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| ONR Project Assessment Report  PR-01560 – Assessment of application for validation of French competent authority package design approval F/420/AF (Bd) |



ONR Project Assessment Report

**Project Name**: PR-01560

**Report Title**: Assessment of application for validation of French competent authority package design approval F/420/AF (Bd)

**Dutyholder/ Applicant**: Urenco UK Ltd

**Authored by**:

**Report Issue No**.: 0

**Publication Date**: Feb-25

**Document ID**: ONRW-2019369590-7126

Table 1: Circulation (latest issue)

|  |  |  |
| --- | --- | --- |
| Organisation | Recipient | Date Report Sent |
| ONR |  | 25/04/2024 |
| Dutyholder/ applicant |  | 25/04/2024 |

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# Executive Summary

In January 2024, Urenco UK Limited (UUK, the ‘applicant’) submitted an application to the Office for Nuclear Regulation (ONR) as the Great Britain (GB) competent authority (CA) for validation of the French package design approval certificate F/420/AF (Bd).

This Project Assessment Report (PAR) documents the basis of our regulatory decision.

Certificate of approval F/420/AF (Bd) certifies the package design DN30, consisting of a 30B cylinder placed in a DN30 overpack and containing uranium hexafluoride (UF6) with a maximum enrichment of 5% of uranium-235. This approval reduces the maximum gross weight of the package loaded for transport to 3825 kg. This is a reduction from the previous maximum gross weight of 4100 kg and to achieve this new gross weight the contents must be restricted from the previous limit of 2277 kg UF6 to 2000 kg UF6.

During the last quarter of 2023 a number of DN30 packages, containing “heeled” quantities of UF6, being transported from overseas to UUK’s facility in the UK under approval certificate F/420/AF (Ab) experienced delays due to poor weather conditions. This coincided with the package design approval expiring when the packages arrived at Seaforth dock in Liverpool resulting in the transport not being completed.

Whilst the reduced maximum gross weight in F/420AF (Bd) is unsuitable for UUK in the long term, validation of this certificate would enable the transport of these packages to be completed. Given the above circumstances, UUK is only seeking validation of this certificate to facilitate the completion of the transport of the aforementioned DN30 packages.

Given the strategic, financial, security and safety aspects associated with the transport of the DN30 packages not being completed the GB CA validation is supported by a targeted inspection of the packages affected by the disrupted transport rather than assessment of the package design safety report (PDSR).

Based on the work carried out by ONR, I am satisfied that the DN30 packages at Seaforth dock are compliant with the French CA approval F/420/AF (Bd). I am also satisfied UUK has met the additional requirements under a GB validation to have made adequate emergency plans before shipment of the DN30 packages at Seaforth dock takes place.

Given the inspection supporting our decision targeted the specific packages stored at Seaforth dock and did not include detailed technical assessment of all package contents and design changes the GB validation should only apply to transport by road and have a period of validity sufficient to allow UK to complete the carriage of the affected packages.

I recommend that the competent authority issues a GB validation of F/420/AF (Bd) for transport by road only and that the period of validity should end on 31 May 2024.

Table 2: List of abbreviations

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| Term/Acronym | Description |
| ADR | Agreement Concerning the International Carriage of Dangerous Goods by Road |
| CA | Competent authority |
| CDG09 | The Carriage of Dangerous Goods and Use of Transportable Pressure Equipment Regulations 2009 |
| EPDM | Ethylene Propylene Diene Monomer |
| GB | Great Britain |
| IRR17 | The Ionising Radiations Regulations 2017 |
| ONR | Office for Nuclear Regulation |
| PAR | Project Assessment Report |
| PDSR | Package Design Safety Report |
| UF6 | Uranium hexafluoride |
| UUK | Urenco UK Ltd |

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# Permission Requested

1. In January 2024, Urenco UK Limited (UUK, the ‘applicant’) submitted an application (ref. [1]) to the Office for Nuclear Regulation (ONR) as the Great Britain (GB) competent authority (CA) for validation of the French package design approval certificate F/420/AF (Bd) (ref. [2]).
2. In line with our arrangements (ref. [3]) we have produced this Project Assessment Report (PAR) to document the basis of our regulatory decision.

