

Hinkley Point C Construction

Assessment of a request by NNB GenCo (HPC) Ltd for ONR Agreement to commence bulk Mechanical, Electrical and HVAC installation in unit 1 nuclear island

Project Assessment Report ONR-NR-PAR-21-002
Revision 1
23 November 2021

EXECUTIVE SUMMARY

TITLE

ONR assessment of a request from NNB Generation Company (HPC) Limited (NNB GenCo) for Agreement under Licence Condition 19 to commence bulk installation of Mechanical, Electrical, and heating, ventilation and air conditioning (HVAC) in unit 1 nuclear island at Hinkley Point C.

PERMISSION REQUESTED

NNB GenCo has requested the Office for Nuclear Regulation's (ONR) Agreement under Licence Condition (LC) 19(1) to commence the start of bulk Mechanical, Electrical and HVAC (MEH) installations in the nuclear island of unit 1 at Hinkley Point C (HPC), as defined by its Hold Point 2.2.20. The activity constrained by this hold point is the start of MEH installations in unit 1 safeguards building HL1.

The start of MEH fit-out represents a major change to the project and is a mammoth undertaking that will involve simultaneous working on a number of different platforms, employing a large number of skilled and semi-skilled workers, including welders, pipe fitters and electricians. Experience with the EPR at Flamanville 3 in France (FA3) highlighted problems in managing this phase of construction, while the twin EPR station at Taishan in China has provided an example of successfully meeting this challenge. NNB GenCo has established a Joint Venture with four existing suppliers (Balfour Beatty Bailey, Doosan, Cavendish and Altrad), forming the MEH Alliance. The Alliance will have a workforce of in excess of 4000 at peak, with the work extending for over three years.

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

This Project Assessment Report (PAR) provides a summary of ONR's assessment of information provided by NNB GenCo in advance of its request for Agreement to commence bulk MEH installation, as well as that gleaned from a programme of targeted ONR interventions carried out over the last two years.

This report draws on reports and advice provided by the relevant ONR delivery leads and technical topic leads, covering five 'cornerstone' themes:

- Organisational capability
- Design and safety case
- Licence condition compliance
- Conventional health and safety, and fire safety
- Nuclear security and safeguards

As there is no safety case iteration associated with the release of this hold point (unlike for example the start of nuclear island concrete) ONR's primary interest is to have confidence in NNB GenCo's capability and capacity to competently begin and control/oversee the task of installing MEH in unit 1 nuclear island. Consequently, the bulk of ONR's assessment work has fallen under the organisational capability cornerstone, with limited but important inputs from the design and safety case team, along with contributions from the site inspection, conventional health and safety, and security teams.

CONCLUSIONS

(i) ONR assessments

There is common support in each ONR assessment report submitted in support this PAR, for ONR giving Agreement to NNB GenCo beginning the bulk installation of MEH in unit 1 nuclear island. In preparing this PAR, I have reviewed all of the submitted assessment reports and

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have sampled some of the supporting references for those assessment reports in addition to considering the direct advice of cornerstone leads.

On the basis of my reviews, I am satisfied that ONR has undertaken a thorough assessment of the capability and capacity of NNB GenCo and the MEH Alliance to begin bulk MEH installation in unit 1 nuclear island, and that the conclusions of that assessment provide a sound basis for ONR to give its Agreement under LC19(1) for the release of Hold Point 2.2.20.

(ii) Matters Arising

As reported in this PAR, while supportive of ONR giving Agreement to the start of bulk MEH installation, a number of ONR's assessors have made recommendations for continuing regulatory oversight of the MEH installation programme. Many of these relate to concerns over 'scalability' of the NNB GenCo and MEH Alliance arrangements as the MEH programme increases in pace, extent, and complexity.

This PAR therefore includes a recommendation that ONR's EPR sub-division head takes cognizance of these concerns in agreeing the sub-division's revised regulatory strategy for HPC.

(iii) NNB GenCo Hold Point Release process

In this PAR I have also considered NNB GenCo's process for determining its own and the MEH Alliance's readiness to begin bulk MEH installation. Having reviewed each aspect of that process, I am satisfied that it is robust and that it has been properly applied to the release of the bulk MEH Hold Point 2.2.20.

(iv) Other ONR considerations

This PAR sets out a number of other matters which I consider to be relevant to any decision on Agreement to release Hold Point 2.2.20. These are:

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

I am satisfied that there are no concerns regarding any of these matters which should prevent ONR from giving its Agreement to NNB GenCo under LC 19(1) to commence bulk MEH installation in HPC unit 1 nuclear island.

RECOMMENDATIONS

On the basis of the request submitted by NNB GenCo and the conclusions of this report, I recommend that the head of ONR's EPR sub-Division:

- considers the proposals for further ONR regulatory oversight and control of the MEH installation programme made in a number of contributory assessment reports and highlighted in Section 4 of this PAR
- signs this PAR to confirm support for the ONR technical and regulatory arguments that justify issuing HPC Licence Instrument 522: Agreement to commence bulk installation of MEH in unit 1 nuclear island
- signs this PAR to approve its publication, after redaction where appropriate; and
- signs HPC Licence Instrument 522.

LIST OF ABBREVIATIONS

ALARP	As Low As Reasonably Practicable
AR	Assessment Report
CDM	Construction (Design and management) Regulations 2015
CSFI	Counterfeit, fraudulent, and suspect items
DA	Design Authority
EIM&C	Enhanced Implementation, Monitoring & Control
FA3	Flamanville-3
GDA	Generic Design Assessment
HGE	Hinkley Point C technical gallery designation
HF	Human Factors
HP	Hold Point
HPC	Hinkley Point C
HPP	Hold Point Panel
HPRD	Hold Point Release Document
HSE	Health and Safety Executive
HVAC	Heating, Ventilation and Air Conditioning
IH	Internal Hazards
INA	Independent Nuclear Assurance (NNB GenCo)
IRR	Ionising Radiation Regulations
ITA	Independent Technical Assessment (NNB GenCo assurance function)
J0	The completion of unit 1 nuclear island common raft
JDO	Joint Design Office
LC	Licence Condition
LTQR	Lifetime Quality Record
MED	Management Expectations Document
MEH	Mechanical, Electrical and HVAC
MEHA	MEH Alliance
NNB GenCo	NNB Generation Company (HPC) Limited
NSC	Nuclear Safety Committee
PAR	Project Assessment Report
PC	Principal Contractor
RAP	Residual Action Plan
RD	Responsible Designer
RGP	Relevant Good Practice
RI	Regulatory Issue
SAP	Safety Assessment Principle(s) (ONR)
SQEP	Suitably Qualified and Experienced Person
SSC	System, Structure or Component
SyAPs	Security Assessment Principles
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) Agreement under Licence Condition (LC) 19(1) to commence the start of bulk Mechanical, Electrical and HVAC (MEH) installations in the nuclear island of unit 1 at Hinkley Point C (HPC), as defined by its Hold Point 2.2.20 (Ref. 2). The activity constrained by this hold point is the start of MEH installations in unit 1 safeguards building HL1.

2 DETAILS OF THE LICENSEE'S REQUEST

2.1 BACKGROUND

2. NNB GenCo, the nuclear site licensee, is constructing a twin reactor EPR™ nuclear power station at HPC. The *ONR Strategy for Regulation of HPC from J0 to CoD* (Ref. 3) sets out ONR's current strategy for regulating the HPC project up to commercial operation. For the lead-up to permissioning the MEH hold point, this has been supplemented by *ONR Bulk MEH Permissioning Strategy* (Ref. 4) which 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's capability and capacity as it prepares to begin bulk MEH installations. Further guidance on the preparation of contributing ONR assessment reports has been provided in *Permissioning the start of bulk MEH at HPC: Assessment guidance note* (Ref. 5).

2.2 HPC CONSTRUCTION AND INSTALLATION HOLD POINTS

3. 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 perceived to be a step change in the risk of poorly conceived or executed construction or installation impacting upon nuclear safety.

4. For HPC unit 1 ONR has already used its primary and derived powers under the licence to permission the following LC19 hold points:

- HP1.2.1 First Nuclear Safety Concrete (Consent: March 2017)
- HP2.2.1 Start of unit 1 Pumping Station (Agreement: July 2018)
- HP1.2.2 Start of unit 1 Nuclear Island (Consent: November 2018)

5. Consistent with its regulatory strategy for HPC, ONR has issued a derived powers specification (Licence Instrument LI519, Ref. 6) that NNB GenCo will not proceed beyond the HP2.2.20 hold point without the Agreement of ONR.

2.3 HOLD POINT 2.2.20: START OF BULK MEH INSTALLATION

6. Most of the work activity at the HPC site up to now has been civil engineering, largely rebar installation and concrete pouring. This work has encompassed the positioning and fixing of liners, embedded plates, channels pipes, sumps and, more recently, walled-in equipment. The project will not pass 'Peak Civils' until well into 2022, so this will continue to be a major activity on the site while MEH installation is underway. ONR will need to maintain (and possibly increase) regulatory vigilance in this area, particularly in relation to the manufacture, fabrication and installation of containment liners, pool liners and other safety class systems, structures, and components (SSCs).

7. The start of bulk mechanical, electrical and HVAC fit-out represents a major change to the project and is a mammoth undertaking; Figure 1 indicates the scale of the task, which will involve simultaneous working on a number of different platforms, employing a large number

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of skilled and semi-skilled workers, including welders, pipe fitters and electricians. Through international regulatory contacts, ONR is aware that experience with the EPR at Flamanville 3 in France (FA3) highlighted problems in managing this phase of construction, while the developers of the twin EPR station at Taishan in China appeared to meet this challenge successfully.

