Office for Nuclear Regulation

PROJECT ASSESSMENT REPORT			
Unique Document ID and Revision No:	ONR-NR-PAR-16-002 Revision 8	**TRIM Ref:**	2016/378742
Project:	HPC Construction		
Site:	Hinkley Point C		
Title:	Specifications under Licence Condition 19 for Hold Point 1.2.1 and Hold Point 1.2.2 for the Hinkley Point C nuclear power station		
Licence Instrument No: (if applicable)	LI 504 and LI 505		
Nuclear Site Licence No:	Site Licence No: 97A		
Licence Condition:	LC 19(4)		

Document Acceptance and Approval for Issue / Publication

Role	Name	Position	Signature	Date
Author	[redacted]	Principal Inspector - HPC Site Inspector	[redacted]	29/09/2016
Reviewer	[redacted]	Principal Inspector - HPC Project Inspector	[redacted]	03/10/2016
Accepted by[1]	[redacted]	Superintending Inspector – Head of New Reactor Construction	[redacted]	10/10/16
Approval for publication[2]	[redacted]	Superintending Inspector	[redacted]	10/10/16

Revision History

Revision	Date	Author(s)	Reviewed By	Accepted By	Description of Change
1	21/09/2016	[redacted]	[redacted]	[redacted]	1st draft for review
5	29/09/2016	[redacted]	[redacted]	[redacted]	2nd draft incorporating comments
8	03/10/2016	[redacted]	[redacted]	[redacted]	First accepted issue

[1] Acceptance of the PAR to allow release of LI
[2] Approval is for publication on ONR web-site, after redaction where relevant

Circulation (latest issue)

Organisation	Name	Date
Office for Nuclear Regulation	[redacted] – Head of NRP (DCI) [redacted] – Head of NRC [redacted] - Site Inspector [redacted] – Project Inspector [redacted] – DMG Lead [redacted] – DMG Lead [redacted] – CHS Lead [redacted] - Security TRIM: 4.4.2.18327.	
Environment Agency	[redacted]	
Licensee	[redacted]	

Hinkley Point C Construction

Specifications under Licence Condition 19 for Hold Point 1.2.1 and Hold Point 1.2.2

Project Assessment Report ONR-NR-PAR-16-002

Revision 8
30 September 2016

Published 10/16

EXECUTIVE SUMMARY

Title

Specifications under Licence Condition 19 for Hold Point 1.2.1 (First Nuclear Safety Concrete) and Hold Point 1.2.2 (Nuclear Island Concrete) for the Hinkley Point C nuclear power station

Action Requested

This report presents ONR's justification for specifying that NNB GenCo shall:

- not commence First Nuclear Safety Concrete without the consent of ONR; and
- not commence Nuclear Island Concrete without the consent of ONR.

Background

Nuclear New Build Generation Company (HPC) Ltd (NNB GenCo) intends to construct a twin reactor EPR™ nuclear power station at Hinkley Point C. The ONR *"Hinkley Point C – Construction Intervention Strategy for the UK EPR™"* sets out ONR's overall strategy for regulation of the construction phase of the HPC project including the management expectations and framework for intervention planning.

Under its arrangements for compliance with LC19(1) and 21(1), NNB GenCo has divided the Hinkley Point C project into stages separated by Hold Points (HPs) which represent the key project milestones where there is a step change in the risk of poorly conceived or executed construction or commissioning impacting upon nuclear safety. ONR intends to make appropriate use of primary or derived powers to permission both the commencement of construction or installation and commissioning as well as selected subsequent stages of construction or commissioning.

Assessment and inspection work carried out by ONR

The definition of the hold points used to separate the Hinkley Point C project into stages was the subject of dialogue between NNB GenCo and ONR that was informed by the experience of regulating construction of the Sizewell B Pressurised Water Reactor.

