ISFS Safety Report (Ref. 5). The ISFS report supports the NIC Report by presenting the nuclear safety justification for the ISFS related equipment in the fuel building (HK), fuel building extension (HKH) and ISFS building (HHK), and on the spent-fuel haul path. It adds to the information presented in PCSR3, providing additional evidence to support the change to dry storage technology, that was not available at the time.

17. The proposed modification will only affect certain aspects of the safety case and therefore ONR's assessment has been limited to those technical areas concerned. The topic area assessments are reported in a series of Assessment Reports (AR), as discussed below. Each AR considers the impact of the change on the relevant parts of the evolving safety report and whether the resulting changes to the RC1.2 design represent relevant good practice (RGP) and/or the contribution to overall plant risk from the components, systems or structures affected is as low as reasonably practicable (ALARP) and thus consistent with the UK context.

3.2 Assessment topic areas

18. ONR fault studies, including fuel and core, internal hazards, mechanical engineering, structural integrity, radiation protection, radiological consequences and civil engineering inspectors carried out an assessment of the safety justification for the modifications to the fuel building for the move from wet to dry interim storage of spent fuel. This assessment focused on the technical and safety justification for the modification, a comparison with RGP and consideration of ALARP, and NNB GenCo's commitments in relation to implementation of the modifications.

19. The following aspects were sampled during ONR's assessment:

- fault studies aspects associated with:
  - SFP storage capacity for SFA cooling before moving to the ISFS
  - SFA cooling inside the MPC, HI-TRAC and HI-STORM

    - mitigation of major faults in HK during SFA transfer from the SFP to the MPC, HI-TRAC and HI-STORM;
- consideration of internal hazards, particularly focused on fuel handling within the fuel building;
- mechanical engineering aspects associated with design changes to and/or change in use of the existing fuel building SSCs:
    - spent fuel mast bridge (SFMB)
    - heavy lift crane (HLC)
    - spent fuel pool cooling
    - fuel building cooling water
    - fuel building HVAC;
- structural integrity aspects of the MPC containment boundary;
- radiation protection aspects of the safety case relating to the impact of moving from wet to dry storage of fuel on the fuel building; and
- civil engineering aspects related to modifications to the structures of the fuel building, the ability of the fuel building and its annexe to accommodate the ISFS equipment, the lifting capacity of the heavy lift crane and the haulage transporter, the size of the ISFS building and its location on the plot plan.

20. For convenience in reporting, summaries of each of the ONR technical assessments for this LC20 modification were included in the ONR Design & Safety Case cornerstone report (Ref. 6) which informed the PAR for granting consent to the start of Unit 1 nuclear island concrete (NIC). The ONR assessment outcomes for this modification which are summarised below have been largely drawn from the relevant sections of that cornerstone report.

3.2.1 Fault studies assessment

21. The ONR fault studies inspector (Ref. 6) concluded:

- the estimation of the fuel cooling time in the SFP and the relevant evaluation of the SFP storage capacity were fit-for-purpose;
- the proposed modification will mitigate the risk from gross failure of the cask loading pit connection to the cask;
- the presentation of the fuel strategy and its impact on spent fuel isotopic contents and heat loadings is appropriate for this stage of the project, and that further development of these design features can be followed in the framework of normal regulatory business during the detailed design stage; and
- safety improvements that could be required during the detailed design (for example, due to results from more precise analyses) are not foreclosed by the current design of HK and its SSCs.

22. Overall, the ONR fault studies inspector concluded that the claims, arguments and evidence presented within the LSS and ISFS Safety Report are fit-for-purpose at this stage of the HPC project and a clear vision has been established regarding the needs for development of the ISFS safety justification during the detailed design phase of the project.

