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Construction of Hinkley Point C

ONR assessment of a request by NNB GenCo (HPC) Ltd for Consent to commence unit 1 nuclear island concrete

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Revision 0
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EXECUTIVE SUMMARY

TITLE

ONR assessment of a request by NNB GenCo (HPC) Ltd for Consent to commence unit 1 nuclear island concrete.

PERMISSION REQUESTED

NNB Generation Company (HPC) Limited (NNB GenCo) is constructing a twin reactor EPR™ nuclear power station at Hinkley Point C (HPC) in Somerset. NNB GenCo is the holder of a nuclear site licence for HPC, first granted by ONR in November 2012. In October 2016 ONR issued a Specification under Licence Condition (LC) 19(4) of the HPC nuclear site licence requiring NNB GenCo to seek ONR's consent before commencing unit 1 nuclear island concrete (NIC). This activity is considered to be the pouring of the first concrete for unit 1 nuclear island common raft, and is constrained by NNB GenCo's Hold Point 1.2.2.

Unit 1 reactor building, fuel building, and the four electrical and safeguard divisions are all founded on one common reinforced concrete base slab. This cross-shaped base slab, known as the common raft, is classified as a nuclear safety-related structure and is seismically qualified. The thickness of the common base slab is typically 4m under the reactor building, and from 1.8m to 3.2m under the other buildings.

In November 2018, NNB GenCo requested ONR's Consent under LC 19(4) to commence nuclear island concrete, as defined by Hold Point 1.2.2.

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

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

- status of the plant design & safety case;
- NNB GenCo's organisational capability for commencement of nuclear island concrete;
- NNB GenCo's compliance with relevant nuclear site licence conditions;
- conventional health & safety and fire safety readiness;
- nuclear security and nuclear safeguards considerations; and
- other matters that ONR considers relevant to its decision on granting consent.

The PAR also considers the robustness of NNB GenCo's processes for determining its own readiness, and that of its Tier 1 contractors, for the commencement of unit 1 nuclear island construction.

CONCLUSIONS

Design & safety case

Taking cognisance of ONR's earlier HPC safety case assessments, ONR's consideration of the safety case for the commencement of unit 1 NIC focused on:

- the adequacy of the safety case to support commencement of construction of the unit 1 nuclear island, including consideration of the nuclear safety justification and whether the level of risk will ultimately be reduced as low as reasonably practicable (ALARP);
- confidence that the civil engineering design does not foreclose options identified post-unit 1 NIC to reach an ALARP position, for example in relation to maturity of system sizing and outcome of safety studies;
- adequacy of the civil engineering design of the nuclear island common raft, which supports the reactor, fuel and safeguard buildings, and confidence in the management and development of ongoing design and associated uncertainties for the unit 1 nuclear island superstructure (buildings supported by the nuclear island common raft) and

other nuclear island buildings, where the civil engineering design process is ongoing; and

- whether the HPC design is sufficiently stable, that is whether all significant modifications have been incorporated into the design, including consideration of whether the impact of future modifications are adequately understood and taken into account.

In terms of the adequacy of the safety case, all the discipline-specific assessment reports conclude that the safety justification supports the judgement that ONR should consent to NNB GenCo to commence nuclear island concrete.

Regarding the maturity of the detailed design, although there remains uncertainty and a risk that options will be foreclosed by fixing the civil engineering design of the raft, ONR assessors expressed confidence that the risk is sufficiently small and the uncertainty adequately managed for this point of the project.

Concerning the civil engineering design of the nuclear island, the design & safety case cornerstone lead has reported that the design of the nuclear island common raft met ONR expectations for this stage of the project and that remaining areas of risk were being suitably managed.

Overall, based on sampling of NNB GenCo's documentation and review of each of ONR's discipline-specific assessment reports, ONR's design & safety case cornerstone lead reported no outstanding concerns that would preclude ONR issuing consent for NNB GenCo to commence unit 1 nuclear island concrete. The cornerstone lead therefore recommended that ONR grants NNB GenCo consent under LC 19(4) to allow construction to commence unit 1 nuclear island concrete at HPC, as defined by Hold Point 1.2.2.

Organisational Capability

The Organisational Capability cornerstone report considers NNB GenCo's establishment and implementation of organisational capability arrangements adequate to commence construction of the unit 1 nuclear Island common raft.

Following First Nuclear Safety related Concrete (FNCS), ONR proposed a series of organisational capability expectations and areas where it would seek to gain confidence in the licensee's arrangements leading up to unit 1 NIC. In addressing these expectations, the cornerstone report summarises the key points from four detailed ONR assessment reports and takes a holistic view on the unit 1 NIC consent from an organisational capability perspective. The four underpinning reports cover:

- quality systems
- supply chain management
- nuclear safety culture
- organisational delivery

The organisational capability cornerstone lead's overall conclusion was that NNB GenCo has made notable progress with their organisational capability arrangements since ONR issued the FNCS consent and the pumping station agreement, and considered their arrangements are adequate for unit 1 NIC. It was noted, however, that there remain significant challenges as the work expands over the next 2 years, and that NNB GenCo's arrangements will need to continue to mature to ensure an appropriate level of control is maintained.

The organisational capability lead therefore recommended that ONR grants consent under LC 19(4) for NNB GenCo to commence unit 1 nuclear island concrete at HPC.

Licence condition compliance

ONR's licence compliance cornerstone report covers the adequacy of NNB GenCo's licence condition compliance and other arrangements which impact the licensee's ability to demonstrate appropriate control of the site activities constrained by this consent, including:

- NNB GenCo's FNSC Substitution Concrete Improvement Plan activities
- ONR crosscutting, themed and construction specific interventions
- construction assurance assessment
- Preservation & Maintenance during the construction phase
- Chief Nuclear Inspector's inspection on supply chain management
- routine non-construction specific licence compliance
- preparations for industrial radiography
- Pre-Operations - covering future licence compliance arrangements and future emergency arrangements

Overall based on sampling of NNB GenCo's documentation and ONR's interventions undertaken since FNSC, including those undertaken since ONR's agreement to the commencement of construction of the pumping station, ONR's licence compliance cornerstone lead did not identify any significant areas related to licence condition compliance which would preclude ONR issuing a consent for NNB GenCo to commence construction of the unit 1 nuclear island. The cornerstone lead noted, however, that there are number of areas related to licence condition compliance where NNB GenCo will need to further mature its arrangements to ensure they remain sustainable as project activity increases, particularly after completion of the unit 1 nuclear island common raft.

The licence compliance cornerstone lead therefore recommended that ONR grants NNB GenCo consent under LC 19(4) to commence construction of the unit 1 nuclear island.

Conventional health & safety and fire safety

From the perspective of NNB GenCo's arrangements for managing both conventional health and safety and fire safety, ONR's specialist inspectors confirmed that there are no issues that prevent ONR from granting consent under LC 19(4) for NNB GenCo to commence unit 1 nuclear island concrete.

Nuclear security and safeguards

ONR's HPC nuclear security lead is satisfied that NNB GenCo's security arrangements are adequate for the start of unit 1 NIC, and expressed confidence that NNB GenCo will continue to make satisfactory progress towards post-NIC milestones.

ONR's HPC nuclear safeguards inspector confirms that there are no nuclear safeguards considerations relevant to ONR's decision to grant consent to commence unit 1 nuclear island concrete.

Other ONR considerations

The PAR sets out ONR's position on a number of other matters which it considers relevant to its decision on NNB GenCo's readiness to proceed beyond Hold Point 1.2.2. These are:

- closure or satisfactory position with all GDA Assessment Findings relevant to Hold Point 1.2.2;
- closure or adequate progress with all relevant Regulatory Issues;
- confirmation that there are no open NNB GenCo Commitments related to Hold Point 1.2.2; and
- the Environment Agency's views on the basis for ONR's decision.

The PAR concludes that there are no concerns regarding any of these matters which should prevent ONR from giving its consent to NNB GenCo under LC 19(4) to commence unit 1 nuclear island concrete.

NNB GenCo's process for release of the Hold Point

The outcome of NNB GenCo's hold-point release process was a Hold Point Review Document (HPRD) with a Residual Action Plan (RAP) which was subject to review by NNB GenCo's Hold Point Panel (HPP). Having reviewed the document and the cited evidence, the HPP recommended approval of the HPRD to the NNB GenCo Board. The Board approved the release of the NIC hold-point on 2nd November. NNB GenCo have separately confirmed to ONR that the RAP items had been satisfactorily closed.

I have examined NNB GenCo's application of its hold point release process for the release of Hold Point 1.2.2 and I consider this to have been carried out in an appropriately rigorous manner, and that its decision to lift the hold point is supported by the evidence cited in the HPRD.

RECOMMENDATIONS

On the basis of the request submitted by NNB GenCo and the conclusions of this PAR, I recommend that

1. the Head of ONR's EPR sub-Division signs this PAR to confirm support for the ONR technical and regulatory arguments that justify issuing HPC Licence Instrument 518: consent to commence unit 1 nuclear island concrete;
2. the Head of ONR's EPR sub-Division signs this PAR approving its release for publication, after redaction where appropriate; and
3. the Head of ONR's New Reactors Division signs HPC Licence Instrument 518 granting consent to NNB GenCo to commence unit 1 nuclear island concrete at Hinkley Point C.