380km of pipework	20,000 valves
200 pumps	42 heat exchangers
86 filters	120 tanks
6,325km of cables (IEG)	404km of containment
51,700 supports	218 LV switchboards
136 transformers	43 HV switchboards
3,000km of cables (IED)	47,000 Lights
Spread over:	
75+ Buildings	200+ Erection Areas 4000+ Rooms

Figure 1 – MEH Programme Scope

8. NNB GenCo’s MEH Programme is responsible for the successful delivery of this phase of the project. The Programme is intent on collaborative working across the supply chain, learning the lessons from Taishan and FA3. Consequently, NNB GenCo has formed a Joint Venture (the MEH Alliance) with four existing suppliers (Balfour Beatty Bailey, Doosan, Cavendish and Altrad). It is anticipated that the Alliance will have a workforce of in excess of 4000 at peak, with the work extending for more than 3 years.

9. NNB GenCo has defined Hold Point 2.2.20 as a ‘secondary 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. 7). However, in view of the importance to the success of the project of a trouble-free installation programme, and reflecting the concomitant change in project risk, the licensee has supplemented the procedure in Ref. 7 with additional senior level oversight (Ref. 45). ONR’s considerations of NNB GenCo’s process for releasing the hold point are set out later in this report.

2.4 NNB GENCO’S CASE FOR ONR’S AGREEMENT

10. On 1st November 2021, the licensee, NNB GenCo, submitted a request (Ref. 1) for ONR to give Agreement to the start of bulk MEH installations in unit 1. That request was supported by a number of accompanying documents:

- Bulk MEH Assurance Concurrence Part B (Ref. 38)
- Minutes of Hold Point Panel meeting no. 136, 24th Sept 2021 (Ref. 39)
- Minutes of Hold Point Panel meeting no. 138, 14th October 2021 (Ref. 40)
- Hold Point Review Document – Start of First Bulk MEH (Ref. 43)
- Minutes of Nuclear Safety Committee No. 61, 19th October 2021 (Ref. 44)
- Notes of HPC Direction Team meeting, 20th October 2021 (Ref. 45)

11. This PAR provides a summary of ONR’s assessment of the information provided by NNB GenCo in support of its request for Agreement to commence bulk MEH installation. This information includes not only that referenced in NNB GenCo’s request for Agreement, but additional information gathered from meetings with NNB GenCo and the MEH Alliance, as well as from ONR interventions at the HPC site and elsewhere.

12. This report draws on reports and advice provided by the relevant ONR delivery leads, covering five ‘cornerstone’ themes:

- Organisational capability
- Design and safety case
- Licence condition compliance
- Conventional health and safety, and fire safety
- Nuclear security and safeguards

2.5 SCOPE OF THIS REPORT

13. This PAR draws on assessment reports from individual topic leads as well as statements from cornerstone leads, plus additional evidence available up to early November 2021 relevant to NNB GenCo's request for ONR's Agreement. The scope of the key contributions to this PAR are described in this section.

14. As there is no safety case iteration associated with the release of this hold point (unlike for example the start of nuclear island concrete, Hold Point 1.2.2) ONR's primary interest here is to have confidence in NNB GenCo's and the MEH Alliance's capability and capacity both to competently begin the task of installing huge quantities of pipework, cabling and equipment in the unit 1 nuclear island, and to proceed without further formal ONR permissioning of this activity over the following 3+ years, or until the job is complete on both units.

15. Consequently, the bulk of ONR's assessment work has fallen under the organisational capability cornerstone, with limited but important inputs from the design and safety case team, along with contributions from the site inspection, conventional health and safety, and security teams.

2.5.1 Organisational capability

16. The scope of the organisational capability cornerstone draws on insights from a number of work-streams, with its assessment focused primarily on:

- Organisational Development (including project enablers)
- Quality (including Lifetime Quality Records – LTQR)
- Manufacturing Oversight
- Nuclear Safety Culture and Organisational Learning

17. In addition to topic lead assessment reports covering all these workstreams, the Organisational Capability Cornerstone Lead has provided a note on the conclusions from these work-streams, along with a view on how ONR should respond to NNB GenCo's request for Agreement to proceed with bulk installation of MEH (Ref. 8).

2.5.2 Design and safety case

18. As noted above, there is no safety case iteration associated with this hold point, with the consequence that inputs from the design and safety case team are more limited than for previous ONR permissioned hold points. For this hold point, the sub-division Delivery Management Group agreed that assessment reports covering the following topics were required:

- Mechanical Engineering
- Electrical Engineering
- Civil Engineering
- Human Factors
- Internal Hazards

19. Having reviewed these assessment reports, the Design and Safety Case Cornerstone Lead has additionally provided a considered view on how ONR should respond to NNB GenCo's request for Agreement to proceed with bulk installation of MEH (Ref. 9).

2.5.3 Site compliance

20. The site compliance cornerstone report (Ref. 10) notes that the scope of ONR's compliance assessment spanned the following areas:

- adequacy of licence compliance particularly relevant to MEH installation, based on installation activities already completed
- preservation and maintenance during the construction phase
- conventional health and safety, and conventional fire safety
- routine non-construction specific licence compliance
- evolution of quality surveillance to manage MEH type activities
- control of industrial radiography

21. The primary focus of this assessment was to confirm that the site teams will be able to adequately manage the impact of bulk MEH activities. The report also records the assessment of compliance with key construction specific licence compliance by the MEH alliance during early (non-nuclear island) installation activities within the HGE gallery and the conventional island Electrical Building.

22. In addition, the report comments on the adequacy of NNB GenCo's routine non-construction related licence compliance to provide assurance that the licensee will be able to maintain adequate compliance with routine LCs concurrent to the significant increase in on-site activity associated with bulk MEH installation.

2.5.4 Conventional health and safety, and fire safety

23. As noted earlier, civil construction work will continue well into the MEH installation period meaning that the associated conventional and fire safety hazards will remain areas for ONR oversight. In addition, the start of bulk MEH work brings additional hazards associated with multi-trade activities, including welding and other hot work in restricted and confined spaces. The use of portable radiographic sources for in-situ weld checking brings an additional hazard requiring close monitoring and control.

24. The combined report from ONR's conventional health and safety (CHS), and fire safety specialists (Ref. 11) details ONR's consideration of CHS and fire safety management arrangements for readiness relevant to the commencement of unit 1 Bulk MEH. The key assessment activities underpinning this report were carried out by MEH-targeted interventions in July and September 2021. Evidence gathered in these interventions was supplemented with that from previous interventions with NNB GenCo.

2.5.5 Nuclear security and nuclear safeguards

25. ONR's nuclear security lead for HPC has provided a report on security considerations for this stage of the project and expectations for the project as it moves into the bulk MEH installation phase (Ref. 12).

26. The ONR safeguards lead has confirmed that there are no safeguards issues relating to the start of bulk MEH installation (Ref. 13). Therefore, safeguards matters are not considered further in this report.

3 ONR ASSESSMENT OF NNB GENCO'S REQUEST

3.1 METHODOLOGY

27. 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 procedure (Ref. 14).

28. The ONR Safety Assessment Principles (SAPs) (Ref. 15) and Security Assessment Principles (SyAPs) (Ref. 16) together with supporting Technical Inspection and Assessment Guides (TIGs and TAGs) (Refs. 17 & 18), have been used as the basis for ONR's technical assessment and interventions.

3.2 ONR'S ASSESSMENT OF NNB GENCO ORGANISATIONAL CAPABILITY

3.2.1 Organisational development

29. The key areas covered by the organisational development assessment report (Ref. 19) are:

- NNB GenCo and MEH Alliance (MEHA) organisational capability and forward resourcing plan
- MEHA competency framework
- Implementation of key enabling software systems
- NNB GenCo Independent Nuclear Assurance capability
- Leadership and governance, including project controls

30. The report notes that the assessment is based on evidence from interventions and engagements including routine Level 4 regulatory meetings and targeted interventions into specific topics and arrangements, including key project enabling activities. It also draws on significant cross-cutting interventions carried out by ONR as part of delivery of its Integrated Intervention Plan.

3.2.1.1 Organisational capability and forward plan

31. In the report, ONR's Organisational Capability inspector concluded that the MEHA and NNB GenCo had formed an integrated alliance with sufficient foundational capability to deliver and oversee current activities. However, it was noted that the number of MEHA personnel is still limited, and the scalability for bulk installation has yet to be stress tested.

32. Similarly, the inspector found that the MEHA has a credible forward plan for developing its organisational capability and capacity in-line with increasing workload, although this is yet to be fully stress tested as the MEHA deployment had so far been piloted in very few projects.

3.2.1.2 Competency framework

33. ONR's assessment of the arrangements for competence management covered both NNB GenCo and MEHA's competency management, and included examination of:

- key performance indicators
- competency governance
- resourcing, recruiting, and onboarding
- Centres of Excellence
- the use of Hinkley Support Operatives
- supervisors and superintendents

34. 'Centres of Excellence' (CoE) refer to three facilities for working on mock-ups, trade tests and training of Hinkley Support Operatives. Currently the Welding CoE is up and running, the Electrical CoE is to be fitted out, with the Mechanical CoE in the design phase. These

Centres of Excellence are thus predominantly in their early stages, with low delegate numbers with mock-ups still to be installed in the Electrical CoE for practical work. The specialist inspector notes the intention for ONR to monitor the development of the Centres of Excellence as recruitment progresses.

35. The Hinkley Support Operative (HSO) programme provides an entry route for those who have little or no prior experience of working in the engineering and construction industry. The model is designed to provide local jobs for local people, in support of delivering obligations under the Development Consent Order. The HSO programme enables the MEHA partners to recruit previously unskilled and semi-skilled labour and provide them with relevant training to carry out a broad range of support and installation type work. It is planned to have more than 1000 HSOs to support the craft skills on site.

36. The ONR inspector concluded that NNB GenCo has an effective competency framework that ensures that teams of suitably qualified and experienced persons are in place. The MEHA is progressing development of a competency framework that is aligned with NNB GenCo, and this will involve extensive use of the Centres of Excellence.