3.2.2 Internal hazards assessment

23. The ONR internal hazards inspector (Ref. 6) concluded that the claims, arguments and evidence laid down within the LSS were adequate for this stage of the project, and that NNB GenCo has reviewed the impact of the modification with respect to a selected number of hazard scenarios. However, to enable NNB GenCo to progress with its design and substantiation, the inspector highlighted some areas the safety case in need of development, which will be followed-up through regular level 4 meetings. The inspector notes that successful implementation of the modification is dependent upon NNB GenCo honouring the commitments outlined in the LSS, including adequate analysis of the ISFS operations against internal hazards.

3.2.3 Mechanical Engineering assessment

24. The ONR mechanical engineering inspector (Ref. 6) concluded:

- further consideration should be given to the location of the SFMB during repositioning of the additional hoist to ensure that the level of risk of dropping the hoist onto fuel assemblies is ALARP. This was captured as a level 4 regulatory issue (6731; see Table 1) for resolution prior to the finalisation of the pre-active commissioning safety report (PCmSR);
- further consideration is required for the design and use of the HLC to move the MPC (within the HI-TRAC) between the spent fuel cask transfer machine and the hauling transporter, particularly as collapse of the crane could lead to a large radiological release in a building (HKH) with no confinement or containment measures. This was captured as a level 4 regulatory issue (6725; see Table 1) for resolution prior to procurement of the HLC;
- although the modifications increase the heat load in the spent fuel pool by up to approximately 10% at certain times, there remains adequate margin in the sizing of the cooling chains and further increases in the heat loads are unlikely;
- in terms of fuel building cooling water, the use of a forced helium dehydrator to dry the inside of the MPCs, will not have a significant impact on the component cooling water margins; and
- regarding the HK ventilation system, although there is insufficient margin in this system for the additional heat discharges arising from the modifications, the solutions proposed by NNB GenCo (move some of the ISFS equipment components so that the heat is discharged externally and the provision of non-classified LCUs to deal with the residual heat load) are acceptable.

25. Overall, the mechanical engineering inspector was satisfied that NNB GenCo has identified the relevant SSCs that require modification as a result of the adoption of dry fuel storage technology. The two issues raised are at level 4 and will be pursued to completion as appropriate as the project progresses.

3.2.4 Civil engineering assessment

26. The ONR civil engineering inspector (Ref. 6) inspector concluded:

- the ISFS Safety Report documents a thorough and comprehensive study that has been undertaken by NNB GenCo to identify and address the implications of a change from a wet to a dry process;
- although not able to check the equipment sizing directly as a part of the assessment (due to the unavailability of suitable information), the inspector was satisfied that the sizing has not been overlooked by NNB GenCo. Furthermore, noting that NNB GenCo's Independent Technical Assessment (ITA) function has also considered this issue in some detail, this issue has been adequately addressed by NNB GenCo; and
- the (relatively minor) structural modifications required to the civil engineering design of the fuel building have been adequately identified in the submitted documents.

27. Overall, from the perspective of civil engineering, the inspector was satisfied with the claims, arguments and evidence laid down within the LSS and supporting documentation.

3.2.5 Structural integrity assessment

28. In the course of assessing the safety case for the release of the NIC hold-point, the ONR structural integrity inspector (Ref. 6) considered the structural integrity claims on the MPC (integrity of the containment boundary), as described in the ISFS report. The inspector identified some points to follow-up post-NIC which will be discussed via regular level 4 meetings. These points relate to the classification of the MPC and key

welds, and the MPC seal welding procedure and inspection. A level 4 regulatory issue was raised (6532; see Table 1) to enable routine monitoring of progress.

3.2.6 Radiological consequences assessment

29. The ONR radiological consequences inspector (Ref. 6) noted that whilst claims are made for the safety of the proposed modification and engineering design presented, the claims are not yet substantiated by radiological consequences analysis in fault conditions. However, the inspector took confidence from operation of a dry fuel store facility at Sizewell B and did not identify any concerns that would prevent ONR agreeing to the implementation of the modification into RC 1.2. However, the inspector emphasised the expectation that site-specific radiological analysis should be carried out as part of the detailed design.

