

SVC4393555 - Fissile Validation of DN30 package - F/420/B(U)F-96;F/420/AF-96; F/420/IF-96

Project Assessment Report for the Fissile Validation of DN30 package – F/420/B(U)F-96;F/420/AF-96; F/420/IF-96

Project Assessment Report ONR-SDFW-PAR-19-024 Revision 0 28 Feb 2020 © Office for Nuclear Regulation, [2020] If you wish to reuse this information visit <u>www.onr.org.uk/copyright</u> for details. Published 03/20

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EXECUTIVE SUMMARY

Project Assessment Report for the Fissile Validation of DN30 package – F/420/B(U)F-96;F/420/AF-96; F/420/IF-96

Permission Requested

This report summarises the basis of the regulatory decision by the Office for Nuclear Regulation (ONR), as the GB Competent Authority (CA) for Class 7 (radioactive materials), to issue Validation of F/420/B(U)F-96;F/420/AF-96; F/420/IF-96.

Background

The F/420 transport package, known as DN30, consisting of a 30B cylinder and outer packaging is designed by DAHER for the carriage of uranium hexafluoride. The design was originally approved by the French Competent Authority (CA) in 2018. Modifications by the design authority to the package's valve protection device as well as associated operation, maintenance and inspection documentation resulted in revised certificates being issued in 2019.

The package is currently approved as a Type IF (Industrial Package), Type AF and Type B(U)F dependent on the radioactive contents.

Permission Requested

In accordance with the Carriage of Dangerous Goods Regulations, Urenco UK Ltd has requested that ONR provide a fissile validation for the package designs to allow radioactive material to be transported by road and rail within GB; sea; and road in Northern Ireland. These regulations transpose into GB law the United Nations Economic Commission for Europe (UNECE) modal requirements ADR and RID for transport of dangerous goods by road and rail. For transport of dangerous goods by sea, the international requirements are specified in the International Maritime Dangerous Goods (IMDG) Code and are implemented in the UK by The Merchant Shipping (Dangerous Goods and Marine Pollutants) Regulations 1997. The modal regulations are based on the International Atomic Energy Agency (IAEA) Regulations for the Safe Transport of Radioactive Material, currently SSR-6 (2012 Edition).

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

In accordance with ONR's transport approval process, and guidance, a targeted and proportionate assessment has been performed with the criticality assessment recorded in an 'Assessment Report'. The safety case requirements, radiation shielding protection and engineering assessments have been reported as 'Other' reports.

The criticality assessment considered new temperature related criticality analysis provided by the applicant. A number of Q1 questions were raised during the assessment and suitably answered with supporting evidence by the applicant. The engineering assessment considered one issue raised by the criticality assessment relating to the accuracy of contents mass measurement which was addressed. The criticality assessment concluded that the package should be approved.

The safety case requirements, radiation shielding and engineering assessments did not raise any Q1 questions and concluded that the package should be approved.

Matters arising from ONR's work

There are no technical matters arising from the current assessment.

The French Competent Authority has issued the original approval certificates in accordance with SSR-6 2018 edition, which differs in identification mark from the current ADR defined requirement. In accordance with ADR para 6.4.23.12(b), I recommend that the UK certificates are issued using the French certificate identification mark, despite this being different from the current UK certificate format.

Conclusions

ONR assessments in the areas of safety case requirements, criticality, radiation shielding and engineering have concluded that this package design meets the regulatory requirements. I am satisfied with the claims, arguments and evidence presented within the applicant's safety case and the supporting information provided by the applicant.

Recommendation

I recommended that the GB Competent Authority provides Fissile Validation of transport package approvals F/420/B(U)F; F/420/AF and F/420/IF run concurrently with the French approval certificate.