3.2.1.3 Implementation of key enabling software systems

37. To ensure efficient and effective project delivery, NNB GenCo is implementing a number of enabling software systems. These include:

- Teamcenter (enduring system for document management)
- Materials Management
- Enterprise Asset Management (Asset Suite 9) – enduring product for asset handover management
- SWITCH (EDF wide project providing end to end construction, change and configuration management)
- ORBIT (software tool for managing completions and handovers)

38. The organisational capability inspector notes that ONR reviewed progress on the implementation of NNB GenCo's enabling software systems via regular Level 4 meetings and through an intervention in July 2021 to gain confidence in how key enabling systems will support HPC during the MEH installation phase. The intervention looked at the five key tools to be used by the MEHA and their ability to support the programme, deliver the required functionality, and maintain integrity of the data. The intervention also looked at mitigation plans associated with identified key risks.

39. The ONR inspector concluded that the implementation of the enabling software systems is adequate for the current stage of the project, but that further enhancements will be needed for some of them in the near future. In addition, some of these systems are yet to be stress tested. The inspector recommended that ONR continues to monitor the development and implementation of these software systems.

3.2.1.4 Independent Nuclear Assurance capability

40. With regard to Independent Nuclear Assurance (INA), the organisational capability report notes that ONR guidance (Ref. 18) sets out a number of safety principles that require licensees to provide:

- *an independent challenge capability*: adequate independent challenge to, and oversight of, nuclear safety leadership, management and decision making at all levels of the organisation, and the establishment of an independent internal regulation function or suitable alternative; and

- *adequate organisational capability for nuclear safety advice and independent challenge*: appropriate organisation, staffing and management of the nuclear safety advice and independent challenge capabilities.

41. The organisational capability assessment report notes that ONR's organisational capability assessors had routinely discussed the effectiveness and efficiency of NNB GenCo's INA during regular Level 4 engagement, and that this topic stream had been consistently rated as acceptable, usually with an improving trend. The report notes that ONR had undertaken several joint interventions with INA underpinned by a series of informal interactions, which helped form a positive opinion about INA's maturity. Furthermore, INA's effectiveness and efficiency was examined during three dedicated interventions, all rated as acceptable.

42. The report's conclusion on INA capability states that in the context of the ONR safety principles NNB GenCo had demonstrated its readiness to start unit 1 bulk MEH installation.

3.2.1.5 Leadership and governance including project controls

43. The ONR organisational capability assessment report notes that leadership and governance are important for safe transition to a new phase of a new nuclear build project. ONR's expectation is for NNB GenCo to ensure appropriate leadership and governance is in place within both the MEHA and NNB GenCo.

44. The report notes that ONR examined the formation of the Joint Design Office (JDO), the Area Management and Delivery Directorate, and the MEH Alliance. The JDO was created as a collaboration between NNB GenCo and the Responsible Designers as a mechanism for providing an enhanced engineering capability on the HPC site.

45. NNB GenCo had utilised learning from other EPR projects and created Area Management for the Nuclear Island, the Conventional Island, and the Balance of Plant, which involved creation of a Delivery Directorate. The Delivery Director now has overall accountability for the delivery of all work on the HPC site. Existing Programme Directors have been given additional accountabilities and have been retitled Area Programme Directors. They are accountable for the integration and co-ordination of the delivery of all scope within their areas.

46. The inspector was satisfied that the model for the Alliance ensures a clear division of responsibilities between NNB GenCo staff deployed within the MEHA and those within NNB GenCo providing the Intelligent Customer and Design Authority function. In its MEHA Implementation Plan (Ref. 46) NNB GenCo is explicit that, as the licensee it retains the core safety, design authority and intelligent customer capability to control and oversee safety at all times.

47. The inspector concluded that NNB GenCo has leadership and governance capability that is focused on the key areas of risk and has the required impact within the organisation, and that appropriate leadership and governance are now in place in the MEHA and within NNB GenCo's oversight. The inspector notes, however, that the expected rapid rise in the number of MEHA personnel will pose challenges. Similarly, given the small scale of the MEHA activity so far, the maturity of governance arrangements and project controls within the MEHA are yet to be stress tested.

3.2.1.6 Conclusions on organisational development

48. ONR's organisational capability inspector reported satisfaction with NNB GenCo's and the MEHA's capability and readiness for the start of bulk MEH installation. However, the inspector also concluded that the adequate supply, training, supervision, and oversight of its workforce throughout the installation period will be a major challenge for the MEHA. The inspector notes that this will also place significant demands on NNB GenCo to exercise

appropriate Intelligent Customer oversight of all the activities on the site, as well as of manufacturers and suppliers. Furthermore, the inspector noted that many of the MEHA's arrangements and plans for its organisational development including project enablers are yet to be stress tested. Given these observations, the inspector recommended that further monitoring of the organisational development including project enablers should be implemented for the next phase of ONR's engagement.

3.2.2 Quality management

49. The report on quality management (Ref. 20) presents ONR's specialist inspector's assessment of the MEHA's integrated management system arrangements, including quality management and lifetime quality records relevant to the MEHA's overall organisational capability and state of readiness for starting bulk MEH installation.

50. The inspector's report notes that effective management system arrangements, including quality management arrangements, document and records management, quality function capability, assurance arrangements such as self-assessment and supplier inspections, are important enabling activities associated with the acquisition and installation of nuclear safety related goods and services.

51. The inspector's assessment focused on the development of the MEHA management system arrangements relevant to ONR's Quality and Lifetime Quality Records workstreams and draws on regular workstream meetings and engagements with NNB GenCo and MEHA staff and senior quality management representatives.

52. The assessment takes into account evidence relating to the MEHA obtained from targeted interventions, engagements and meetings on specific topics and arrangements. It also draws on the significant cross-cutting interventions carried out by ONR in response to quality issues which had arisen in the period since ONR's previous permissioning point (start of nuclear island concrete).

53. The report notes that following assessment the inspector considered that the current MEHA integrated management system arrangements and capabilities are sufficiently mature for this phase of the project. However, the inspector notes that scalability of the management system arrangements and quality function capability for bulk MEH installation are yet to be stress tested, and that MEHA management system arrangements and resource levels will need to develop and increase progressively to align with the planned ramp-up of installation activities.

54. The report concludes that the MEHA integrated management system arrangements and quality function are sufficiently mature to support ONR's Agreement to commence unit 1 bulk MEH installation at Hinkley Point C, and adequate to carry out the initial phase of the work.

55. The assessment also identifies that there are a number of areas which require further development and implementation that, if not adequately addressed, have the potential to impact on the delivery of the safety case requirements for bulk MEH installation. The inspector recommended that ONR should continue to engage with NNB GenCo and the MEHA on the development and adequacy of management system arrangements and quality function capability. The report noted that the inspector had also raised a Level 4 RI (10474) for progressing after the hold point release, which requires the licensee to produce a summary document, which clarifies the overall basis of the safeguards buildings' HVAC safety justification and presents the cumulative effect of recent changes.

56. The inspector concluded by supporting ONR's Agreement to release NNB Generation Company Limited's hold point 2.2.20, Start of Bulk Mechanical, Electrical and HVAC Installation in unit 1 nuclear island at Hinkley Point C.

57. This inspector also recommended that following the release of the hold point:

- the level of direct mechanical engineering inspection, of manufacturing and site installation activities, should be increased. The aim is to gain confidence that installed equipment will be fit for purpose and deliver safety case requirements.
- an appropriate strategy should be developed to allow future regulatory control of installation activities. This strategy should enable the control of the installation of key mechanical engineering equipment, such as the polar crane and emergency diesel generators.

3.2.3 Manufacturing oversight

58. The report from ONR's supply chain specialist inspector (Ref. 21) notes that the assessment has been focused primarily on a sample of evidence relating to the management of manufacturing and supply chain oversight. The evidence was obtained from:

- interventions involving the ONR supply chain specialist inspector
- feedback from activities within the supply chain conducted by ONR inspectors in other technical disciplines
- routine engagement with NNB GenCo through Level 4 meetings

59. The report notes that NNB GenCo has established the Manufacturing Hub in the period since Nuclear Island Concrete Consent. The Hub exists to coordinate various control and oversight activities required by NNB GenCo for equipment supplied to it. Control is based on a gateway model with certain prerequisites in place before permission to move to the next gate is granted. It relies on sound quality control by each supplier overseen by NNB GenCo.

60. ONR's interventions during 2019 and early 2020 revealed some weaknesses in NNB GenCo's systems, indicating strategic shortfalls in NNB GenCo's manufacturing oversight regime. An ONR stocktake concluded that there were shortfalls in NNB GenCo's arrangements for overseeing the manufacture of off-site components, leading ONR to raise a Level 3 regulatory issue (RI 8126). NNB GenCo drew up a Manufacturing Surveillance Improvement Plan to address the shortfalls identified by ONR as well as those they had self-diagnosed. Actions by NNB GenCo in response to the shortfalls identified in the RI enabled it to be closed in March 2021.

61. The report notes that ONR has identified the management of counterfeit, fraudulent and suspect items (CFSI) as a significant risk to the safe operation of nuclear facilities. An intervention in August 2020 found that NNB GenCo's CSFI policy and strategy were inadequately implemented – some levels of defence were in place, but others were weak or not present in line with the strategy. A Level 3 RI (8313) led to a number of improvement actions being taken by NNB GenCo and the issue was closed by ONR in June 2021.

62. The report makes a number of recommendations regarding areas for ONR attention as the project moves into the MEH installation phase. The specialist inspector will produce a topic Task Sheet based on these recommendations to inform ONR's future intervention plan.