LIST OF ABBREVIATIONS

AF	Assessment Finding
ALARP	As low as reasonably practicable
AR	Assessment Report
BMS	(ONR) How2 Business Management System
C&I	Control and Instrumentation
CDM	Construction (Design and management) Regulations 2015
CNI	Chief Nuclear Inspector
CSJ	Construction Safety Justification
DA	Design Authority
DSR	Design Substantiation Report
EDF	Électricité de France
EPR™	The generic design of pressurised water reactor submitted for GDA
FNSC	First Nuclear Safety Concrete
GDA	Generic Design Assessment
GLD	Government Legal Department
HP	Hold Point
HPC	Hinkley Point C
HPMD	Hold Point Management Document
HPP	Hold Point Panel
HPRD	Hold Point Review Document
HSE	Health and Safety Executive
HVAC	Heating, Ventilation and Air Conditioning
IACO	Independent Assessment Challenge and Oversight
ISFS	Interim Spent Fuel Storage
ITA	Independent Technical Assessment
LC	Licence Condition
LI	Licence Instrument
MED	Management Expectations Document
NIC	Nuclear Island Concrete
NICR	Nuclear Island Concrete Report
NISR	Nuclear Industries Security Regulations 2003
NNB GenCo	NNB Generation Company (HPC) Limited
NSC	Nuclear Safety Committee
NSL	Nuclear Site Licence
OCA	Organisational Capability Assessment (NNB GenCo)
ONR	Office for Nuclear Regulation

PAR	Project Assessment Report
PCmSR	Pre-Commissioning Safety Report
PCSR	Pre-Construction Safety Report
PCSR3	Version 3 of the PCSR
PSA	Probabilistic Safety Assessment
QMS	Quality Management System
RAP	Residual Action Plan
RC1.2	Reference Configuration 1.2
SAP	Safety Assessment Principle(s) (ONR)
SCM	Supply Chain Management
SSC	System, Structure or Component
TAG	Technical Assessment Guide(s) (ONR)
TIG	Technical Inspection Guide(s) (ONR)

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1 PERMISSION REQUESTED

1. NNB Generation Company (HPC) Limited (NNB GenCo) has requested (Ref. 1) the Office for Nuclear Regulation's (ONR) consent under Licence Condition (LC) 19(4) to commence unit 1 nuclear island concrete at Hinkley Point C (HPC), as defined by its Hold Point 1.2.2 (Ref.2). The activity constrained by this hold-point is the start of concrete pour for the unit 1 nuclear island common raft.
2. The common raft is a reinforced concrete structure supporting the reactor building, fuel building, and the four electrical and safeguard divisions. The thickness of the common base slab is typically 4m under the reactor building, and from 1.8m to 3.2m under the other buildings. There is one per unit. The raft takes the shape of a cross with a surface area is approximately 6,800 m².
3. The pouring of concrete for the nuclear island structures is an important step in the construction process, and an expression of confidence in the maturity of the HPC design. The concrete structures will impose structural integrity limits, seismic response characteristics, space constraints and certain access constraints that are fixed. For these reasons, commencement of pouring unit 1 Nuclear Island Concrete was identified by NNB GenCo as a Primary Hold Point and was selected by ONR for permissioning using primary powers given to it via the HPC Nuclear Site Licence (NSL).

2 DETAILS OF REQUEST

2.1 BACKGROUND

4. NNB GenCo, the nuclear site licensee, is constructing a twin reactor EPR™ nuclear power station at HPC. The ONR "*Hinkley Point C – Construction Intervention Strategy for the UK EPR™*" (Ref. 3) sets out ONR's current strategy for regulating the construction phase of the HPC project.
5. ONR has supplemented its strategy for HPC construction with "*Guidance for Early Construction Phase Activities up to ONR Consent to Nuclear Island Concrete*" (Ref. 4). That document provides guidance to ONR's topic leads to assist planning interventions and the preparation of topic specific assessment reports that will inform ONR's collective judgement of NNB GenCo capability as it prepares to proceed beyond key construction hold-points.

2.2 HPC CONSTRUCTION HOLD POINTS

6. Under its arrangements for compliance with Licence Condition 19 (*Construction or installation of new plant*), NNB GenCo has divided the HPC project into stages separated by Hold Points (HPs) which represent key project milestones where there is a step change in the risk of poorly conceived or executed construction or commissioning impacting upon nuclear safety. ONR expects NNB GenCo to have effective and robust arrangements for managing the progress of construction from one stage to the next.
7. For HPC unit 1 ONR judges the following Hold Points as separate stages of construction that, if inadequately conceived or executed, could represent a significant increase in risk to nuclear safety of the plant when operational.
 - HP1.2.1 First Nuclear Safety Concrete - first pour of nuclear safety related concrete on site;
 - HP1.2.2 Nuclear Island Concrete – pouring of the common raft concrete.
8. ONR issued Specifications using its primary powers under LC19(4) (Ref. 5) in the form of Licence Instruments 504 and 505, requiring NNB GenCo to gain the consent of ONR before passing Hold Point 1.2.1 - First Nuclear Safety Concrete (FNCS) and Hold

Point 1.2.2 - Nuclear Island Concrete (NIC). In March 2017, ONR issued Licence Instrument (LI) 509 giving its consent for NNB GenCo to proceed to FNSC (Ref. 6).

9. In view of the expected significant gap between HP 1.2.1 (FNSC) and HP 1.2.2 (NIC), in late 2016 ONR decided that it would be appropriate to permission a further construction hold-point, interim between HP1.2.1 and HP 1.2.2, using powers derived from the licensee's own arrangements under LC 19(1). ONR issued its agreement under LC 19(1) for NNB GenCo to proceed with the construction of the pumping station by means of LI 511, in July 2018 (Ref. 7).

2.3 NNB GENCO CASE FOR ONR'S CONSENT TO PASS HOLD POINT 1.2.2

10. NNB GenCo's request (Ref. 1) for ONR to grant consent for the start of unit 1 nuclear island concrete, cites a number of supporting documents:
 - HP 1.2.2 Hold Point Management Document (HPMD) (Ref. 8);
 - Independent Assessment Challenge and Oversight (IACO) Concurrence Part B (Ref. 9);
 - Minutes of Hold Point Panel meeting dated 17th October 2018 (Ref. 10)
 - Nuclear Island Concrete Report (NICR) (Ref. 11)
 - Interim Spent Fuel Storage (ISFS) Report (Ref.12)
 - Minutes of the 9th October 2018 Nuclear Safety Committee (NSC) meeting (Ref. 13)
 - Pre-Construction Safety Report (PCSR) Version 3 (PCSR3. Ref. 14)
11. This PAR provides a summary of ONR's assessment of the information provided by NNB GenCo in support of its request for consent. This assessment also takes into account additional information gathered by ONR from meetings with NNB GenCo and its Tier 1 contractors, as well as from inspections carried out at the HPC site and elsewhere.
12. This Project Assessment Report (PAR) draws on separate assessment reports, provided by the relevant ONR delivery leads, covering five 'cornerstone' themes:
 - Design & safety case
 - Organisational capability
 - Licence condition compliance
 - Conventional health & safety and fire safety
 - Nuclear security and nuclear safeguards

2.4 SCOPE OF THIS REPORT

13. This PAR draws on ONR's cornerstone reports and, where indicated, any other information gathered by ONR which is relevant to NNB GenCo's request.

2.4.1 Design and safety case

14. The safety case supporting NNB GenCo's request for ONR consent to commence construction of the unit 1 nuclear island common raft is covered by the following:
 - Pre-construction safety report (PCSR): The baseline safety justification for the construction of HPC is provided in HPC PCSR version 3 (PCSR3, Ref.14). However, due to the timing of the production of PCSR3, it does not include sufficient safety justification or design substantiation to support lifting the NIC hold point. Furthermore, NNB GenCo identified a number of safety case 'commitments' (defined as significant missing or immature input data required to complete a safety report document in order to meet its declared objectives) in PCSR3 that need to be resolved in advance of NIC.

- Nuclear Island Concrete Report (Ref. 11): This report supplements the baseline safety justification presented in PCSR3 and provides the nuclear safety justification and civil engineering design substantiation, as far as available, for the construction of the main nuclear island structures (the common foundation raft and the buildings located on it for unit 1).
 - Interim Spent Fuel Storage (ISFS) Safety Report (Ref. 12): This report supports the NIC Report by presenting the nuclear safety justification for the ISFS related equipment in the fuel building, fuel building extension, the interim spent fuel store building and on the haul path (route spent fuel will be moved from the fuel building to the interim spent fuel store building).
 - The design substantiation for the nuclear island structures, which is delivered as part of the civil engineering design sequence and discussed in the NIC Report.
15. The PCSR3 is not discussed in any detail in the design and safety case cornerstone as it has previously been assessed by ONR and reported elsewhere (Ref. 15).
16. As discussed in ONR's design & safety case cornerstone report (Ref. 16), the main purpose of the NIC Report is to justify the suitability of the current design to support release of the NIC hold point. This includes justifying the underpinning safety analyses, which support the derivation of suitable and sufficient safety requirements, as well as provision of the design substantiation demonstrating that these safety requirements are met.
17. The ISFS Safety Report supports the NIC Report by presenting the nuclear safety justification for the ISFS related equipment in the fuel building, fuel building extension, and interim spent fuel store building, and on the haul path. It adds to the information presented in PCSR3, providing additional evidence, to support the change to dry spent fuel storage technology which was not available when PCSR3 was produced.
18. ONR's design & safety case cornerstone report covers:
- the adequacy of the safety case to support commencement of NIC, including consideration of the nuclear safety justification and whether the level of risk will be ultimately reduced As Low As Reasonably Practicable (ALARP);
 - confidence that the civil engineering design does not foreclose options to reach an ALARP position that may be identified post-NIC, for example regarding system sizing and outcome of safety studies;
 - adequacy of the civil engineering design of the nuclear island common raft and confidence in the management and development of ongoing design and associated uncertainties for the NIC superstructure and other nuclear island buildings, where the civil engineering design process is ongoing;
 - for areas not directly foreclosed by the civil engineering design, whether progress is adequate for this point in the project;
 - resolution of relevant Generic Design Assessment (GDA) assessment findings and resolution of relevant regulatory issues raised as part of earlier assessments of the safety case and/or engagement with NNB GenCo;
 - the adequacy of NNB GenCo's LC 14 (safety documentation) arrangements;
 - the adequacy of NNB GenCo's safety case strategy post NIC.
19. The design & safety case cornerstone report provides a summary of technical assessments carried out under a number of ONR topic streams. Those individual topic stream assessments identify the standards and criteria that have been applied, the use of technical support contractors, the integration with other assessment topics and matters outside the scope of the assessment.

