



SVC400245 - Renewal of Fissile Validation of UX-30 package

**Assessment in support of renewal of Fissile Validation of UX-30 package –
USA/9196/B(U)F-96**

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EXECUTIVE SUMMARY

Assessment in support of Renewal of Fissile Validation of UX-30 package – USA/9196/B(U)F-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 USA/9196/B(U)F-96.

Background

Urenco UK Ltd. have requested that ONR provide a Fissile Validation for the package USA/9196/B(U)F-96, known as UX-30, which is designed and certified in the USA.

ONR has previously validated this package design issuing certificate GB/5121/B(U)F-96 in February 2016 with an expiry date of 31 December 2019. The certificate had a number of additional limitations on contents and actions prior to shipment were included:

As the design has not changed since the previous validation the applicant has not requested the removal of these limitations. New analysis was provided, at the request of the ONR criticality assessor, to address updated regulatory expectations relating to temperature effects on criticality.

The applicant has however identified that it is in the process of reviewing the design and testing methodology with the aim to demonstrate that some of these limitations can be lifted. Due to the timescales involved in this (within the next 2 years) the French and German Competent authorities have issued a 3 year validation certificate rather than the usual 5 years. This expectation is that a full assessment of the new information will be carried out at that time.

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

In accordance with ONR's Transport Approval Process, and ONR's guidance in TRA-PER-GD-001 Revision 1 'Transport Permissioning Assessment', a targeted assessment has been performed with the Criticality assessment recorded within an 'Assessment Report', Shielding/Radiation protection and Engineering assessments have been reported as 'Other' reports. This level of reporting is proportionate as this is a Fissile Validation.

Matters arising from ONR's work

There are no additional matters arising from the current assessment, but the limitations and actions currently included on the GB/5131/B(U)F-96 certificate remain extant and should be included on the next issue of the certificate.

Conclusions

Assessments in the areas of criticality, shielding/radiation protection and engineering have concluded that this package design meets the regulatory requirements and that there is no reason to withhold the Fissile Validation.

To conclude, I am satisfied that claims, arguments and evidence presented within the applicant's safety case and the further information provided by the applicant allow ONR to permission the Fissile Validation by issuing a GB/5000 certificate as outlined in the ONR Transport Permissioning Process Guide.

Recommendation

This project assessment report recommends ONR provides a Fissile Validation of USA/9196/B(U)F-96 with an expiry date of 15 November 2022.

The limitations and actions identified on the current certificate should be included.

LIST OF ABBREVIATIONS

ALARP	As low as reasonably practicable
BSL	Basic Safety level (in SAPs)
BSO	Basic Safety Objective (in SAPs)
CNS	Civil Nuclear Security (ONR)
HOW2	(Office for Nuclear Regulation) Business Management System
HSE	The Health and Safety Executive
IAEA	The International Atomic Energy Agency
NDA	Nuclear Decommissioning Authority
ONR	Office for Nuclear Regulation
PCER	Pre-construction Environment Report
PCSR	Pre-construction Safety Report
PSA	Probabilistic Safety Analysis
PSR	Preliminary Safety Report
RGP	Relevant Good Practice
SAP	Safety Assessment Principle(s)
SFAIRP	So far as is reasonably practicable
SSC	Structure, System and Component
TAG	Technical Assessment Guide (ONR)

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1 PERMISSION REQUESTED

1. Urenco UK Ltd. have requested (Ref. 1) that ONR provide a Fissile Validation for the package USA/9196/B(U)F-96, known as UX-30, which is designed and certified in the USA.
2. The package was originally certified in the USA (Ref. 2) and has been previously certified for use within the UK which expires on 31st December 2019 (Ref. 3).

2 BACKGROUND

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:

(iii) fissile material excepted under 2.2.7.2.3.5 (f);

5. In accordance with the ONR process (Ref. 6) this is considered a Validation of Overseas Fissile Certificate of Approval.
6. The UX-30 package is designed to transport Uranium Hexafluoride (UF₆) up to 5%w enrichment, it consists of a 30B Cylinder (ANSI N14.1 and ISO7195) and a UX-30 outer packaging system.
7. ONR has previously validated this package design issuing certificate GB/5121/B(U)F-96 (Ref. 3) in February 2016 with an expiry date of 31 December 2019. The certificate currently has a number of additional limitations on contents and actions prior to shipment were included, as follows:
 - 1.3 - The UX-30 comprising a 30B cylinder may contain up to a maximum mass of 15kg of 'heels' (the uranic / non-uranic residue that remains following emptying of the cylinder).
 - 1.5 - To ensure that the dose rates do not exceed the regulatory limits, the storage times of the full and empty/heel 30B cylinders must be complied with as specified in URENCO note UG-CTG-N-0-15-015129, 'Dose rate assessment for the 30B-cylinder inside UX-30 PSP containing natural, depleted, enriched or reprocessed UF₆ according to ASTM C996', dated 04 December 2015.
 - 2.4 - Pre-shipment measurements shall be used for empty/heel cylinders to confirm that the maximum surface dose rate is within the regulatory limit.

