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| ONR Project Assessment Report  PR-01211 Mk A2 AGR Transport Flask (Design No. 2834) – Assessment of Modification N0251 to Extend the Flask Major Maintenance Period |



ONR Project Assessment Report

**Project Name**: PR-01211 Mk A2 AGR Transport Flask (Design No. 2834)

**Report Title**: Assessment of Modification N0251 to Extend the Flask Major Maintenance Period

**Dutyholder/ Applicant**: EDF Energy Nuclear Generation Limited

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# Executive Summary

EDF Energy Nuclear Generation Limited has applied to the Office for Nuclear Regulation (ONR) for approval of Modification N0251 to the Mk A2 AGR Transport Flask (Design No. 2834) package design.

The full scope of Modification N0251 requests approval for:

* extension of the flask major maintenance period from four to five years;
* addition of sea transport for the ‘D’ and ‘E’ package variants; and
* the ‘C’ package variant, which was withheld at the last renewal of the package design approval.

The applicant has a requirement to increase AGR flask availability to support the defueling of AGR power stations. We agreed with the applicant that increased AGR flask availability can be achieved in the near term by granting approval initially for the extended flask major maintenance period, with the remaining scope of the modification to be covered by a separate future approval.

We have undertaken a proportionate and targeted assessment of this reduced permissioning scope, assessing the claims, arguments and evidence for increasing the flask major maintenance period in this modification. We have completed a review of the last renewal of the package design approval to confirm that there are no outstanding issues.

It is concluded that the modification provides an adequate justification to extend the flask major maintenance period from four to five years.

It is recommended that the Competent Authority grants approval for the extended flask major maintenance period under Modification N0251. This will necessitate the issue of revised certificates of package design approval and shipment approval for the ‘A’, ‘B’, ‘D’ and ‘E’ variants of the Mk A2 AGR flask package under the GB/2834 identification mark.

Table : List of abbreviations

|  |  |
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| Term/Acronym | Description |
| ADR | Agreement Concerning the International Carriage of Dangerous Goods by Road |
| AGR | Advanced Gas-cooled Reactor |
| CA | Competent Authority |
| CDG | The Carriage of Dangerous Goods and Use of Transportable Pressure Equipment Regulations 2009 |
| CoA | Certificate of Approval |
| GB | Great Britain |
| ONR | Office for Nuclear Regulation |
| PAR | Project Assessment Report |
| PDSR | Package Design Safety Report |
| RI | Regulatory Issue |
| RID | Regulations Concerning the International Carriage of Dangerous Goods by Rail |
| TCA | Transport Competent Authority |
| UK | United Kingdom |
| WIReD | (ONR) Well Informed Regulatory Decisions |

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# Permission Requested

1. EDF Energy Nuclear Generation Limited has applied [1, 2] to the Office for Nuclear Regulation (ONR) as the Great Britain (GB) Competent Authority (CA) for approval of Modification N0251 to the Mk A2 AGR transport flask, Design No. 2834.
2. This Project Assessment Report (PAR) presents the basis of our regulatory decision regarding Modification N0251.

# Background

## Overview of Package Design

1. The GB/2834 package design is commonly known as the Mk A2 AGR fuel flask and has been in operational use since the 1990s. It has principally been used for the shipment of Advanced Gas-cooled Reactor (AGR) fuel from the applicant’s AGR power stations to Sellafield for storage and reprocessing, as well as transport of tie-bars and other non-fissile components.
2. The package design comprises a forged carbon steel flask body with attached external cooling fins, a flask lid assembly and an internal stainless steel skip (of two different designs) carrying the radioactive contents.
3. The package design has five variants:

* ‘A’ - unbottled AGR fuel elements in a 15-compartment skip;
* ‘B’ - bottled AGR fuel elements in an 8-compartment skip;
* ‘C’ - loose AGR fuel pins in slotted cans or debris capsules in an 8-compartment skip (proposed under this modification, no current approval);
* ‘D’ - discharged flask; and
* 'E' - non-fissile components, e.g. tie-bars.

## Regulatory History

1. The last renewal of the GB/2834 package design approval was completed in 2022. Based on that renewal assessment, we granted approval for the ‘A’, ‘B’, ‘D’ and ‘E’ package variants for transport by road and rail. We withheld approval of the ‘C’ variant at that time due to shortcomings in the applicant’s demonstration that the design satisfied the statutory dose rate limits external to the package surface.
2. Our regulatory decision was effected by the issue of certificates of package design and shipment approval [3, 4, 5, 6, 7, 8, 9, 10].

