

## SAFETY EVALUATION REPORT

Docket No. 72-1026  
FuelSolutions™ Spent Fuel Management System  
Certificate of Compliance No. 1026  
Amendment No. 3

### SUMMARY

By application dated May 28, 2002, as supplemented October 3, 2002, BNFL Fuel Solutions (BFS) requested an amendment to the Certificate of Compliance No. 1026 for the FuelSolutions™ Spent Fuel Management System, specifically to amend the W21 canister Technical Specifications (TS). BFS requested that the Technical Specifications (TS) and basis be revised to provide an alternative to returning the W21 canister to the spent fuel building. Also in connection with this amendment, BFS requested several minor editorial corrections to the Technical Specifications language.

The application, as supplemented, included the necessary engineering analyses and proposed Safety Analysis Report (SAR) page changes. The proposed SAR revisions will be incorporated into the Final Safety Analysis Report (FSAR).

The U.S. Nuclear Regulatory Commission (NRC) staff has reviewed the application, as supplemented, including the proposed SAR revisions, and other supporting documents submitted with the application. Based on the statements and representations in the application, as supplemented, the staff concludes that the FuelSolutions™ Spent Fuel Management System, W21 canister, as amended, meets the requirements of 10 CFR Part 72.

### 1.0 GENERAL INFORMATION

The applicant's request to amend the Certificate of Compliance proposes that an alternative be approved to returning the W21 canister to the fuel building, as specified in TS 3.3.2 and 3.3.3. The applicant has proposed returning the canister to the transfer cask for a maximum period of 270 days, while restoring normal storage conditions. The applicant has also requested to make several editorial corrections to the TS language for clarification. Due to the limited scope of the amendment request, only those sections affected are addressed in this Safety Evaluation Report (SER).

### 2.0 STRUCTURAL

The staff has reviewed the proposed changes in the W21 canister TS, Limiting Condition for Operation (LCO) 3.3.2 and LCO 3.3.3. Specifically, BFS requested to change the required action from "Return CANISTER to the fuel building and remove all fuel assemblies" to "Return CANISTER to TRANSFER CASK."

The applicant's states on the basis for LCO 3.3.2 that the W21 canister must be retrieved from the storage cask to the transfer cask by using either vertical or horizontal transfer procedures. LCO 3.3.2 and 3.3.3 specify that the canister may remain in temporary storage in the transfer cask for a time period of up to 270 days.

The canister and transfer cask have been evaluated for the normal, off-normal, accident and (extreme) natural phenomena loading conditions. Thus, it can be concluded that there is no event which would lead to structural integrity problems during temporary storage (maximum of 270 days) of a loaded canister in the transfer cask.

Based on the above, the staff concludes that returning the W21 canister to the transfer cask while restoring normal storage conditions is acceptable.

### **3.0 THERMAL**

The applicant's proposed modifications to TS 3.3 (Storage Cask Integrity) specify that, in case of a storage cask's abnormal thermal behavior not being resolved in a timely manner, the canister should be returned to a transfer cask instead of the spent fuel pool, as originally proposed. The canister would then be kept in a horizontal-positioned transfer cask for a maximum period of 270 days during which it must be returned to a repaired or a replacement storage cask.

Chapter 4 of the FSAR presents thermal analyses of several limiting cases (normal and off-normal) indicating that the transfer cask, in the horizontal position, is able to provide adequate cooling of the canister for the maximum time period specified of 270 days. Due to the fact that the canister can be moved in/out of the storage cask in a vertical configuration (vertical canister transfer), the applicant has included in the TS 3.3 Bases a commitment not to allow the transfer cask (loaded with the canister) in a vertical position for more than 8 hours.

A few extra editorial changes clarify the location (liner) of the thermocouple that is being used for temperature monitoring. These changes provide consistency with the terminology used in Chapter 4 of the FSAR and are editorial in nature. Therefore, the staff finds them acceptable.

Based on a review of the statements and representations in the application, the staff concludes that temporarily placing the W21 canister in the transfer cask meets the thermal performance requirements of 10 CFR Part 72.

### **4.0 SHIELDING**

The changes requested in this amendment, with the exception of the revision to TS 3.2, Storage Cask Temperatures During Storage and 3.3, Storage Cask Integrity, will not affect the shielding evaluation.

