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| ONR Project Assessment Report  Mk A2 AGR Transport Flask (Design No. 2834) – Assessment of Modification N240 Issue 2 |



ONR Project Assessment Report

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

**Report Title**: Assessment of Modification N240 Issue 2

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

**Report Issue No**.: 1

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# Executive Summary

EDF Energy Nuclear Generation Limited (the applicant) has applied for a modification (N240 Issue 2) to the Mk A2 AGR Transport Flask (Design No. 2834) package design certificates for transport by road and rail within the United Kingdom for the refurbishment and entry into operational service of its 15 refurbished Mk A2 fuel flasks.

The A2 flask (variants A-E) is used to carry 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(M) package.

The applicant is refurbishing 15 Mk A2 fuel flasks that have been placed in storage as strategic spares across the United Kingdom, following manufacture in the 1990s. Four flasks have been refurbished under contract to Sellafield Limited, and the remaining 11 are being refurbished under contract to Altrad Babcock. We have undertaken inspections of both organisations contracted to undertake the flask refurbishment, as part of the renewal of the existing package design and shipment certificates for the GB/2834 package in 2022. We endorsed the release of the four flasks being refurbished by Sellafield Limited at Issue 1 of this modification in May 2023.

The remaining 11 flasks were not endorsed at Issue 1 due to the applicant being unable to demonstrate that it was able to meet the expectations of its management system, or the requirements of the existing safety case, in relation to the flasks being refurbished by Altrad Babcock. These shortfalls were demonstrated to have been resolved via Inspection in May 2023. Modification N240 Issue 2 has therefore been submitted to remove this restriction.

We have not undertaken any new assessment of this modification. Assessment of the overarching strategy was undertaken in May 2023 in support of our endorsement of Issue 1 of this modification.

Following our endorsement of modification N240 Issue 1, we undertook an inspection at the Altrad Babcock facility in May 2023. This confirmed that shortfalls which were identified during the renewal of the package design and shipment certificates in 2022 had been adequately addressed. This Project Assessment Report summarises the findings of the previous assessment and subsequent inspection activities we have undertaken.

This modification supersedes Issue 1, and therefore the applicant has requested permission for all 15 A2 flasks to be released into operational service. Issue 2 of the modification will be included with the package design and shipment certificates.

It is concluded that the proposed strategy for refurbishment of the flasks by Sellafield Ltd and Altrad Babcock is sufficient to ensure compliance with the current package design and shipment certificates.

It is recommended that the competent authority endorses the strategy for refurbishment and entry into operational service of all 15 refurbished flasks by endorsing modification N240 Issue 2.

Table 2: List of abbreviations

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| Term/Acronym | Description |
| AGR  CA | Advanced Gas-cooled Reactor  Competent Authority |
| GB | Great Britain |
| HOW2 | ONR’s Management System Platform |
| IAEA | International Atomic Energy Agency |
| NGL | Nuclear Generation Limited |
| ONR | Office for Nuclear Regulation |
| PDSR | Package Design Safety Report |
| RI | Regulatory Issue |
| UK | United Kingdom |

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# Permission Requested

1. EDF Energy Nuclear Generation Limited (the applicant) has applied for a modification (N240 Issue 2 ‎[‎1]) to the Mk A2 AGR Transport Flask (Design No. 2834) package design for the refurbishment and entry into operational service of its 15 refurbished Mk A2 fuel flasks.

# Background

## Purpose of Modification

1. The A2 flask (variants A-E) is used to carry 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(M) package.
2. The applicant is refurbishing 15 Mk A2 fuel flasks. Four have been refurbished under contract to Sellafield Limited, and the remaining 11 are being refurbished under contract to Altrad Babcock.
3. We endorsed the strategy for maintenance of all 15 flasks, and entry into operational service of the four flasks being refurbished by Sellafield Limited at Issue 1 of this modification in May 2023 [‎‎2].
4. Modification N240 Issue 2 [‎‎1] has been submitted to remove the restriction placed by us on the endorsement of N240 issue 1 that approval only extends to the four flasks being refurbished by Sellafield Ltd.
5. Modification N240 Issue 2 [‎1] has updated Issue 1 of the modification to make reference to the fact that our inspection activities [‎‎3] have been completed, and that the findings of the Inspection were Green – No Formal Action. It also states that the Sellafield packages team have audited both Sellafield Flask Maintenance and Altrad Babcock to gain confidence in the arrangements as flask consignor as part of the Sellafield site Plant Modification Process. The modification claims the arrangements met the expectations of the Consignor.

## Overview of package design

1. The Mk A2 AGR flask has been designed for the transport of AGR fuel elements and components. 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 2 different designs) carrying the radioactive contents.

## Flask History

1. The existing operational fleet of Mk A2 AGR fuel flasks entered service from 1991 onwards. Although a total of 47 flasks were manufactured, fitted out, inspected and prepared for duty, only 31 flasks entered operational service. This was approved by the Department for Transport as the GB CA at that time.
2. The remaining 16 flasks were placed into strategic storage, distributed between Scottish Energy (now EDF Energy), Nuclear Electric (now EDF Energy) and Magnox (now NDA) [‎‎5]:
   * 1. Torness - 3 flasks, serial numbers E113, E114, E115;
     2. Hunterston B - 1 flask, serial number E112;
     3. Heysham (EDF-owned) - 8 flasks, serial numbers E99, E116, E117, E118, E120, E121, E122, E137; and
     4. Heysham (NDA-owned) - 4 flasks, serial numbers E123, E128, E130, E134.
3. Flask E118 was removed from storage at Heysham some years ago and used for destructive testing. It is not suitable for refurbishment and is out with the scope of Modification N240 Issue 2.