LIST OF ABBREVIATIONS

ADR	Agreement Concerning the International Carriage of Dangerous Goods by Road
CA	Competent Authority
CDG	Carriage of Dangerous Goods
GB	Great Britain
HOW2	(ONR) Business Management System
IAEA	International Atomic Energy Agency
IMDG	International Maritime Dangerous Goods regulations
ONR	Office for Nuclear Regulation
OTIF	Intergovernmental Organisation for International Carriage by Rail
RGP	Relevant Good Practice
RID	Regulations concerning the International Carriage of Dangerous Goods by Rail
SAP	Safety Assessment Principle(s)
TAG	Technical Assessment Guide(s) (ONR)
UNECE	United Nations Economic Commission for Europe

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1 PERMISSION REQUESTED

- 1. Urenco UK Ltd. has requested (Ref. 1) that ONR provide a Fissile Validation for the package F/420, known as DN30, which is designed by DAHER GmbH. The request is for transport by road; rail; sea; and road in Northern Ireland.
- 2. The package was originally certified in France (Ref. 2 & 3) and this is the first validation of the package in the UK.

2 REGULATORY BASIS

- 3. ONR is the GB Competent Authority (CA) for the civil carriage of UN Class 7 (radioactive material) goods in Great Britain by road, rail and inland waterway (limited provisions only in UK). The CA is a statutory duty and function given to ONR in law through The Carriage of Dangerous Goods and Use of Transportable Pressure Equipment Regulations (CDG) 2009 (Ref. 4). These regulations transpose into UK law the European modal requirements (ADR and RID) for road and rail transport and limited aspects of ADN for inland waterway transport. ONR also acts on behalf of the other UK CAs with respect to the issuing of transport approvals namely: the Secretary of State for Transport and the Maritime and Coastguard Agency for transport in UK waters; the Civil Aviation Authority for air transport; and the Department of Agriculture, Environment and Rural Affairs Northern Ireland for road transport in that part of the UK.
- 4. ADR (Ref. 5) 5.1.5.2.1 states that:

Certificates issued by the competent authority are required for the following:

(a) Designs for:

(v) packages containing fissile material unless excepted by 2.2.7.2.3.5, 6.4.11.2 or 6.4.11.3;

5. In accordance with the ONR process (Ref. 6) this is considered a Validation of Overseas Fissile Certificate of Approval.

3 BACKGROUND

- 6. The DN30 package is designed to transport Uranium Hexafluoride (UF6) with enrichment up to 5%w. It consists of a 30B Cylinder (designed to ANSI N14.1 and ISO7195 standards) and a DN30 outer packaging system.
- 7. The design was originally approved by the French Competent Authority (CA) in December 2018 (Ref. 2) and updated certificates were issued in November 2019 (Ref. 3). The update was due to modifications to the package valve protection device and associated operation, maintenance and inspection documentation.
- 8. The updated certificates and associated modifications to the safety case were provided after the formal assessment by the ONR specialist assessors. I confirmed with all assessment specialists that changes to the safety case did not require further review in any of the specialist areas.
- 9. There are three certificates for the package as an Industrial Package, Type A and Type B dependant on contents.
- 10. As a new package this is the first validation assessment carried out by ONR; validation of all three French certificates is required.

4 ASSESSMENT AND INSPECTION WORK CARRIED OUT BY ONR IN CONSIDERATION OF THIS REQUEST

- 11. ONR has carried out a programme of work in accordance with ONR's management system for transport approvals. This involved assessment of the safety case requirements, criticality, engineering and radiation shielding of the package. No inspection of the applicant was carried out as the applicant's management arrangements had been inspected in 2018 and found to be compliant with a green rating. A safety case review was carried out (Ref. 8) and recorded as compliant with a green rating. The assessment strategy was detailed in a Decision Record (Ref. 7).
- 12. The ONR assessment of the safety case raised no concerns and approval was recommended for the package.
- 13. The criticality assessment conducted by ONR (Ref. 9) considered new temperature related criticality analysis provided by the applicant. A number of Q1 questions were raised during the assessment (Ref. 10) and answered with supporting evidence by the applicant. The criticality assessment noted that the approach taken to calculating the k-eff value was conservative, using a large standard deviation, and results in a value for k-eff that is below the 0.95 safety criterion.
- 14. The applicant's criticality safety report was predicated on the ability of the applicant to assure an absolute maximum heels mass of 11.4 kg, considering uncertainties due to corrosion and facility weigh-scale tolerances. This was addressed by the mechanical engineering assessment.
- 15. The criticality assessment recommended that a Fissile Validation be given.
- 16. The engineering assessment conducted by ONR (Ref. 11) confirmed that the safety case addressed the areas required for containment and thermal performance in accordance with the ONR engineering TAG. The issue of heel mass raised by the criticality report, ensuring that the maximum amount of material did not exceed 11.4kg, was addressed within the ONR assessment. The ONR assessment referenced previous work carried out, reviewing the processes, equipment and margins for the weighing of 30B cylinders and concluded that the applicant's arrangements were suitable and sufficient in this area.
- 17. The engineering assessment recommended that a Fissile Validation be given.
- 18. The radiation shielding assessment conducted by ONR (Ref. 12) confirmed that the Applicant's safety case considered the relevant areas in accordance with the Transport Shielding Technical Assessment Guide.
- 19. The shielding assessment recommended that a Fissile Validation approval based on the applicant's safety case time restrictions and pre shipment dose rate measurement.

