

Hinkley Point C Construction

Assessment of a request by NNB GenCo (HPC) Ltd for ONR Agreement to receive the first Nuclear Steam Supply System component to site

Project Assessment Report: ONR-NR-PAR-21-003

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Permission requested

NNB Generation Company (HPC) Limited (NNB GenCo), the licensee for the Hinkley Point C (HPC) nuclear licensed site has requested ONR's agreement under Licence Condition (LC) 19(1) to receive the first Nuclear Steam Supply System (NSSS) component to the HPC site.

Background

ONR had specified that it would apply LC19(1) to permission Hold Point 2.2.10, 'receipt of first major NSSS shipment to site' in response to NNB GenCo identifying performance shortfalls at Framatome Creusot Forge. At the time, both ONR and NNB GenCo understood that Hold Point 2.2.10 would refer to the receipt of the unit 1 reactor pressure vessel at HPC. More recently, the subject of the first major NSSS to be shipped to site has, for schedule and operational reasons, been changed to the main coolant pump (MCP) casing, and the constrained activity for Hold Point 2.2.10 is now the receipt of the first MCP casing at the HPC site. The shipment of subsequent NSSS equipment will then be subject to a standard gateway process that will confirm that each specific equipment is ready to be shipped to site. ONR will permission the release from the factory or installation of a selection of other NSSS high integrity components in the future, including the reactor pressure vessel.

Work carried out by ONR in consideration of this request

Assessments were undertaken by ONR's structural integrity and quality management specialisms.

The structural integrity report concludes that:

- the licensee has adequately demonstrated compliance with claims on the achievement of high integrity for the casing throughout the life of the plant and on its demonstration for all foreseeable types of failure.
- for all relevant regulatory issues, generic design assessment (GDA) findings and regulatory commitments, the licensee has demonstrated sufficient progress to support lifting of the hold-point.
- ONR's understanding of Hinkley Point C structural integrity case from meetings with the licensee and the ONR intervention programme, is consistent with lifting of the hold-point.

The quality management report concluded that:

- the licensee has developed and deployed adequate post-manufacture management system arrangements and facilities for the release, receipt, storage, preservation, and issue of NSSS components, including the arrangements for the production and maintenance of the lifetime quality records, which are sufficient to support the release of the NSSS hold point. I recommend that an area of continued ONR focus during future engagements is the licensee site-based management system arrangements associated with the receipt, storage, care and maintenance of NSSS components.
- The assessment also identifies that there are several remaining matters which require follow-up with the licensee through routine engagement.

- there should be follow-up ONR engagement on the licensee's management system arrangements associated with the receipt, storage, care, and maintenance of NSSS components at the HPC site, as well as pursuit to closure of related open regulatory issues.

Matters arising from ONR's work

ONR has developed a sub-strategy for permissioning the release to site of subsequent NSSS components which will employ a flexible permissioning approach for a range of NSSS items.

Conclusions

Having reviewed the assessment reports from the ONR structural integrity and quality management specialisms and examined NNB GenCo's process for determining its readiness to release the hold point, I conclude that there is a robust and auditable basis for ONR to give its Agreement under LC19 for NNB GenCo to release Hold Point 2.2.10.

It is noted however that the original motivation for ONR specifying the hold point for formal permissioning was that the first NSSS component would be the reactor pressure vessel (RPV) supplied from a Framatome factory. While some of the conclusions from this Project Assessment Report are applicable more generally to other NSSS components, as set out in the NSSS permissioning strategy, there will need to be more targeted regulatory oversight of future items manufactured at Framatome's factories.

Recommendations

I recommend that:

- ONR issues Licence Instrument LI523, giving its Agreement under LC19(1) of nuclear site licence 97A, for NNB GenCo to receive the first nuclear steam supply system component to the Hinkley Point C site.
- ONR maintains appropriate oversight of NNB GenCo's closure activities in relation to the first MCP casing and in particular the review and acceptance of Framatome's fracture mechanics assessment work.
- ONR should maintain appropriate oversight over, and regulatory control of, the licensee's activities in relation to the manufacture and shipment of future NSSS items including the RPV.



LIST OF ABBREVIATIONS

AF	Assessment Finding
C&M	Care and Maintenance
CFSI	Counterfeit, Fraudulent or Suspect Items
CRDM	Control Rod Drive Mechanism
EIM&C	Enhanced Implementation, Monitoring and Control
ENSA	Equipos Nucleares S.A. [Spanish nuclear equipment manufacturer]
EoMR	End of Manufacturing Report
FA3	Flamanville-3
FCF	Framatome Creusot Forge
FMA	Fracture Mechanics Assessment
FSM	Framatome Saint Marcel
GDA	Generic Design Assessment
HIC	High Integrity Component
HP	Hold Point
HPC	Hinkley Point C
HPP	Hold Point Panel
HPMD	Hold Point Management Document
HPRD	Hold Point Release Document
INA	Independent Nuclear Assurance (NNB GenCo)
LC	Licence Condition
LTQR	Lifetime Quality Record
MCL	Main Coolant Line
MCP	Main Coolant Pump
MSL	Main Steam Line
MED	Management Expectations Document
NIC	Nuclear Island Consent
NNB GenCo	NNB Generation Company (HPC) Limited
NSC	Nuclear Safety Committee
NSSS	Nuclear Steam Supply System
PAR	Project Assessment Report
RAP	Residual Action Plan
RI	Regulatory Issue
RPV	Reactor Pressure Vessel
SAP	Safety Assessment Principle(s) (ONR)
SED	Summary Evidence Document
SG	Steam Generator
SI	Structural Integrity
SQEP	Suitably Qualified and Experienced Person
TAG	Technical Assessment Guide(s) (ONR)
TIG	Technical Inspection Guide(s) (ONR)

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1 PERMISSION REQUESTED

1. The licensee, 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 receive the first Nuclear Steam Supply System (NSSS) component to site, as defined by its Hold Point 2.2.10 (Ref. 2). The activity constrained by this hold point is the receipt of the first Unit 1 main reactor coolant pump casing at the HPC licensed site.

2 BACKGROUND

2. NNB GenCo, the nuclear site licensee, is constructing a twin reactor EPR™ nuclear power station at HPC. *ONR Strategy for the Regulation of HPC from 2022 - 2027* (Ref. 3) sets out ONR's strategy for regulating the HPC project up to commercial operation.
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. NNB GenCo has defined Hold Point 2.2.10 as a 'secondary hold-point', and the process for the release of such a hold point is set out in its Define, Manage, and Release Key Hold Points procedure (Ref. 4).

