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| ONR Project Assessment Report  PR-01210 Mk A2 AGR Transport Flask (Design No. 2834) - Assessment of Modification N0232 |



ONR Project Assessment Report

**Project Name**: PR-01210 Mk A2 AGR Transport Flask (Design No. 2834)

**Report Title**: Assessment of Modification N0232

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

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# Executive Summary

EDF Energy Nuclear Generation Limited (the applicant) has applied for approval of modification number N0232 for the Mk A2 AGR Transport Flask (Design No. 2834) package design.

The A2 flask carries irradiated Advanced Gas-cooled Reactor (AGR) fuel between the applicant’s AGR nuclear power stations and the Sellafield Nuclear Licensed site. The A2 flask is categorised as a Type B package.

This modification proposes to reintroduce flask E107 into operational service following replacement of a water level valve housing. Routine maintenance of E107 identified scoring on the water level valve housing. The applicant chose to replace the valve housing with one from a non-operational flask. As this is a non-routine maintenance activity, the applicant is seeking approval of the modification, from the Competent Authority, to return it to operational service.

We have assessed the applicant’s claims, arguments and evidence supporting modification number N0232 in relation to the relevant engineering aspects of the modification. Due to the nature of the modification we did not assess the criticality and shielding aspects of the package design.

It is concluded that the modification provides an adequate justification for the replacement of the water level valve housing and demonstrates that flask E107 remains compliant with the current package design and shipment approvals.

It is recommended that the Competent Authority grants approval of the replacement of the water level valve housing by endorsing modification N0232 Issue 2.

# List of Abbreviations

|  |  |
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| Term/Acronym | Description |
| AGR | Advanced Gas-cooled Reactor |
| CA | Competent Authority |
| GB | Great Britain |
| HOW2 | (Office for Nuclear Regulation) Business Management System |
| IAEA | The International Atomic Energy Agency |
| ONR | Office for Nuclear Regulation |
| UK | United Kingdom |

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# Permission Requested

1. EDF Energy Nuclear Generation Limited (the applicant) has applied for a modification (N232) to the Mk A2 AGR Transport Flask (Design No. 2834) package design for entry into service of flask E107 following replacement of the water level valve housing[1].

# Background

## Purpose of Modification

1. Routine maintenance of E107 identified scoring on the water level valve housing. The applicant chose to replace the valve housing with one from a E118, a non-operational flask. As this is a non-routine maintenance activity, the applicant is seeking approval of the modification, from the CA, to return it to operational service.

## Overview of package design

1. The A2 flask (variants A, B, D and E) carries irradiated Advanced Gas-cooled Reactor (AGR) fuel, tie bars and other steel non fissile items between the Applicant’s AGR nuclear power stations and the Sellafield Nuclear Licensed site.
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 features an insert which houses the water level valve that drains water from the package. When transported, the package must contain water such that the height of the water level corresponds to the level of the weir in the water level valve.

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

1. The key aspect of this modification is the exchange of the water level valve housing. Consequently, we have conducted an engineering assessment [2].
2. The modification does not have any criticality or shielding implications [3]. Therefore, we have not assessed the criticality and shielding aspects of the package design.
3. We previously assessed 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 [4]. Given that this was a recent assessment, and that the modification does not require any changes to the existing safety case or management system, we have not reassessed the safety case requirements as part of this modification.
4. We undertook our most recent inspection of the applicant in 2023 [5] and concluded that the applicant was compliant with its duties under ADR [6], RID [7] (by inference) and CDG [8]. 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 the Office for Nuclear Regulation (ONR) How2 Business Management System (BMS) and its associated guidance.

## Engineering Assessment

1. The engineering assessment [2] sampled the package design safety report, bespoke quality plans, drawings and changes that could affect the engineering safety performance of the package. This focused on the water level valve housing replacement.
2. The water level valve housing is secured in position using six M10 screws on the external face of the package containment and 4 M10 screws on the internal face designed to hold the valve housing in position during an accident. There is also an internal and external sealing weld to maintain containment.
3. The existing external six M10 screw holes have been drilled and re-tapped to use M12 screws thus increasing the thread engagement area. The existing internal holes were found not to be perpendicular to the package wall, therefore these have been plugged and four new M10 holes have been drilled and tapped at 45 degrees offset to the original holes. A bespoke Quality Plan was developed to ensure correct execution of the repair.
4. The replacement valve housing has been pressure tested to provide confidence that the sealing welds will maintain containment.
5. The engineering assessor reviewed the calculations and reserve factors within the package design safety report and concluded that the weld and screw stresses are less than the shear equivalent proof stress.
6. The engineering assessor was satisfied that the existing safety justifications remain valid and that the applicant has adequately completed the maintenance work. They had no objection to us approving the category B modification from an engineering perspective.

# Matters Arising from ONRs Work

1. We raised a query against the initial application (Issue 1) regarding inconsistencies in supporting documentation regarding the size of the screws used to secure the water level valve housing in position [9]. We received an adequate response from the applicant stating there was an error in the submission and the application was re-submitted at Issue 2 with the error rectified [2].

# Conclusions

1. I conclude that the proposed modification provides an adequate justification for the replacement of the water level valve housing and demonstrates that flask E107 remains compliant with the extant package design and shipment approvals.

# Recommendations

1. I recommend that the Competent Authority grants approval of the replacement of the water level valve housing by endorsing modification N0232 Issue 2.

# References

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| [1] | EDF, “EDF Modification N0232 Return to Service of A2 Flask, Email Correspondence, 3/08/2023; WIReD Reference: ONRW-2019369590-3952”. |
| [2] | ONR, “Modification N0232 – Flask E107 return to service following the Water Level Valve (WLV) insert replacement, Rev 1 WIReD Ref: ONRW-2126615823-1404”. |
| [3] | ONR, “GB\_2834 Mk A2 AGR Flask - EDF Modification N0232 - Shielding and Criticality.msg WIReD Ref: ONRW-2019369590-4311”. |
| [4] | ONR, “ONR-TD-AR-22-003 Safety Case Requirements Assessment of Modification N0219, CM9 2022/31401”. |
| [5] | ONR, “IR52708 Compliance inspection - nuclear transport - EDF”. |
| [6] | “Agreement concerning the International Carriage of Dangerous Goods by Road (ADR), 2023”. |
| [7] | “Regulations concerning the International Carriage of Dangerous Goods by Rail (RID), 2023”. |
| [8] | “The Carriage of Dangerous Goods and use of Transportable Pressure Equipment (2009) Regulations”. |
| [9] | EDF, “EDF Modification N0232 Return to Service of A2 Flask, Email Correspondence, 31/07/2023; WIReD Reference: ONRW-2019369590-3951”. |