2.4.2 Organisational capability

20. The Organisational Capability cornerstone report (Ref. 17) considers NNB GenCo's establishment and implementation of organisational capability arrangements adequate to commence construction of the unit 1 nuclear island common raft.
21. Following FNSC, ONR proposed a series of organisational capability expectations and areas where it would seek to gain confidence in the licensee's arrangements leading up to unit 1 NIC, these covered:
 - site operation & activities
 - project management/governance
 - delivery of the 2017 NNB GenCo re-organisation
 - maturity of NNB GenCo's Project Delivery Model
 - essential foundations (project enablers/ key systems)
 - nuclear safety culture within NNB GenCo and its contractors
 - supply chain oversight & delivery
22. In addressing these expectations, the cornerstone report summarises the key points from four detailed assessment reports and takes a holistic view on the unit 1 NIC consent from an organisational capability perspective. The four underpinning reports cover:
 - quality systems
 - supply chain management
 - nuclear safety culture
 - organisational delivery
23. The organisational capability cornerstone also summarises ONR's views on NNB GenCo's own organisational capability assessment (OCA), which assesses their readiness at key stages of the project, and had been piloted at the previous (pumping station) hold point.

2.4.3 Licence Condition compliance

24. The scope of ONR's Licence Condition Compliance cornerstone report (Ref. 18), covers the adequacy of NNB GenCo's licence condition compliance and other arrangements which impact the licensee's ability to demonstrate appropriate control of the on-site activities constrained by this consent, including:
 - NNB GenCo's FNSC Substitution Concrete Improvement Plan activities
 - ONR crosscutting, themed and construction specific interventions
 - construction assurance assessment
 - Preservation & Maintenance during the construction phase
 - Chief Nuclear Inspector's inspection on supply chain management
 - routine non-construction specific licence compliance
 - safety case related Licence Condition compliance (LCs14 and 20)
 - conventional health & safety during construction
 - conventional fire safety during construction
 - preparations for industrial radiography
 - Pre-Operations - covering future licence compliance arrangements and future emergency arrangements
 - NNB GenCo's application of its hold point process for nuclear island concrete
 - progress with relevant regulatory issues

2.4.4 Conventional health & safety

25. The report from ONR's conventional health and safety lead (Ref. 19) focuses on NNB GenCo's important roles as client and principal contractor under the Construction (Design & Management) Regulations 2015, for all activities on the HPC site.
26. The report summarises the results of a number of interventions carried out at the HPC site covering a range of topics, including:
 - traffic management, extraction & tipping activities;
 - temporary works procedures;
 - lifting operations;
 - work at heights;
 - occupational health management.

2.4.5 Conventional fire safety

27. The report from ONR's fire safety specialist (Ref. 20) summarises ONR's assessment of NNB GenCo fire strategy with a view to establishing the adequacy of the fire safety justification, including whether the level of fire risk will be ultimately reduced ALARP. The report also covers fire safety on the construction site.

2.4.6 Nuclear security and nuclear safeguards

28. ONR's HPC nuclear safeguards lead has confirmed (Ref. 21) that there are no nuclear safeguards considerations relevant to ONR's decision to grant consent to NNB GenCo to commence unit 1 nuclear island concrete. Consequently, nuclear safeguards arrangements are not considered further in this PAR.
29. ONR's nuclear security assessment report (Ref. 22) focuses on ONR's activities in relation to:
 - regulating the extant physical security arrangements of the construction site and the associated supply chain in accordance with the Site Security Plan;
 - compliance against regulatory information security requirements; Regulation 22 of Nuclear Industries Security Regulation (NISR) 2003, the Site Security Plan and the ONR Classification Policy;
 - compliance with personnel security requirements as detailed, for instance, in the security policy frameworks of ONR and the Cabinet Office. ONR's assessment of personnel security practices includes both NNB GenCo and its supply chain.

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

3.1 METHODOLOGY

30. The assessments referenced in this PAR, as well as the preparation of the report itself, were undertaken in accordance with the requirements of ONR's How2 Business Management System (BMS) procedure (Ref. 23).
31. The ONR Safety Assessment Principles (SAPs) (Ref. 24), together with supporting Technical Inspection and Assessment Guides (TIGs and TAGs) (Refs. 25 and 26), have been used as the basis for ONR's technical assessment and interventions.

3.2 ONR'S DESIGN & SAFETY CASE CORNERSTONE

3.2.1 Safety case to support commencement of NIC

32. The design & safety case cornerstone report (Ref. 16) summaries the outcome of ONR's assessment of the safety case relevant to NIC covering a wide range of technical areas:

- fault studies and severe accident analysis
 - fuel and core design
 - internal hazards
 - conventional fire
 - human factors
 - probabilistic safety analysis (PSA)
 - radiological consequences analysis
 - external hazards
 - chemistry
 - radioactive waste and decommissioning
 - radiation protection
 - mechanical engineering
 - structural integrity
 - essential electrical
 - control and instrumentation (C&I)
 - civil engineering
33. These assessments build on previous design and safety case assessments of: the GDA of the EPR; assessment for site licensing; assessment of HPC PCSR2012; assessment for release of the first nuclear safety concrete hold point; and PCSR3.
34. In terms of the adequacy of the safety case, all the discipline-specific assessment reports concluded that the safety justification supports the judgement that ONR should consent to NNB GenCo to commence construction of the unit 1 nuclear island. The cornerstone report notes, however, that a number of matters have been identified where further justification and/or evidence is required post-NIC. These have been captured as ONR regulatory issues, which will be followed-up with NNB GenCo after the hold point has been released through regular level 4 meetings.
35. Regarding the maturity of the detailed design, the cornerstone report notes that although there remains uncertainty and a risk that options will be foreclosed by the civil engineering design, topic-specific assessment reports concluded that this risk is acceptably small and the uncertainty adequately managed for this point of the project. ONR will continue to engage with NNB GenCo post-NIC to ensure this uncertainty reduces and the risk remains under control as the project progresses.
36. Concerning the civil engineering design of the nuclear island, the cornerstone lead notes that the design of the nuclear island common raft met ONR expectations for this stage of the project and that remaining areas of risk were being suitably managed. Although some risks were noted associated with NNB GenCo's decoupling approach (where some inputs to the design are not substantiated until post construction), ONR's civil engineering specialist judged that the level of risk was acceptable for NIC. These areas of risk have been captured as regulatory issues to follow up and gain further confidence post-NIC. For the structures above the common raft and off common raft structures, where the design and substantiation are at different stages of maturity and completion, the ONR civil engineering assessment report concluded that current progress from both a technical and organisational perspective was acceptable for the current stage of the project.
37. Based on discipline-specific assessment reports' consideration of: the consistency of the safety case with the current reference design; progress with GDA assessment findings; NNB GenCo's progress with accepting modifications to the design; ONR's assessment of relevant modifications; the impact of modifications post-NIC; and key areas of design risk, ONR's design & safety case cornerstone lead concluded that the

design is moving to a position of increased stability and that the introduction of further significant design modifications, beyond those already notified, is unlikely.

3.2.2 Resolution of regulatory issues

38. The design & safety case cornerstone report notes that a number of regulatory issues were raised in previous ONR assessments, for example of PCSR2012, as well as in assessments related to FNSC and the start of the pumping station. Further regulatory issues had been raised as a result of regulatory engagements or interventions relating to the unit 1 nuclear island.
39. The cornerstone report notes that the assessment reports from ONR's specialist inspectors have confirmed that all the design and safety case related regulatory issues relevant to NIC have either been closed or adequate progress demonstrated.
40. Having reviewed the remaining HPC open regulatory issues, the ONR design & safety case lead concluded that NNB GenCo has made adequate progress towards resolution of ONR regulatory issues for commencement of construction of the nuclear island.

3.2.3 Resolution of GDA assessment findings

41. The cornerstone report notes that there are 118 assessment findings (AFs) identified by ONR during GDA for closure prior to NIC. In the NIC report, NNB GenCo identified a further 190 AFs which it aimed to either close or demonstrate adequate progress for NIC. The cornerstone lead reports that for the GDA AFs identified by ONR for closure by NIC, these have either been closed to ONR's satisfaction or, for the small number where there is still some work by NNB GenCo needed for closure, adequate progress has been made towards their resolution.
42. The cornerstone lead was therefore able to conclude that NNB GenCo has made adequate progress towards the resolution of GDA AFs to allow commencement of unit 1 NIC.