2.1 NUCLEAR STEAM SUPPLY SYSTEM

4. The Nuclear Steam Supply System (NSSS) consists of a number of high integrity parts that are being produced across Europe. The NSSS comprises some of the most safety critical components for HPC. These include high integrity components (HICs) for which the safety case claims that the likelihood of gross failure is so low that it can be discounted. The concomitant requirements for this claim are that HICs must meet very demanding standards of design and manufacture that often invoke properties and tests that exceed those defined by the relevant code.
5. The Main Reactor Coolant Pump (MCP) casings (four to each reactor unit) are HIC components that are being manufactured under contract to Framatome at both SAFAS SPA in Italy and at Le Creusot in France. The first MCP casing has been shipped from SAFAS and is in storage at Avonmouth awaiting delivery to the HPC site. The second casing is expected to be shipped to the UK during spring 2022.
6. Other Unit 1 NSSS items are scheduled for delivery to the UK during 2022/23, including the reactor pressure vessel (RPV), four steam generators (SG), pressuriser, the main coolant lines (MCL) and main steam lines (MSL). Framatome is the supplier for much of the NSSS and manufactures the RPV and steam generators at its St Marcel plant and the MCL at the Chalon workshop, nearby to St Marcel. The pressurisers are sub-contracted by Framatome to ENSA in Spain. The MSL is manufactured by Bilfinger under a direct contract to NNB GenCo.

7. In early 2018 ONR specified (Ref. 5) that it would apply LC19(1) to permission Hold Point 2.2.10, 'receipt of first major NSSS shipment to site' in response to NNB GenCo identifying performance shortfalls at Framatome. At the time, both ONR and NNB GenCo understood that Hold Point 2.2.10 would refer to the receipt of the RPV at HPC site.
8. More recently, the subject of the first major NSSS to be shipped to site has, for schedule and operational reasons, been changed to the MCP casing, and the constrained activity for Hold Point 2.2.10 is now the receipt of the first MCP casing at the HPC site. The shipment of subsequent NSSS equipment will then be subject to NNB GenCo's standard gateway process that will confirm that each specific equipment can be shipped to site.
9. Although the hold point is expected to demonstrate the effectiveness of NNB GenCo's process for determining readiness for receipt of HICs, the MCP casing is a simple, single piece casting and is not made in a Framatome manufacturing facility. Consequently, ONR's intent in permissioning Hold Point 2.2.10 (exercising regulatory control over NNB GenCo's oversight of Framatome manufacturing of a welded assembly) will not be fully met.
10. NNB GenCo has also recognised the significance of not having a major vessel made at Framatome St Marcel as the subject of the hold point and has introduced two items in a residual action plan (RAP) within the hold point management document (HPMD) (Ref. 6) for hold point 2.2.10. These require evidence to be presented to the Hold Point Panel (HPP) demonstrating readiness to receive the first NSSS equipment manufactured at St Marcel, and/or the RPV which is also manufactured at St Marcel.
11. In view of the changed order of NSSS component delivery, and in order to give ONR confidence in the quality of the components scheduled to be delivered after the first MCP, ONR has developed a sub-strategy for regulating the NSSS delivery programme (Ref. 7). That sub-strategy is discussed in Section 4 of this Project Assessment Report (PAR).

2.2 NNB GENCO'S CASE FOR ONR'S AGREEMENT

12. NNB GenCo's request (Ref. 1) for ONR to give Agreement to the receipt at site of the first NSSS component was supported by a number of accompanying documents:
 - Approved Hold Point Management Document (Ref. 6)
 - Concurrence Part B (Ref. 8)
 - Minutes of two Hold Point Panel meetings (Refs. 9 and 10)
 - Minutes of Nuclear Safety Committee (Ref. 11)
13. This PAR provides a summary of ONR's assessment of the information provided by NNB GenCo in support of its request for Agreement. This information includes not only that referenced in NNB GenCo's request, but additional information gathered from meetings with NNB GenCo, as well as from ONR interventions at the HPC site and elsewhere.

3 ONR ASSESSMENT OF NNB GENCO'S REQUEST

3.1 METHODOLOGY

14. 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. 12).
15. The ONR Safety Assessment Principles (SAPs) (Ref. 13), together with supporting Technical Inspection and Assessment Guides (TIGs and TAGs) (Refs. 14 and 15), have been used as the basis for ONR's technical assessment and interventions.
16. There is no iteration in the development of the HPC safety case associated with this hold point. Consequently, the involvement of ONR specialist inspector resources has been limited to those with direct interest in the quality of the NSSS HIC components under manufacture, and in NNB GenCo's oversight of the manufacturing, examination and testing of these components.
17. Discussions with the sub-division Engineering Delivery Lead (Ref. 16) established that two assessment reports would be needed to inform the permissioning of the hold point. The first would include an assessment by an ONR structural integrity inspector that focuses on whether the equipment delivered to site will be fit for purpose and whether its delivery to site is likely to foreclose reasonably practicable solutions.
18. The second assessment report, from an ONR quality management inspector, considers the adequacy of the licensee's post manufacture management system arrangements, including quality management, and the arrangements for the production and maintenance of the lifetime quality records (LTQRs), including the End of Manufacturing Report (EoMR) associated with NSSS HICs.

3.2 STRUCTURAL INTEGRITY ASSESSMENT

19. The report from the ONR structural integrity (SI) inspector (Ref. 17) notes that NNB GenCo issued a summary evidence document (SED) to support the HIC claims for the MCP casing (Ref. 20).
20. The SED, which resembles a safety case for the hold-point, provides claims, arguments, and evidence related to the hold-point including:
 - analysis including stress reports, defect tolerance assessments and supporting work on materials properties and inspection
 - the licensee's oversight and control of the manufacturing and the inspection release note from the independent third-party inspection agency; and
 - progress in resolving relevant Generic Design Assessment (GDA) assessment findings (AFs) and regulatory issues.
21. The ONR SI assessment report considers:
 - the claims, arguments and evidence presented in the licensee's SED;