## Further modification strategy post approval of modification N240 Issue 2

1. Following approval of modification N240 Issue 2 ‎[‎1], the applicant intends to produce further modifications for each flask, detailing the refurbishment undertaken, which will be appropriately categorised in accordance with ONR’s Guidance for applications for GB competent authority (CA) approval [‎4] and the applicant’s own arrangements.
2. If new/novel repairs are required for any specific flasks, this will entail further modification proposal(s). Category C modifications will be self-approved by the applicant and submitted to ONR for information. Any Category A or B modifications will be subject to CA approval prior to releasing the flask into operational service.

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

1. In accordance with the regulatory permissioning plan we have not undertaken any new assessment of this modification. Assessment of the overarching strategy was undertaken in May 2023 in support of our endorsement of Issue 1 of this modification.
2. Following our endorsement of modification N240 Issue 1, we undertook an inspection at the Altrad Babcock facility in May 2023 [‎3] to confirm that shortfalls identified during the renewal of the package design and shipment certificates in 2022, that prevented the entry into operation of the 11 flasks being refurbished at this facility, had been adequately addressed.

## Historic Assessment

1. We carried out a programme of assessment of the applicant’s claims, arguments, supporting documentation and evidence supporting modification number N240 Issue 1 [‎2], to determine whether the proposed strategy complied with relevant transport legislation, and whether existing safety claims remained valid.
2. 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.
3. Our shielding assessment [‎6] supported approval of modification N240 Issue 1. The shielding assessor has confirmed that that there are no changes at Modification N240 Issue 2 that affect the shielding advice provided previously [‎‎7].
4. Our engineering assessment [‎‎8] found that shortfalls identified during the renewal of the existing transport and shipment certificates for the GB/2834 package, specifically relating to Altrad Babcock’s ability to identify and record defects, and its ability to paint the flask to the requirements of the safety case documentation had not been resolved at the time of the assessment.
5. Defects in critical flask components or engineered tolerances have the potential result in safety consequences or incorrectly categorised modifications, and therefore the engineering assessor considered it was important to gain regulatory confidence that these shortfalls had been resolved prior to introduction of the Altrad-Babcock flasks into operational service. Our engineering assessment of Modification N240 issue 1 did not support the release of the flasks being refurbished by Altrad Babcock into operational service, and the engineering assessor proposed to undertake an inspection of the Altrad-Babcock facility to establish whether these shortfalls had been resolved.

## Inspection of Altrad-Babcock facility

1. We previously inspected the Altrad-Babcock facility in August 2022 [‎9], and shortfalls were identified with data verification and training of operators, resulting in a Level 4 Regulatory Issue (RI-11022) being raised. Regulatory observations were also raised around painting of the A2 flasks and foreign material exclusion.
2. We undertook a follow up inspection of the Altrad-Babcock facility in May 2023 [‎3] and were content that foreign material exclusion was being adequately managed, and that defects were being recorded and verified appropriately. During the inspection, we observed the inspection data from the painting records, and were content that the painting process was adequately controlled on site.
3. Overall, we were content that the shortfalls identified during the previous inspection and assessment were no longer valid, and that positive improvements had been made in the area of defect recording and verification.
4. I consider that the inspection activities undertaken are sufficient to provide regulatory confidence that the refurbishment process is being adequately controlled at Altrad-Babcock, and that the shortfalls from historic assessment and inspection activities have been closed out.

# Matters Arising from ONRs Work

1. Issue 2 of Modification N240 is seeking permission for all 15 refurbished flasks to be released into operational service. Although not explicit within the body of the modification, further correspondence [‎10‎,11] from the applicant has confirmed that Issue 2 supersedes Issue 1 of the modification. Thus our endorsement of Issue 2 will ensure all 15 refurbished flasks are permissioned under one modification. Issue 2 of this modification will be included with the package design and shipment certificates.

# Conclusions

1. I conclude that the proposed strategy for refurbishment of the flasks by Sellafield Ltd and Altrad Babcock is sufficient to ensure compliance with the current package design and shipment certificates.

# Recommendations

1. I recommend that the competent authority endorses the strategy for refurbishment and entry into operational service of the 15 refurbished flasks by endorsing modification N240 Issue 2 [‎‎1].

# References

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2. ONR, PR-01169, Mk A2 AGR Transport Flask (Design No. 2834) - Assessment of Modification N240, K Hughes-Gill, WIReD Ref: ONRW-2019369590-2202
3. ONR, IR-52779, Transport Permissioning Inspection of Altrad-Babcock Refurbishment Facility, K Hughes-Gill.
4. ONR, TRA-PER-GD-014 - Guidance for applications for UK Competent Authority approval.
5. EDF Energy Nuclear Generation Limited. Package Design Safety Report (PDSR) - E/REP/BRDB/0007/AGR/03 - WiRED Ref: ONRW-2019369590-996.
6. ONR, Technical Assessment File Note - Radiation Protection – Shielding Assessment, R Bowden, CM9 Reference: 2023/10880.
7. Email from R. Bowden to K Hughes-Gill, Subject: GB/2834 Mod N240 Issue 2 - Shielding & Criticality, WIReD Ref: ONRW-2019369590-3824.
8. ONR, AR-01115 - Mk A2 Irradiated Fuel Transport Flask – Engineering Assessment of Modification N240 – K Hughes-Gill and T McLoughlin, WIReD Reference: ONRW- 2126615823-450.
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10. Email from K Hughes-Gill to S Austin, Subject: Re: Modification 240 Issue 2, WIReD Ref: ONRW-2019369590-3861
11. Email from S. Austin to K Hughes-Gill, Subject: Mk2 AGR flask MOD 240 issue 2 - Further Flasks in Readiness, WIReD Ref: ONRW-2019369590-3825.