Matters arising from ONR's work

ONR's regulation of Hinkley Point C involves the use of primary powers to specify only a selected sub-set of the stages of construction or commissioning, and differs significantly to the Nuclear Installations Inspectorate's regulation of Sizewell B where the regulator issued a single specification requiring the licensee to seek its consent to commence each stage of construction or commissioning.

ONR has sought and obtained Government Legal Department agreement to both its proposed use of the primary powers contained in LC19(4) and LC21(4) to regulate only selected stages of construction and commissioning of Hinkley Point C and to the wording of the Specifications identified as Licence Instruments LI504 and LI505

Conclusions

NNB Genco's Hold Point 1.2.1 – First Nuclear Safety Concrete – constrains the commencement of construction or installation of the new plant as defined in LC19(4). Licence Instrument LI504 exercises ONR's primary power to specify that NNB GenCo shall not commence construction without the consent of ONR.

Similarly, NNB Genco's Hold Point 1.2.2 – Nuclear Island concrete – constrains the commencement of construction of the nuclear island. Licence Instrument LI505 exercises the primary power given by LC19(4) to specify that NNB GenCo shall not commence Nuclear Island construction without the consent of ONR.

Recommendation

I recommend that the Superintending Inspector:

- consider the proposal contained in this Project Assessment Report to exercise the primary power under LC19(4) to specify that NNB GenCo shall:
    - not commence First Nuclear Safety Concrete without the consent of ONR; and
    - not commence Nuclear Island Concrete without the consent of ONR.
- if supportive of the proposal, sign the Specifications identified as Licence instruments LI505 and LI505.

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1 ACTION REQUESTED

1. This report presents the justification for ONR to issue two specifications under Licence Condition (LC) 19(4) requiring NNB GenCo to seek ONR's Consent before commencing:

   (i) the first nuclear safety concrete at Hinkley Point C; and

   (ii) the nuclear island common raft.

2 INTRODUCTION

2. Nuclear New Build Generation Company (HPC) Ltd (NNB GenCo) intends to construct a twin reactor EPR™ nuclear power station at Hinkley Point (HPC). The ONR *"Hinkley Point C – Construction Intervention Strategy for the UK EPR™"* (Ref 1) sets out ONR's strategy for regulating the construction phase of the HPC project.

3. ONR has supplemented its strategy for HPC construction with *"Guidance for Early Construction Phase Activities up to ONR Consent to Nuclear Island Concrete"* (Ref 2). That document provides guidance to ONR's topic leads to assist planning interventions and the preparation of topic specific assessment reports that will inform ONR's collective judgement of NNB GenCo capability as it prepares to proceed beyond key construction hold-points.

4. ONR intends to regulate construction and commissioning of HPC using NNB GenCo's arrangements for compliance with LC19 and LC21. Thus ONR will make appropriate use of primary or derived powers to permission both the commencement of construction or installation and commissioning as well as selected subsequent stages of construction and commissioning which NNB GenCo has separated by hold points.

3 BACKGROUND

5. A nuclear site licensee's arrangements under LC 19(1) for the construction or installation and under LC 21(1) for the commissioning of any new installation shall where appropriate divide the construction and commissioning into stages. LC 19(4) and LC 21(4) permit ONR to specify that the licensee shall not commence nor thereafter proceed from one stage to the next of the construction or installation/commissioning without the consent of ONR.

6. Under its arrangements for compliance with LC19(1) and 21(1) (Ref 3), NNB GenCo has divided the HPC project into stages separated by Hold Points (HPs) which represent the key project milestones where there is a step change in the risk of poorly

conceived or executed construction or commissioning impacting upon nuclear safety. The definition of the hold points used to separate the HPC project into stages was the subject of dialogue between NNB GenCo and ONR that was informed by the experience of regulating construction of the Sizewell B Pressurised Water Reactor (PWR). Table 1 reproduces NNB GenCo's list of HPs for Unit 1 (Ref 4) which divide construction and commissioning into stages. The list is the subject of regular review that will permit both NNB GenCo and ONR to introduce additional stages to enhance the control/regulation of the project if deemed necessary.