- progress for the SI work-stream within normal business including the ONR intervention programme; and
 - the concurrence report for the hold-point prepared by the licensee's independent nuclear assurance.
22. The MCP casing is classified as a HIC component, and the claims that the SED makes reflect this:
- Claim 1: High integrity is achieved in design, manufacture, construction, and commissioning.
 - Claim 2: High integrity is [will be] maintained throughout the plant design life of 60 years.
 - Claim 3: High integrity is demonstrated by the avoidance of all reasonably foreseeable types of failure.
23. Having considered the arguments and evidence attached to these claims, the SI inspector concluded that claims 1 and 2 would be met by the MCP casing. For claim 3, the inspector noted that while the licensee has demonstrated compliance with the design code for a defect-free MCP casing and for margins against fast fracture, for HIC components ONR SAPs require an adequate demonstration of integrity in the presence of defects.
24. As part of the HIC demonstration, to complement the design code requirements, the licensee has also undertaken defect tolerance assessments for the casing using a bespoke fracture mechanics assessment (FMA) methodology. The SI inspector notes that the licensee has stated that, due to time constraint with the intended lifting of the hold-point, the current FMAs of the MCP casing undertaken by Framatome, although verified, are not yet presented in a formal document. This will be issued in due course following the licensee's established review and acceptance process.
25. Although not able to sample the Framatome calculations, the inspector was familiar with the licensee's approach and was aware that the licensee's suitably qualified and experienced persons (SQEPs) have been engaging with Framatome since very early in the process. The licensee has stated that Framatome has undertaken internal verification of the results and since the analyses were carried out in a staged manner, its SQEPs were able to review and approve the activities at all the stages. The licensee has also made a recommendation in the SED that all the FMA results should be reviewed and accepted via its formal process before installing the casing.
26. The inspector concluded that while this and other SED recommendations relating to the Framatome FMA are acceptable for the first MCP casing to be received by HPC site, ONR would expect the licensee to review defect excavation maps for all the subsequent MCP casings. This would confirm the absence of defects in the flange regions and supply a suitably rigorous justification for the acceptance of any MCP casing with a defect in the flange region (the flange region being subject to the most onerous design transient stresses).

3.2.1 PROGRESS WITH GDA ASSESSMENT FINDINGS

27. The SI report provides a detailed commentary on the status of GDA AFs relevant to the release of the hold point. It notes that there was an expectation that three of the GDA AFs (AF-UKEPR-SI-23, AF-UKEPR-SI-24 and AF-UKEPR-SI-27) would be closed prior to the hold-point. However, since these GDA findings all relate to forgings and are not relevant to the MCP casing (which is a casting), the SI inspector was content for their completion dates to be deferred to a later relevant hold-point (the installation of the RPV).
28. The inspector concluded that the licensee has demonstrated sufficient progress on all relevant GDA AFs to support lifting of the hold-point.

3.2.2 STRUCTURAL INTEGRITY NORMAL BUSINESS AND REGULATORY ISSUES

29. The SI assessment report notes that since ONR gave regulatory consent to lifting the hold point to allow pouring of nuclear island concrete (NIC), the ONR and the licensee have discussed HPC structural integrity at quarterly progress meetings, monthly teleconferences, and ad hoc meetings on specific issues. Over the same period, ONR has carried out twenty-eight interventions on the structural integrity of HPC. All but four of those interventions relate to aspects of the licensee's control and management of the NSSS and one of the interventions made checks on the first MCP casing to be delivered to HPC site (see Table 1). In response to shortfalls, largely identified by this intervention programme since NIC permissioning, ONR has raised thirteen regulatory issues for HPC structural integrity (Table 2). Based on evidence supplied by the licensee, ONR has accepted that all but one of these issues have been resolved. The open issue, which concerns the scope of the fracture toughness testing programme for ferritic steels is not relevant to this hold-point.
30. Overall, the SI inspector concluded that through normal regulatory business as above, the licensee has demonstrated sufficient progress to support lifting the hold-point.

3.2.3 STRUCTURAL INTEGRITY CONCLUSIONS AND RECOMMENDATIONS

31. The structural integrity report concludes that:
 - the licensee has adequately demonstrated compliance with claims on the achievement of high integrity for the casing throughout the life of the plant and on its demonstration for all foreseeable types of failure
 - for all relevant regulatory issues, GDA AFs and regulatory commitments, the licensee has demonstrated sufficient progress to support lifting of the hold-point; and
 - ONR's understanding of HPC structural integrity, from meetings with the licensee and the ONR intervention programme, is consistent with lifting of the hold-point.

32. The report recommends that, from the perspective of structural integrity, ONR should give agreement under LC19 for receipt of the first major shipment of NSSS by the HPC site.

3.3 QUALITY ASSESSMENT

33. The ONR quality management inspector's assessment (Ref. 18) was based on a range of routine, ad hoc and dedicated interventions and engagements. The dedicated quality management interventions were:
- NSSS6 – Quality management arrangements for NSSS – February 2020
 - QU6 Part 1 – Post manufacture quality management arrangements associated with NSSS HICs – October 2021
 - QU6 Part 2 – End of Manufacturing Report for the MCP casing and gateway review process for component release – February 2022
 - QU6 Part 3 – HIC receipt, storage, preservation, and issue – March 2022
34. In addition to these interventions the report notes a number of wider project interventions that were completed to assess the licensee's management system arrangements on topics such as counterfeit, fraudulent and suspect items (CFSI), manufacturing and post design non-conformance reporting, as well as the management of manufacturing oversight and the associated LTQRs.
35. The Inspector noted that ONR has used these interactions to influence improvements in the licensee's organisational capability and arrangements, in line with relevant good practice, which the licensee has responded positively to and has been a contributing factor to the conclusions reached in the assessment report.

3.3.1 OUTCOME OF INTERVENTION QU6

36. The findings from intervention QU6 were crucial to the quality inspector's conclusions. The intervention was in three parts, carried out over the period October 2021 to March 2022.
37. Based on the engagements and evidence sampled, although areas of good practice were noted, the inspector identified shortfalls in the specific areas of the licensee's management system arrangements. Three regulatory issues (RI 10667, RI 10668, and RI 10669) were raised to seek improvement in the quality of EoMRs, the management of inspection activities, hold and witness points in Follow-Up Documents and the proposed management and interface arrangements to manage any residual open technical issues following the shipment of NSSS components to site.
38. The report notes that based on the evidence provided by the licensee in response to the regulatory issues (which included improvement in the review and verification of EoMRs, enhanced clarity for the management of witness points which is now provided in the HIC quality release certificates, and clarity on proposed management of residual open technical issues following the

shipment of NSSS components to site), the inspector was content that the licensee had provided sufficient evidence to close the three regulatory issues.

39. In addition to the regulatory issues, a number of matters were identified during the dedicated intervention and sampling of evidence which required further licensee clarification and response. These matters did not affect the inspector's overall judgement and conclusions but are planned for follow-up in subsequent routine engagements.
40. One area of continued ONR focus during future engagements is the management system arrangements associated with the receipt, storage, care, and maintenance of NSSS components at the HPC site. The report notes that receipt and interim storage arrangements at the offsite asset warehouse facility (W248) in Avonmouth (where MCP casing #1 was located) and the eventual storage facilities at the HPC site for the MCP casing#1 were both inspected as part of the intervention.
41. The care and maintenance (C&M) arrangements at Avonmouth were found to be satisfactory. The onsite storage building is a permanent structure, temperature controlled and has been fitted out internally with racking in preparation for the storage of components. Segregated rooms have been established in the building for the storage of control and instrumentation equipment. The intervention found the building to be finished to an adequate standard and subject to the implementation of the appropriate management systems, security and access arrangements, was considered suitable for the storage of NSSS components.
42. I note that ONR's HPC sub-division intervention plan includes two LC28 (Examination, inspection, maintenance and testing) compliance interventions during 2022/23 which will consider C&M arrangements at the site.