# Background

## Overview of Package Design

1. Certificate of approval F/420/AF (Bd) certifies the package design DN30, consisting of a 30B cylinder placed in a DN30 overpack and containing uranium hexafluoride (UF6) with a maximum enrichment of 5% of uranium-235.
2. The DN30 overpack is a cylinder consisting of two half overpacks. Each half overpack consists of an interior half shell and an exterior half shell, both made of stainless steel. The interior half shell is covered by intumescent material. The exterior shell has eighteen thermal plugs or valves (nine per half overpack). The space between both shells is filled with rigid polyisocyanurate foam (PIR) and an insulating material. The horizontal connection between both half overpacks is formed by an ethylene propylene diene monomer (EPDM) gasket.
3. The 30B cylinder is a carbon steel cylindrical tank closed at each end by a domed head and defined by standards ISO 7195 (ref. [4]) and ANSI N14.1 (ref. [5]).

## Regulatory history

1. The design was first approved by the French CA in December 2018 (F/420/AF (Aa)). The French CA issued an updated certificate in November 2019 (F/420/AF (Ab)) to address modifications to the package valve protection device and associated operation, maintenance and inspection documentation.
2. Our first validation of the DN30 package design, F/420/AF (Ab) (ref. [6]), was issued in February 2020 (ref. [7]).
3. In October 2023, the French CA issued a renewal of the DN30 package design approval, F/420/AF (Bd) (ref. [2]). This approval reduces the maximum gross weight of the package loaded for transport to 3825 kg. This is a reduction from the previous maximum gross weight of 4100 kg and to achieve this new gross weight the contents must be restricted from the previous limit of 2277 kg UF6 to 2000 kg UF6 (2002 kg rounded down).

## Scope of application

1. During the last quarter of 2023 a number of DN30 packages, containing “heeled” quantities of UF6, being transported from overseas to UUK’s facility in the UK under approval certificate F/420/AF (Ab) (ref. [7]) experienced delays due to poor weather conditions. This coincided with the package design approval expiring when the packages arrived at Seaforth dock in Liverpool resulting in the transport not being completed.
2. Whilst the reduced maximum gross weight in F/420/AF (Bd) (ref. [2]) is unsuitable for UUK in the long term, validation of this certificate would enable the transport of these packages to be completed.
3. Given the above circumstances, UUK is only seeking validation of this certificate to facilitate the completion of the transport of the aforementioned DN30 packages.

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

1. Given the strategic, financial, security and safety aspects associated with the transport of the DN30 packages not being completed the GB CA validation is supported by a targeted inspection (ref. [8]) of the packages affected by the disrupted transport rather than assessment of the package design safety report (PDSR) (ref. [9]).
2. The inspection focussed on confirming that the cylinders are demonstrably compliant with: the PDSR under which F/420/AF (Ab) was issued, and Attachment 0 (DN30 Packaging) and Attachment 3 (Heels from commercial grade unranium hexafluoride complying with standard ASTM C996-10/15/20) to that certificate. The inspection sought to confirm that any changes arising from F/420/AF (Bd) do not impact the affected cylinders. The inspection also examined compliance with relevant transport legislation for the remaining stage of the transport.
3. The inspection (ref. [8]) of the packages confirmed that:

* the packages have been maintained and inspected in compliance with the requirements of F/420/AF (Ab) and no additional requirements have been identified in F/420/AF (Bd).
* the maximum gross weight of the packages are within the limit of 3825 kg identified in F/420/AF (Bd).
* the heeled UF6 masses are all less than 11.3 kg and hence they are compliant with the requirements of F/420/AF (Bd) and the supporting criticality safety assessment (ref. [10]).
* the designer’s radiation shielding assessment demonstrates that there is a significant margin to the statutory dose rate limits for heels of non-recycled UF6 and hence there is no further shielding consideration required for this validation (ref. [10]).
* UUK had not ensured that its carrier had made a suitable and sufficient radiation risk assessment for the transport of the DN30 packages from Seaforth dock to UUK’s premises. Consequently, suitable emergency plans for the carriage by road have also not been made. Further details are provided in Section 4.