3.2.4 LC14 compliance

43. LC 14(1) requires licensees to make and implement adequate arrangements for the production and assessment of safety cases. For NIC this includes PCSR3, the NIC Report, the ISFS Safety Report, and the supporting documentation and substantiation.
44. The design & safety case cornerstone lead notes that ONR's assessment of PCSR3 had identified the need for substantial improvement of future safety cases, and it was decided to carry out an intervention to determine the adequacy of the NNB GenCo's LC 14 arrangements and their implementation, and to identify any necessary improvements in advance of NIC. ONR carried out the planned LC 14 intervention in March 2018, focusing on NNB GenCo's production of the supporting safety report for the start of offshore works. Following the intervention, ONR concluded that NNB GenCo was able to demonstrate that it has adequate arrangements for the production and assessment of safety case documentation relevant to the start of offshore works.
45. In addition, the cornerstone lead notes that on the basis of the safety documentation reviewed by ONR since PCSR3, as summarised in the cornerstone report, most ONR assessment topic stream inspectors confirmed that NNB GenCo has followed its processes and that the arrangements under LC 14 were adequate for this stage of the project.
46. The design & safety case cornerstone lead concluded that the positive outcome of the LC 14 intervention, the general views of the inspectors regarding the NIC submission, Independent Technical Assessment's (ITA) view on the progress made by NNB GenCo in improving the quality of the safety case, and NNB GenCo's strategy for developing the safety case post-NIC, provide sufficient evidence to conclude that NNB GenCo's LC 14 arrangements and their implementation for NIC are adequate.

3.2.5 NNB GenCo safety case governance

47. The NIC Report, ISFS Safety Report and the supporting references have been subjected to NNB GenCo governance, which has included review and acceptance by the NNB GenCo Design Authority (DA), ITA and consideration by the Nuclear Safety Committee.
48. The NIC Report identifies five open points that are required to be addressed before NNB GenCo lifts the hold point. The bases for NNB GenCo's closure of these open points are covered in ONR's assessments summarised in the design & safety case cornerstone report, and based on these assessments the cornerstone lead was satisfied that NNB GenCo has provided ONR with sufficient confidence for NIC on each of these points.
49. Of the 25 safety case commitments set out in PCSR3, the design & safety case cornerstone report notes that NNB GenCo has confirmed that all of those which are related to NIC are closed, and that where ONR's assessors had considered the basis of closure of a commitment, no concerns had been raised.
50. The cornerstone report notes that ITA had raised three conditions of acceptance from its assessment of version 1 of the NIC Report, which were subsequently closed within ITA assessment of version 2 of the NIC Report. ITA also raised two conditions of acceptance from its assessment of the ISFS Safety Report, although ITA agreed neither of these required resolution prior to NIC. IACO's Concurrence design and safety case assessment report identified six actions were required to be addressed prior to NNB GenCo lifting the NIC hold point. The cornerstone lead notes that resolution of ITA's conditions and actions is captured in the Hold Point Management Document for NIC, and was satisfied that these are being adequately managed by NNB GenCo's hold point process.
51. Overall, ONR's cornerstone lead was satisfied that governance has been applied consistent with NNB GenCo's arrangements and any outstanding PCSR3 or NIC Report open points will be adequately progressed by those arrangements and, where necessary, closed by NNB GenCo before it releases the hold point.

3.2.6 Post-NIC safety case strategy

52. As noted in Section 3.2.4 above, ONR's assessment of PCSR3 had identified a number of themes regarding the quality and structure of the safety case, which resulted in a level 3 issue being raised that included the following actions requiring resolution prior to NIC:
 - NNB GenCo should develop a safety case strategy that delivers and maintains an adequate safety case post-NIC.
 - NNB GenCo should outline implementation of / arrangements for its post-NIC safety case strategy, taking account of any learning from Construction Safety Justification CSJ-01 and PCSR3 and implementing necessary improvements.
53. The cornerstone report notes that NNB GenCo has written to ONR outlining the strategy for the safety case post-NIC and how this will address the themes identified by ONR in its assessment of PCSR3. The strategy proposes that the next major safety report will be the Pre-Commissioning Safety Report (PCmSR) (active commissioning), and that NNB GenCo will produce three interim 'safety case summary reports', with the first one being delivered in late 2019.
54. Overall, the cornerstone lead expressed confidence for NIC that ONR's feedback from earlier safety case assessments has been considered and adequately incorporated into the developing strategy for future safety cases. The cornerstone lead was also confident, subject to ongoing development and adequate implementation, that the future safety case has the potential to meet ONR expectations for an adequate pre-commissioning safety case.

3.2.7 Proposed RC1.2 design modifications (LC20)

55. The design & safety case cornerstone report notes that NNB GenCo has also separately requested ONR's agreement, using its arrangements made under LC 20, to implement several category 1 (the most significant) modifications into the HPC reference configuration (RC 1.2). To facilitate the production of the PARs that ONR will need to enable permissioning of the proposed modifications, Section 4 of the cornerstone report includes summaries of the findings from ONR's assessments of NNB GenCo's justifications for each design change. The three sets of proposed modifications cover:
- modifications to the design of the reactor cavity and fuel transfer compartment access arrangements, reactor cavity technical openings and fuel transfer tube, and associated civil works;
 - redesign of safeguard building (uncontrolled area) ventilation system and safety chilled water system, and associated civil works; and
 - design changes to reflect the impact on the fuel building of the move to dry spent fuel storage technology.
56. Regarding the three modifications, the cornerstone lead had no outstanding concerns that would preclude ONR issuing agreements for NNB GenCo to implement the modifications. However, given the stage at which these modifications are being incorporated into the reference configuration, all the evidence has not been produced and substantiation for the modifications has not been completed. To reflect this, the Licensing Summary Statements, which provide NNB GenCo's safety justification for the modifications, identify a number of future activities. The cornerstone lead notes that the assessors are content for these activities to be completed post-NIC.

3.2.8 Conclusion from design and safety case cornerstone report

57. Considering the various aspects of the design and safety case cornerstone summarised above, the cornerstone lead recommended that ONR grants consent under LC 19(4) for NNB GenCo to commence construction of unit 1 nuclear island.

3.3 ONR'S ORGANISATIONAL CAPABILITY CORNERSTONE

58. ONR's organisational capability cornerstone report (Ref. 17) considers NNB GenCo's establishment and implementation of organisational capability arrangements adequate to commence construction of the unit 1 nuclear island common raft. The scope of this cornerstone was set out in Section 2.5.2 which noted that it was informed by ONR assessment reports covering the four themes discussed in Sections 3.3.1 to 3.3.4 below, and also took cognisance of NNB GenCo's OCA process for establishing organisational readiness for this stage of the project.

3.3.1 Quality systems

59. The focus of ONR's assessment of the licensee's quality systems (Ref. 27) was on the development, deployment and effectiveness of NNB GenCo's Quality Management System (QMS) arrangements against ONR's expectations for NIC (Ref. 28). ONR's main areas of interest covered:
- maturity of NNB GenCo's Quality & Learning function;
 - deployment of quality arrangements across HPC Programmes and Projects;
 - adequacy of NNB GenCo's response to GDA Assessment Findings and ONR Regulatory Issues
60. Although the resourcing of the NNB GenCo's quality function has been a key area of concern for ONR for some time, the organisational capability report notes that ONR is now content that NNB GenCo has adequate specialist quality resources in-place, or under recruitment to meet the expected needs for NIC. NNB GenCo had also

instigated their own third party independent assessment that concluded these resources were sufficient for NIC.

61. The cornerstone report also notes that NNB GenCo's learning process and systems have continued to mature as the project progresses. The maturity of these arrangements was assessed by ONR in May 2018 and although there were some shortfalls regarding the inclusion of broader learning, ONR were content with the maturity of the arrangements for NIC. The cornerstone report notes, however, that the learning process and systems will continue to be a focus for ONR during the next phase of engagement.

3.3.2 Supply chain management

62. The focus of ONR's supply chain management assessment (Ref. 29) covers the development, deployment and effectiveness of HPC NNB GenCo's Supply Chain Management (SCM) arrangements against ONR's expectations for NIC, covering:
 - maturity of SCM functions and arrangements.
 - manufacture of High Integrity Items.
 - site civil work.
 - supply of manufactured safety related equipment.
63. The organisational capability cornerstone report notes that there have been a number of organisational changes within NNB GenCo and its parent French company (Électricité de France (EDF) SA) which are intended to enhance NNB GenCo's supply chain management capability, which will be assessed by ONR during the next phase of engagement.
64. ONR have inspected the development and deployment of the NNB GenCo's Commercial / Supply Chain Directorate's management system arrangements, and has reviewed a sample of key documents, which the cornerstone lead notes were found to be adequate.
65. In addition, the cornerstone report notes that ONR has carried out inspections at supply chain manufacturers of:
 - reactor vessel components (Japan Steel Works), where ONR considered that NNB GenCo had deployed effective supply chain controls; and
 - stainless steel pipes (Boccard, in Portugal), where ONR concluded that the NNB GenCo commercial assessment team had carried out a thorough and effective assessment of the manufacturer which met NNB GenCo's supply chain management arrangements and ONR's expectations.
66. The cornerstone report notes that the ONR inspector leading the supply chain work-stream engagement is satisfied that NNB GenCo has developed and deployed adequate supply chain management arrangements for the current stage of the project and to support NIC consent.

3.3.3 Nuclear safety culture

67. The organisational capability report summarises the results of ONR's assessment (Ref. 30) of NNB GenCo's nuclear safety culture against ONR's expectations for NIC. This assessment covered:
 - effectiveness of on-site leadership – in both NNB GenCo and its major contract partners;
 - implementation of the Project Culture strategy – both site plans and wider 'Project' activities;
 - effectiveness of the on-boarding process for site construction partners & expanding workforce; and
 - the new organisational structure supporting the Project Delivery Model

68. The organisational capability report notes that NNB GenCo has developed a Project Culture Strategy that incorporates nuclear safety as its foundation. This strategy embraces the expectations from IAEA, WANO and INPO, with the strategy underpinned by an implementation plan. ONR conducted an intervention in July 2018 and concluded that NNB GenCo was making adequate progress with implementing that plan. ONR are encouraged by the active engagement of the Site Construction Director with the Site Supervisors. ONR's organisational capability lead was content with NNB GenCo's progress in this area for NIC. However, ONR recognise the significant challenge facing NNB GenCo in maintaining a healthy nuclear safety culture within their existing teams and in the expanding supply chain over the life of the project. ONR will continue to actively engage in this area going forward.