3.3.2 QUALITY RELATED REGULATORY ISSUES

43. In addition to the three regulatory issues (RIs) noted above, the quality assessment report highlights several other RIs raised in the period 2019-22 which are identified as partly or wholly relevant to the ONR inspector's recommendations on the release of this hold point. These are listed in Table 3. The inspector's report notes that all the relevant issues had either been closed or that the progress towards closure was satisfactory. Further progress on closure of open issues has been made since the inspector's report was written and Table 3 indicates their current status.

3.3.3 QUALITY INSPECTOR'S CONCLUSIONS AND RECOMMENDATIONS

44. The inspector was satisfied that the licensee has developed and deployed adequate post-manufacture management system arrangements and facilities for the release, receipt, storage, preservation, and issue of NSSS HICs, including the arrangements for the production and maintenance of the LTQRs, which are sufficient to support the release of the NSSS hold point. The assessment also identifies that there are several remaining matters which require follow-up with the licensee through routine engagement.

47. The inspector therefore recommended that ONR should give agreement under LC19(1) for release of NNB GenCo Hold Point 2.2.10. In addition, the inspector recommended follow-up ONR engagement on the licensee's management system arrangements associated with the receipt, storage, care, and maintenance of NSSS components at the HPC site.

3.4 OTHER ONR CONSIDERATIONS

48. The above sections have considered the conclusions from the two specialist assessors. These are ONR's primary considerations in making a judgement on whether to give its agreement under LC 19(1). This section summarises 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 AFs relevant to this project milestone
- closure or adequate progress with all relevant ONR regulatory issues
- closure of NNB GenCo Regulatory Commitments related to the hold point
- liaison with the Environment Agency; and
- preparation of the Licence Instrument.

3.5 GDA ASSESSMENT FINDINGS

49. ONR's EPR™ GDA identified a significant number of GDA AFs and six of these were scheduled for completion by 'Receipt of first NSSS to site'. In addition to these, the GDA structural integrity assessment report identified those assessment findings that were directly related to the NSSS and concluded that these had either been closed or that there was adequate progress to closure.
50. Of the six GDA AFs assigned to the NSSS hold point for closure, two have been fully closed, while four have been deferred to a later hold point. ONR has reviewed the justifications for these deferrals and is satisfied that lack of closure does not affect ONR's recommendation to permit NNB GenCo to progress beyond the hold point.

3.6 REGULATORY ISSUES

51. As reported in the two contributory ARs, all level 3 RIs relevant to the release of the hold point have either been closed or reduced to level 4 issues for closure following the release of the hold point. Tables 2 and 3 list all relevant regulatory issues.

3.7 NNB GENCO REGULATORY COMMITMENTS

52. 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.
53. Examination of the relevant Commitments log (Ref. 21) has shown that although there were no commitments directly assigned to the hold point, there were a number which were assigned to the 'Install RPV' milestone, which is

expected to be several months later than Hold Point 2.2.10. Both ONR and NNB GenCo checked whether any of these commitments were appropriate for consideration for closure at this hold point. The structural integrity inspector's report (Ref. 17) noted three commitments that were judged relevant to this hold point:

- **CMT-HPC-000020: Lower testing temperature and setting lower bound limits on fracture toughness:** *Since the fracture toughness data used for the FMA of the MCP casings were based on literature studies as part of the thermal aging assessment of MCP castings and the related GDA AF (SI-UKEPR-SI-19) is closed, the SI inspector considered that the licensee has made sufficient progress to support the release of the hold-point.*
- **CMT-HPC-000023: Undertake inspection qualification:** *The licensee has completed the inspection qualification that is relevant to the MCP casings (that for Group 9 which covers major repairs to the MCP bodies) and has either closed or demonstrated adequate progress for the related GDA AFs (AF-UKEPR-SI-09, AF-UKEPR-SI-12, AF-UKEPR-SI-13 and AF-UKEPR-SI-14); the ONR SI inspector considered that this progress supports the release of hold-point.*
- **CMT-HPC-000038: Independent review of RSE-M Appendix 5.4 for HPC safety case:** *The methodology given in RSE-M Appendix 5.4 has been reviewed by the independent expert working group and, subsequently, aspects of the methodology related to fatigue crack initiation have been reviewed in response to Regulatory Issue 6490 which is now closed. The ONR SI inspector considered that this progress supports the release of the hold-point.*

54. Having reviewed the arguments set out in the ONR SI inspector's assessment report, I am satisfied that none of the outstanding Commitments undermine the case for giving agreement to the release of this hold point. Outstanding work on all the outstanding Commitments will need to be pursued by the licensee with a view to closure at a later agreed milestone.

3.8 LIAISON WITH THE ENVIRONMENT AGENCY

55. ONR works closely with the Environment Agency to ensure that both regulators are fully aware of any matters which may affect their regulatory activities in relation to HPC or the adjacent nuclear sites. This is facilitated not only through routine working-level contacts and sharing of information, but also by virtue of the Environment Agency being an attendee at ONR's regular EPR Subdivision Board.
56. Nevertheless, to ensure the Environment Agency's fullest possible awareness of ONR's decision making in relation to NNB GenCo's request for agreement, the Agency's views were sought (Ref. 22). In response (Ref. 23), the Environment Agency stated that in this case it had no matters to raise for ONR's consideration.

3.9 PREPARATION OF THE LICENCE INSTRUMENT

57. The Licence Instrument giving ONR's agreement to the receipt of the first NSSS component to site (LI523) follows the approved standard format of a derived power specification set out in the relevant ONR guide (Ref. 24).
58. This PAR will be subject to peer review in accordance with ONR's procedure (Ref. 25) and amended as necessary prior to submission to the Head of ONR's HPC 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. 25.