# Matters Arising from ONR’s Work

1. Inspection of UUK’s arrangements, and its appointed carrier, for transporting the packages by road from Seaforth dock to UUK’s facility in the UK identified that UUK had not ensured compliance with the following requirements:

* Before each shipment of any package, it shall be ensured that all the requirements specified in the relevant provisions of the Agreement concerning the International Carriage of Dangerous Goods by Road (ADR, ref. [11]) and in the applicable certificates of approval have been fulfilled as required by ADR 4.1.9.1.8.
* GB competent authority package approvals issued in compliance with ADR 5.1.5.2.1 (a) require that before shipment, suitable emergency plans are made.
* ADR 1.7.1 Note 1 requires that in the event of a nuclear or radiological emergency during the carriage of radioactive material, provisions as established by relevant national and/or international organizations shall be observed to protect people, property and the environment. This includes arrangements for preparedness and response established in accordance with the national and/or international requirements and in a consistent and coordinated manner with the national and/or international emergency arrangements.
* The Carriage of Dangerous Goods and Use of Transportable Pressure Equipment Regulations 2009 (CDG09) Regulation 24 and Schedule 2, Part 1(ref. [12]) require assessing, planning and responding to radiation emergencies within Great Britain. Specifically:
  + Regulation 8 of The Ionising Radiations Regulations 2017 (IRR17, ref. [13]) and CDG09 Schedule 2, Part 1, paragraph 2 require production of suitable and sufficient transport radiation risk assessments for the loads carried.
  + CDG09 Schedule 2, Part 1, Paragraph 3 and IRR17 Regulation 13 require production of suitable emergency arrangements for the loads carried.

1. Consequently, UUK has contravened Regulation 5 of CDG09 which, requires that no person is to carry dangerous goods, or cause or permit dangerous goods to be carried, where that carriage is prohibited by ADR, including where that carriage does not comply with any applicable requirement of ADR. To remedy this contravention an improvement notice was issued to UUK (ref. [14]).
2. GB validation of F/420/AF (Bd) does not require compliance with the improvement notice arising from our inspection. UUK has revised emergency plans and radiation risk assessments for the transport of the “heeled” DN30 cylinders at Seaforth dock that are compliant with regulatory expectations (ref. [15]).

# Conclusions

1. Based on the work carried out by ONR, I am satisfied that the DN30 packages at Seaforth dock are compliant with the French CA approval F/420/AF (Bd).
2. I am also satisfied UUK has met the additional requirements under a GB validation to have made adequate emergency plans before shipment of the DN30 packages at Seaforth dock takes place.
3. Given the inspection supporting our decision targeted the specific packages stored at Seaforth dock and did not include detailed technical assessment of all package contents and design changes, the GB validation should only apply to transport by road and have a period of validity sufficient to allow UK to complete the carriage of the affected packages.

# Recommendations

1. I recommend that the competent authority issues a GB validation of F/420/AF (Bd) for transport by road only and that the period of validity should end on 31 May 2024.

# References

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| [1] | Application for UK Competent Authority Validation of French DN30/30B Package, dated 25/01/24, ONR/2024/01R , ONRW-2019369590-6723. |
| [2] | French certificate of approval for package design DN30, F/420/AF (Bd), issued 31/10/2023, expires 31/12/28, ONRW-2019369590-6724. |
| [3] | Guidance for applications for UK competent authority approval, TRA-PER-GD-014 Issue 4. |
| [4] | ISO 7195, Second edition 2005-09-01, Nuclear energy - Packaging of uranium hexaflouride (UF6) for transport. |
| [5] | ANSI N14.1, Nuclear Materials - Uranium Hexafluoride - Packagings For Transport. |
| [6] | French certificate of approval for package design DN30, issued 4/11/19, expires 26/12/23, ONRW-157424439-362. |
| [7] | GB certificate of approval for package design DN30, F/420/AF (Ab), issued 28/02/20, expires 26/12/24, ONRW-157424439-69. |
| [8] | “WIReD inspection record IR-52974, date of inspection 26/02/24”. |
| [9] | Package Design Safety Report for the DN30 Package, 0023-BSH-2016-001 Rev. 8, ONRW-2019369590-6571. |
| [10] | “Validation of F/420/AF (Bd) - Criticality Safety & Radiation Shielding, ONRW-2019369590-8513”. |
| [11] | “United Nations Economic Commission for Europe (UNECE), Agreement concerning the International Carriage of Dangerous Goods by Road (ADR) 2023 Edition. www.unece.org.”. |
| [12] | “The Carriage of Dangerous Goods and Use of Transportable Pressure Equipment Regulations (CDG) 2009, (SI 2009 No. 1348)”. |
| [13] | “The Ionising Radiations Regulations 2017 (SI 2017 No. 1075)”. |
| [14] | “Improvement notice ONR-IN-23-009, The Carriage of Dangerous Goods and Use of Transportable Pressure Equipment Regulations 2009, Regulation 5, ONRW-648724129-10514”. |
| [15] | “Heeled DN30 cylinders - Revised Risk Assessments and Emergency Plans, ONRW-2019369590-8969”. |