



PROJECT ASSESSMENT REPORT			
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Project:	Disposal of sludge containing low levels of tritium originating from the treatment of groundwater extracted during dewatering operations.		
Site:	Hinkley Point C		
Title:	Consent for the consignment of nuclear matter comprising sludge containing low levels of tritium to a suitably permitted site in the United Kingdom.		
Licence Instrument No: (if applicable)	Consent LI506 and Consent LI507		
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Hinkley Point C

Consent for the consignment of nuclear matter comprising sludge containing low levels of tritium to a suitably permitted site in the United Kingdom

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EXECUTIVE SUMMARY

Title

Consent for off-site disposal of tritiated sludge originating from the dewatering groundwater treatment plant at Hinkley Point C.

Permission Requested

The Licensee, NNB Generation Company (HPC) Ltd (NNB GenCo), has requested ONR's Consent under Licence Condition 5(1) for the consignment of nuclear matter to a suitably permitted facility, in accordance with NNB- 308-REP-000394 version 1.0.

The Licensee has also requested ONR's Consent under Licence Condition 5(1) for the consignment of nuclear matter to a laboratory for analysis, in accordance with NNB- 308-REP-000394 version 1.0.

Background

As part of the construction of Hinkley Point C power station (HPC), dewatering will be undertaken to lower the groundwater level and enable deep excavation to be carried out. Modelling of the groundwater flow during dewatering indicates that tritium contamination from the adjacent Hinkley Point A site will migrate to the Hinkley Point C Licensed Site, resulting in low levels of tritium being present in the groundwater.

To meet the requirements of the Construction Water Discharge Activity Permit, issued by the Environment Agency, the pumped groundwater requires on-site treatment to remove non-radioactive contaminants such as heavy metals prior to discharge off-site. This treatment process will generate sludge which has the potential to be contaminated with low levels of tritium. The sludge is not classed as radioactive waste under the Environmental Permitting (England and Wales) Regulations 2010 (as amended) (EPR10). NNB GenCo proposes to dispose of the sludge at a suitably permitted facility which can accept controlled or hazardous waste, in accordance with the Waste (England and Wales) Regulations 2011.

NNB GenCo have considered the legal definitions of "nuclear matter", "radioactive waste" and "excepted matter" and how these would apply to the sludge generated from the groundwater treatment process and concluded that a consent under Licence Condition 5(1) is required for both the off-site disposal of the sludge containing low levels of tritium and to the consignment of samples to a laboratory for analysis.

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

The scope of this assessment work has been to consider whether there is a legal requirement to issue a consent under LC5(1). As part of this assessment I have used the ONR technical inspection guide NS-INSP-GD-005 LC5 Consignment of Nuclear Matter. I have also taken advice from the Government Legal Department (GLD).

Matters arising from ONR's work

Based on the legal definitions relevant to Licence Condition 5, the sludge is nuclear matter, but is neither radioactive waste nor excepted matter. Therefore NNB GenCo is required to obtain ONR's consent under Licence Condition 5(1) to consign the sludge to any place in the United Kingdom other than a relevant site.

Applying the legal definitions relevant to Licence Condition 5 to the consignment of samples to a laboratory for analysis, I consider that in this circumstance NNB GenCo is required to obtain ONR's consent under Licence Condition 5(1).

However, the estimated levels of tritium within the sludge are significantly below the activity concentration limits which would require an environmental permit for disposal, therefore the level of risk posed by this material from a radiological protection perspective is extremely low.

I consider that issue of a Consent under these circumstances could be viewed as disproportionate to the level risk associated with the material. Therefore I recommend that ONR considers whether changes are needed, for example to its processes, licence conditions, or legislation to ensure that it continues to regulate this type of activity in a proportionate manner. In addition, it should consider the application of the excepted matter criteria, described in Nuclear Installations (Excepted Matter) Regulations 1978, regulation 3(2) to nuclear matter on the licensed site.

Conclusions

Based on the legal definitions relevant to Licence Condition 5, I conclude that a Consent under Licence Condition 5(1) is required for the consignment of tritium contaminated sludge to a suitably permitted disposal facility. A Consent for the consignment of samples to a laboratory is also required.

Recommendations

The following recommendations are made:

- ONR to complete an LC5 compliance inspection prior to the Licensee commencing dewatering operations.
- ONR to consider how legislation or licence conditions might be changed to remove the requirement for any future consent under LC5(1) for nuclear matter which meets the out of scope definition within EPR10. In addition, to consider the application of the excepted matter criteria, described in Nuclear Installations (Excepted Matter) Regulations 1978, regulation 3(2) to nuclear matter on the licensed site.