5 MATTERS ARISING FROM ONR'S WORK

- 20. For this assessment effort has concentrated on the criticality assessment, specifically the effect of temperature, with supporting work from shielding and mechanical engineering assessments.
- 21. In finalising the documentation for approval I identified that the French certificates were issued under the 2018 edition of SSR-6 and as such do not have a "-96" suffix to the certificate Type-code. I contacted the French Competent Authority who confirmed that they are issuing all new package approvals against the 2018 edition. The current UK regulations are based on the 2012 edition of SSR-6 and do include a "-96" suffix. The

criteria for package assessment in the 2018 edition meet the 2012 edition requirements and as such there are no safety issues raised.

22. The SSR-6 2018 edition package identification format is not currently transposed into UK regulations, but in accordance with ADR para 6.4.23.12(b) for validations, the identification mark of the originating certificate should be used. I therefore recommend that the UK certificates are issued using the French certificate identification mark, despite this being different from the current UK certificate identification mark format.

6 CONCLUSIONS

- This report presents the findings of ONR's assessment for the Fissile Validation of the DN30 package approved under French certificates F/420/B(U)F, F/420/AF and F/420/IF.
- 24. Assessments in the areas of safety case requirements, criticality, radiation shielding and engineering have concluded that this package design meets the regulatory requirements and that there is no reason to withhold the Fissile Validation.
- 25. To conclude, I am satisfied that claims, arguments and evidence presented within the applicant's safety case (Ref. 1) and the further information provided by the applicant (Ref. 10) allow ONR to permission the Fissile Validation by issuing validation certificates for the three variants of F/420 following the process defined in ONR's Transport Permissioning Process Guide. (Ref 6).

7 RECOMMENDATIONS

26. This project assessment report recommends ONR provides Fissile Validation of F/420/B(U)F, F/420/AF and F/420/IF with an expiry date of 26th Dec 2023 in line with the French Approval certificate.

8 REFERENCES

- 1. F/420 (SVC4393555) Application for Validation of F/420/AF, F/420/B(U)F & F/420/IF - DN30 - Urenco UK Ltd - 6 March 2019 – 2019/68498
- 2. F/420/B(U)F-96; F/420/AF-96; F/420/IF-96 Issue Aa dated 26 December 2018– contained within 2019/73882
- 3. F/420/B(U)F-96; F/420/AF-96; F/420/IF-96 Issue Ab dated 18 November 2019– contained within 2020/3219.
- 4. The Carriage of Dangerous Goods and Use of Transportable Pressure Equipment Regulations 2009 (SI 2009/1348)
- 5. ADR European Agreement Concerning the International Carriage of Dangerous Goods by Road applicable as from1 January 2019. ECE/TRANS/257
- 6. TRA-PER-GD-001 Revision 1 Transport Permissioning Assessment December 2016
- F 420 (SVC4393555) Transport Approval Assessment Scope Decision Record -Decision Record - Nov 2019 - Nov 2019 – CM9 2019/340922
- F/420 (SVC4393555) Safety Case requirements Assessment Jan 2020 CM9 2020/9456
- F/420 (SVC4393555) Report ONR-SDFW-AR-19-054 Transport Criticality Assessment for F/420 French Certificate Validation - A Nichols - December 2019 – CM9 2020/361957
- 10. F/420 (SVC4393555) Q1 Assessment Review Form Rev 3 CM9 2020/342837
- 11. F/420 (SVC4393555) Mechanical Engineering Assessment Note Dec 2019 CM9 2020/9534
- 12. F/420 (SVC4393555) Shielding Assessment CM9 2019/342879