3.3.4 Organisational delivery

69. The focus of this ONR assessment (Ref. 31) covers the development, deployment and effectiveness of HPC NNB GenCo's organisational delivery and project enablers arrangements against ONR's expectations for Nuclear Island Consent (NIC), covering:
- site operations & activities
 - Project Management & Governance
 - delivery of the reorganisation
 - maturity of the Project Delivery Model
 - effective programme delivery
70. The specialist inspector's assessment report (Ref.31) provides details of a number of ONR interventions / inspections, including:
- Licence Compliance Inspection covering: LC19; Construction or installation of new plant focusing on NNB GenCo's implementation of its site surveillance processes;
 - Examination of NNB GenCo's Work Control and Delivery Work Package processes;
 - Licence Compliance Inspection of Licence Conditions covering: LC 07; Incidents on the site and LC19; Construction or installation of new plant focusing on NNB GenCo's implementation of its non-conformance and field change request processes;
 - NNB GenCo's Organisational Capability Assessment (OCA);
 - examination of NNB GenCo management of the project reorganisation against its LC36 compliance arrangements;
 - examination of the overall effectiveness of NNB GenCo's internal regulator function.
71. The ONR specialist assessment report concluded that NNB GenCo has developed and deployed adequate organisational delivery and project enabling activities for the current stage of the project and to support unit 1 NIC consent.
72. In the cornerstone report, ONR's organisational capability lead noted that NNB GenCo has developed the OCA process to assess their organisational readiness at key stages of the project. This process was piloted at the Pumping Station milestone and improvements in the process have been incorporated for NIC. NNB GenCo's findings from the OCA did not highlight any notable resource shortfalls for NIC. The cornerstone lead notes that ONR's targeted intervention to examine the OCA process found that it was adequate to detect adverse organisational capability conditions. Based on ONR's overall assessment and the OCA, the cornerstone lead was content that NNB GenCo has sufficient resources to safely commence unit 1 NIC.

3.3.5 Overall conclusions on Organisational Capability

73. The organisational capability cornerstone lead's overall conclusion was that NNB GenCo has made notable progress with their Organisational Capability arrangements since ONR issued the FNSC consent and pumping station agreement, and considered their arrangements are adequate for unit 1 NIC. It was noted, however, that there remain significant challenges as the work expands over the next 2 years, and that NNB GenCo's arrangements will need to continue to mature to ensure an appropriate level of control is maintained.
74. The organisational capability lead therefore recommended that ONR grants consent under LC 19(4) for NNB GenCo to commence unit 1 nuclear island concrete.

3.4 LICENCE CONDITION COMPLIANCE CORNERSTONE

75. The scope of the Licence Compliance cornerstone report (Ref.18) was set out in Section 2.4.3 and includes the following, which are highlighted in the following sections:
- NNB GenCo's FNSC Substitution Concrete Improvement Plan activities
 - ONR crosscutting, themed and construction specific interventions
 - construction assurance assessment
 - Preservation & Maintenance during the construction phase
 - Chief Nuclear Inspector's inspection on supply chain management
 - routine non-construction specific licence compliance inspections
 - preparations for industrial radiography
 - Pre-Operations - covering future licence compliance arrangements and future emergency arrangements
76. In coming to a judgement on the adequacy of NNB GenCo's licence compliance activities, ONR's licence compliance cornerstone lead (the nominated HPC Site Inspector) drew on the findings from a number of site visits carried out during 2018, as well as from Level 4 meetings held elsewhere and from examination of relevant NNB GenCo and Tier 1 contractor documents.

3.4.1 NNB GenCo's FNSC substitution concrete improvement plan activities

77. The initial construction activities related to FNSC identified a number of areas for improvement and resulted in NNB GenCo and ONR carrying out independent investigations into NNB GenCo's management and implementation of FNSC. Although the identification of areas for improvement once construction starts is not unexpected, the deficiencies were such that they necessitated NNB GenCo producing a specific improvement plan, and ONR's associated intervention (Ref. 32) raised three level 3 regulatory issues to ensure that the most significant improvements were subjected to appropriate regulatory oversight.
78. The licence compliance cornerstone report concludes that NNB GenCo has made adequate progress with all three issues such that they have now been closed, and that regulation of relevant areas will continue as part of normal regulatory business. The cornerstone lead concluded that no issues remain in this area which preclude ONR issuing a Consent to commence construction of the unit 1 nuclear island.

3.4.2 ONR Crosscutting, themed and construction specific interventions

79. The cornerstone report summarises the outcomes of a number of cross-cutting and themed interventions, including:
- effectiveness of NNB GenCo's internal regulator function;
 - capture and management of future activities as defined within LC 20;

- effectiveness of NNB GenCo's supply chain management and the application of its intelligent customer arrangements for the procurement of embedded mechanical items by Bylor;
 - adequacy of quality and learning processes and the wider project management systems;
 - adequacy of NNB GenCo's management of its project reorganisation;
 - inspection of LC17 & LC36 focused on nuclear safety culture development at the NNB GenCo delivery command centre;
 - adequacy of implementation of NNB GenCo's non-conformance and field change request processes.
80. These interventions were assessed against ONR's expectations for compliance against:
- LC17 – Management systems
 - LC19 - Construction or installation of new plant
 - LC20 – Modification to design of plant under construction
 - LC36 – Organisational capability
81. The licence compliance cornerstone lead judged that NNB GenCo had been able to demonstrate continued adequate compliance with those crosscutting, themed and construction specific licence conditions as evidenced by the predominantly **green** inspection ratings in the associated intervention reports. Although the interventions identified two instances of shortfalls in compliance with LC17 management, the cornerstone lead noted that the relevant ONR topic leads have concluded that NNB GenCo has made adequate progress such that neither of these issues precludes ONR granting consent to commence construction of the unit 1 nuclear island.

3.4.3 Construction Assurance Assessment

82. The licence compliance cornerstone lead notes that one of ONR's civil engineering specialist inspectors, acting in the role of ONR HPC construction assurance lead, has completed an assessment of the adequacy of NNB GenCo's construction assurance activities (Ref. 33). The ONR construction assurance lead identified a number of areas related to construction assurance where NNB GenCo will need to further mature its arrangements to ensure they remain sustainable as project activity increases post-NIC.
83. Overall, however, the cornerstone lead notes that ONR's HPC construction assurance lead has not identified any significant concerns in respect to construction assurance which would preclude ONR granting consent to commence construction of the unit 1 nuclear island.

3.4.4 Preservation & Maintenance During the Construction Phase

84. ONR's HPC site inspector had identified that improvements were required to NNB GenCo's arrangements for preservation and maintenance of Systems, Structures or Components (SSCs) during the construction phase and had raised a level 3 issue to ensure appropriate regulatory oversight. As a result NNB GenCo put in place an improvement plan and has placed a requirement in the HP 1.2.2 Hold Point Management Document for an approved care & maintenance plan to be in place for the nuclear island prior to unit 1 NIC.
85. The licence compliance cornerstone report confirms ONR is satisfied that NNB GenCo has taken sufficient steps to ensure that appropriate preservation & maintenance arrangements are in place to support the commencement of unit 1 nuclear island construction.

3.4.5 Chief Nuclear Inspector's Inspection on Supply Chain Management

86. The Chief Nuclear Inspector's (CNI) themed inspection in late 2017 and other regulatory engagements had identified a range of deficiencies in NNB GenCo's Quality Management arrangements relevant to its supply chain oversight. This resulted in ONR raising a number of level 3 regulatory issues (Ref. 32). NNB GenCo's response to the CNI inspection and its own self-assessments has been to produce and implement an improvement plan.
87. The cornerstone report notes that NNB GenCo has made adequate progress with CNI's inspection related issues such that they have now been closed. The cornerstone lead concludes that there are no remaining issues in this area which would preclude ONR granting consent for commencement of construction of the unit 1 nuclear island.

3.4.6 Routine non-construction specific Licence Compliance inspections

88. In the period following ONR's Agreement to the commencement of construction of the pumping station, ONR has carried out a number of routine licence compliance inspections covering the following non-construction specific LCs:
 - LC05 - Consignment of nuclear matter
 - LC07 - Incidents on the site
 - LC08 - Warning notices
89. The cornerstone report sets out ONR's judgement that NNB GenCo has been able to demonstrate adequate compliance with these licence conditions. Although there were shortfalls in compliance with LC07 the cornerstone lead reports that the required improvements needed to address these shortfalls do not directly impact NNB GenCo's ability to manage the increased construction activities related to the unit 1 nuclear island consent.

3.4.7 Preparations for Industrial Radiography

90. Although there is a limited amount of on-site radiography at present, this is set to increase significantly as the project moves forward. Consequently the ONR HPC radiological protection lead undertook an inspection to examine the radiation protection arrangements made or planned by the site for its initial and bulk programmes of radiography.
91. The ONR licence compliance cornerstone report notes that as a result of this inspection no concerns have been identified regarding NNB GenCo's ability to meet the relevant applicable legislative requirements (Ionising Radiations Regulations 2017) prior to the commencement of industrial radiography.

3.4.8 Pre-Operations - covering future licence compliance arrangements and future Emergency Arrangements

92. ONR's Pre-Operations topic lead is continuing to engage with NNB GenCo to ensure that it is adopting a proportionate approach to the development of its future operational licence compliance arrangements with current focus being across three main areas:
 - Future operational emergency arrangements
 - Operations – operations capability and development of operational technical specifications (LC23)
 - Future operational maintenance arrangements (LC28)
93. The licence compliance cornerstone report notes that the Pre-Operations topic lead had concluded that NNB GenCo is taking a proportionate approach to developing its licence compliance arrangements applicable to the Plant Operations work stream. As such, although further continued engagement will be required to ensure the final licence compliance arrangements meet regulatory expectations, the Pre-Operations topic lead concluded that that there are no current substantive concerns which would

challenge ONR's decision to grant a consent for commencement of construction of the unit 1 nuclear island.