The Deputy Chief Inspector is invited to:

- consider the proposals contained in this Project Assessment Report to exercise the primary power under LC 5(1) to consent
 - the consignment of relevant nuclear matter (not being excepted matter or radioactive waste) to a suitably permitted place in the United Kingdom other than a relevant site; and,
 - the consignment of relevant nuclear matter to a laboratory for analysis;
- if supportive of the proposals,
 - sign the Consent identified as Licence Instrument LI506; and
 - sign the Consent identified as Licence Instrument LI507.

LIST OF ABBREVIATIONS

ALARP	As low as reasonably practicable
BSL	Basic Safety level (in SAPs)
BSO	Basic Safety Objective (in SAPs)
CNS	Civil Nuclear Security (ONR)
HOW2	(Office for Nuclear Regulation) Business Management System
HSE	The Health and Safety Executive
IAEA	The International Atomic Energy Agency
NDA	Nuclear Decommissioning Authority
ONR	Office for Nuclear Regulation
PCER	Pre-construction Environment Report
PCSR	Pre-construction Safety Report
PSA	Probabilistic Safety Analysis
PSR	Preliminary Safety Report
RGP	Relevant Good Practice
SAP	Safety Assessment Principle(s)
SFAIRP	So far as is reasonably practicable
SSC	Structure, System and Component
TAG	Technical Assessment Guide (ONR)

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1 PERMISSION REQUESTED

1. The Licensee, NNB Generation Company (HPC) Ltd (NNB GenCo), has requested ONR's Consent under Licence Condition 5(1) for the consignment of nuclear matter to a suitably permitted facility, in accordance with NNB- 308-REP-000394 version 1.0^[ref 4, 5]. In addition, the Licensee has also requested ONR's Consent under Licence Condition 5(1) for the consignment of nuclear matter to a laboratory for analysis^[ref 4].

2 BACKGROUND

2. As part of the construction of Hinkley Point C power station (HPC), dewatering will be undertaken to lower the groundwater level and enable deep excavation to be carried out. Tritium has been detected in groundwater on the adjacent Hinkley Point A Licensed Site (HPA). Modelling of the groundwater flow during dewatering indicates that tritium will migrate from HPA to the HPC Licensed Site, resulting in low levels of tritium being present in the groundwater.
3. To meet the requirements of the Construction Water Discharge Activity Permit, issued by the Environment Agency, the pumped groundwater requires on-site treatment to remove non-radioactive contaminants such as heavy metals prior to discharge off-site. The treatment process consists of three elements, a settling tank for removal of sediment, an ultra-filtration system and a demineraliser plant. This treatment process will generate sludge which has the potential to be contaminated with low levels of tritium (up to 0.218 Bq/g)^[ref 5].
4. The sludge will be disposed of at a suitably permitted facility which is authorised to receive, treat and/or dispose of the waste and that holds an appropriate environmental permit for a "waste operation activity", issued under the Environmental Permitting (England and Wales) Regulations 2010 (as amended), or that has registered an appropriate exempt waste operation (as defined in paragraph 3 of schedule 2 of EPR).
5. NNB GenCo (HPC) Ltd intends to apply to the Environment Agency for a variation in the Construction Water Discharge Activity Permit to allow for the discharge of the groundwater without further treatment. If successful, this will remove the need for the water treatment plant and the subsequent generation and disposal of sludge will no longer be required. If the application to vary the permit is not successful, the generation and disposal of sludge will continue until construction of the common raft of the nuclear island for unit 1 is completed (milestone J0).
6. NNB GenCo have considered the legal definitions of "nuclear matter", "radioactive waste" and "excepted matter" and how these would apply to the sludge generated from the groundwater treatment process and concluded that a consent under LC5(1) is required for off-site disposal of the sludge containing low levels of tritium^[ref 5].
7. To enable dewatering operations to commence as planned, NNB GenCo (HPC) Ltd has therefore requested consent from ONR under Licence Condition 5(1) for the consignment of sludge containing low levels of tritium to a suitably permitted facility, in accordance with NNB- 308-REP-000394 version 1.0^[ref 4, 5]. In addition, environmental samples of material will be consigned off-site for analysis, therefore NNB has also requested consent from ONR under Licence Condition 5(1) for the consignment of samples to a laboratory for radiochemical analysis^[ref 4].

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

8. The scope of this assessment work has been to consider whether there is a legal requirement to issue a consent under LC5(1). I have taken advice from the

Government Legal Department (GLD). The following technical inspection guide has been used as part of this assessment:

■ NS-INSP-GD-005 LC5 Consignment of Nuclear Matter

9. In addition, I have engaged with the licensee and Environment Agency (EA) to understand the proposal and ensure ONR's regulatory requirements under LC(5) can be met.