3.2.7 Radiation protection assessment

30. The ONR radiation protection inspector (Ref. 6) concluded that:

- the ISFS report provides suitable proof of concept that the ISFS design and proposed process can be carried out in a manner that will ultimately reduce the level of risk (from a radiation protection perspective) ALARP and, although significant design and optioneering work is still required, this is unlikely to impact on the HK design;
- the ISFS report provides confidence that an ALARP position for public and occupational radiation doses may be reached during future detailed design and safety justification, and there are no further reasonably practicable measures that can be incorporated into the ISFS design would be foreclosed by proceeding past the NIC hold point; and
- the reduced shielding in the bottom of the HI-TRAC transportation container does not significantly affect occupational and public doses and therefore the ALARP position.

3.2.8 Consideration of ALARP arguments

31. Taking into consideration the assessments carried out by ONR technical specialists, ONR's safety case & design delivery lead (Ref. 6) noted that, subject to the proposed modifications:

- the ISFS activities produce outcomes that are in line with the safety case;
- the proposed ISFS process resembles that already successfully adopted at Sizewell B power station;
- is similar to processes adopted world-wide; and
- is considered representative of RGP.

32. Based on this, the design & safety case delivery lead concluded that the proposed modified design will ultimately reduce the level of risk ALARP.

3.2.9 Future licensee activities regarding the modification

33. The purpose of the LSS is to provide confidence that the design is sufficiently mature such that it can be included within the reference configuration. The LSS acknowledges that the full justification for these modifications was not available at the time of its submission and, consequently the licensee has defined a number of future intelligent customer activities (FICA), which identify any points that require resolution to fully substantiate the modifications**.**

34. All inspectors that assessed the proposed modification were content with the future activities identified by NNB GenCo, which will form a key source of evidence in any future safety case.

35. Ref. 6 notes that an ONR intervention had been carried out to examine the effectiveness on NNB GenCo's process for capturing and managing FICAs. Through

this intervention ONR inspectors were content that, while this process uses a system not intended for this purpose, the process appeared robust. The inspectors also observed evidence of its use and although they noted some areas where the process could be strengthened, the general intent and use was adequate.

3.2.10 Conclusion on ONR assessments

36. As noted in the Design & Safety Case cornerstone report for NIC (Ref. 6), all ONR inspectors that assessed the LSS recommended that in accordance with NNB GenCo's arrangements for compliance with LC 20, ONR may provide agreement to GenCo's request to implement the proposed modification to the HPC UK EPR described in the LSS.

3.3 NNB GenCo internal assurance and governance

37. NNB GenCo's control of modifications to the design of the HPC EPR uses the arrangements for compliance with LC20 described in the suite of procedures and associated guidance listed in the licensee's Nuclear Site Licence Compliance Matrix (Ref. 7). The arrangements involve activities within both the Responsible Designer (RD) and NNB GenCo.

38. A proposed modification, initiated by a 'fiche de modification' (FDM), is assessed by the RD and NNB GenCo as it is developed. A 'decision du modification' (DDM) is subsequently produced to capture details of the modification. The modification is categorised in accordance with NNB GenCo and RD procedures (Refs. 8 and 9). NNB GenCo's LC20 arrangements require it to review modification proposals raised by the RD and to confirm the nuclear safety categorisation. Modifications of nuclear safety Category 1 or 2 are issued to NNB GenCo for acceptance. NNB GenCo's ITA function assesses all Category 1 modifications.

39. The licensee's Safety Design Change Committee (SDCC) will assess the adequacy of the technical information in the LSS and agree to the categorisation. If approved by the SDCC (Ref. 10), a Category 1 LSS will be presented to the HPC Nuclear Safety Committee (NSC) for 'Consideration and Advice' before being submitted to ONR for regulatory review. In accordance with its LC20 arrangements NNB GenCo cannot implement a Category 1 modification to the installation's design without ONR's acknowledgement or agreement.