3.4.9 Licence compliance cornerstone conclusions

94. ONR's licence compliance lead concluded that, based on sampling of NNB GenCo's documentation and on interventions undertaken since FNSC including those undertaken since ONR's Agreement to the commencement of the construction of the pumping station, there were no significant areas related to licence condition compliance which would preclude ONR issuing a consent for NNB GenCo to commence construction of the unit 1 nuclear island.
95. The licence compliance cornerstone lead therefore recommended that ONR grants NNB GenCo Consent under LC 19(4) to commence construction of the unit 1 nuclear island.

3.5 CONVENTIONAL HEALTH & SAFETY AND FIRE SAFETY ASSESSMENTS

3.5.1 Conventional health & safety

96. ONR has responsibility for regulating all aspects of safety, including conventional health and safety, within licensed nuclear sites or in the adjacent new nuclear build/main construction site. However, HPC is a major construction project spread over several years and would require a greater specialist conventional health and safety regulatory resource than ONR has available.
97. In this context and in recognition of the Health & Safety Executive's (HSE) Construction Division's expertise developed during interventions with other major projects, ONR has provided warrants under the Energy Act 2013 to a number of experienced HSE construction inspectors to enable them, working closely with ONR's Conventional Health and Safety Team, to act on ONR's behalf at the HPC main construction site.
98. As discussed in the report from the conventional health and safety lead (Ref. 19), and also in the licence compliance cornerstone report (Ref. 18), ONR's conventional health and safety interventions at Hinkley Point C have focussed on NNB GenCo's arrangements as client and principal contractor under the Construction (Design and Management) Regulations 2015. These interventions have concluded that:
 - NNB GenCo has implemented generally reasonable site health and safety standards, with widespread effective control measures and evidence of good performance;
 - NNB GenCo has demonstrated understanding of its CDM duties as client and principal contractor and it is clear that NNB GenCo has aspirations as CDM client to set itself high standards;
 - there is on-going positive development of the principal contractor role, despite changes of key personnel and the current team's expansion and embedding of new staff. ONR acknowledge that there is visible leadership and productive contractor interface;
 - the implementation and embedding of proportionate and effective NNB GenCo project safety policies and procedures has been challenging, involving balancing the requirements of experienced Tier 1 contractors (with due recognition of their internal systems), and of other, smaller contractors, within a complex construction project. NNB GenCo will need to ensure sustained focus in the area as the number of contractors onsite increases, and overall construction activity accelerates;
 - ONR interventions have identified that some further improvement is required regarding NNB GenCo's control of lifting operations and site traffic management, captured in a level 4 regulatory issue (now closed) which was not linked to unit 1 NIC.

99. Overall, ONR's conventional health and safety lead concludes that with regards to conventional health and safety on the main construction site, there are no significant concerns which would preclude ONR granting consent to NNB GenCo to start construction of the unit 1 nuclear island.

3.5.2 Fire Safety

100. As reported by ONR's HPC conventional fire safety inspector (Ref. 20), ONR has carried out a series of interventions assessing the adequacy of NNB GenCo's conventional fire safety arrangements related to the construction phase. These interventions examined the planning, implementation, supervision, monitoring and review of fire safety during construction. ONR's conventional fire safety inspector concluded that adequate fire safety management arrangements are in place for the construction phase of the project.
101. In addition, the inspector considered the fire strategies which NNB GenCo proposes to apply to the completed nuclear island buildings to ensure that proceeding with unit 1 NIC does not foreclose options for reaching an ALARP position with regard to fire safety. In relation to this, the inspector raised no objections to the release of Hold Point 1.2.2 and the start of construction of the unit 1 nuclear island common raft.

3.5.3 Conclusions on conventional and fire safety

102. Drawing from the conclusions of the ONR conventional health & safety, and conventional fire safety leads, it is clear that there are no issues emerging from ONR's regulation of conventional health and safety, and fire safety that should prevent ONR from granting consent under LC19(4) for NNB GenCo to commence construction of the nuclear island.

3.6 NUCLEAR SECURITY ASSESSMENT

103. ONR's views on the security arrangements for the HPC site are set out in the assessment report produced by the ONR HPC security lead (Ref. 22). That report notes that NNB GenCo's approach to the security of the nuclear island is based upon the requirement to *Deter, Detect, Delay and Respond* to malicious activity, in order to prevent the theft or sabotage of nuclear material, other radioactive material or compromise of sensitive nuclear information.
104. The report notes that NNB GenCo has developed suitable and proportionate physical security arrangements for the nuclear island and the security regime is considered appropriate for NIC. As their plans evolve, NNB GenCo will have to demonstrate (through appropriate claims, arguments and evidence) that the physical security systems and associated processes in place will be sufficient to achieve the necessary security and these systems and processes will continue to be monitored by ONR through routine engagement and interventions.
105. The security assessment report also notes that NNB GenCo had satisfactorily addressed the nuclear security GDA Assessment Findings related to NIC.
106. In the report, the security lead concludes NNB GenCo has provided assurance that security arrangements are adequate for ONR's consent for unit 1 NIC. The report notes that ONR currently has no reason to doubt that NNB GenCo will continue to make satisfactory progress towards post-NIC security milestones.

3.7 OTHER ONR CONSIDERATIONS

107. The above sections have considered the conclusions from the five cornerstone themes regarding the readiness of NNB GenCo to release Hold Point 1.2.2 and commence construction of the unit 1 nuclear island. These are ONR's primary considerations in making a judgement on whether to grant consent under LC 19(4).

108. This section considers some other matters which are pertinent to the release of this hold point, and on which ONR needs to be satisfied; namely:
- closure or satisfactory position with all GDA Assessment Findings relevant to Hold Point 1.2.2;
 - closure or adequate progress with all relevant ONR Issues;
 - closure of NNB GenCo Commitments related to HP 1.2.2;
 - liaison with the Environment Agency; and
 - preparation of the Licence Instrument.

3.7.1 Resolution of GDA Assessment Findings

109. In ONR's EPR™ Generic Design Assessment (GDA) Step 4 reports and GDA issue close-out reports (Ref. 34) ONR identified a number of Assessment Findings - matters to be addressed by a future licensee prior to proceeding beyond various construction and commissioning milestones. Some of these AFs had been closed by the FNSC milestone, with the rest to be closed at later stages, including 118 AFs for which ONR required evidence of closure prior to the start of NIC. The bulk of these AFs are related to design and safety case matters, with their status reported in the design and safety case cornerstone report, and a small number covered by the organisational capability and security reports.
110. The design and safety case cornerstone report (Ref. 16) notes that in the NIC Report NNB GenCo had identified a further 190 assessment findings that it wished to either close or show adequate progress prior to release of the NIC hold point. Where NNB GenCo has submitted closure proposals for any of these additional AFs, ONR has applied the same process for judging the basis for their closure as for those directly related to NIC.

3.7.1.1 Design & safety case AFs

111. The design and safety case cornerstone report notes that NNB GenCo had submitted interim or full closure forms for each of the assessment findings targeted for closure by NIC. Full closure forms summarise the basis for closure and provide links to the supporting evidence. Interim closure forms are used as part of planned, staged closure or to record evidence of adequate progress to support lifting of a key hold point.
112. The design and safety case report notes that ONR specialist inspectors in reviewing the closure forms submitted by NNB GenCo have noted closure for the majority of full closure forms. In a small number of cases where clarification is still being sought or full closure has been rejected for this stage of the project, ONR specialist inspectors have indicated they are content with progress and that further evidence to fully close these assessment findings can be provided post-NIC. Where interim closure forms have been produced, in all cases ONR inspectors have identified that progress is adequate for this point.
113. For a small number of AFs, NNB GenCo wrote to ONR requesting a change to the milestone published in GDA. In all cases ONR specialist inspectors were satisfied with the proposed change in milestone and with the progress made towards resolution, and the cornerstone report notes that ONR has written to NNB GenCo agreeing to these deferrals. The design and safety case lead therefore concluded that NNB GenCo has made adequate progress towards resolution of relevant GDA assessment findings for commencement of unit 1 NIC.

3.7.1.2 Organisational capability AFs

114. The organisational capability cornerstone report notes that the small number of AFs relevant to this area had been considered by ONR's HPC quality systems lead, who reported (Ref. 27) that all had been satisfactorily closed.

3.7.1.3 Security AFs

115. The report from ONR's HPC security lead (Ref. 22) notes that all of the security AFs directly related to NIC had been adequately addressed.

3.7.1.4 Conclusion on Assessment Findings

116. Having considered the reports from the design and safety case, organisational capability, and security leads, I am satisfied that the vast majority of NIC-related AFs have been satisfactorily closed. For a small number of NIC-related AFs that remain outstanding, I am satisfied that ONR's specialist inspectors have identified that progress is adequate for unit 1 NIC.

3.7.2 Resolution of Regulatory Issues

117. ONR defines a Regulatory Issue as "any matter that has the potential to challenge regulatory compliance ..." They are normally identified following ONR interventions and are the licensee's responsibility to manage and correct. ONR places the issue on its Regulatory Issues Database in order to record that it is given the appropriate regulatory oversight. Issues are ranked levels 1 to 4 with level 1 denoting the highest level of importance.
118. For HPC, ONR inspectors had raised a number of level 3 and level 4 issues which identified NIC as a target closure milestone. Level 4 issues are tracked to closure by individual inspectors while the closure of a Level 3 issue is subject to the agreement of ONR's EPR Sub-Division Board. The status of regulatory issues identified for closure by the commencement of nuclear island construction is discussed in the design and safety case, organisational capability and licence compliance cornerstone reports.