4 MATTERS ARISING FROM ONR'S WORK

10. Licence condition 5(1) (LC5(1)) states that "the licensee shall not consign nuclear matter (other than excepted matter and radioactive waste) to any place in the United Kingdom other than a relevant site except with the consent of ONR."
11. Nuclear matter is defined in the Nuclear Installations Act 1965 (as amended) (NIA65), section 26(1). This states:
- "nuclear matter" means, subject to any exceptions that may be prescribed –
- (a) Any fissile material in the form of uranium metal, alloy or chemical compound (including natural uranium), or of plutonium metal, alloy or chemical compound, and any other fissile material which may be prescribed.
 - (b) Any radioactive material produced in, or made radioactive, by exposure to radiation the radiation incidental to, the process of producing or utilising any such fissile material as aforesaid.
12. Based on this definition, sludge containing low, but detectable, levels of tritium would be classed as nuclear matter. Where the results are below the limit of detection, the sludge would not be considered nuclear matter.
13. One exemption to the requirement for consent under LC5(1) would be if the material was radioactive waste. Based on the interpretation in LC1, the definition of radioactive waste in the Environmental Permitting (England and Wales) Regulations 2010 (EPR10) Schedule 23, Part 2, paragraph 3 should be used. Paragraph 3 references EPR2010 Schedule 23, Part 2, paragraph 6, which requires the tritium activity in the sludge to exceed 100 Bq/g to be classed as radioactive waste. The expected radioactivity of the sludge is significantly below this level and is therefore not classed as radioactive waste.
14. Excepted matter is also exempt from requiring a consent under LC5(1). The Nuclear Installations (Excepted Matter) Regulations 1978 (NIR78) provide the definition of excepted matter. The sludge is waste, therefore would not meet the requirements of regulation 3(2) as it would be waste consigned on or from a relevant site.
15. There is no definition of radioactive material within NIA65. Utilising the definition of radioactive material within EPR10 Schedule 23, Part 2, paragraph 3 would mean that the sludge would not be nuclear matter. Consultation with the government legal department ^[ref 6] confirms that applying the EPR10 definition of radioactive material to NIA65 would not be appropriate. This is also in line with ONR's published guidance ^[ref 7].
16. Based on the legal definitions relevant to LC5, the sludge is nuclear matter, but is neither radioactive waste nor excepted matter. Therefore, NNB GenCo is required to obtain ONR's consent under LC5(1) to consign the sludge to any place in the United Kingdom other than a relevant site. To support this, Licence Instrument (LI) 506 has been produced ^[ref 8] and reviewed by the GLD ^[ref 10].

17. NNB GenCo proposes to consign the sludge to a suitably permitted facility which is authorised to receive, treat and/or dispose of the waste. Based on the non-radioactive properties of the sludge, the sludge will be classed as either a controlled or hazardous waste. Under NNB GenCo's existing arrangements, the sludge will be appropriately contained, transferred by a registered waste carrier, and will be accompanied by a valid transfer note that includes a description of the waste to enable the waste to be handled appropriately and safely. This is in line with the Duty of Care requirements within Waste (England and Wales) Regulations 2011. I therefore consider that adequate controls will be in place for the disposal of this material to a suitable permitted facility.
18. The estimated levels of tritium within the sludge are significantly below the activity limits which would require an environmental permit, therefore the level of risk posed by this material from a radioactive perspective is extremely low. During dewatering operations, NNB have a series of boreholes located at the HPA/HPC boundary of the site which will provide information on the level of tritium migration and provide early indication of the presence of tritium in the groundwater. Analysis results to establish the tritium content of the sludge will be available retrospectively; however the sludge is not radioactive waste, and the transfer of the waste will be undertaken in accordance with the Waste (England and Wales) Regulations 2011, I therefore consider this to be adequate.
19. The proposed definition of relevant nuclear matter used within the consent is consistent with the out of scope limits defined within EPR2010, below which the level of risk posed by this material from a radioactive perspective is considered extremely low.

Recommendation: ONR to issue Licence Instrument 506.

20. The Licensee consigns samples for off-site for analysis at a laboratory which is not based on a relevant site. Based on the definition of waste within EPR2010, Schedule 23, Part 2, paragraph 3, the samples generated would still be categorised as a waste, i.e. requires to be disposed of. Therefore the same arguments described above apply and the sludge is therefore considered nuclear matter, but is neither radioactive waste nor excepted matter. Based on this, NNB GenCo would be required to obtain ONR's consent under LC5(1) to consign the samples to a laboratory for analysis.
21. However, as a sample of material for analysis, it could be argued that it has a use and therefore would not be categorised as waste. Based on this, it would be appropriate to consider the excepted matter criteria in NIR78, regulation 3(2). This states that:

It is hereby prescribed that the following should be excepted matter -

(2) for such time as it is outside a relevant site, nuclear matter (other than waste discharged on or from or consigned therefrom) which has been consigned from a relevant site and which at the time it left site -

(a) was duly packed and labelled in accordance with the appropriate provisions of the IAEA regulations, and

(b) did not exceed the limits of activity prescribed in regulation 4 hereof, and

(c) being fissile material, did not exceed the limits prescribed in regulation 5 hereof.