63. The report concludes that:

- NNB GenCo has adequate management arrangements for manufacturing oversight and for CFSI mitigation in their supply chain suitable for bulk MEH
- the arrangements are sufficient to justify progressing beyond the MEH hold point.

64. The inspector recommended that ONR should give Agreement under Licence Condition 19 for NNB GenCo to commence unit 1 bulk MEH installation at HPC.

3.2.4 Nuclear safety culture and organisational learning

65. ONR's Safety Culture and Organisational Learning assessment report (Ref. 22) covered these aspects in both NNB GenCo and the MEHA. The report notes that, as evidenced by relevant good practice and learning from experience, it is important to apply nuclear safety culture principles and practices together with organisational learning from the early stages of a new build project to avoid both latent and immediate deficiencies.

66. Assessments to support ONR's permissioning activity in relation to the start of nuclear island concrete in 2018, concluded that although the status of nuclear safety culture in NNB GenCo was sufficient at the time, there were significant challenges facing the licensee in maintaining a healthy nuclear safety culture within its existing teams and the expanding supply chain over the life of the project. Similarly, those assessments determined that although the position on organisational learning within NNB GenCo was adequate, there were a number of areas where NNB GenCo needed to mature its arrangements to ensure they remained sustainable as project activity increases.

67. The specialist inspectors' assessment in support of the release of the MEH hold point examined the progress made in both of these areas and, additionally, considered the situation with the newly established MEHA. The assessment drew on the findings from a series of Level 4 interactions plus a number of targeted interventions carried out from late 2018 to mid-2021.

3.2.4.1 Nuclear safety culture and organisational learning in NNB GenCo

68. With regard to safety culture within NNB GenCo, the ONR assessment report provides commentary on the findings from targeted interventions, as well as the actions taken by the licensee to close RI 7446. This Level 3 issue had been raised in August 2019 because of shortfalls in NNB GenCo's strategic leadership for nuclear safety. NNB GenCo developed an action plan to deal with this issue, the progress of which was followed up in a series of Level 4 interactions. The issue was closed out in April 2021.

69. The inspector notes that the Site Construction and Civils Director, who was a respected leader, passionate about promoting healthy nuclear safety culture had recently left the project. The inspector observes that losing this person's wealth of experience and positive influence will pose a challenge for NNB GenCo in ensuring that proper focus remains on nuclear safety culture as the project gathers pace.

70. The assessment report notes that an intervention in autumn 2019 had found a number of shortfalls in NNB GenCo's management of organisational learning, which led to two Level 3 issues being raised: RI 7544 to address required short term improvements relating to the management of significant investigations, resultant actions and internal non-conformances; and RI 7545 to ensure appropriate regulatory oversight of improvements to the effectiveness of the organisational learning processes, which would be facilitated by the introduction of a new organisational learning tool (*Insight*). NNB GenCo's progress towards closure of these issues was followed up in a series of Level 4 interactions. Both issues were subsequently closed in July 2021.

71. The ONR assessment report concludes that NNB GenCo had made sufficient progress in development of its nuclear safety culture and organisational learning for its existing staff, evidenced by successful closure of the three Level 3 RIs. The report notes, however, that there are still areas relating to NNB GenCo's nuclear safety culture and organisational learning where further ONR monitoring should be implemented as the project moves into its next phase.

3.2.4.2 Nuclear safety culture and organisational learning in the MEH Alliance

72. An ONR intervention in May 2021 examined whether NNB GenCo had defined, communicated, and subsequently assured implementation of its nuclear safety culture expectations to the MEHA. ONR found NNB GenCo had identified and specified in its contracts the expectations for nuclear safety culture development in the MEHA and that a clear interface had been established. It was noted that the MEHA is fully adopting NNB GenCo's values and behaviours including nuclear safety culture training, and the MEHA had a suitable nuclear safety culture policy in place. The intervention concluded that the MEHA leadership is committed, visible, and is reinforcing the right messages. ONR also noted some risks to further nuclear safety culture development that the MEHA is cognizant of, including the anticipated significant growth of the organisation.

73. With regard to the MEHA's approach to the management of multiple cultures and languages in its workforce at HPC, ONR was satisfied with the information (based on the assumed Bilfinger workforce) provided by the MEHA during the intervention.

74. A further ONR intervention in May 2021 considered the MEHA's approach to organisational learning. It was noted that the MEHA will also use NNB GenCo's new *Insight* tool for recording and progressing instances of learning.

75. In the nuclear safety culture and organisational learning report the ONR inspector concluded that the MEHA had made sufficient progress in development of its nuclear safety culture and organisational learning. It was noted that the MEHA is fully adopting NNB GenCo's values and behaviours including nuclear safety culture training, with a good link with NNB GenCo's organisational learning. However, the inspector recommended that ONR undertook further monitoring of nuclear safety culture and organisational learning in the MEHA as the MEH activity ramps up.

3.2.4.3 Conclusions on safety culture and organisational learning

76. The ONR assessment report rated the MEHA's nuclear safety culture and organisational learning development as acceptable with regard to ONR's Agreement to the start of bulk MEH installation. Although some shortfalls were identified in arrangements or uncertainties in organisational development, the inspector commented that these should not impact the project's ability to successfully carry out the work associated with the start of bulk MEH installation.

3.2.5 Overall conclusions on organisational capability

77. The organisational capability cornerstone lead confirmed (Ref. 8) that having reviewed the reports produced under this cornerstone, the conclusions and recommendations in those reports were consistent with the assessments undertaken. Furthermore, having reviewed those reports, conclusions and recommendations, the cornerstone lead recommended that ONR gives its Agreement under LC19(1) to the start of bulk installation of MEH in unit 1 nuclear island, as constrained by NNB GenCo Hold Point 2.2.20.

3.3 DESIGN AND SAFETY CASE ASSESSMENTS

78. As indicated earlier, design and safety case assessment reports were limited to five technical areas:

- Mechanical Engineering
- Electrical Engineering
- Civil Engineering
- Human Factors
- Internal Hazards

79. The rationale for this is that these cover matters relating to nuclear safety which may be particularly affected by inadequately conceived or implemented MEH installation activities. In particular, ONR wished to be satisfied that options for risk reduction as low as reasonably practicable (ALARP) are not unnecessarily foreclosed by the manufacture and installation of MEH equipment and facilities.

3.3.1 Mechanical engineering assessment

80. In the ONR mechanical engineering assessment (Ref. 23), the ONR specialist inspector focused on whether the equipment delivered to site will be fit for purpose and whether early MEH installation activities will foreclose reasonably practicable solutions to topics currently under consideration.

81. The inspector's key findings included:

- prior to the start of manufacturing, equipment design was shown to be sufficiently mature and stable, with manufacturing documentation found to be adequate
- safety related equipment had been shown to be correctly classified, providing for it to be designed and manufactured to a level of quality commensurate with its importance to nuclear safety
- although limited due to COVID-19, findings from interventions at manufacturers' premises were generally positive, although wider manufacturing issues were noted which could challenge whether all the equipment delivered to site will be fit for purpose. However, the inspector considered that it disproportionate to withhold permissioning as MEH activities scheduled for the next 6 - 9 months are largely limited to the installation of pipe supports, cable trays and HVAC ducting, allowing time for further regulatory follow-up after the release of the hold point
- full closure forms have been provided for several HVAC related Generic Design Assessment (GDA) assessment findings (AFs). With one exception, the inspector decided not to note closure pending completion of ongoing studies that could alter the conclusions. The inspector was, however, satisfied that it is unlikely that there will be a need for any reasonably practicable measures that could be foreclosed by early MEH installation activities. Hence, the inspector was content for closure of these AFs to be deferred
- relevant RIs have been closed, and where not closed satisfactory progress had been demonstrated
- the inspector noted that learning events from the other EPR projects in China, Finland, and France were being appropriately managed by the HPC project. The inspector was also satisfied that reasonably practicable measures preventing event occurrence at HPC will not be foreclosed by early MEH installation activities.

82. The inspector had raised one new RI in the course of the assessment, requiring the HPC project to produce a summary document clarifying the basis of the safeguard buildings' HVAC safety justification, and presenting the cumulative effect of recent design changes. The inspector was content to progress the closure of this issue after the release of the hold point.

83. The inspector concluded by supporting ONR giving its Agreement to the commencement of bulk MEH installation in unit 1 nuclear island.

84. The inspector also made the following recommendations:

- the level of direct mechanical engineering inspection, of manufacturing and site installation activities, should be increased. The aim is to gain confidence that installed equipment will be fit for purpose and deliver its safety case requirements; and

- an appropriate strategy should be developed to allow future regulatory control of installation activities, including the installation of key mechanical engineering equipment, such as the polar crane and emergency diesel generators.

3.3.2 Electrical engineering assessment

85. The scope of ONR's electrical engineering assessment report (Ref. 24) covers three main areas:

- manufacturing and installation assurance
 - interventions to gain confidence that safety case requirements are appropriately recognised in the detailed design/manufacturing process, and that the equipment is appropriately qualification and type-tested to meet its operational requirement under normal and accident conditions
 - management and closure of new and extant electrical engineering RIs.
- development of design
 - assessment of ongoing technical design issues such as cabling, protection strategy and interface with control and instrumentation equipment
- GDA Assessment Findings
 - NNB GenCo's progress towards AF closure, ensuring that the approach being taken is adequate and findings are closed out prior to the foreclosure of options.

86. The report summarises the electrical engineering inspector's findings from 7 targeted interventions covering:

- earthing installation
- qualification testing – low voltage switchboards
- manufacturing and testing facilities – electrical penetrations
- qualification testing – uninterruptible power supplies
- manufacturing and testing – ultimate diesel generator engine
- manufacturing and testing – low voltage switchboards
- evolution of electrical design substantiation to support construction on site

87. The electrical engineering inspector reported that the completed interventions had given confidence that NNB GenCo is demonstrating that electrical equipment delivered to site is fit for purpose with respect to the claims made in the safety case and are of appropriate quality. The inspector also considered that with regard to electrical equipment, NNB GenCo is adequately managing design maturity and stability prior to the start of manufacture or the handover of work packages.