## Purpose and Scope of Modification

1. The applicant has a requirement to increase the number of Mk A2 AGR flasks within its operational fleet to support the defueling of AGR power stations when their generating lifetime is complete.
2. Modification N0251 is part of a wider modifications programme to deliver this requirement. Specifically, this Category A modification [1, 2] requests approval for:

* extension of the flask major maintenance period from four to five years;
* addition of sea transport for the ‘D’ and ‘E’ package variants; and
* the ‘C’ package variant.

1. The regulatory permissioning strategy for Modification N0251 [11] was agreed with the Transport Competent Authority (TCA) delivery lead based on assessing the full modification scope submitted by the applicant.
2. We engaged with the applicant to discuss the principal issues and what could be achieved in the near term to maximise the number of flasks available in the operational fleet. We identified that approval of the extended flask major maintenance period would allow release of two flasks that had been held back from their major maintenance by the applicant in anticipation of Modification N0251 being approved. We agreed with the applicant [12] that we would prioritise our assessment effort to approve that aspect of the modification through an initial approval, with the remaining scope to be covered under a separate future approval.
3. The application scope covered by this PAR is therefore limited to extension of the flask major maintenance period only, as noted in the WIReD permissioning record [11]. The next stage of our assessment of Modification N0251 will be conducted under a separate permission [13].

# Assessment and Inspection Work Carried out by ONR in Consideration of this Request

1. In accordance with the regulatory permissioning strategy, we have carried out targeted and proportionate assessments of the applicant’s modification request. Major maintenance of the flask involves the principal engineered items of the flask, which also provide a radiation shielding function for the package design. Our assessment of the modification has therefore included assessment by engineering and shielding specialist inspectors.
2. The modification does not have any criticality safety implications [14] and hence a criticality assessment was not required.
3. We previously assessed the safety case requirements aspects of the package design as part of the approval for the renewal of the existing transport and shipment certificates for the GB/2834 package in 2022 [15]. Given that this was a recent assessment, and that this modification does not require any significant changes to the existing safety case and management system, we have not assessed the safety case requirements for this modification.
4. We undertook our most recent inspection of the applicant in 2023 [16] and concluded that the applicant was compliant with its duties under ADR [17], RID [18] (by inference) and CDG [19]. The applicant has a positive history of compliance. Given the nature of this modification and the recent history of transport compliance inspections, I did not consider it proportionate to undertake further inspection activities as part of this assessment.
5. All our assessments were undertaken in accordance with the requirements of ONR’s How2 Business Management System and its associated guidance, principally ONR’s transport permissioning assessment guidance [20].

## Shielding Assessment

1. Our radiation shielding assessment for the full scope of Modification N0251 was reported in a technical assessment note [21].
2. The shielding assessor identified the principal shielding components of the GB/2834 packaging to be the flask body, flask lid and borosilicone neutron shielding material and judged that they are not compromised by extending the flask major maintenance period from four to five years. The shielding assessor concluded that the proposed extension of the major maintenance period can therefore be approved from a radiation shielding perspective.

## Engineering Assessment

1. Our mechanical engineering assessment for the full scope of Modification N0251 was reported in an assessment report [22].
2. The engineering assessor examined whether increased usage of flasks during defueling activities would significantly impact flask performance with the flask maintenance period extended from four to five years. The assessor confirmed that individual flask usage was limited by processing capability and that increased usage during the extended major maintenance period would not impact the continued safe operation and function of the flask.
3. The engineering assessor examined the scopes of flask major maintenance, the routine maintenance conducted at each use and the three-yearly maintenance for seal replacements. The assessor concluded that extending the major maintenance period does not undermine the existing claims, arguments and evidence in the Package Design Safety Report (PDSR) [23] and that there is adequate justification for continued operation for the increased major flask maintenance period of five years.

## Review of Previous Renewal

1. At the last renewal of the package design approval, our human factors assessment [24] identified some shortfalls in the identification of the administrative controls and operating limits for the Mk A2 AGR flask and their inclusion in the package operating and handling instructions. We managed this with the applicant via a Regulatory Issue [25], which we have now closed.
2. Our last renewal maintained the practice of issuing separate certificates for the package design and shipment approvals for each package variant. I see no benefit from separate package design and shipment approvals in this case and judge it would be more efficient to issue combined certificates for each variant and the applicant agrees with this approach [26].

# Matters Arising from ONRs Work

1. There are no matters arising from our assessment of this modification application.

# Conclusions

1. I conclude that the proposed modification provides an adequate justification for extension of the flask major maintenance period from four to five years.

# Recommendations

1. I recommend that the Competent Authority approves the extension of the flask maintenance period from four to five years, as proposed by Modification N0251. This will necessitate the issue of revised certificates for the package design approval and shipment approval for the ‘A’, ‘B’, ‘D’ and ‘E’ variants of the Mk A2 AGR flask under the GB/2834 CA identification mark.
2. I further recommend that the package design and shipment approvals are granted under a combined certificate for each package variant.