7. The most recent experience of regulating the construction and commissioning of an installation as complex as HPC was the Nuclear Installations Inspectorate's (NII's) regulation of the Sizewell B Pressurised Water reactor (PWR). The NII elected to consent all 19 stages of the construction and commissioning programme, which presented a significant regulatory burden. On more than one occasion the regulator granted the licensee consent to commence stages that were separated by less than two months. ONR now believes this was a disproportionate use of the primary powers of the licence and did not give due credit to the effectiveness of the licensee's own arrangements for self-regulating construction, installation and commissioning.

8. For the regulation of HPC ONR will look to NNB GenCo to have effective and robust arrangements for managing the progress of construction and commissioning from one stage to the next. For HPC unit 1 ONR judges the following Hold Points separate stages of construction and commissioning that, if inadequately conceived or executed, represent a significant increase in risk to nuclear safety of the operating plant.

- HP1.2.1 First Nuclear Safety Concrete - First placement of structural concrete for a nuclear safety related building on the HPC on site.
- HP1.2.2 Nuclear Island Concrete – Placement of structural concrete for the common raft.
- HP1.3.1 Start of Commissioning (non-active) – Energising the auxiliary transformer
- HP1.4.1 Active Commissioning – Release for first reactor fuel on site
- HP1.4.2 First Criticality – Release of the first approach to criticality
- HP2.4.2 Synchronisation of plant operation with the grid.

ONR has advised NNB GenCo that for each of the above stages it intends to specify that NNB GenCo seeks its consent to proceed.

9. For HPC NNB GenCo equates HP 1.2.1 (First Nuclear Safety Related Concrete) to the "commencement of construction". This is consistent with ONR publication *Licensing Nuclear Installations* (Ref 5) which defines the commencement of construction as the placement of first structural concrete for buildings with nuclear safety significance.

4 REGULATORY CONSIDERATION OF THIS REQUEST

10. As explained above, ONR's regulation of HPC using primary powers to specify only a selected sub-set of the stages of construction or commissioning, differs significantly to the regulation of Sizewell B where NII issued a single specification requiring the licensee to seek its consent to commence every stage of construction and commissioning.

11. ONR sought Government Legal Department (GLD - formerly Treasury Solicitors) advice on this alternative use of LC19 (4) and LC21 (4) to regulate HPC. GLD's response (Ref 6) agreed with ONR's interpretation of the license conditions and

accepted its proposal to issue individual specifications requiring NNB GenCo to seek ONR consent to proceed with selected stages of the construction or commissioning.

12. ONR also recognises that it must retain the option to regulate additional stages as and when necessary. NNB GenCo's arrangements for compliance with LC19 (1) and LC21(1) include derived powers which permit ONR to specify that it will not commence a stage of construction or commissioning without ONR's agreement. Thus at any stage of the of HPC project ONR has the option of using primary powers under the nuclear site licence, or alternatively the more flexible derived powers under the licensee's own arrangements, to secure appropriate and proportionate regulation of any or all of the stages listed in Table 1.

13. The subjects of this PAR are the first two construction hold-points for which ONR proposes to specify that NNB Genco seeks its consent to proceed:

- Hold Point 1.2.1 - First Nuclear Safety Concrete - constrains the first placement of structural concrete for a nuclear safety building on site. In specifying that NNB GenCo seeks consent to place this concrete ONR is exercising the primary power to permission commencement of construction or installation of HPC.

- Hold Point 1.2.2 – Nuclear Island Concrete – constrains the placement of structural concrete for the nuclear island common raft. As with the first consent, here ONR is exercising its primary power to permission the start of construction of the nuclear safety structure housing the nuclear steam supply system.