88. The inspector noted that the relevant AFs and RIs had been adequately closed or, where appropriate, that satisfactory progress towards closure had been demonstrated. The inspector was content that, overall, NNB GenCo has managed ongoing technical design issues appropriately, ensuring that safety significant components are designed and manufactured to a level of quality commensurate with their importance to safety.

89. Nevertheless, drawing on intervention findings the inspector concluded that NNB GenCo will need to ensure that the manufacturing issues associated with the Class 1 emergency diesel generators (EDG) are appropriately managed and that continued ONR focus will be placed on this area beyond MEH hold point release. A regulatory issue is being raised to address the shortfalls identified. However, the inspector did not consider that the EDG issues preclude release of the MEH hold point.

90. In addition, the inspector observed that there will need to be increased ONR focus on cable management and installation practices to ensure that these activities are carried out competently and do not undermine claims made on electrical systems and equipment intended to perform and/or contribute to nuclear safety functions.

91. Overall, the inspector did not find any electrical engineering topics that had significant consequences for nuclear safety and where ALARP options may be foreclosed by early MEH installation activities in unit 1 nuclear island. The inspector concluded by recommending that ONR give Agreement to the start of bulk MEH installation.

3.3.3 Civil engineering assessment

92. The ONR civil engineering assessment (Ref. 25) is based principally upon the findings of routine LC19 interventions/inspections, plus one intervention (designated CD13 in the ONR intervention plan) which was undertaken in September 2021. The CD13 intervention was designed to provide an up-to-date and representative sample of the NNB GenCo's application of relevant good practice in the area of equipment integration into the civil engineering works.

93. The scope of the CD13 intervention covered:

- handover of civil works to MEH
- 3D design integration of classified MEH equipment
- structural anchorage requirements of classified equipment
- case studies of major equipment integration and conduits system integration

94. The ONR civil engineering assessment report notes that the CD13 intervention was based on a significant body of evidence presented by NNB GenCo. This included procedures, specifications, forms, digital platforms, schedules designed to control installation of the MEH equipment, plus evidence pertaining to the case studies where such arrangements had been recently implemented.

95. The report notes that no significant shortfalls were identified in the CD13 intervention. Nevertheless, the inspector made a number of observations that relate to potential future risks related to conformance with the arrangements themselves, which do not constitute a significant shortfall against current regulatory expectations but will warrant follow-up with the licensee in a future civil engineering engagement plan.

96. Overall, the report concluded that the evidence available from the licensee in support of the civil engineering assessment had been sufficient to allow an informed regulatory judgement, and that the inspector had no objection to ONR providing Agreement to commencement of the activity connected with Hold Point 2.2.20, bulk MEH installation.

3.3.4 Internal hazards assessment

97. The focus of the ONR internal hazards assessment (Ref. 26) was on findings from licensee responses to relevant AFs and RIs and the status of key technical issues relevant to the internal hazards safety case.

98. The AFs considered related to:

- the venting of steam in the event of a break of a high energy system and the resultant selected leak path which protects either the building structure or divisional segregation
- the potential for the Main Feedwater System (MFWS) to generate a leak which can then affect cables in the cable raceways associated with the MFWS
- the potential for explosive atmospheres to be generated in battery rooms should there be a loss of ventilation within the room
- the automatic isolation of the Emergency Service Water System

- flooding scenarios requiring automatic isolation on detection of a leak or break.

99. The inspector concluded that the licensee had made progress in addressing all of these and that where AFs remained open these should not prevent the release of the bulk MEH hold point.

100. The inspector also considered the status of open internal hazards related RIs 6020, 6743 and 7651 and concluded that progress towards closure of each of these was such that any ongoing work to achieve closure should not prevent ONR giving permission to release the hold point.

101. In addition, the assessment report noted progress that had been made in relation to hazards posed by failure of a reactor safety injection system (RIS) accumulator. Although selection of the option to resolve the concern will not be made until after the date for release of the MEH hold point, the inspector was confident that by continuing to engage with the licensee an adequate solution can be found that reduces the risk to ALARP.

102. Overall, the inspector concluded that, having reviewed the outstanding AFs, RIs and the current status of the RIS accumulator issue, and noting that there are a number of issues as yet unresolved, that there is an adequate way forward for each area, and that withholding release of the MEH hold point (and thus potentially delaying the installation of systems relevant to the IH considerations above) would be disproportionate. The inspector went on to recommend that ONR gives its permission to the start of bulk installation of MEH.

3.3.5 Human factors assessment

103. The ONR human factors (HF) assessment (Ref. 27) considered whether the station's design arrangements had adequately considered maintenance tasks and local-to-plant actions claimed within the safety case, as well as the feasibility of Main Control Room related tasks. For this permissioning milestone, the HF assessment has specifically focused on:

- Human Factors Integration (HFI) management
- Workspace design and layout
- Integration of HF relevant good practice (RGP) into equipment designs
- Integration of HF RGP into on-site facilities for emergency response / severe accident response
- Closure of the HF AFs associated with the bulk MEH milestone.

104. The report notes that although shortfalls remain in several HF topic areas, overall, the inspector supports ONR giving permission for NNB GenCo to undertake bulk MEH installation. However, the report notes that the quality of NNB GenCo's HF submissions must be improved in order to deliver an acceptable safety case by the start of non-active commissioning. The inspector has also raised a Level 4 regulatory issue (RI 8988) to ensure HF RGP is satisfactorily applied to equipment designs (to support operability, maintainability, and recoverability) in a timely fashion prior to delivery to site.

105. The report concludes by recommending that ONR supports the release of the bulk MEH hold point. It also recommends a number of areas for ONR to include in its intervention plan post bulk MEH.

3.3.6 Conclusion on design and safety case assessments

106. Having considered the outcomes of the design and safety case assessments, and the recommendations made by the specialist inspectors, the cornerstone lead recommended (Ref. 9) that ONR issues an Agreement under LC 19 for NNB GenCo to commence bulk installation of MEH in unit 1 nuclear island.

3.4 SITE COMPLIANCE

107. The scope of the site compliance cornerstone report (Ref. 10) was set out in Section 2.5.3. In the report the site compliance lead noted that the commencement of bulk MEH activities will result in increased activity on site with the installation activities placing additional burden on NNB GenCo's arrangements for managing construction/installation and routine site compliance. The report notes that the impact is expected to be at a relatively limited scale at least initially, when compared against those activities already underway under the main civil engineering contract.

108. The report reviews the adequacy of NNB GenCo's routine non-construction specific licence compliance to confirm that that NNB GenCo has been able to maintain adequate compliance with routine LCs concurrent with the increase in activity associated with early MEH installation activities and provides confidence that this can be maintained as MEH activity gradually picks up. Additionally, the report usefully summarises NNB GenCo's licence condition compliance inspection history from November 2018 to September 2021.

109. In coming to a judgement on the adequacy of NNB GenCo's licence compliance activities, the cornerstone lead (the nominated HPC Site Inspector) drew on the findings from a number of site visits carried out during 2020/21 as well as from Level 4 meetings held elsewhere and from examination of relevant NNB GenCo and MEHA documents.

110. The report highlights the cornerstone lead's conclusions on a number of key interventions; these are considered below.

3.4.1 Adequacy of MEH installation specific licence compliance

111. The report notes that, based on ONR inspection of very limited early installations (not on the nuclear island), the MEHA had demonstrated it is capable of appropriately delivering bulk MEH activities.

112. Nevertheless, the report considered that the MEHA arrangements for the management of construction readiness (and supporting processes) were not fully developed. The cornerstone lead therefore expects NNB GenCo to implement enhanced governance for the first bulk MEH activities, and to take steps to appropriately evolve its processes as per the open Level 3 issue RI 8977.

113. In addition, the report notes that the LTQRs for the Electrical Building civil structures were not in accordance with regulatory expectations and that NNB GenCo will need to ensure that such records are in an appropriate status in subsequent handovers from main civils to the MEHA (RI 8998 refers).

3.4.2 Preservation and maintenance during the construction phase

114. The report notes that NNB GenCo and the MEHA have implemented appropriate arrangements to ensure preservation and maintenance of assets during the construction/installation phase but concludes that further development within the MEHA will be required in order to discharge its responsibilities as the scale of activities increases. In addition, NNB GenCo will need to ensure clarity in the responsibilities for maintenance activities for civil structures once they have been handed over to the MEHA.

3.4.3 Conventional health and safety and conventional fire safety

115. The report noted (as covered in more detail in Section 3.5 below) that the ONR site inspection team considered that there were no conventional health and safety or fire safety issues that should prevent ONR from giving Agreement to the start of bulk MEH installation.

As in Section 3.5, the cornerstone lead notes that continued regulatory engagement and oversight will be required as scale and complexity of activities at site increase.

3.4.4 Routine non-construction specific licence compliance

116. The report concluded that overall NNB GenCo has maintained appropriate standards of non-construction specific licence compliance with no significant issues identified that would negatively affect the permissioning decision.

3.4.5 Evolution of quality surveillance to manage MEH activities

117. The report concludes that NNB GenCo has put in place appropriate arrangements for quality surveillance in relation to initial bulk MEH installation activities.

3.4.6 Overall conclusions on site compliance

118. From the perspective of site compliance, based on sampling of NNB GenCo's documentation and the interventions undertaken, ONR's cornerstone lead concluded that there were no significant areas that would preclude ONR issuing an Agreement for the commencement of bulk installation of MEH in unit 1 nuclear island.