3.7.2.1 Design & safety case Regulatory Issues

119. The design and safety case cornerstone lead (Ref. 16) notes that a number of regulatory issues were raised in previous ONR assessments which relate to the nuclear island. The cornerstone report notes that the ONR specialist inspectors have considered NNB GenCo's resolution of these issues and were satisfied with the progress made. The design and safety case cornerstone lead also reviewed ONR's open regulatory issues and confirmed that NNB GenCo has addressed, or demonstrated adequate progress towards resolution of those relevant to NIC.
120. The design and safety case cornerstone lead concluded that NNB GenCo has made adequate progress towards resolution of ONR regulatory issues for commencement of construction of the unit 1 nuclear island.

3.7.2.2 Organisational capability Regulatory Issues

121. Each of ONR's specialist inspectors responsible for the four assessment reports contributing to the organisational capability cornerstone (Ref.17) has considered the status of the NIC-related Regulatory Issues relevant to their areas.
122. Having considered each of the contributory assessment reports, ONR's organisational capability cornerstone lead confirmed that for the commencement of unit 1 nuclear island concrete, there were no open level 3 (or above) Regulatory Issues.

3.7.2.3 Licence compliance Regulatory Issues

123. The licence compliance cornerstone lead notes (Ref. 18) that all regulatory issues arising from ONR's intervention following FNSC, and which ONR had expected closure prior to NIC, had been satisfactorily closed and that regulation of relevant areas would continue as part of normal regulatory business.
124. The cornerstone lead also notes that the ONR Pre-Operations topic lead had identified three outstanding emergency arrangements related level 4 issues which needed to be

adequately progressed by NNB GenCo to support ONR granting consent for unit 1 NIC:

- severe accident instrumentation classification
- emergency arrangements HVAC ALARP justification
- emergency arrangements classification process

125. The cornerstone lead noted that in the relevant assessment note (Ref. 35) the ONR Pre-Operations topic lead had concluded that for these areas NNB GenCo had now made adequate progress such that full resolution of the issues was not required to support NIC Consent.

3.7.2.4 Conclusions on NIC-related Regulatory Issues

126. Having reviewed the conclusions of the ONR cornerstone leads, I am satisfied that NNB GenCo has addressed, or demonstrated adequate progress towards resolution, of all those regulatory issues relevant to unit 1 NIC.

3.7.3 NNB GenCo Regulatory Commitments

127. Significant undertakings given by NNB GenCo to the regulators during the course of normal interactions are recorded formally as regulatory Commitments. Each commitment will be given a milestone by which it will be expected to be fulfilled.

128. Examination of the relevant Commitments log (Ref. 36) has shown that in relation to the start of unit 1 nuclear island common raft there are no open regulatory Commitments which ONR would expect NNB GenCo to fulfil. There are therefore no matters relating to unfilled Commitments which would prevent ONR from granting consent under LC 19(4) for commencement of unit 1 nuclear island common raft.

3.7.4 Liaison with the Environment Agency

129. ONR works closely with the Environment Agency to ensure that both regulators are fully aware of any matters which may affect their regulatory activities in relation to HPC or the adjacent nuclear sites. This is facilitated not only through routine working-level contacts and sharing of information, but also by virtue of the Environment Agency being an attendee at ONR's regular EPR Sub-Division Board.

130. Nevertheless, to ensure the Environment Agency's fullest possible awareness of, and the basis for, ONR's decision making in relation to NNB GenCo's request for consent, the Agency's views were sought on the draft contents of this PAR (Ref. 37). In response (Ref. 38), the Environment Agency expressed no concerns that should prevent ONR from granting consent under LC 19(4) for commencement of unit 1 nuclear island common raft.

3.7.5 Preparation of the Licence Instrument

131. Annex 2 of the ONR Instruction NS-PER-IN-001 Revision 8: *Preparation and Issue of Licence Instruments* (Ref. 39) does not include a standard form for a Licence Instrument giving ONR consent under LC19(4). Consequently I sought the advice of the Government Legal Department (GLD) on the drafting of this LI. GLD subsequently confirmed (Ref. 42) that the wording of my draft LI 518 was acceptable.

132. This PAR will be subject to peer review in accordance with ONR's procedure (Ref. 40) and amended as necessary prior to submission to the Head of ONR's EPR sub-Division for approval. The preparation of the Licence Instrument will also be subject to a standard check-list, signed and countersigned in accordance with the requirements of Ref. 39.

4 NNB GENCO'S PROCESS FOR RELEASE OF THE HOLD POINT

133. As discussed in Section 2.3 above, NNB GenCo has defined Hold Point 1.2.2 as a 'primary hold point' and the process for the release of such hold points is set out in its

- Define, Manage, and Release Key Hold-Points* procedure (Ref. 41). That process requires the production of a Management Expectations Document (MED) setting out those actions which need to be completed in order for the hold point to be released.
134. A MED is an integral part of the Hold Point Management Document (HPMD) which consists of the MED, a Hold Point Review Document (HPRD) and a Residual Action Plan (RAP). The HPRD sets out the evidence that NNB GenCo considers necessary to close each of the actions and this will be submitted to the NNB GenCo Hold Point Panel (HPP) for review. If satisfied, the HPP will recommend the release of the hold point. For a primary Hold Point, such as this one, the recommendation from the HPP will be submitted to the NNB GenCo Board for its approval. Any outstanding actions that cannot be completed before that stage will be included in the RAP. The actions in RAP must be closed before the start of the constrained activity. Closure of the RAP requires the signatures of the HPP Chair, the NNB GenCo Head of Assurance and the Hold Point Manager.
 135. The MED for the NIC hold point was recommended for approval by the HPP in January 2018 and approved by the NNB GenCo Board in June 2018. The MED identified 57 expectations which are required to be completed before the hold point is released. Since that time the HPRD has been updated periodically by the Hold Point Manager to reference the evidence that supports expectation closure.
 136. On a number of occasions from August to October 2018, the HPP has considered progress with the HPRD, including reviewing the evidence for expectation closure, with a special meeting to confirm the precise definition of the constrained activity. At the 17th October 2018 HPP meeting, the HPP was presented with the latest version of the HPRD and considered all of the expectations in order to establish a panel view on the status of each one and to decide whether to recommend the HPRD for approval by the NNB GenCo Board.
 137. I have reviewed the minutes of the October 17th HPP (Ref. 10) and I am satisfied that the panel undertook a thorough consideration of the status of each MED expectation. As a result of its deliberations, the HPP agreed that all but five of the MED expectations were satisfactorily closed, and that the five open expectations could be carried forward into the RAP. The panel recommended that the HPRD be presented to the NNB GenCo Board for its approval.
 138. Subsequently, on 26th October 2018, NNB GenCo's Hold Point Manager confirmed to ONR that the five RAP items had been closed and the RAP could be signed off as complete (Ref. 43).
 139. As part of its internal governance, in August 2018 NNB GenCo's internal assurance function (IACO) undertook a concurrence review of the project's readiness to release the hold point and proceed with the constrained activity, and this identified a number of actions which IACO required to be completed prior to NIC. The final version of the concurrence document (Ref. 9) issued in October 2018 notes that all of these actions, apart from one, had been satisfactorily closed. The remaining action was included in the RAP as discussed above. The concurrence report concluded that, subject to successful completion of the RAP actions, the assurance function concurs with the lifting of the NIC hold point.
 140. Both the HPMD and the IACO concurrence findings were put to the 9th October 2018 Nuclear Safety Committee (NSC) for consideration and advice. Following discussion, the NSC (Ref. 13) expressed satisfaction with NNB GenCo's hold point governance process and concluded that, subject to completion of the identified outstanding actions and the remainder of the governance process, that it had no reason not to recommend the release of the NIC hold point.
 141. On the basis of the above, I am satisfied that NNB GenCo has properly applied its hold-point management process to the release of the NIC Hold Point 1.2.2.

5 CONCLUSIONS

142. This PAR presents the findings of ONR's assessment of NNB GenCo's request for its consent under LC 19(4) for commencement of nuclear island concrete.
143. The report summarises ONR's assessment in relation to the following key areas:
- status of the plant design & safety case;
 - NNB GenCo's organisational capability;
 - NNB GenCo's compliance with its nuclear site licence conditions;
 - conventional health & safety and fire safety readiness;
 - nuclear security and nuclear safeguards considerations; and
 - other matters ONR considers relevant to its decision on granting consent for the start of construction of the nuclear island.
144. This PAR also considers NNB GenCo's processes for determining its own and its Tier 1 civil contractor's (Bylor) readiness to commence construction of the unit 1 nuclear island.

5.1 CONCLUSIONS ON DESIGN & SAFETY CASE

145. Taking cognisance of ONR's earlier HPC safety case assessments, ONR's consideration of the safety case for the commencement of NIC focused on:
- the adequacy of the safety case to support commencement of construction of the nuclear island, including consideration of the nuclear safety justification and whether the level of risk will ultimately be reduced ALARP;
 - confidence that the civil engineering design does not foreclose options identified post commencement of nuclear island concrete to reach an ALARP position, for example in relation to maturity of system sizing and outcome of safety studies;
 - adequacy of the civil engineering design of the nuclear island common raft, which supports the reactor, fuel and safeguard buildings, and confidence in the management and development of ongoing design and associated uncertainties for the nuclear island superstructure (buildings supported by the nuclear island common raft) and other nuclear island buildings, where the civil engineering design process is ongoing; and
 - whether the HPC design is sufficiently stable, that is whether all significant modifications have been incorporated into the design, including consideration of whether the impact of future modifications are adequately understood and taken into account.
146. Based on sampling of NNB GenCo's documentation and a review of each of ONR's discipline-specific assessment reports, ONR's safety case and design cornerstone lead reported no outstanding concerns regarding the start of construction of unit 1 nuclear island common raft. The cornerstone lead therefore recommended that ONR grants consent to NNB GenCo under LC 19(4) for NNB GenCo to commence construction of unit 1 nuclear island common raft.
147. Having reviewed the conclusions of the design & safety case cornerstone lead, I am satisfied that there are no matters relating to the HPC design and safety case which would prevent ONR granting NNB GenCo consent under LC 19(4) to commence construction of the unit 1 nuclear island.