14. In accordance with the ONR Instruction NS-PER-IN-001 *Preparation and Issue of Licence Instrument* (Ref 8), I have prepared Licence Instruments 504 and 505 (Refs 9 and 10) and sought and obtained (Ref 7) GLD's agreement to their wording. The draft LIs are at Annex 1 and Annex 2; paper copies ready for signature will be provided in the associated file along with this PAR and the completed and checked Licence Instrument check-sheet.

4.1 LEGAL ADVICE

15. As previously discussed I have sought and obtained GLD's agreement both to the proposed use of the primary powers contained in LC19(4) and LC21(4) to permission selected stages of construction and commissioning and to the wording of Licence Instruments LI504 and LI505.

5 CONCLUSIONS

16. NNB Genco's Hold Point 1.2.1 – First Nuclear Safety Concrete – constrains the commencement of construction or installation of the new plant as defined in LC19(4). Licence Instrument LI504 exercises ONR's primary power to specify that NNB GenCo shall not commence construction without the consent of ONR.

17. Similarly, NNB Genco's Hold Point 1.2.2 – Nuclear Island Concrete – constrains the commencement of construction of the nuclear island. Licence Instrument LI505 exercises the primary power given by LC19 (4) to specify that NNB GenCo shall not commence Nuclear Island construction without the consent of ONR.

18. The regulation of subsequent stages of construction or commissioning will be the subject of separate Project Assessment Reports justifying the use of the appropriate primary or derived power via licence instrument specifications.

6 RECOMMENDATIONS

19. I recommend that the Superintending Inspector:

(i) consider the proposal contained in this Project Assessment Report to exercise the primary power under LC19(4) to specify that NNB GenCo shall:

- not commence First Nuclear Safety Concrete without the consent of ONR; and
- not commence Nuclear Island Concrete without the consent of ONR.

(ii) if supportive of the proposal, sign the Specifications identified as Licence Instruments LI504 and LI505.

7 REFERENCES

1 Hinkley Point C. Construction Interventions Strategy for the UK EPR™. 23 March 2016. TRIM 2016/134216.

2 Guidance for Early Construction Phase Activities up to ONR Consent to Nuclear Island Concrete. July 2016. TRIM 2016/297853

3 NNB GenCo document: Define, Manage and release Key Hold Points. NNB-209-PRO-000025 Ver. 4.0. March 2015 TRIM 2016/392779

4 NNB GenCo document: Hinkley Point C Hold Point List. NNB-209-LST-000030, Version 6.0 dated April 2016 TRIM 2016/392768

5 Licensing Nuclear Installations. 4th Edition ONR January 2015

6 Correspondence with Treasury Solicitors July 2012. TRIM 2015/0033776

7 Legal advice from Treasury Solicitors January 2015. TRIM 2015/36218

8 ONR Instruction NS-PER-IN-001 Revision 7, January 2016. *Preparation and Issue of Licence Instruments*

9 Licence Instrument 504; First Nuclear Safety Concrete TRIM 2016/380527

10 Licence Instrument 505; Nuclear Island Concrete TRIM 2016/380542

TABLE 1: HINKLEY POINT C UNIT 1: HOLD POINTS SEPARATING STAGES OF CONSTRUCTION OR INSTALLATION AND COMMISSIONING.