119. However, the cornerstone report also made the following recommendations for ONR oversight beyond the release of the hold point:

- ONR should consider whether enhanced implementation monitoring, and control (EIM&C) should be applied to ensure appropriate regulatory control and oversight of subsequent significant MEH activities
- ONR should consider implementing a specific intervention to assess the adequacy of handover implementation for the first bulk MEH activities.

3.5 CONVENTIONAL HEALTH AND SAFETY, AND FIRE SAFETY ASSESSMENTS

120. Ref. 11 presents the combined assessment of ONR conventional health and safety (CHS), and fire safety lead inspectors for the HPC project. The key assessment activities underpinning this report were carried out by interventions in July and September 2021. Due to the limited construction work being undertaken by the MEHA at the time of the interventions, evidence was supplemented with that gathered from previous interventions with NNB GenCo.

121. The purpose of the interventions was to gain assurance that NNB GenCo and the MEHA have met their responsibilities as a principal contractor (PC) and contractor respectively, as required by the Construction (Design and Management) Regulations 2015 (CDM 2015), to ensure that the health and safety arrangements including planning, managing, monitoring and co-ordinating the construction phase are in place when bulk MEH installation starts. The requirements of CDM Regulation 13 (duties of a principal contractor in relation to health and safety at the construction phase), and Regulation 15 (duties of contractors) were sampled. Fire safety arrangements, as required by the Regulatory Reform (Fire Safety) Order 2005, were also sampled.

122. The report notes that anticipated non-nuclear island MEH installation work (in the HGE gallery and in the Electrical Building) had been delayed and the number of MEHA workers on site was small, which limited the evidence that could be drawn from these activities. Nevertheless, the report considered the health and safety management and fire safety arrangements in place and sampled some limited MEHA activities on site, and notes that the arrangements will need to evolve as the project grows. Significantly, the report comments that the scalability of the arrangements for safely managing MEH installation as the number of workers and installation platforms increase is yet to be tested and will be kept under ONR's review as demands increase.

123. The report notes that:

- the NNB GenCo Construction Phase Health and Safety Plan as required by CDM Regulation 12, which records the arrangements for managing significant health and safety risks associated with the project, is fit for purpose and compliant with the regulation
- the PC MEH Support Plan is a summary of how the MEHA will support the PC in discharging its duties under CDM 2015. Supporting framework documents indicate that there is a credible forward plan for the management of and compliance with health and safety risks as required by those regulations
- NNB GenCo has an effective competency framework in place that ensures that suitably qualified personnel are in place. The MEHA has a recruitment and mobilisation process that aims to align with the NNB GenCo process and ensure a planned approach to confirming competence and identifying skills and gaps as work increases. The MEHA stated that as work increases the number of health and safety advisors will increase in proportion to the numbers of workers on site. Health and safety advisors with construction experience and appropriate qualifications will be sourced from delivery partners. The competency frameworks are aligned with CDM 2015.

124. However, the report also notes that:

- the MEHA organogram only identifies two specific Fire Safety Advisors within the safety function of its organisational structure, and ONR's fire safety lead considered MEHA would be challenged to satisfactorily fulfil this function without support from other Safety Advisors
- significant shortfalls in the NNB GenCo permit-to-work arrangements were noted by ONR during a CHS/fire safety intervention. NNB GenCo is reviewing the permit-to-work procedure, which is being tracked by RI 8929 raised following the intervention. Resolution of these shortfalls is particularly important as the MEHA will be using NNB GenCo's permit-to-work arrangements for its MEH activities
- ONR has found shortfalls in NNB GenCo's monitoring arrangements, which are essential to ensure delivery of suitable and sufficient health and safety performance standards. RI 8929 has been raised to address concerns that existing fire safety audits are not monitoring the correct criteria.

125. In the light of the findings of the ONR CHS and fire safety leads, the report recommends that ONR should maintain appropriate regulatory oversight and engagement with NNB GenCo and MEHA during bulk MEH installation. This will allow monitoring of progress with the development and implementation of the NNB GenCo and MEHA integrated health and safety and fire safety management arrangements as work on site increases and the risk profile changes. ONR will continue to seek assurance that risks which could affect workers and others are being adequately controlled. The open RI 8929 will be followed up to ensure timely resolution.

3.5.1 Conclusions on conventional and fire safety

126. Having noted its findings, the report concludes that there are no conventional health and safety or fire compliance gaps that should prevent ONR from giving Agreement under LC 19 for NNB GenCo to commence unit 1 bulk MEH installation at HPC.

3.6 NUCLEAR SECURITY ASSESSMENT

127. ONR security lead's assessment report (Ref. 12) notes that in the lead-up to the MEH hold point ONR's security interventions have remained proportionate, targeted, and integrated with HPC project milestones, hold points and ONR's broader regulatory strategy. The report notes that emphasis for the period following MEH hold point release will be placed on the continued compliance with the extant physical, personnel and cyber security and information

assurance security arrangements of the HPC construction site, including associated locations, and the related supply chain in accordance with the ONR-approved Project Security Plan (PSP).

128. The security arrangements will continue to be monitored by the ONR site security inspector during routine engagement to ensure they continue to meet the regulatory expectations in the Security Assessment Principles (SyAPs) and are compliant with the PSP. The PSP will be further developed in alignment with the SyAPs and to reflect the changing security regime commensurate with the level of construction and installation activity and proportionate to the inherent risks.

129. With regard to the MEHA workforce, the SyAPs stipulate the minimum levels of security clearance for access to nuclear licensed sites and specific areas on these sites. The report notes that HPC security staff will need to ensure that adequate arrangements are in place which restrict access to areas within the site commensurate with an individual's clearance level, and that ONR will expect procedures to be in place to ensure satisfactory levels of workforce trustworthiness across the project.

130. As a result of regular engagement between HPC and TCO security staff, and based on performance to date, the assessment report notes that the ONR site security inspector remains confident that HPC will continue to align with regulatory expectations.

3.6.1 Conclusions on security

131. The report notes that ONR's HPC security lead is content that the security arrangements in the PSP meet regulatory expectations and is confident of the continued compliance with those arrangements, and concludes that there are no security concerns which would raise objections to the bulk MEH hold point being lifted.

3.7 OTHER ONR CONSIDERATIONS

132. The above sections have considered the conclusions from the five cornerstone themes regarding the readiness of NNB GenCo to release Hold Point 2.2.20 and commence bulk MEH installation. These are ONR's primary considerations in making a judgement on whether to give its Agreement under LC 19(1).

133. This section considers some other matters which are pertinent to the release of this hold point, and on which I consider ONR needs to be satisfied; namely:

- closure or satisfactory position with all GDA Assessment Findings relevant to the start of bulk MEH installation
- closure or adequate progress with all relevant ONR Issues
- closure of NNB GenCo Commitments related to the hold point
- liaison with the Environment Agency; and
- preparation of the Licence Instrument.

3.7.1 GDA Assessment Findings

134. ONR's EPR™ Generic Design Assessment (GDA) Step 4 reports and GDA issue close-out reports (Ref. 28) identified around 120 GDA Assessment Findings (AFs) against the milestone relevant to start of bulk MEH. A review in 2020 by NNB GenCo suggested (Ref. 29) that fewer than 40 of those were actually relevant to the MEH hold point and proposed that the remaining AFs be re-allocated to later milestones. Following discussions, ONR subsequently wrote to NNB GenCo (Ref. 30) confirming its acceptance of the proposals for deferral of AF closure.

135. The status of closure of AFs relevant to the bulk MEH hold point has been monitored at monthly meetings of ONR's EPR Sub-Division Board (SDB) to ensure that they were being

addressed in a timely manner. ONR's design and safety case cornerstone lead has confirmed (Ref. 9) that the AFs have all either been noted as closed by ONR or sufficient progress towards closure has been made on those still open such that their status does not impinge on ONR's permissioning decision. A table showing the MEH-related AFs and their current status is in Appendix 2 of this report.

3.7.2 Regulatory Issues

136. ONR defines a Regulatory Issue (RI) 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 RI 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.

137. ONR inspectors had raised a number of Level 3 and Level 4 RIs which identified the start of bulk MEH installation as a target closure milestone. Level 4 RIs are tracked to closure by individual inspectors while the closure of a Level 3 RI is subject to the agreement of the SDB. The SDB has monitored the progress of all Level 3 RIs relevant to the bulk MEH hold point in the run-up to the target release date to ensure that in each case there was a clear and timely path to closure.

138. As reported in the various ARs contributing to this PAR, all Level 3 RIs relevant to the release of the bulk MEH hold point have either been closed or reduced to Level 4 issues for closure following the release of the hold point. Similarly, as reported in the contributory ARs, in the small number of cases where relevant Level 4 issues remain open, the topic leads are satisfied that sufficient progress towards closure has been made, and closure can be pursued following the release of the hold point.

139. Appendix 1 of this PAR includes a table showing the RIs identified as particularly relevant to the release of the bulk MEH hold point, and their current status.

3.7.3 NNB GenCo Regulatory Commitments

140. A number of significant undertakings given to ONR by NNB GenCo during the early stages of the project, have been recorded formally as Regulatory Commitments. Each commitment is allocated a milestone by which both parties expect it to be fulfilled.

141. Examination of the relevant commitments log (Ref. 31) has shown that in relation to the start of bulk MEH installation there are no commitments which are linked to the bulk MEH installation phase.

3.7.4 Liaison with the Environment Agency

142. 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 SDB.

143. Nevertheless, to ensure the Agency's fullest possible awareness of, and the basis for, ONR's decision making in relation to NNG GenCo's request for Agreement, the Agency's views were sought on the draft contents of this PAR (Ref. 32). In response (Ref. 33), the Environment Agency stated that it did not anticipate that the lifting of the hold point would have any negative consequences for the Agency or its ability to regulate.

3.7.5 Preparation of the Licence Instrument

144. The Licence Instrument giving ONR's Agreement to the start of bulk MEH installation (LI 522) follows the approved standard format of a derived power specification set out in the relevant ONR guide (Ref. 34).