4 MATTERS ARISING FROM ONR'S WORK

59. As discussed earlier, in the lead up to ONR issuing the Specification under LC19(1) for permissioning this hold point, there had been concerns regarding the quality arrangements at both Framatome factories in France, and NNB GenCo's oversight and control of Framatome's manufacturing activities. The Specification was issued to ensure ONR provided focused attention on the release to the site of the first component from one of these factories. However, it became clear during 2020 that the first NSSS component delivered to site would be a MCP casing from SAFAS in Italy, where quality concerns had not been raised.
60. In discussion with NNB GenCo, it was established that two RAP items would be added to the Hold Point Release Document (HPRD) for this hold point which would ensure that the HPP would scrutinise the evidence for the release to site of two subsequent NSSS items manufactured at the St Marcel factory. Although ONR welcomed the additional oversight by NNB GenCo of the two items from St Marcel, it was decided that regulatory permissioning was appropriate for the delivery of these and additional NSSS HIC items.
61. Consequently, ONR developed a sub-strategy for permissioning the release to site of subsequent NSSS components (Ref.7). Instead of using permissioning by means of Licence Instruments, the sub-strategy proposes that ONR employs a different flexible permissioning approach (Enhanced Implementation, Monitoring and Control – EIM&C) for a range of NSSS items:
 - Release of the unit 1 RPV from Framatome St Marcel. This will be one of the first major assemblies from Framatome St Marcel and is the subject of open regulatory issues related to irradiation surveillance, fracture toughness, and control rod drive mechanism (CRDM) welding. It is also noted that there are significant schedule pressures on the completion of the RPV.
 - Release of the unit 2 RPV from Framatome St Marcel. Establish that lessons have been learnt from the manufacture of the unit 1 RPV have been carried forward and that high quality has been achieved.
 - Release of first steam generator from Framatome St Marcel. Early steam generators are amongst the first major assemblies to be delivered from Framatome St Marcel and are subject to schedule pressures. The steam generators are also more complex assemblies than RPVs.



- Release of initial Main Coolant Line pipe assemblies from Framatome Chalon. These assemblies are likely to be the first assemblies shipped from a Framatome factory and pose particular challenges for welding and non-destructive testing. Furthermore, problems have been encountered with bending some of the elbows and confidence is required that the non-conformances have been closed appropriately.
- Release of first pressuriser from ENSA. These HIC vessels have been made by ENSA under a sub-contract to Framatome. Quality issues have been observed at ENSA and ONR requires assurance that quality issues have been addressed and non-conformances closed.
- Release of initial Main Steam Line assemblies. These are being welded at Bilfinger and are of particular interest due to the technical issues encountered at Flamanville-3.

62. The use of EIM&C as a permissioning tool is new to the HPC project. Following discussion, NNB GenCo are implementing changes to its LC19 arrangements to allow ONR to use the EIM&C approach, and these arrangements should be in place well before they are required for permissioning the receipt of the next NSSS component.

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

5.1 DEFINE, MANAGE AND RELEASE HOLD POINT PROCEDURE

63. As discussed in Section 2 above, NNB GenCo has defined Hold Point 2.2.10 as a 'secondary hold-point' and the process for the release of such a hold point is set out in its *Define, Manage, and Release Key Hold Points* procedure (Ref. 4). 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).

64. 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.

65. The HPRD for this hold point (Ref. 4) lists 17 expectations for the evidence required to demonstrate that the HIC component can be released to site. It notes that these expectations will ensure that the site is ready and capable to receive shipment, that the component is fit for purpose, and that records are acceptable.

5.2 The HPRD identified several RAP items for closure before the hold point is released. In addition, because the MCP casing was not manufactured at either of the Framatome factories in France (where there had been concerns about quality and NNB GenCo's oversight and control of Framatome's manufacturing

activities), the HPRD identified two RAP items which would endure beyond the hold point. These are:

- RAP1.1 – Hold point evidence to be produced and presented to the HPP prior to delivery of the first NSSS equipment manufactured at Framatome St Marcel; and
- RAP1.2 – Hold point evidence to be produced and presented to the HPP prior delivery of the Reactor Pressure Vessel manufactured at Framatome St Marcel.

66. These two RAP items require the same standard of evidence to be provided to the HPP before shipment of the first NSSS item manufactured at the St Marcel factory, and similarly for the RPV. NNB GenCo's control over the release for shipment and delivery of these items would be via its standard Gateway Review process.

5.3 INDEPENDENT NUCLEAR ASSURANCE: CONCURRENCE

67. As provided for in the NNB GenCo Hold Point management procedure (Ref.4), the licensee's Independent Nuclear Assurance (INA) team applied a Concurrence assessment of the proposals to release the hold point (Ref. 8). This was carried out in accordance with the extant NNB GenCo *Apply Concurrence* procedure (Ref. 26). The concurrence scope focused largely on four key areas, with particular attention paid to the 'High Integrity' aspect of the components released for shipping following the lifting of this hold point. These are:

- HIC Specification
- achievement and demonstration of high integrity
- maintenance of high integrity
- HIC shipping and acceptance

68. The concurrence report summarises a comprehensive series of assessments covering all the above. It concludes that no issues have been identified which are considered blocking to the release of Hold Point 2.2.10, and that concurrence is given subject to the satisfactory resolution of the findings raised. As discussed in the previous section, these were listed in the HPRD as RAP items, for closure before the MCP is brought onto the HPC site.

5.4 HOLD POINT PANEL

69. The draft HPRD was reviewed by two meetings of the Hold Point Panel, on 10 and 24 March 2022 (Refs. 9 and 10). The first meeting identified several points in the HPRD for further clarification or attention. The second meeting reviewed the clarifications and additional evidence and concluded that the panel Chair would recommend to the Responsible Director that the hold point could be released subject to closure of the RAP items and the findings from the INA

Concurrence. NNB GenCo has confirmed that the RAP items and INA Concurrence findings have been adequately resolved.

70. I have reviewed the minutes of both meetings and, based on those, I consider that the HPP deliberations were thorough and appropriate, and reflect a proper fulfilment of NNB GenCo's process for the release of a secondary hold point.

5.5 NUCLEAR SAFETY COMMITTEE

71. The HPRD was presented for consideration and advice to meeting number 64 of the HPC Nuclear Safety Committee (NSC) on March 23 2022 (Ref. 11). The discussion of the HPRD was observed by ONR's EPR Engineering Lead. Based on my review of the minutes and the feedback from the ONR observer (Ref. 27), I am satisfied that the consideration of the matter was appropriately rigorous. Although the NSC was broadly satisfied with the evidence for the release of the hold point, it raised a number of pertinent queries, including the closure of GDA AFs relevant to this hold point (discussed in Section 3.5 above).

5.6 CONCLUSIONS ON NNB GENCO'S INTERNAL PROCESSES

72. Having reviewed all the documentation related to NNB GenCo's internal process for releasing this hold point, I am satisfied that it has been carried out in an appropriately rigorous manner.

6 CONCLUSIONS

73. This PAR has summarised ONR's assessment in relation to the following key areas:
- structural integrity
 - quality; and
 - other matters ONR considers relevant to its decision.
74. This PAR has also considered the adequacy of NNB GenCo's processes for determining its own readiness to release the hold point.
75. My conclusions covering each of these matters are set out below.