The changes to these two TSs consider an off-normal situation where the W21 canister could be placed within the Transfer Cask for up to 270 days while the Storage Cask is either being repaired or replaced. As described in Sections 2 and 3 of this SER, the staff has reviewed the structural and thermal evaluations and agrees that the transfer cask will provide adequate protection against normal, off-normal and accident conditions during this temporary period. The

SAR does not include a shielding evaluation for this off-normal condition. However, the applicant has included in the Bases for both TSs a commitment at the time of the off-normal occurrence to demonstrate compliance with the regulations of 10 CFR 72.104 and to evaluate the need for supplemental shielding under the authority of 10 CFR 72.48. The staff agrees that evaluating the off-site doses at the time of this off-normal occurrence is acceptable because such an evaluation would consider cask- and site-specific parameters as well as the time expected for recovery. Additionally the applicant has included a commitment to evaluate the potential for freezing of the liquid neutron shield on a cask- and site-specific basis and to implement measures, if needed to prevent freezing.

The staff concludes that should the W21 canister be temporarily placed in the transfer cask, evaluating compliance with 10 CFR 72.104 at the time of such an off-normal event is in compliance with the requirements of 10 CFR Part 72.

## **5.0 ACCIDENT ANALYSIS**

The changes requested in this amendment, with the exception of the revision to TS 3.3, Storage Cask Integrity, will not affect the accident analysis.

The changes requested to TS 3.3 involve an off-normal condition in which the W21 canister is returned to the transfer cask for a period of time of up to 270 days while the storage cask is repaired or replaced and normal conditions are re-established. Due to the amount of time that the W21 canister may remain inside the transfer cask, there is the possibility that this off-normal condition occurs during severely cold weather. This possibility may affect the ability of the system to meet TS 3.4, Transfer Cask Integrity, which requires that the temperature of the neutron shield does not fall below 40 °F when the ambient air temperature is 32 °F. However, the applicant has included in the TS 3.3 Bases a commitment to evaluate the possibility of freezing of the neutron shield on a cask- and site-specific basis, and to implement preventive measures when this off-normal condition occurs. The staff agrees that performing this evaluation at the time of the off-normal event is acceptable.

The staff has determined that the changes to TS 3.3, and its impact on the completion of TS 3.4, Transfer Cask Integrity, will not adversely affect the accident analysis and that the changes are in compliance with the requirements of 10 CFR Part 72.

## **6.0 CONDITIONS FOR CASK USE - OPERATING CONTROLS AND LIMITS OR TECHNICAL SPECIFICATIONS**

The changes to the certificate and its technical specifications proposed by this amendment to the W21 canister are as follows:

1. TS 3.1.1, "W21 Canister Helium Backfill Density," was revised to specify the required tolerance for the helium backfill density range.
2. TS 3.3.2, "Storage Cask Temperatures During Storage," was revised by adding required action A.6, "Verify STORAGE CASK temperature returns to within limit," with a completion time of 48 hours.

3. TS 3.3.3, "Storage Cask Temperatures During Horizontal Transfer," was revised by making several editorial corrections to clarify the conditions and required actions.
4. TS 3.3.2 and 3.3.3 were revised to change required action "Return CANISTER to the fuel building and remove all assemblies" to "Return CANISTER to TRANSFER CASK," and to add required action "Return CANISTER to repaired or replacement STORAGE CASK," with a completion time of 270 days.
5. TS 3.3.3 was revised by changing surveillance requirement SR 3.3.3.1 to specify "liner" thermocouple instead of "side wall" thermocouple.

The staff has reviewed these changes and revisions, as discussed in this SER, and have found them to be acceptable.

### **CONCLUSION - EVALUATION FINDINGS**

The staff has reviewed the FuelSolutions™ W21 canister amendment application, as supplemented, including the engineering analyses, proposed SAR revisions, and other supporting documents submitted with the application. Based on the information provided in the application, as supplemented, the staff concludes that the FuelSolutions™ W21 canister, as amended, meets the requirements of 10 CFR Part 72.

Issued with Certificate of Compliance No. 1026, Amendment 3,  
on May 12, 2003.