145. This PAR will be subject to peer review in accordance with ONR's procedure (Ref. 35) and amended as necessary prior to submission to the Head of ONR's EPR Sub-Division for acceptance. The preparation of the Licence Instrument will also be subject to a standard checklist, signed and countersigned in accordance with the requirements of Ref. 35.

4 MATTERS ARISING FROM ONR'S WORK

146. A number of the assessment reports considered above make recommendations for continuing regulatory oversight of the MEH installation programme (see sections 3.2.1.1; 3.2.1.5; 3.2.2; 3.2.4.1; 3.2.4.2; 3.3.1; 3.4.1; 3.4.2; 3.4.5; and 3.5). Many of these relate to concerns over 'scalability' of the NNB GenCo and MEHA arrangements as the MEH programme increases in pace, coverage, and complexity, and that there had been limited opportunities prior to the hold point release for the extant arrangements to be 'stress tested'.

147. It is therefore important that the EPR sub-division head and delivery leads take cognizance of these concerns and recommendations in developing the revised regulatory strategy for HPC which is currently planned to be in place by Q1 2022. That revised strategy is intended to cover the remainder of the HPC project, including installation, commissioning, and pre-operations for both units (Ref. 48). The strategy development is subject to a review by ONR's Regulatory Assurance function (Ref. 49).

148. A recommendation to the Head of ONR's EPR sub-division, drawing attention to these matters arising, is therefore included in Section 7 of this PAR.

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

5.1 DEFINE, MANAGE AND RELEASE HOLD POINT PROCEDURE

149. As discussed in Section 2.3 above, NNB GenCo has defined Hold Point 2.2.20 as a 'secondary 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. 7). 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. An MED is an integral part of the Hold Point Management Document which consists of the MED, a Hold Point Review Document (HPRD) and a Residual Action Plan (RAP).

150. The HPRD sets out the evidence that NNB GenCo considers necessary to close each of the actions and will be submitted to the NNB GenCo Hold Point Panel (HPP) for consideration and approval. Any outstanding actions that cannot be completed before the HPRD is submitted to the panel will be included in the RAP. The RAP must, in due course, be signed off by the HPP Chair and the head of Assurance (or the deputy HPP Chair) prior to the start of the constrained activity.

151. From June 2020, ONR and NNB GenCo met approximately monthly (more recently, fortnightly) to discuss progress with the compilation of evidence in the HPRD. The meetings also allowed ONR to provide comments on aspects of the accumulating evidence and to apprise NNB GenCo of areas of ongoing ONR concerns as its MEH intervention plan progressed. In advance of each meeting NNB GenCo's Hold Point Manager shared a spreadsheet which tracked the status of the evidence required to close 119 actions that were intended to meet the 36 broad management expectations in the MED. This document was

particularly helpful in keeping ONR apprised of the progress that NNB GenCo were making towards the release of the hold point.

152. The approved HPRD (Ref. 43) identified three RAP items for closure before the hold point is released. NNB GenCo has since confirmed that all the RAP items have been closed (Ref. 47).

5.1.1 Control Gate Reviews

153. A recurring theme in ONR's discussions with NNB GenCo during the build up to the release of this hold point, is whether the largely untested arrangements in place at the start of the installation programme would be scalable to cope safely with the demands of a rapidly expanding set of tasks of increasing complexity across multiple platforms.

154. NNB GenCo's original intention was to utilise the MEHA's early installation works in the HGE Gallery and conventional island Electrical Building to test the management arrangements and confirm their effectiveness before the volume of work increases. Delays in the programme impacting on civil hand overs and material availability meant that only very limited installation work has been possible before hold point release. This led to concerns in NNB GenCo that aspects of the arrangements in place to support the lifting of the hold point have not been stress tested for managing the volume and complexity of activities that will be involved as the MEH programme ramps up.

155. The Hold Point Manager undertook a review of the scalability challenges for each management expectation in the MED (Appendix 2 of the HPRD, Ref. 36) and concluded that there are 18 MED themes where enhancements will or are likely to be necessary to ensure that the organisation has the capability and resilience to operate at scale, with many of the remaining areas requiring close management oversight to ensure that current arrangements and plans continue to be appropriate and effective when operating at scale. This led to the proposal to introduce a series of 'scalability' Control Gate reviews to take place at selected stages of the installation programme to ensure that any weaknesses at the start of the programme are incrementally addressed as it expands in scale and complexity (Ref. 36).

156. Similar concerns regarding the scalability of the NNB GenCo/MEHA arrangements had been expressed by ONR in the lead up to this hold point and are raised in assessment reports contributing to this PAR. ONR therefore views NNB GenCo's proposal for periodic Control Gate reviews as a welcome one. At a meeting with NNB GenCo on 1 November 2021 ONR was able to discuss the mechanics of the proposed scalability gate review procedure along with the associated governance (Ref. 41). At that meeting NNB GenCo described the proposals, so far as they had been so far developed (Ref. 42). It was noted that the Control Gate reviews were not likely to start until autumn 2022 and would be at intervals of not less than 6 months. It is likely that the gates will be tagged to particular activities in the MEH programme rather than to particular dates. After discussion, ONR noted that it was supportive of the proposals which it considered should address some of the reservations about scalability expressed in assessment reports contributing to this PAR.

157. As noted in Section 5.1.4 below, the October 2021 HPC Nuclear Safety Committee (Ref. 44) was also supportive of the NNB GenCo proposal for the use of Control Gates as the installation activities scale up.

5.1.2 Independent Nuclear Assurance: concurrence procedure

158. As provided for in the NNB GenCo Hold Point management procedure (Ref. 7), the licensee's Independent Nuclear Assurance (INA) team applied a Concurrence assessment of the proposals to release the hold point. This was carried out in accordance with the extant NNB GenCo *Apply Concurrence* procedure (Ref. 37). The resulting Concurrence statement

(Ref. 38) provides a set of conclusions from a comprehensive and rigorous series of engagements carried out over the previous 18 months. The result is that Concurrence was given subject to the project adequately addressing four caveats. The approved HPRD included as RAP items two caveats that had still to be addressed. Those have since been confirmed to be closed (Ref. 47).

5.1.3 Hold Point Panel

159. The HPRD was presented to the HPP on 24th September 2021 (Ref. 39) and was further discussed at the HPP on 14th October 2021 (Ref. 40). At the October meeting, the Panel concluded that:

- the approach set out in the HPRD is comprehensive and well-designed, although as yet has been subject to limited testing
- that there are risks and opportunities regarding the on-going deployment of the MEH programme (which were listed)
- the Panel supports the proposed approach to subject the MEH Programme to 'control points' where their readiness for future growth in scope will be assessed; and
- agreed and recommended acceptance of the HPRD and lifting of the hold point, subject to the closure of the RAP items.

160. I have reviewed the minutes of both HPP meetings (Refs. 39 and 40) and conclude that the Panel subjected the evidence for completion of the actions in the HPRD to a rigorous, questioning examination. On the basis of this, I am satisfied that the HPP adequately discharged its oversight responsibilities with regard to the release of the hold point.

5.1.4 Nuclear Safety Committee

161. In accordance with NNB GenCo's hold point governance process (Ref. 7) the HPRD was submitted to the October 19th, 2021 Nuclear Safety Committee (NSC) for consideration and advice. As part of the ONR intervention strategy for permissioning this hold point, I observed the NSC meeting to verify that the matter had been subject to an appropriate level of consideration, and that advice given by the Committee had been taken on board by NNB GenCo.

162. Having observed the meeting, I am satisfied that the NSC undertook its responsibilities diligently and that its considerations of the HPRD as evidence of NNB GenCo's readiness for the lifting of the hold point was appropriate. The NSC endorsed the release of the hold point but provided some useful advice regarding the controls that would be needed to ensure the subsequent installation programme was carried out in an effective manner, and with due considerations of the consequences for nuclear safety. Regarding the specific proposal for a series of Control Gate 'scalability' reviews outlined in an NSC paper (Ref.36), the committee were supportive of this proposal.

163. I have since examined the minutes of that meeting (Ref. 44) and I am satisfied that they present an accurate and sufficient record of the NSC's considerations.

5.1.5 HPC Direction Team

164. On the 20th October, HPC's Direction Team (Delivery and Engineering Directors, supported by the Safety Director) met to be briefed on and consider the HPRD and the recommendations of the HPP along with the outcome of the previous day's NSC, thus providing an additional level of oversight.

165. The notes of the meeting (Ref. 45) confirm that:

- members of the Direction Team and the Safety and Regulation Director supported the approval of the HPRD, and release of the Hold Point upon closure of the RAP items

- feedback from the HPP and NSC was noted
- all agreed with the importance of the successful establishment and implementation of the Control Point governance process.

5.1.6 Conclusions on NNB GenCo internal processes

166. On the basis of the above, I am satisfied that NNB GenCo has a robust hold point management and release process in place and that it has been properly applied to the release of the bulk MEH Hold Point 2.2.20.

167. NNB GenCo has confirmed (Ref. 47) that the outstanding RAP items have been closed in accordance with its hold point management procedure.

6 CONCLUSIONS

168. This PAR has considered the findings from ONR's assessment of NNB GenCo's request for its Agreement under LC19 for commencement of bulk MEH installation in unit 1 nuclear island. It has summarised ONR's assessment in relation to the following key areas:

- the organisational capabilities of NNB GenCo and the MEH Alliance
- matters relating to the design and safety case
- NNB GenCo's regulatory compliance at HPC
- conventional health and safety readiness
- nuclear security considerations; and
- other matters ONR considers relevant to its decision.

169. This PAR has also considered the adequacy of NNB GenCo's processes for determining its own and the MEH Alliance's readiness to commence bulk MEH installation.

