Request for Supplemental Information
and Observation
for the
Model No. DN30-X Package
Docket No. 71-9388

This request for supplemental information (RSI) identifies information needed by the staff in connection with its acceptance review of the DAHER NUCLEAR TECHNOLOGIES GmbH (DAHER NT) Model No. DN30-X package. The application is for a new package design for shipment of uranium hexafluoride with an enrichment of up to 20%.

Observation

O-1 Clearly state how Charpy test temperature and acceptance criteria are obtained for the lattice holders, stiffeners, and criticality control rods (CCR) lids, and how low temperature fracture requirements are established for the CCR pipes

The application states that the lattice holders, stiffeners, and CCR lids will be Charpy impact tested per ASTM A20 “Standard Specification for General Requirements for Steel Plates for Pressure Vessels”. However, staff notes that ASTM A20 does not provide specific requirements for Charpy test temperature and acceptance criteria. In addition, neither the CCR pipe nor its corresponding materials standard have fracture requirements. Staff notes that the A106 standard for these pipes are for high temperature service but, in this application, these pipes need to be evaluated for low-temperatures for transportation and, as such, low-temperature fracture performance of such pipes needs to be clearly established.

This information is needed to determine compliance with 10 CFR 71.31(c), 71.43(f), 71.55(d)(1), and 71.55(e).

Request for Supplemental Information

RSI-1 Provide in the application a detailed description of the exceptions to ASTM C996 “Standard Specification for Uranium Hexafluoride Enriched to less than 5% U-235U” and ANSI N14.1 “Standard Specification for Uranium Hexafluoride Enriched to less than 5% U-235” and discuss how the safety aspects of the 30B-10 cylinder and 30B-20 cylinder continue to be maintained with such exceptions, recognizing that the two consensus standards have typically been used to ensure safe conditions for UF_6 transport.

ASTM C996 is a long-standing industry consensus standard for uranium hexafluoride enriched to less than 5% U-235. It is understood that the UF_6 content in the applications for the 30B-10 cylinder and 30B-20 cylinder is enriched beyond 5% U-235; however, the ASTM C996 standard includes

specifications that are not explicitly dependent on enrichment levels. For example, Section 4.3 specifies the exclusion of hydrocarbon, chlorocarbon, and partially substituted halohydrocarbon content (within a certain mol %) in order to prevent vigorous reactions upon heating. The application should state the exceptions to those sections of ASTM C996 related to the proposed content and discuss how the safety aspects of the 10% and 20% enriched cylinders continue to be maintained for these exceptions.

ANSI N14.1 is a long-standing industry consensus standard for design and construction of cylinders that transport UF_6 material. Although Section 1.3 of the application stated that the 30B-X cylinder is designed in accordance with the requirements of ANSI N14.1, Section 1.4.1.1 and Section 1.4.2.1 of the application appear to indicate there are exceptions to using the ANSI N14.1 standard (e.g., inclusion of the criticality control system (CCS) even beyond the "main characteristics" listed in Table 1-13 of the application. The application should state the exceptions to ANSI N14.1 and discuss how the safety aspects of the 10% and 20% enriched cylinders continue to be maintained for these exceptions.

This information is needed to determine compliance with 10 CFR 71.35, 71.43(d), and 71.51.

RSI-2 Justify that the presence of the CCS within a 30B-X cylinder will not adversely affect the cylinder's operations and, correspondingly, impact the analyses associated with safe transport.

Section 1.4.2.1 of the application discussed the placement of criticality control rods (CCR) within a 30B-X cylinder. Recognizing that UF_6 has unique properties and there are multiple phases of UF_6 within the 30B-X cylinder during use (e.g., solid, liquid, gas), it was not clearly demonstrated (e.g., test results) that the presence of the CCS within the 30B-X cylinder would not adversely affect the operations (e.g., filling, emptying) and transport of the contents within the DN-30X package.

For example, Section 1.3.1.7 of the application stated that up to 11.4 kg of UF_6 as heels may remain in a 30B-X cylinder after emptying. There was no discussion in the application that justified the 11.4 kg quantity, considering that the amount of UF_6 remaining within the cylinder after emptying could be affected by the added surface area of the CCR rods within the 30B-X cylinder.

It is noted that a change in the amount of heels would impact the analyses described in Section 1.3.1.7 of the application. Any additional impacts on operations (i.e., filling, emptying) by the CCS also should be addressed.

This information is needed to determine compliance with 10 CFR 71.35, 71.51.

RSI-3 Confirm in the application that the enriched uranium associated with the 30B-10 and 30B-20 cylinders is pure commercial grade uranium, i.e., it is not based on down-blended nuclear material (i.e., derived enriched UF_6) and not based on recycled nuclear material.

Section 1.3.1.6 of the application described the content associated with the 30B-10 cylinder and 30B-20 cylinder. It was not clearly stated that the enriched uranium is based only on pure commercial grade uranium. These details should confirm the validity of the "unlimited A_2" assumption and ensure its proper considerations for the containment review.

This information is needed to determine compliance with 10 CFR 71.51.