Hold Point	Title	Constrained Activities	Project Phase	LC
1.2.1	First Nuclear Safety Concrete	**Commencement of construction**. Placement of first nuclear safety concrete	Construction or Installation	19
2.2.1	Start of Pumping Station	Construction of pumping station	ditto	19
2.2.2	Start of Marine Works	Commencement of off-shore construction works	ditto	19
2.2.14	Start of Tunnelling	Tunnelling activities	ditto	19
2.2.13	Turbine Hall Raft and CRF Pipe Protection	Placement of concrete for Turbine hall raft and CRF pipe protection	ditto	19
2.2.12	Pre-stressing Gallery	Placement of concrete for pre-stressing gallery	ditto	19
1.2.2	Nuclear Island Concrete	Placement of common raft concrete	ditto	19
2.2.5	Turbine Pedestal Pouring	Placement of concrete for turbine pedestal	ditto	19
2.2.7	Start of Interim Fuel Store	Commence foundations of ISFS	ditto	19
2.2.8	Reactor Building Dome Lifting.	Dome lifting.	ditto	19
2.2.10	First Major NSS Shipment to Site	Shipping of first major nuclear steam supply system component	ditto	19
2.2.11	Loading/Installation of First Major NSSS Component	Loading/installation of first major NSSS component.	ditto	19
2.2.9	Commencement of Pre-Stressing Activities	Start of pre-stressing main reactor containment building	ditto	19
1.3.1	Non-Active Commissioning	**Commencement of commissioning.** First energisation of auxiliary transformer	Commissioning	21
2.3.2	Water into Fore Bay	Release of water into fore bay	ditto	21
2.3.4	NSSS Hydro-test	NSSS pressure test	ditto	21
2.3.6	Containment testing	Start of containment testing	ditto	21
2.3.7	Hot Functional Tests	Start of hot functional tests	ditto	21
2.3.3	Secondary System Hydro-test	Secondary hydro-test		21
2.3.8	First steam to turbine during Hot Functional Testing	First steam to main turbine	ditto	21
1.4.1	Active Commissioning	**Commencement of radioactive commissioning** Release for first reactor fuel on site	ditto	21

Hold Point	Title	Constrained Activities	Project Phase	LC
2.4.1	Start of fuel loading	Fuel loading	ditto	21
1.4.2	First criticality	Release for approach to the first criticality.	ditto	21
2.4.2	Synchronisation of the main generator to the Grid under Nuclear Steam.	Synchronisation of main generator to the grid.	ditto	21

ANNEX 1: DRAFT LICENCE INSTRUMENT – FIRST NUCLEAR SAFETY CONCRETE

Site Licence No: 97A

Licence Instrument No: Insert Relevant No Month 2016

NUCLEAR INSTALLATIONS ACT 1965 (AS AMENDED)

SPECIFICATION

Issued under Condition 19(4) of

Schedule 2 attached to

Nuclear Site Licence No: 97A

Hinkley Point C

The Office for Nuclear Regulation, for the purposes of Condition 19(4) of Schedule 2 attached to Nuclear Site Licence No: 97A, hereby specifies that the licensee shall not commence First Nuclear Safety Concrete, defined as Hold Point 1.2.1 in the document titled Hinkley Point C: Hold Point List, NNB-209-LST-000030, Version 6.0 dated April 2016, without the consent of the Office for Nuclear Regulation.

Dated: [Insert Month and Year ONLY - signatory will date on day of signing]

For and on behalf of the
Office for Nuclear Regulation

Signed:

Superintending Inspector Name

A person authorised to act in that behalf

ANNEX 2: DRAFT LICENCE INSTRUMENT – NUCLEAR ISLAND CONCRETE

Site Licence No: 97A

Licence Instrument No: [Insert relevant No.] Month 2016

NUCLEAR INSTALLATIONS ACT 1965 (AS AMENDED)

SPECIFICATION

Issued under Condition 19(4) of

Schedule 2 attached to

Nuclear Site Licence No: 97A

Hinkley Point C

The Office for Nuclear Regulation, for the purposes of Condition 19(4) of Schedule 2 attached to Nuclear Site Licence No: 97A, hereby specifies that the licensee shall not commence Nuclear Island Concrete, defined as Hold Point 1.2.2 in the document titled Hinkley Point C: Hold Point List, NNB-209-LST-000030, Version 6.0 dated April 2016, without the consent of the Office for Nuclear Regulation.

Dated: [Insert Month and Year ONLY - signatory will date on day of signing]

For and on behalf of the Office for Nuclear Regulation

Signed:

Superintending Inspector Name

A person authorised to act in that behalf