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| ONR Project assessment report  PR-01786 – GB/1648C/B(M): Approval of modification NPA 1-26-156 clarifying depleted uranium and natural uranium package content |



ONR Project assessment report

**Project name**: PR-01786

**Report title**: GB/1648C/B(M): Approval of modification NPA 1-26-156 clarifying depleted uranium and natural uranium package content

**Dutyholder/Applicant**: International Nuclear Services Ltd (trading as Nuclear Transport Solutions)

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# Executive summary

This report presents the findings of the ONR assessment of the proposed modification to the description of allowable content for package design GB/1648C.

ONR granted a combined package design and shipment approval for GB/1648C, to International Nuclear Services Ltd on 24 June 2022.

The modification proposes the production of a technical memorandum to clarify the fissile mass limits in the situation where natural and/or depleted uranium are transported in the package.

Based on the work carried out by ONR, it is concluded that:

* the proposed modification to the description of the package content meets the criticality safety requirements of ADR as implemented in UK law.
* The requirements of the modification to the package content description have been reflected in the applicant’s summary of acceptance criteria and package operating instructions.

It is recommended that ONR’s Head of Regulation for the GB Transport Competent Authority should grant approval by signing the competent authority approval section of modification NPA 1-26-156 subject to the inclusion of the following conditions of approval:

* The modification is Category B on the grounds that it materially affects the basis on which the extant package design and shipment approvals were based.
* The package design safety report (PDSR) must be updated to incorporate the changes required, and addressed, in response to regulatory query RQ-01594.
* The applicant must submit a request for renewal of the package design approval based on the revised PDSR.
* Paragraphs 1.10 to 1.13 in the current package design renewal will be removed on renewal.

Table 1: List of abbreviations.

|  |  |
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| Term/Acronym | Description |
| ACB | Active Collection Bureau Ltd |
| ADR | Agreement Concerning the International Carriage of Dangerous Goods by Road |
| CoA | Certificate of approval |
| Dep U | Depleted uranium |
| E&Z | Eckert and Ziegler Environmental Services Ltd |
| GB | Great Britain |
| IAEA | The International Atomic Energy Agency |
| INS | International Nuclear Services Ltd |
| JCO | Justification for continued operation |
| Nat U | Natural Uranium |
| NTS | Nuclear Transport Solutions |
| ONR | Office for Nuclear Regulation |
| PDSR | Package Design Safety Report |
| SL | Sellafield Ltd |
| SSR-6 | Regulations for the Safe Transport of Radioactive Material (2018 Edition) |
| SSG-26 | Advisory Material for the IAEA Regulations for the Safe Transport of Radioactive Material (2018 Edition) |
| UK | United Kingdom |

Table of contents

[Executive summary 3](#_Toc192577398)

[1. Permission requested 6](#_Toc192577399)

[2. Background 6](#_Toc192577400)

[3. Assessment and inspection work carried out by ONR in consideration of this request) 7](#_Toc192577401)

[3.1. Criticality Assessment 7](#_Toc192577402)

[4. Matters arising from ONR’s work 8](#_Toc192577403)

[5. Conclusions 8](#_Toc192577404)

[6. Recommendations 8](#_Toc192577405)

[References 10](#_Toc192577406)

# Permission requested

1. In August 2022, International Nuclear Services Ltd (INS) notified ONR of a Category C modification (ref. [1]) to the 1648C package design that proposed a revision/clarification to the package content description in relation to inclusion of depleted uranium (Dep-U) and natural uranium (Nat-U) in combination with fissile nuclides.
2. At the time of the notification ONR confirmed that the assigned categorisation was acceptable. However, a subsequent review of the package design history in response to a recent Category B submission (ref. [2]) identified that whilst the modification may not be safety significant it is significant in relation to compliance with the current design/shipment approval and should have been categorised as Category B, assessed by ONR and the approval certificate updated to reflect the modification.

# Background

1. We granted a combined package design and shipment approval for the 1648C package, to International Nuclear Services Ltd (INS) on 24 June 2022 (ref. [3]).
2. In parallel to the applicant’s submission for approval of this modification an additional modification, NPA 1-26-157 (ref. [2]), was submitted for competent authority approval and a justification for continued operation (JCO) of package design GB/1648C (ref. [4]) for 6 months whilst we assessed the submissions.
3. Our assessment (ref. [5]) of the JCO concluded that the consignors and carrier were not compliant with all aspects of the current package design and associated shipment approval. Consequently, the applicant was advised that the extant approval would cease to have effect until several regulatory queries are addressed and applications for renewal of the package design approval and separate shipment approvals are submitted, assessed by the competent authority and revised CoA issued (ref. [6]).
4. The current Package Design Safety Report (PDSR) allows transport of Dep-U and Nat-U based on supporting report (ref. [7]), however the way the limits are presented are unnecessarily restrictive. The modification proposes the production of a technical memorandum to clarify the mass limits in the situation where Nat-U and/or Dep-U are transported in the package.
5. The applicant has recognised that the definition of fissile material in ADR 2.2.7.1.3 (a)-(d) (SSR-6 222 (a)-(d)) excludes natural and depleted uranium, material with <0.25 g of fissile nuclides and any combination of these. The applicant has used this to provide two options to account for the presence of natural and depleted uranium:  
     