170. My conclusions covering each of these matters are set out below.

6.1 ORGANISATIONAL CAPABILITY

171. Having considered the assessment reports from inspectors covering the licensee's organisational capability and readiness, ONR's cornerstone lead recommended that ONR issues an Agreement under LC 19 for NNB GenCo to commence installation of bulk MEH in unit 1 nuclear island.

172. Having sampled the arguments and conclusions in the assessment reports produced under this cornerstone, I concur with the conclusions of the cornerstone lead that, on the basis of those reports, ONR should issue an Agreement under LC 19 for NNB GenCo to commence bulk installation of MEH in unit 1 nuclear island.

6.2 DESIGN AND SAFETY CASE

173. As release of this hold point does not depend on an iteration in the safety case, there was a limited demand on ONR's design and safety case team, with only a small number of assessment reports contributing to the considerations in this PAR. After considering those reports, the design and safety case cornerstone lead recommended that ONR issues an Agreement under LC 19 for NNB GenCo to commence installation of bulk MEH in unit 1 nuclear island.

174. Having sampled the arguments and conclusions in the assessment reports produced under this cornerstone, I concur with the conclusions of the cornerstone lead that, on the basis of those reports, ONR should issue an Agreement under LC 19 for NNB GenCo to commence bulk installation of MEH in unit 1 nuclear island.

6.3 SITE COMPLIANCE

175. Based on sampling of NNB GenCo's documentation and interventions during 2020/21, ONR's cornerstone lead did not identify any significant areas which would preclude ONR issuing an Agreement for NNB GenCo to proceed with bulk installation of MEH. The cornerstone lead therefore recommended that ONR issues an Agreement under LC19 for NNB GenCo to commence bulk installation of MEH in unit 1 nuclear island.

176. I have reviewed the cornerstone report and sampled some of the referenced Intervention Records, and I concur with the conclusions of the cornerstone lead that ONR should issue an Agreement under LC 19 for NNB GenCo to commence bulk installation of MEH in unit 1 nuclear island. I also support the cornerstone lead's proposals for ONR oversight of the early stages of the bulk MEH installation activities.

6.4 CONVENTIONAL HEALTH AND SAFETY, AND FIRE SAFETY

177. From the perspective of NNB GenCo's arrangements for managing both conventional health and safety, and fire safety, ONR's CHS and fire safety leads conclude that there are no conventional health and safety or fire compliance gaps that should prevent ONR from granting Agreement under LC 19 to the start of bulk MEH installation in unit 1.

178. I have reviewed the CHS and fire safety assessment report, and sampled its supporting reports, and I concur with these conclusions.

6.5 NUCLEAR SECURITY

179. ONR's nuclear security lead for HPC is content that the security arrangements in the ONR-approved Project Security Plan meet regulatory expectations and is confident of the continued compliance with those arrangements and concludes that there are no security concerns which would raise objections to the bulk MEH hold point being lifted.

180. I have reviewed the security assessment report and I am satisfied that its content supports ONR's HPC security lead's conclusions.

6.6 OTHER ONR CONSIDERATIONS

181. This report sets out the position on a number of other matters which I consider to be relevant to ONR's decision on giving its Agreement to the start of bulk MEH installation. These are:

- closure or satisfactory position with all GDA Assessment Findings relevant to the hold point
- closure or satisfactory progress with all relevant Regulatory Issues
- confirmation that there are no open NNB GenCo Commitments related to Hold Point 2.2.20; and
- the Environment Agency's views on the basis for ONR's decision giving its Agreement.

182. I conclude that there are no concerns regarding any of these matters which should prevent ONR from giving its Agreement under LC 19 for NNB GenCo to commence bulk installation of MEH in unit 1.

6.7 NNB GENCO'S HOLD POINT RELEASE PROCESS

183. This PAR notes that 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. Having reviewed the HPRD, the HPP recommended that the hold point could be lifted, subject to the satisfactory closure of the items

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identified in the RAP, and this was endorsed by a subsequent meeting of NNB GenCo's Direction Team.

184. I have examined NNB GenCo's application of its hold point release process for the start of bulk MEH installation, and I consider this to have been carried out in an appropriately rigorous manner.

7 RECOMMENDATIONS

185. On the basis of the request submitted by NNB GenCo and the conclusions of this report, I recommend that the head of the EPR sub-Division:

- takes into account the proposals for further ONR regulatory oversight and control of the MEH installation programme made in a number of contributory assessment reports and highlighted in Section 4 of this PAR
- signs this PAR to confirm support for the ONR technical and regulatory arguments that justify issuing HPC Licence Instrument 522 – Agreement to commence bulk installation of MEH in unit 1 nuclear island
- signs this PAR approving its release for publication, after redaction where appropriate; and
- signs HPC Licence Instrument 522.

8 REFERENCES

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20. ONR-NR-AR-21-028 Revision 0 Assessment report of the MEH Alliance (MEHA) Integrated management system arrangements, (IMS) including quality management and lifetime quality records (LTQRs), and quality function capability to Inform Agreement to Start of unit 1 Bulk MEH Installation at Hinkley Point C. CM9 2021/68014
21. ONR-NR-AR-21-024 Assessment Report for workstream DEV6, manufacturing and supply chain, for ONR's Agreement to the start of bulk Mechanical, Electrical and HVAC (MEH) installation in unit 1 nuclear island, October 2021. CM9 2021/66048
22. ONR-NR-AN-21-053 Revision 0 Assessment Note of Nuclear Safety Culture and Organisational Learning to Inform Agreement to Start of unit 1 Bulk MEH Installation at Hinkley Point C. CM9 2021/66253
23. ONR-NR-AR-21-025 Mechanical Engineering Assessment CM9 2021/69893

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24. ONR-NR-AR-21-032 Revision 0. Electrical Engineering Assessment CM9 2021/77492
25. ONR-NR-AR-21-030 Bulk MEH - Civil Engineering Assessment (Hold Point 2.2.20). CM9 2021/70580
26. ONR-NR-AN-21-049. NNB GenCo – HPC: Internal Hazards Assessment of MEH. CM9 2021/62098
27. ONR-NR-AR-21-027 Revision 0, October 2021. Human Factors Review of NNB HF Capability and Progress Ahead of Bulk MEH Milestone on Hinkley Point C. CM9 2021/68668
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48. HPC Long Term Strategy – Plan for a Plan July 2021 CM9 2021/0052185
49. ONR Assurance Review Scope for HPC Regulatory Strategy, November 2021. CM9 2021/77259

Appendix 1. Bulk MEH Hold Point: related Regulatory Issues

Ref	Level	Title	Closure date	Status
7545	3	LC7 Longer term required improvements	31-Jul-21	Closed
8661	3	Inner Containment Liner Quality Arrangements	Open	ONR view: Adequate progress Achieved for MEH
8313	3	Counterfeit, Fraudulent & Suspect Items (CFSI) management by NNB GenCo	31-Aug-21	Closed
8312	3	Shortfalls in NNB GenCo management system arrangements to manage non-conformances.	30-Jul-21	Closed
8501	3	Integrated Management System (IMS) Adherence and Oversight	31-Jul-21	Closed
7506	3	Strategic arrangements for records that demonstrate adequate quality of HPC Safety Systems, Structures and Components	Open	Downgraded to Level 4, Sept 22, 2021 ONR issue owner's view: Adequate progress achieved for MEH
8823	3	Shortfalls in the ENSA EoMR and NNB partitioning strategy	Open	Bulk MEH related actions closed. ONR view: Adequate progress achieved for MEH
8818	3	Inconsistent standards and expectations across the Project Management and Quality functions	31-Aug-21	Closed.
6692	4	Robustness of equipment anchorage for proprietary fixings, excluding standard embedment plates.	30-Sep-21	Closed
6698	4	Review and sentencing of the observations of Arup from its assessment of the sampled NI Structures	Open	Progress on this issue allowed it to be decoupled from the MEH milestone (16 Sept 2021)
6724	4	HVAC LC20 assessment - diversity of safety chilled water system pumps	31-Jul-21	Closed
6726	4	HVAC LC20 assessment – design of the false floor in I&C rooms and analysis of impact on HVAC system performance	Open	ONR has confirmed that the RI has been sufficiently progressed for Bulk MEH.
6754	4	NIC assessment – HPC High Air Temperature	30-Oct-21	Closed
8908	4	Chillers / I&C control	Open	ONR has confirmed that the RI has been sufficiently progressed for Bulk MEH.

Appendix 2

Status of GDA Assessment Findings for Closure at Start of Bulk MEH

AF- UKEPR- EE-016	AF- UKEPR- EE-020	AF- UKEPR- FS-006	AF- UKEPR- FS-014	AF- UKEPR- FS-015	AF- UKEPR- FS-016	AF- UKEPR- FS-017	AF- UKEPR- FS-020	AF- UKEPR- FS-030
AF- UKEPR- FS-51	AF- UKEPR- FS-61	AF- UKEPR- FS-64	AF- UKEPR- FS-66	AF- UKEPR- FS-68	AF- UKEPR- FS-71	AF- UKEPR- FS-85	AF- UKEPR- FS-94	AF- UKEPR- FS-101
AF- UKEPR- FS-107	AF- UKEPR- FS-108	AF- UKEPR- FS-115	AF- UKEPR- FS-116	AF- UKEPR- FS-118	AF- UKEPR- HF-036	AF- UKEPR- PSA-013	AF- UKEPR- PSA-015	AF- UKEPR- PSA-024
AF- UKEPR- PSA-025	AF- UKEPR- PSA-031	AF- UKEPR- PSA-033	AF- UKEPR- PSA-034	AF- UKEPR- PSA-035	AF- UKEPR- PSA-036	AF- UKEPR- PSA-037	AF- UKEPR- RC-034	AF- UKEPR- RP-001

	Full closure
	Closure forms submitted by NNB GenCo