6.1 STRUCTURAL INTEGRITY

76. The structural integrity report concludes that:
- the licensee has adequately demonstrated compliance with claims on the achievement of high integrity for the casing throughout the life of the plant and on its demonstration for all foreseeable types of failure
 - for all relevant regulatory issues, GDA AFs and regulatory commitments, the licensee has demonstrated sufficient progress to support lifting of the hold-point; and
 - ONR's understanding of Hinkley Point C structural integrity, from meetings with the licensee and the ONR intervention programme, is consistent with lifting of the hold-point.

77. The report recommends that, from the perspective of structural integrity, ONR should give agreement under LC19 for receipt of the first major shipment of NSSS by the HPC site.
78. I have reviewed the structural integrity inspector's report and sampled its supporting references, and I concur with these conclusions.
79. I note that the structural integrity inspector supports NNB GenCo's proposal that it will require completion of the FMA work undertaken by Framatome before the MCP casing is installed in the plant.

6.2 QUALITY

- 6.3 The ONR quality inspector was satisfied that the licensee has developed and deployed adequate post-manufacture management system arrangements and facilities for the release, receipt, storage, preservation, and issue of NSSS HICs, including the arrangements for the production and maintenance of the LTQRs, which are sufficient to support the release of the NSSS hold point. The assessment also identifies that there are several remaining matters which require follow-up with the licensee through routine engagement.
- 6.4 I have reviewed the quality inspector's report and sampled its supporting references, and I concur with these conclusions.

6.5 OTHER ONR CONSIDERATIONS

80. 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 receipt of the first NSSS component to site. These are:
 - closure or satisfactory position with all GDA AFs relevant to the hold point
 - closure or satisfactory progress with all relevant Regulatory Issues
 - confirmation that there are no open NNB GenCo Regulatory Commitments related to Hold Point 2.2.10; and
 - the Environment Agency's views on ONR giving its Agreement.
81. 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 receive the first NSSS component to the HPC site.

6.6 NNB GENCO'S HOLD POINT RELEASE PROCESS

82. 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 (HPP). Having reviewed the HPRD, the HPP recommended that the hold point could be lifted, subject to the satisfactory closure of the items identified in the RAP.
83. The consideration and advice of the Nuclear Safety Committee was also sought on the proposals to release the hold point and on the findings of the concurrence assessment undertaken by the NNB GenCo internal regulator.

84. I have examined NNB GenCo's application of its hold point release process for the release of Hold Point 2.2.10, and I consider this to have been carried out in an appropriately rigorous manner.

6.7 OVERARCHING CONCLUSION

85. This PAR has considered the findings from ONR's assessment of NNB GenCo's request for Agreement under LC19 for receipt of the first NSSS component to the HPC site. The overall conclusion is that the evidence examined justifies ONR issuing such an agreement.
86. However, it is noted that the original motivation for ONR specifying the hold point for formal permissioning was that the first NSSS component would be the RPV supplied by Framatome. While some of the conclusions from this PAR are applicable more generally to other NSSS components, as set out in the NSSS permissioning strategy, there will need to be more targeted regulatory oversight of future items manufactured at Framatome's factories.

7 RECOMMENDATIONS

87. I recommend that:
- 1) ONR should issue Licence Instrument LI523, giving its agreement under LC19(1) for NNB GenCo to receive the first Nuclear Steam Supply System component to the Hinkley Point C site.
 - 2) ONR maintains appropriate oversight of NNB GenCo's closure activities in relation to the first MCP casing and in particular the review and acceptance of Framatome's FMA work.
 - 3) ONR should maintain appropriate oversight over, and regulatory control of, the licensee's activities in relation to the manufacture and shipment of future NSSS items including the RPV.

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20. NNB GenCo, 'Summary evidence document: SAFAS Main coolant pump #1 casing (H1100-7),' 100881796 Rev. 3, 13 Apr 2022. CM9 2022/24447

21. NNB GenCo HPC Commitments Log CM9 2017/49551
22. ONR request to Environment Agency for comments on lifting of Hold Point 2.2.10. April 22nd,2022. CM9 2022/25452
23. Response from Environment Agency 25th April 2022. CM9 2022/0025817
24. ONR Guide – The Purpose and Use of Permissioning - NS-PER-GD-001 Revision 5. <http://www.onr.org.uk/operational/assessment/index.htm>
25. NS-PER-GD-016 Revision 2. Guidance on peer review and acceptance of reports for permissioning. CM9 2020/288726
26. NNB GenCo Company Procedure: Apply Concurrence. NNB-104-PRO-000007 Rev 3. CM9 2018/382952
27. Email from ONR EPR Engineering Lead, 23 March 2022 CM9 2022/24139

Table 1: Interventions

This table lists the objectives of the twenty-eight ONR interventions and the related reports for the structural integrity work-stream since the hold-point on the pouring of nuclear island concrete in 2018.

Title and code	Ref and Date	Objectives
Visit to Framatome Creusot Forge (FCF) to witness forging of HPC main coolant line (MCL) hot leg	ONR-NNB-CR-17-647 Rev. 0, 1 Feb 2018	To witness forging of HPC MCL hot leg in response to concerns over: <ul style="list-style-type: none"> • Non-conformances and performance shortfalls • Carbon segregation in large ferritic forgings • Falsifications in historic quality records • Shortcomings in mechanical and chemical test activities, and associated results.
Framatome Saint Marcel (FSM), observation of welding operation and review of documentation	ONR-NR-IR-18-015 Rev. 1, 15 Oct 2018	To provide confidence that the specified technical requirements of the design had been achieved; to gather evidence that supports a judgment that the licensee has achieved and retained the required level of Intelligent Customer capability to deliver the necessary safety assurance and enable continued construction of HPC; and to gather evidence that will inform a judgment on whether the licensee has deployed adequate oversight and surveillance.
NNB GenCo specification, control and oversight of onsite welding operations on components having design quality requirements of Q2 or Q3	ONR-NR-IR-18-22 Rev. 1, 21 Feb 2019	To demonstrate the adequacy of NNB GenCo’s ability to specify, control and oversee key Q2 / Q3 welding operations on site; to determine how the experience gained by the construction of previous EPR projects has been used to inform the design and surveillance processes for the HPC project; to determine the adequacy of the supply chain management arrangements for the completion of the welding operations on Q2 / Q3 components in terms of ONR expectations set out in relevant SAPs and TAGs; to determine compliance with LC19.
NNB GenCo specification, control and oversight of control rod drive mechanism welder training	ONR-NR-IR-18-26 Rev. 1, 2 Apr 2019	To gather evidence on the licensee’s ability to specify, control and oversee the welder training; the licensee’s processes for the specification, generation and approval of welder training documentation; how operating experience from previous EPR projects had been used to develop sound processes to manufacture the RPV CRDM penetration welds for HPC; and that the technical requirements of the design would be met.