# References

[1] EDF, “Mk A2 AGR Flask. Increase in the Major Maintenance Period from 4 to 5 Years and Committed Updates to the PDSR from Modification N0219”, Modification N0251, NSLGEN32823, April 2023, WIReD Ref: ONRW-2019369590-2268.

[2] EDF, “EDF Energy Nuclear Generation - Modification Number N0251 Issue 1”, February 2023, WIReD Ref: ONRW-2019369590-2271.

[3] ONR, “Certificate of Approval of Package Design for the Carriage of Radioactive Material, GB/2834A/B(M)F (Rev.12)”, CM9 Ref: 2022/52758.

[4] ONR, “Certificate of Approval of Package Design for the Carriage of Radioactive Material, GB/2834B/B(M)F (Rev.12)”, CM9 Ref: 2022/52759.

[5] ONR, “Certificate of Approval of Package Design for the Carriage of Radioactive Material, GB/2834D/B(M) (Rev.12)”, CM9 Ref: 2022/52762.

[6] ONR, “Certificate of Approval of Package Design for the Carriage of Radioactive Material, GB/2834E/B(M) (Rev.4)”, CM9 Ref: 2022/52763.

[7] ONR, “Certificate of Approval for the Shipment of Radioactive Material, GB/2834A/B(M)FT (Rev.15)”, CM9 Ref: 2022/52766.

[8] ONR, “Certificate of Approval for the Shipment of Radioactive Material, GB/2834B/B(M)FT (Rev.13)”, CM9 Ref: 2022/52767.

[9] ONR, “Certificate of Approval for the Shipment of Radioactive Material, GB/2834D/B(M)T (Rev.16)”, CM9 Ref: 2022/52768.

[10] ONR, “Certificate of Approval for the Shipment of Radioactive Material, GB/2834E/B(M)T (Rev.4)”, CM9 Ref: 2022/52769.

[11] ONR, WIReD Permissioning Record PR-01211.

[12] EDF, “Mod N0251 and N0232 Recovery and Transport Approval Process”, Email to ONR, September 2023, WIReD Ref: ONRW-2019369590-4431.

[13] ONR, WIReD Permissioning Record PR-01479.

[14] ONR, “GB/2834 Modification N0251 - Criticality Safety”, Internal Email, April 2023, CM9 Ref: 2023/23271.

[15] ONR, “Safety Case Requirements Assessment of Modification N0219”, ONR-TD-AR-22-003, CM9 Ref: 2022/31401.

[16] ONR, “Compliance Inspection – Nuclear Transport - EDF”, May 2023, WIReD Inspection Record IR-52708.

[17] United Nations Economic Commission for Europe (UNECE), “Agreement Concerning the International Carriage of Dangerous Goods by Road (ADR) 2023 Edition”, [www.unece.org](http://www.unece.org).

[18] Intergovernmental Organisation for International Carriage by Rail (OTIF), “Regulations Concerning the International Carriage of Dangerous Goods by Rail (RID) 2023 Edition”, [www.otif.org](http://www.otif.org).

[19] “The Carriage of Dangerous Goods and Use of Transportable Pressure Equipment Regulations (CDG) 2009”, SI 2009 No. 1348, [www.legislation.gov.uk](http://www.legislation.gov.uk).

[20] ONR, “Transport Permissioning Assessment”, TRA-PER-GD-001 Revision 3, February 2021, CM9 Ref: 2021/14609.

[21] ONR, “Shielding Assessment for GB/2834 - Mk A2 AGR Transport Flask - Modification N0251”, June 2023, WIReD Ref: ONRW-2126615823-867.

[22] ONR, “Mechanical Engineering Assessment of EDF Mk A2 AGR Flask Category A Transport Modification N0251”, September 2023, WIReD Ref: ONRW-2126615823-1157.

[23] EDF, “Package Design Safety Report for the Mk A2 AGR Flask Design No 2834”, E/REP/BRDB/0007/AGR/03, Rev 14, November 2023, WIReD Ref: ONRW-2019369590-2270.

[24] ONR, “EDF Energy Nuclear Generation Limited. GB/2834/B(M) A-E Package Approval – Human Factors Assessment in Support of the Safety Case Requirements Assessment”, ONR-TD-AR-22-004, June 2022, CM9 Ref: 2022/35261.

[25] ONR, “GB/2834/(B)M Flask - Improvements to the Identification of the Necessary Administrative and Operational Limits and Controls and their Inclusion in Operator Instructions”, WIReD Regulatory Issue RI-10869.

[26] ONR, “Mk A2 AGR Flask Mod N0251 – Certificates”, Email from ONR to EDF, October 2023, WIReD Ref: ONRW-2019369590-4697.