22. Based on legal advice ^[ref 10], this provision only has effect outside of a relevant site. For the case where nuclear matter is on a relevant site, as the sample is in this case, this prescription does not apply. Based on this, I therefore conclude that NNB GenCo is required to obtain ONR's consent ^[ref 9] under LC5(1) to consign the sludge to any place in the United Kingdom other than a relevant site.

Recommendation: ONR to issue Licence Instrument 507.

23. Whilst recognising that, under current legislation two consents under LC5(1) are required in this situation, I consider that this is disproportionate to the level risk associated with the material. Therefore I recommend that ONR considers whether changes are needed, for example to its processes, licence conditions, or legislation to ensure that it continues to regulate this type of activity in a proportionate manner.
24. In addition, ONR to consider the application of excepted matter criteria, described in NIR78, paragraph 3(2) to nuclear matter on the licensed site.

Recommendation: ONR to consider how legislation or licence conditions might be changed to remove the requirement for any future consent under LC5(1) for nuclear matter which meets the out of scope definition within EPR10. In addition, to consider the application of the excepted matter criteria, described in Nuclear Installations (Excepted Matter) Regulations 1978, regulation 3(2) to nuclear matter on the licensed site.

25. Prior to dewatering operations, NNB will need to revise the current arrangements for LC5 to demonstrate compliance with LI506 and LI507. I therefore recommend that a readiness inspection is completed prior to the Licensee commencing dewatering operations to demonstrate compliance with Licence Condition 5 and Licence Instruments 506 and 507.

Recommendation: ONR to complete an LC5 compliance inspection prior to the Licensee commencing dewatering operations.

5 CONCLUSIONS

26. Based on the legal definitions relevant to Licence Condition 5, I conclude that a Consent under Licence Condition 5(1) is required for the consignment of tritium contaminated sludge to a suitably permitted disposal facility. A Consent for the consignment of samples to a laboratory is also required.

6 RECOMMENDATIONS

27. The following recommendations are made:

- ONR to complete an LC5 compliance inspection prior to the Licensee commencing dewatering operations.
- ONR to consider how legislation or licence conditions might be changed to remove the requirement for any future consent under LC5(1) for nuclear matter which meets the out of scope definition within EPR10. In addition, to consider the application of the excepted matter criteria, described in Nuclear Installations (Excepted Matter) Regulations 1978, regulation 3(2) to nuclear matter on the licensed site.

28. The Deputy Chief Inspector is invited to:

- consider the proposals contained in this Project Assessment Report to exercise the primary power under LC 5(1) to consent
 - the consignment of relevant nuclear matter (not being excepted matter or radioactive waste) to a suitably permitted place in the United Kingdom other than a relevant site; and,
 - the consignment of relevant nuclear matter to a laboratory for analysis;
- if supportive of the proposals,
 - sign the Consent identified as Licence Instrument LI506; and
 - sign the Consent identified as Licence Instrument LI507.

7 REFERENCES

1. *ONR HOW2 Guide - Purpose and Scope of Permissioning - NS-PER-GD-014 Revision 4*. July 2014.
<http://www.onr.org.uk/operational/assessment/index.htm>
2. *Safety Assessment Principles for Nuclear Facilities*. 2014 Edition Revision 0. November 2014.
<http://www.onr.org.uk/saps/saps2014.pdf>.
3. ONR Technical Inspection Guides:
 - NS-INSP-GD-005 LC5 Consignment of Nuclear Matter, revision 2, January 2016
http://www.onr.org.uk/operational/tech_asst_guides/index.htm
4. Letter from NNB to request consent, NNB-209-RIO-001386, TRIM 2016/405259
5. Disposal of potentially tritiated sludge from dewatering groundwater treatment at HPC via an offsite disposal facility, NNB-308-REP-000394, version 1.0, TRIM 2016/405259
6. E-mail from Government Legal Department re: LC5 consent and the definition of the radioactive waste, 30 Aug 2016, 2016/383358
7. Note to file: Licence condition 5: guidance on the meaning of “nuclear matter”, “radioactive matter” and “consign”. TRIM 2016/35543
8. LI506: Consent to the consignment of relevant nuclear matter to a suitably permitted facility. TRIM 2016/396330
9. LI507: Consent to the consignment of relevant nuclear matter to a laboratory. TRIM 2016/402157
10. Legal review of Licence Instruments 506 and 507:
 - E-mail dated 12 October 2016 – TRIM 2016/401389
 - E-mail dated 14 October 2016 – TRIM 2016/401360