Title and code	Ref and Date	Objectives
NSSS site intervention, FSM (NSSS9)	ONR-NR-IR-19-007 Rev. 0A, 30 Jul 2019	To provide ONR with evidence of the adequacy of NNB GenCo's control and oversight of the manufacture of the nuclear steam supply system (NSSS). The evidence gathered will inform ONR's assessment of the quality of the NSSS in support of permissioning of NNB GenCo's hold-point: 'Delivery of first NSSS to site.'
Witness fracture toughness testing (NSSS8)	ONR-NR-IR-19-007 Rev. 0A, 30 Jul 2019	To inform ONR's judgment on the adequacy of the fracture toughness test testing, analysis and recommendations in advance of the final FMAs of the HPC pressure circuits and, if necessary, give ONR an opportunity to influence the licensee while mitigations can be put in place.
Oversight of site welding, containment liner (WN2)	ONR-NR-IR-19-015 Rev. 0, 30 Sep 2019	To gain confidence that the licensee, NNB GenCo, has adequate arrangements in place for compliance with Licence Condition LC19, in relation to welding of the HPC containment liner.
Multinational Design Evaluation Programme (MDEP) vendor inspection of Aubert & Duval (A&D) (NSSS3)	CODEP-DEP-2019-042689, 23 Oct 2019 & ONR-NR-CR-19-290 Rev. 0, 28 Oct 2019	To inform ONR and ASN judgments on: <ul style="list-style-type: none"> • The extent and potential impact of the record discrepancies • The effectiveness of any recovery plan and action plans in place • Framatome's supply chain management • EDF SA's review process and conclusions • the quality of the HPC items that include material produced by A&D • NNB GenCo's oversight arrangements and ability to influence improvements • EDF DI/Framatome and A&D surveillance arrangements.
MDEP vendor inspection of ENSA (NSSS2)	ONR-NR-CR-19-317 Rev. 0, 14 Nov 2019	To provide evidence to inform ONR's judgment on: <ul style="list-style-type: none"> • NNB GenCo's oversight and control of the NSSS supply chain • The ability of ENSA to manufacture components of the appropriate quality • NNB GenCo's audit capability • Framatome's supply chain management arrangements.
Adequacy of arrangements for welding, non-destructive testing (NDT) and surveillance (WN1)	ONR-NR-IR-19-025 Rev. 0, 15 Nov 2019	To gain confidence that the licensee has adequate arrangements in place for compliance with LC19, in relation to welding, NDT and surveillance of components manufactured at FSM for HPC.

Title and code	Ref and Date	Objectives
Management arrangements for the HPC main steam lines (NSSS7)	ONR-NR-IR-19-032 Rev. 0, 19 Dec 2019	To establish that: <ul style="list-style-type: none"> • The safety case requirements for the MSL (in particular, the HIC claims) are understood and are being promulgated through the supply chain; • The issues encountered with the manufacture of the MSL at Flamanville 3 (FA3) are understood and appropriate lessons are being learnt; • NNB GenCo is exercising appropriate control over the MSL manufacture.
NSSS site intervention, FSM (NSSS10)	ONR-NR-IR-19-037 Rev. 0, 25 Feb 2020	To gain confidence that NNB GenCo is exercising adequate control over the manufacturing of the NSSS and can influence improvements where necessary and gain assurance that the quality of the NSSS will meet the requirements defined in the HPC safety case and inform ONR's permissioning of the HPC hold-point 2.2.10 'Receipt of first major shipment NSSS by site.'
Quality management arrangements for NSSS (NSSS6)	ONR-NR-IR-19-039 Rev. 2, 11 Mar 2020	To inform ONR's judgment on: <ul style="list-style-type: none"> • The effectiveness of NNB GenCo revised quality management arrangements including identified quality improvements for the delivery of NSSS items • The role and effectiveness of the supply chain assurance for the NSSS supply chain • The wider effectiveness (by way of example) of the quality arrangements and supply chain assurance.
FSM monthly review (NSSS16)	ONR-NR-IR-20-008 Rev. 0, 24 Jul 2020	To seek confidence that NNB GenCo is exercising adequate control over the manufacturing quality and overseeing the implementation of the quality improvements at FSM. A secondary objective is to understand the Framatome restrictions on factory camera visits and discuss whether these can be overcome.
Implementation of management system arrangements for manufacturing non-conformances (MSC4)	ONR-NR-IR-20-012 Rev. 0, 28 Aug 2020	To assess whether NNB GenCo has adequately implemented its management system arrangements for manufacturing non-conformances.
Supply chain arrangements – NNB GenCo's management of CFSI (MSC10)	ONR-NR-CR-20-131 Rev. 0, 27 May 2020; ONR-NR-IR-20-009 Rev. 0, 10 Sep 2020	To gain confidence in the management arrangements for the prevention and control of counterfeit and fraudulent items by NNB GenCo. The objectives were to determine NNB GenCo's policy, strategy and approach to CFSI management; and how their approach was systematized and implemented.

Title and code	Ref and Date	Objectives
FSM monthly Review (NSSS18)	ONR-NR-IR-20-013 Rev. 0, 25 Sep 2020	To seek confidence that NNB GenCo is exercising adequate control over manufacturing quality and overseeing the implementation of the quality improvements being implemented at FSM.
Oversight of site welding class 1/2 systems (WN3)	ONR-NR-IR-20-021 Rev. 0, 24 Nov 2020	To gain confidence that the licensee, NNB GenCo, has adequate arrangements in place for compliance with LC19, in relation to site welding of safety Class 1/2 Systems, for the HPC project.
Manufacturing assurance, manufacture of nuclear pressure equipment (NPE) / systems (MSC2)	ONR-NR-IR-20-022 Rev. A, 14 Dec 2020	The licensee plans to expand its supply chain to procure NPE for structures, systems and components (SSCs) that are safety classified and non-HIC. Operating experience has pointed to shortfalls in the supply chains for the manufacture of NPE for other EPRs. The purpose of the intervention is to: <ul style="list-style-type: none"> • Confirm that the licensee has effective control over its supply chain for NPE • Ensure that the requirements of the design code & Pressure Equipment Regulations are met. • Sample the implementation of requirements which may potentially include visits to sample manufacturing facilities.
Framatome - Improvement plan, joint inspection with INA (NSSS31)	ONR-NR-CR-20-785 Rev. 0, 31 Dec 2020	To review the content of the improvement plan for Framatome factories at Creusot Forge, Saint Marcel & Jeumont and form a view on its likely effectiveness in addressing quality shortfalls.
NSSS site Intervention #5 FSM (NSSS13)	ONR-NR-IR-20-034 Rev. 0, 8 Apr 2021	To gain confidence that NNB GenCo is exercising adequate control over the manufacturing of the NSSS and can influence improvements where necessary. Ultimately, to gain assurance that the quality of the NSSS will meet the requirements defined in the HPC safety case and inform ONR's permissioning of the HPC hold-point 2.2.10 'Receipt of first major shipment of NSSS by site.
Tensile testing of pressure circuit components (NSSS1)	ONR-NR-IR-20-032 Rev. A, 13 Apr 2021	To inform judgment on the adequacy of the tensile testing, analysis and recommendations in advance of the final FMAs of the HPC pressure circuits and, if necessary, give ONR an opportunity to influence the licensee while mitigations can be put in place.
MDEP Inspection FSM (NSSS23)	ONR-NR-CR-21-112 Rev. 0, 26 May 2021; ONR-NR-CR-21-221 Rev. 0, 22 Jul 2021	To evaluate the ability of Framatome to ensure that the equipment delivered from its Saint Marcel site meets the applicable requirements following: <ul style="list-style-type: none"> • The 2nd multinational vendor inspection on FCF in 2016 • The detection in 2019 of technical issues affecting the quality of the products delivered by Saint Marcel site in the past to several countries • Deviations detected in 2018-2019 on the equipment manufactured for the EPR HPC project.