8. As the design has not changed since the previous validation the applicant has not requested the removal of these limitations. New analysis was provided, at the request of the ONR criticality assessor, to address updated regulatory expectations relating to temperature effects on criticality.
9. The applicant has however identified that it is in the process of reviewing the design and testing methodology with the aim to demonstrate that some of these limitations can be lifted. Due to the timescales involved in this (within the next 2 years) the French and German Competent authorities have issued a 3 year validation certificate rather than the usual 5 years. The expectation is that a full assessment of the new information will be carried out by ONR at that time.

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

10. ONR has carried out a programme of work in accordance with ONR's management system for transport approvals. This involved assessment of the Criticality, Engineering and Shielding of the package. No inspection of the applicant was carried out as the applicant's management arrangement had been inspected in 2018 and found to be compliant. A safety case review was carried out (Ref. 12) and recorded as compliant with a green rating. The assessment strategy was detailed in a Decision Record (Ref. 7).
11. The criticality assessment conducted by ONR (Ref. 8) considered new temperature related criticality analysis provided by the applicant. A number of Q1 questions were raised during the assessment (Ref. 9) and suitably 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.
12. The criticality assessment recommended that a Fissile Validation be given.
13. The engineering assessment conducted by ONR (Ref. **Error! Reference source not found.**) confirmed that there was no physical change to the package design and that the existing limitation on maximum heel mass was still appropriate.
14. The engineering assessment recommended that a Fissile Validation be given with the existing limitations.
15. The shielding assessment conducted by ONR (Ref. 11) considered the no change design and whether the existing limitations were still valid.
16. The shielding assessment recommended that a Fissile Validation approval with the existing limitations.

4 MATTERS ARISING FROM ONR'S WORK

17. For this assessment effort has concentrated on the criticality assessment, specifically the effect of temperature, with supporting work from shielding and engineering assessments.
18. There are no additional matters arising from the current assessment, but the limitations and actions currently included on the GB/5131/B(U)F-96 (Ref. 3) certificate remain extant and should be included on the next issue of the certificate.
19. To ensure continuity of approvals across the ADR countries I recommend that ONR issue the validation certificate with an expiry date of 15 November 2022

5 CONCLUSIONS

20. This report presents the findings of ONR's assessment for the Fissile Validation of package USA/9196/B(U)F-96.
21. Assessments in the areas of criticality, shielding/radiation protection and engineering have concluded that this package design meets the regulatory requirements and that there is no reason to withhold the Fissile Validation.
22. 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. 9) allow ONR to permission the Fissile Validation by re-issuing GB/5121/B(U)F-96 at revision 2 following the process defined in ONR Transport Permissioning Process Guide. (Ref 6).

6 RECOMMENDATIONS

23. This project assessment report recommends ONR provides a Fissile Validation of USA/9196/B(U)F-96 with an expiry date of 15 November 2022.
24. The limitations and actions identified on the current certificate should be included.

7 REFERENCES

1. USA/9196 (SVC4400245) - Application for the renewal of USA/9196/B(U)F-96 (GB/5121) - Urenco UK Ltd - 28 June 2019 – CM9 2019/190927
2. USA/9196/B(U)F-96 Rev. 34, dated 2 Nov 2018, expires 31 Dec. 2024 - CM9 2019/190927
3. GB/5121/B(U)F-96 Rev.0, dated 10 Feb 2016, expires 31 Dec. 2019 – CM9 2016/1394
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 from 1 January 2019. ECE/TRANS/257
6. TRA-PER-GD-001 Revision 1 - Transport Permissioning Assessment - December 2016
7. USA 9196 (SVC4400245) - Transport Approval Assessment Scope Decision Record - Decision Record - Nov 2019 – CM9 2019/340901
8. USA/9196 (SVC4400245) - ONR-SDFW-AR-19-030 - Transport Criticality Assessment – CM9 2019/254911
9. USA/9196 (SVC4400245) - Q1AR Query form - Criticality Related Questions - November 2019 – CM9 2019/226305
10. USA 9196 (SVC4400245) - Mechanical Engineering Assessment Note – CM9 – 2019/353930
11. USA 9196 (SVC4400245) - GB/5121 validation - Shielding/RP assessment – CM9 2019/334171
12. USA 9196 (SVC4400245) - Safety Case Requirements Assessments - Nov 2019 – CM9 2019/366081