5.2 CONCLUSIONS ON ORGANISATIONAL CAPABILITY

148. The Organisational Capability cornerstone report considers NNB GenCo's establishment and implementation of organisational capability arrangements adequate to commence construction of the unit 1 nuclear Island common raft.

149. Following FNSC, ONR proposed a series of organisational capability expectations and areas where it would seek to gain confidence in the licensee's arrangements leading up to NIC. In addressing these expectations, the cornerstone report summarises the key points from four detailed ONR assessment reports and takes a holistic view on the NIC consent from an organisational capability perspective. The four underpinning reports cover:
- Quality Systems
 - supply chain management
 - nuclear safety culture
 - organisational delivery
150. The organisational capability cornerstone lead's overall conclusion was that NNB GenCo has made notable progress with their organisational capability arrangements since ONR issued the FNSC consent and pumping Station agreement, and considered their arrangements are adequate for NIC. It was noted, however, that there remain significant challenges as the work expands over the next 2 years, and that NNB GenCo's arrangements will need to continue to mature to ensure an appropriate level of control is maintained. The organisational capability lead therefore recommended that ONR grants consent under LC 19(4) for NNB GenCo to commence nuclear island concrete for unit 1 at HPC.
151. Having reviewed the conclusions of the organisational capability cornerstone lead, I am satisfied that there are no matters relating to NNB GenCo's organisational capability which would prevent ONR granting NNB GenCo consent under LC 19(4) to commence construction of the unit 1 nuclear island

5.3 CONCLUSIONS ON LICENCE CONDITION COMPLIANCE

152. ONR's licence compliance cornerstone report covers the adequacy of NNB GenCo's licence condition compliance and other arrangements which impact the licensee's ability to demonstrate appropriate control of the site activities constrained by this Consent, including:
- NNB GenCo's FNSC Substitution Concrete Improvement Plan activities
 - ONR crosscutting, themed and construction specific interventions
 - Construction assurance assessment
 - Preservation & Maintenance during the construction phase
 - Chief Nuclear Inspector's inspection on supply chain management
 - Routine non-construction specific licence compliance.
153. Based on sampling of NNB GenCo's documentation and ONR's interventions undertaken since FNSC including those undertaken since ONR's agreement to the commencement of construction of the pumping station, ONR's licence compliance cornerstone lead did not identify any significant areas related to licence condition compliance which would preclude ONR issuing a consent for NNB GenCo to commence construction of the unit 1 nuclear island.
154. Having reviewed the conclusions of the licence compliance cornerstone lead, I am satisfied that there are no matters relating to licence compliance which would prevent ONR granting NNB GenCo consent under LC 19(4) to commence construction of the unit 1 nuclear island.

5.4 CONCLUSIONS ON CONVENTIONAL HEALTH & SAFETY AND FIRE SAFETY

155. From the perspective of NNB GenCo's arrangements for managing both conventional health and safety and fire safety, I am satisfied that there are no issues which ONR is aware that prevent ONR from giving consent under LC19(4) to the start of construction of the unit 1 nuclear island.

156. Having reviewed the conclusions of ONR's conventional health & safety and fire safety leads, as well as the conclusions of the licence compliance cornerstone lead which are relevant to this area, I am satisfied that there are no matters relating to conventional health & safety or fire safety which would prevent ONR granting NNB GenCo consent under LC 19(4) to commence construction of the unit 1 nuclear island.

5.5 CONCLUSIONS ON NUCLEAR SECURITY AND SAFEGUARDS

157. ONR's HPC nuclear safeguards lead has confirmed that there are no nuclear safeguards considerations relevant to the start of construction of unit 1 nuclear island common raft.
158. The security cornerstone report concludes NNB GenCo has continued to provide the requisite level of assurance that security arrangements are adequate for ONR's consent for Nuclear Island Concrete.
159. Having reviewed the conclusions of ONR's safeguards and security leads, I am satisfied that there are no matters relating to these areas which would prevent ONR granting NNB GenCo consent under LC 19(4) to commence construction of the unit 1 nuclear island.

5.6 CONCLUSIONS ON OTHER ONR CONSIDERATIONS

160. This report sets out ONR's position on a number of other matters which it considers relevant to its decision on giving its consent to the release of Hold Point 1.2.2. These are:
- closure or satisfactory position with all GDA Assessment Findings relevant to Hold Point 1.2.2;
 - closure or satisfactory progress with all relevant Regulatory Issues;
 - confirmation that there are no open NNB GenCo Commitments related to Hold Point 1.2.2; and
 - The Environment Agency's views on the basis for ONR's decision to grant consent.
161. This PAR concludes that there are no concerns regarding any of these matters which should prevent ONR from granting consent under LC 19(4) for NNB GenCo to commence construction of unit 1 nuclear island common raft.

5.7 CONCLUSIONS ON NNB GENCO'S HOLD POINT RELEASE PROCESS

162. This PAR notes that the outcome of NNB GenCo's hold-point release process was a Hold Point Review Document (HPRD) which was subject to review by NNB GenCo's Hold Point Panel. Having reviewed the HPRD, the HPP recommended that the hold point could be lifted, subject to the satisfactory closure of five items identified in the RAP. The panel recommended that the HPRD be presented to the NNB GenCo Board for its approval. NNB GenCo subsequently confirmed to ONR that each of the RAP items had been satisfactorily closed.
163. I have examined NNB GenCo's application of its hold point release process for the release of Hold Point 1.2.2 and I consider this to have been carried out in an appropriately rigorous manner, and that its decision to lift the hold point is supported by the evidence cited in the HPRD.
164. On 2nd November 2018, NNB GenCo confirmed to ONR that the NNB GenCo Board had approved the lifting of the NIC hold point.

6 RECOMMENDATIONS

165. On the basis of the request submitted by NNB GenCo and the conclusions of this PAR, I recommend that the Head of ONR's EPR sub-Division approves this PAR:

- to confirm support for the ONR technical and regulatory arguments that justify issuing HPC Licence Instrument 518: consent to commence the construction of unit 1 nuclear island; and
 - to allow its release for publication, after redaction where appropriate.
166. Following approval of the PAR, I recommend that the Head of the New Reactors Division signs HPC Licence Instrument 518 granting consent to NNB GenCo to commence construction of unit 1 nuclear island at Hinkley Point C.

7 REFERENCES

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- 3 Hinkley Point C. Construction Intervention Strategy for the UK EPRTM. 23 March 2016. TRIM 2016/134216
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- 5 ONR-NR-PAR-16-002 Revision 8. PAR for Specifications under Licence Condition 19 for Hold Point 1.2.1 and Hold Point 1.2.2 for the Hinkley Point C nuclear power station. TRIM 2016/378742
- 6 ONR letter HPC50265N, 7th March 2017: Licence Instrument 509, Consent for FNSC TRIM 2017/92591
- 7 ONR letter HPC50326N, 26th July 2018: Licence Instrument 511, Agreement to commence the start of the pumping station TRIM 2018/227090
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- 16 ONR-NR-AR-18-029 Revision 0. Design and Safety Case Cornerstone Report to Inform Consent to Commence Hinkley Point C Unit 1 Nuclear Island Concrete TRIM 2018/252545
- 17 ONR-NR-AR-18-027 Revision 0. Organisational Capability Cornerstone Assessment Report – NNB Generation Company (HPC) Ltd - Consent to Commence Unit 1 Nuclear Island Concrete TRIM 2018/259373
- 18 ONR-NR-AR-18-032 Revision 0. Licence Condition Compliance Cornerstone Report to Inform Consent to Commence Hinkley Point C Unit 1 Nuclear Island Concrete TRIM 2018/289579
- 19 ONR-NR-AN-18-007 Revision 0. ONR Conventional Health and Safety Assessment - of NNB GenCo (HPC) to inform the HPC Nuclear Island Concrete Decision TRIM 2018/263609
- 20 ONR-NR-AR-18-017 Revision 6. Conventional Fire Safety Assessment - NNB Generation Company (HPC) Ltd - Consent to Commence Unit 1 Nuclear Island Concrete TRIM 2018/227869

- 21 ONR Safeguards input - Hinkley Point C: Start of Nuclear Island Concrete September 2018 TRIM 2018/317158
- 22 ONR-NR-AR-18-023. Hinkley Point C - Status of the Security Arrangements at Nuclear Island Concrete TRIM 2018/247235
- 23 ONR How2 Business Management System, Guidance on Production of Reports, NS-PER-GD-015 Revision 0 (NS-TAST-GD-084). TRIM 2016/448248
- 24 Safety Assessment Principles for Nuclear Facilities, 2014 Edition Revision 0, ONR. November 2014. <http://www.onr.org.uk/saps/saps2014.pdf>.
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- 33 ONR-NR-AR-18-030 Revision 0B NNB Generation Company (HPC) Ltd – Consent to Commence Unit 1 Nuclear Island Concrete: Civil Engineering Construction Assurance Assessment TRIM 2018/252034
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