3.3.1 Safety Design Change Committee

40. The draft LSS for the proposed modification was discussed at the 6th February 2018 SDCC (Ref. 11) and, with changes, it was put to the 26th March 2018 meeting for acceptance (Ref. 12). Following further discussion, the latter meeting concluded that the LSS could be accepted as suitable for a nuclear safety category 1 design change, subject to some changes proposed by the committee, and satisfactory completion of the ITA assessment.

41. Having reviewed the minutes of the SDCC meetings, I am satisfied that the proposed modification was subject to a thorough consideration by the committee, as required by the licensee's LC20 arrangements, and that the SDCC's final acceptance statement was justified by those considerations.

3.3.2 Nuclear Safety Committee

42. The LSS was submitted to the 10th April 2018 Nuclear Safety Committee (NSC) for consideration and advice (Ref. 13). Specifically, the NSC was asked to consider and advise on:

- the acceptability of the proposed modifications to the HK Building;
- the adequacy of the safety justification supporting the modifications; and
- the appropriateness and level of detail of the proposed future activities.

43. Following discussion of each of these questions, the committee gave its overall support to the proposed modification, subject to closure of any conditions of acceptance arising from the ITA assessment (Note: the single ITA Condition was subsequently closed – see next section) .

44. Having reviewed the minutes of the NSC meeting, I am satisfied that, in line with the licensee's LC20 arrangements, the proposed modification was subject to a suitably thorough consideration by the committee, and that the committee's overall support for the modification was justified by those considerations.

3.3.3 Independent Technical Assessment

45. The Independent Technical Assessment (ITA) report from NNB GenCo's assurance function (Ref. 14) provides a thorough assessment of the LSS. ITA accepted the final version of the LSS subject to the closure of one Condition of Acceptance.

46. The ITA Condition related to the confidence that all impacts on HK of the proposed design changes have been considered. ITA stated it had a reasonable degree of confidence that this primarily related to availability of evidence at the time of writing the LSS and the ITA assessment. Although ITA considered there was a low risk that providing this evidence will challenge any of the assumptions / claims in the LSS, ITA required the Condition to be addressed prior to release of the NIC hold-point, to confirm that the HK design has incorporated all of the impacts associated with implementing dry storage at HPC ahead of commencing construction of the nuclear island structures. Prior to NIC, ITA confirmed (Ref. 15) that the identified further work had been adequately progressed and that its Condition had been closed.

3.3.4 Conclusions on NNB GenCo internal assurance & governance

47. I am satisfied that the proposed modification has been subject to NNB GenCo's rigorous due process, including reviews by the SDCC and the NSC, and engagement and sign-off by the NNB GenCo internal assurance function (ITA).

4 MATTERS ARISING FROM ONR'S WORK

48. Arising from ONR's assessment of the proposed design modification and the ISFS safety case, the ONR mechanical engineering and structural integrity inspectors raised three Level 4 Regulatory Issues which is set out in Table 1. These issues will be addressed by the licensee as the project progresses, and do not prevent ONR giving Agreement to the proposed modification.

5 CONCLUSIONS

49. This report presents the findings from ONR's considerations of the request by NNB GenCo to implement a modification to the HPC EPR. Section 3.2 above sets out the findings of ONR's assessment of those technical topics relevant to the proposed modification. Section 3.3 above examines the adequacy of NNB GenCo's application of its governance and assurance processes in its consideration and approval of the proposed modification.

50. Having considered the matters discussed above, I am satisfied that:

- NNB GenCo has completed its due process for the proposal; and
- the ONR technical assessments support ONR giving agreement to the proposal.

51. I have prepared the Hinkley Point C Licence Instrument LI 515 in accordance with published ONR guidance, which proposes ONR's agreement to NNB GenCo implementing the proposed modification described in NNB GenCo's Licence Summary Statement HPC-NNBOSL-U9-HKX-LSS-100000 Version 2.0. (Ref. 2).

6 RECOMMENDATIONS

52. I recommend that the Superintending Inspector:

- accepts this Project Assessment Report to confirm support for the ONR technical and regulatory arguments that justify Hinkley Point C Licence Instrument LI 515;
- approves this Project Assessment Report for publication, after redaction where appropriate; and
- signs Hinkley Point C Licence Instrument LI 515.