   Option 1: Depleted and natural uranium can be transported with >0.25 g of standard fissile nuclides (U-233, U-235, Pu-239 and Pu-241) as follows:

* Restricted to a maximum of 45 g of the nuclides combined from the 45 g list of nuclides from report NTS R 21 017 Rev 2 (ref. [7]) (which includes the standard fissile nuclides) and noting that:

1. The U-234 and U-235 from depleted and natural uranium must be included within the 45 g consignment calculation.
2. There must be no nuclides from the 0.25 g list from report NTS R 21 017 Rev 2 (ref. [7]) in the consignment.

or  
  
Option 2: Depleted and natural uranium can be transported in unlimited quantities (up to the package payload limit) as follows:

* Restricted to transporting with <0.25 g per package of the combined 45 g list of nuclides from report NTS R 21 017 Rev 2 (ref. [7]); and
* There must be no nuclides from the 0.25 g list from report NTS R 21 017 Rev 2 (ref. [7]) in the package.

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

1. In accordance with the regulatory permissioning strategy ONR has carried out a proportionate and targeted criticality assessment (ref. [8]) to ensure that modification NPA 1-26-156 (ref. [1]) for the GB/1648C/B(M) package design meets the requirements of ADR as implemented in UK law.

## Criticality Assessment

1. The applicant’s criticality assessment has been reviewed against ONR's internal guidance on criticality transport assessment (NS-TAST-GD-097). Overall, the criticality assessment as presented in the applicant’s supporting documentation (refs. [7] [9]) demonstrates compliance with the required legal requirements relating to criticality safety during transport and follows relevant good practice (SSR-6 and SSG-26).
2. The fissile material limits under the applicant’s “Option 1” were stipulated in the current certificate of package design approval (ref. [3]) as ‘Restriction on Contents’. The ONR criticality assessment concludes that this is unnecessary under ADR requirements for a fissile-excepted or non-fissile package. Consequently, the ONR criticality inspector recommended that the approval of the applicant’s modification requires a revision to the package design approval certificate. Paragraphs 1.10 to 1.13 should be removed from the CoA (which in any case are already covered by paragraph 1.7 of the certificate of approval (ref. [3]).
3. The ONR criticality assessment also concluded that the applicant’s Summary of Acceptance Criteria (ref. [7]) needed to be revised to reflect the applicant’s “Option 2” of this modification, along with the package operating instructions (ref. [10]) for the GB/1648C/B(M) package. These requirements were raised with the applicant as a regulatory query (ref. [11]) and satisfactorily addressed.

# Matters arising from ONR’s work

1. There were no matters arising.

# Conclusions

1. Based on the work carried out by ONR, I am satisfied that:

* the proposed modification to the description of the package content meets the criticality safety requirements of ADR as implemented in UK law.
* The requirements of the modification to the package content description have been reflected in the applicant’s summary of acceptance criteria and package operating instructions.

# Recommendations

1. I recommend that ONR’s Head of Regulation for the GB Transport Competent Authority should grant approval by signing the competent authority approval section of modification NPA 1-26-156 subject to the inclusion of the following conditions of approval:

* The modification is Category B on the grounds that it materially affects the basis on which the extant package design and shipment approvals were based.
* The PDSR must be updated to incorporate the changes required, and addressed, in response to regulatory query RQ-01594.
* The applicant must submit a request for renewal of the package design approval based on the revised PDSR.
* Paragraphs 1.10 to 1.13 in the current package design renewal will be removed on renewal.

# References

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| [1] | Notification of Proposed Alteration, NPA 1-26-156, dated 18 August 2022, ONRW-2019369590-11035. |
| [2] | “Notification of Proposed Alteration, NPA 1-26-157, dated 5 June 2024, ONRW-2019369590-10031”. |
| [3] | “Certificate of Approval, GB/1648C/B(M)T (Rev.10), Issued 24 June 2022”. |
| [4] | “Nuclear Transport Solutions Letter 30.07.1648C.01, Justification for Continued Operation for Design Approval GB/1648C/B(M)T, dated 30 July 2024, ONRW-2019369590-11773”. |
| [5] | “ONR Decision Record, PR-01832 - Assessment of Justification for Continued Operation of Pacakge Design GB/1648C, ONRW-2019369590-12167”. |
| [6] | “ONR Letter ONR-TD-TRA-24-038, dated 3 October 2024, Competent Authority Notification of Approval GB/1648C/B(M)T (Rev. 10) Ceasing to have Effect, ONRW-2019369590-13462”. |
| [7] | “Nuclear Transport Solutions Report NTS R 21 017 Rev 2, 1648C Summary of Acceptance Criteria, dated 29 April 2022, ONRW-2019369590-11036”. |
| [8] | “AR-01558, Criticality Assessment for GB/1648C/B(M) Modification NPA 1-26-156, September 2024, ONRW-2126615823-4322”. |
| [9] | “Nuclear Transport Solutions Technical Memo NTS TM 22 068 Rev 0, Transport of depleted and natural unranium in 1648C, dated 30 September 2022, ONRW-2126615823-4155”. |
| [10] | “Nuclear Transport Solutions Report NTS R 22 152 Rev 1, 1648C Operating Instructions, dated 5 May 2022, ONRW-2019369590-17601”. |
| [11] | “ONR Regulatory Query RQ-01594, Package Acceptance Criteria”. |