Title and code	Ref and Date	Objectives
Fracture toughness testing production of mock-ups (NSSS26)	ONR-NR-CR-21-233 Rev. 0, 23 Aug 2021	To observe a sample of the mock-ups being welded and establish that the parameters applied provide appropriately bounding weld features.
Provision of documents and records including supply chain records & regulatory issue 7506 (MSC6)	ONR-NR-IR-21-025 Rev. 0, 7 Oct 2021	To seek confidence that NNB GenCo's: <ul style="list-style-type: none"> • Management system arrangements for the provision of documents and records, including supply chain records, are adequate • LC06 planned improvements are adequate and sustainable • Arrangements for specifying, controlling, receiving, storage of documents and records demonstrate acceptable quality of HPC SSCs • Documents and records are provided to the required standards and timescales.
Licensee specification, control and oversight of site welding and NDT - IRWST (WN4)	ONR-NR-IR-21-028 Rev. 0, 18 Oct 2021	To gain confidence that the licensee has adequate arrangements in place for compliance with LC19, in relation to site welding and NDT of the HPC in-containment refuelling water storage Tank (IRWST).
Inspection of FSM and FCF. joint inspection with licensee's INA ^[1]	ONR-NR-CR-21-403 Rev. 0, 23 Nov 2021	Inspection of FSM & FCF
Pressure systems safety regulation safety case policy implementation (MSC47)	NR-CR-21-474 Rev. 0, 23 Dec 2021	To obtain a better understanding of the licensee's arrangements for pressure regulations compliance focusing on implementation of its newly introduced PSSR-Safety Case Policy (PSCP)
CRDM adaptor welds: welding (NSSS24)	ONR-NR-IR-21-042 Rev. 0, 2 Apr 2022	The CRDM adaptor welding process has been modified significantly to reflect OPEX from FA3. The intervention will observe the welding activity at FSM and confirm that the appropriate documentation is in place; that procedures are being adhered to and that controls are effective.

[1] Independent nuclear assurance

Table 2. Structural Integrity related Regulatory Issues

This table lists regulatory issues for the structural integrity work-stream that have been active since the hold-point on the pouring of nuclear island concrete in 2018.

ID	Title / Concern	Concern	Status
6490	Use of the RSE-M fatigue crack initiation methodology	Adequacy of the methodology	Closed
6532	The classification of the lid attachment weld for the ISFS multi-purpose canister	Lack of clarity on classification of the weld	Closed
6998	Findings from HPC site welding intervention on components having design quality requirements Q2 & Q3	Shortfalls in arrangements for welding	Closed
7021	Findings from HPC NSSS HIC/Q1 welding intervention	Major quality events at Framatome St Michel	Closed
7072	Findings from HPC CRDM welder training intervention	Lack of formal documentation for welder training	Closed
7416	Findings from the fracture toughness testing intervention	Shortfalls in scope of fracture toughness testing programme	Open
7517	Finding from HPC containment liner welding intervention	Lack of specified shelf life for welding consumables containing flux	Closed
7530	Finding from Hinkley Point C (HPC) WN1 Intervention	Shortfall in root cause analysis process at FSM	Closed
7691	Finding from Hinkley Point C (HPC) WN1 Intervention	Shortfalls in arrangements for welding at FSM related to inter-pass temperature	Closed
7768	Unit 1 RPV beltline weld irradiation surveillance & end of life properties	Shortfall in scope of irradiation surveillance programme	Closed
8158	Main coolant line (MCL) counterbores	Uncertainty over implications of late design change for inspection	Closed
8773	Findings from Hinkley Point C (HPC) Intervention WN4 Part 1A	Shortfall in use of standards for welding	Closed
8867	Finding from Hinkley Point C (HPC) Intervention WN4 Part 1B	Shortfall of surveillance frequencies for on-site welding	Closed

Table 3. Quality related Regulatory Issues

RI	Title	Required Status for NSSS Hold Point	Current Status
RI 7506*	Strategic arrangements for records that demonstrate adequate quality of HPC systems, structures, and components	Adequate progress	Adequate progress CM9 2022/22962
RI 8312	Shortfalls in NNB GenCo management system arrangements to manage non-conformances	Closed	Closed
RI 8501	Shortfalls in the NNB GenCo deployment of the Integrated Management System	Closed	Closed
RI 8313*	CFSI management improvement	Closed	Closed
RI 8818*	Shortfalls associated with inconsistent standards and expectations across the project management and quality functions	Closed	Closed
RI 8823*	Shortfalls in the ENSA End of Manufacturing Report (EoMR) and NNB GenCo partitioning strategy for contract UK 4551	Adequate progress	Adequate progress. CM9 2022/23290
RI 10474**	Shortfalls in the management system arrangements associated with NSSS HICs	Closed	Closed
RI 10667**	Management of residual open technical issues following the shipment of NSSS components to site.	Action 1 and 2 closed Action 3 - Adequate progress	Closed
RI10668**	Shortfalls in the End of Manufacturing Report (EoMR) for Main Coolant Pump (MCP) Casing #1 H1100-7.	Closed	Closed
RI 10669**	Shortfalls in the management and completion of inspection activities in Follow-up Documents associated with the Main Coolant Pump (MCP) casing #1 H1100-7.	Action 1 and 2 closed Action 3: Adequate progress	Closed

* Wider project RI; ** NSSS related RI