7 REFERENCES

1. NNB-209-RIO-001980 – LC 20(1) Request for Acknowledgement or Agreement under LC20(1) Category 1 design change – 02 May 2018 2018. TRIM 2018/148979
2. Licence Summary Statement - HPC-NNBOSL-U9-HKX-LSS-100000 Version 2.0, 23 April 2018. Dry Store Impacts on HK Building TRIM 2018/149006
3. ONR HOW2 Guide - Purpose and Scope of Permissioning - NS-PER-GD-014 Rev 4. July 2014. http://www.onr.org.uk/operational/assessment/index.htm
4. ONR-NR-AR-17-038 Hinkley Point C (HPC) Pre-Construction Safety Report 3 (PCSR3), PCSR3 – Summary Assessment Report, Revision 0, February 2018, TRIM 2017/356172
5. NNB GenCo, ISFS Safety Report, HPC-NNBOSL-U9-000-REP-100011, Revision 2.0, April 2018, TRIM 2018/147261
6. ONR-NR-AR-18-029 Revision 0. Design and safety case cornerstone assessment report – Hinkley Point C Consent to commence unit 1 nuclear island concrete TRIM 2018/252545
7. Nuclear Site Licence Compliance Matrix, NNB-209-MAT-000076, Version 6.0, June 2018. TRIM 2018/260492
8. NNB GenCo Company Procedure NNB-202-PRO-000033 Rev 4.0. Manage Design Modification. TRIM 2018/27420
9. RD Instruction: INS-UKEPR-313 UK EPR Management of Design Changes UKX-ECUKXX-XX-000-INS-000808 TRIM 2018/27305
10. NNB-202-TOR-00003 Version 2.0. Safety Design Change Committee Terms of Reference. November 2015 TRIM 2018/295612
11. HPC-HPC-NNBOSL-XX-000-MOM-100144 Minutes of the 6th February 2018 Safety Design Change Committee TRIM 2018/148996
12. HPC-HPC-NNBOSL-XX-000-MOM-100146 Minutes of the 26th March 2018 Safety Design Change Committee TRIM 2018/149005
13. NNB-102-MOM-000661 Nuclear Safety Committee Minutes 10th April 2018. TRIM 2018/135278
14. NNB-103-REP-000333 Independent Technical Assessment of LSS on Dry Store Impacts on HK Building. April 2018 TRIM 2018/182943
15. NNB GenCo, Closeout of ISFS LSS Conditions of Acceptance, October 2018, TRIM 2018/346487

Office for Nuclear Regulation

Table 1
Regulatory issues arising from ONR assessments

Issue number	Issue level	Target/ Milestone	Topic	Issue / actions
6532	4	April 2019	Structural integrity	**Issue:** The classification of the lid attachment weld for the ISFS Multi-Purpose Canister - NNB GenCo has made the claim 'A gross failure of MPC confinement function is not deemed credible.' It is noted that the classification of this weld is an open point and will be resolved in due course. It is ONR's expectation that a claim that gross failure is not credible should only be applied when it is not reasonably practicable to eliminate, mitigate or protect against the consequences of failure. It is also ONR's expectation that if this claim is made then additional confidence is achieved beyond code compliance. ONR expects that NNB GenCo will provide the basis for the classification of the MPC lid attachment weld and the basis for the proposed justification.
6725	4	Procurement of HLC	Mechanical engineering	**Issue:** NNB GenCo should undertake an optioneering study to identify the most appropriate solution for transfer cask handling in the fuel building annex and depending upon the outcome amend the technical specification for the heavy lift crane accordingly.
6731	4	PCmSR	Mechanical engineering	**Issue:** NNB GenCo should identify, and reflect in operational procedures, an appropriate location for the re-positioning of the spent fuel mast bridge auxiliary hoist such that the risk of dropping the hoist on to fuel assemblies is ALARP.