Enclosure 7 to E-62133

Proposed Amendment 18, Revision 5
Changes to the Standardized NUHOMS® System
Updated Final Safety Analysis Report
(Public Version)

Proprietary and Security Related Information for Drawing NUH24PTH-1002-SAR, Rev. 3C Withheld Pursuant to 10 CFR 2.390

As shown in Figure P.4-72, at the end of the 11.5 hours transient transfer operation, the maximum fuel cladding temperature has sufficient margin to the fuel cladding temperature limit of 752 °F. However, a time limit of 9.5 hours is chosen to provide an additional margin to the temperature limit for both the vertical transfer operations within the fuel building and horizontal transfer operations that occur outside the building consistent with the time limits for 24PTH Type 1 DSC. During the vertical transfer operations performed within the building, the OS197 TC is not exposed to the sun (i.e., no solar load), whereas, for horizontal transfer operation performed outside the building it is exposed to the solar load, which makes the horizontal transfer operations the bounding case compared to vertical operations. The maximum fuel cladding temperature at 9.5 hours after the start of operations is **[ ]** *for LC #T-1. Further, this reduction in the time limit will ensure that sufficient time is provided to initiate the recovery actions. If the maximum heat load of a DSC is less than 40.8 kW, a new time limit can be determined and recalculated based on the maximum heat load for that DSC using the methodology/models presented in Sections P.4.12.2.2 through P.4.12.2.4 to provide more realistic time limit for transfer operations.*

If transfer operations cannot be completed within the time limit of 9.5 hours and the TC/DSC is in a horizontal orientation, one of the recovery actions is to initiate air circulation within 2 hours.

If air circulation is initiated as a recovery option, it must be operated for a minimum duration of 8 hours to allow sufficient time for the TC/DSC components to cool down before it is turned off. After 8 hours has elapsed with the blower in operation, it can be turned off to complete the DSC transfer. The maximum fuel cladding temperature 4 hours after the air circulation is turned off has sufficient margin to the temperature limit of 752 °F. As shown in Figure P.4-72, these time limits are conservatively calculated based on the initial temperatures at the end of the 11.5 hours transient transfer operation before the blowers in operation.

Even for this worst-case condition, the maximum fuel cladding temperature remains below the allowable limit of 752 °F. In addition to the fuel cladding temperature, a review of the maximum temperatures presented in Table P.4-64 shows large margins for other TC components.

The minimum duration of 8 hours to run the blower and the time limit of 4 hours after the blower is turned off for completion of the transfer operations are determined based on the 24PTH Type 3 DSC in the OS197FC TC with the maximum allowable heat load of 40.8 kW.

P.4.12.3 Impact of Top and Bottom Forging modifications on 24PTH-S-LC DSCs

The 24PTH-S-LC DSC includes lead shield plugs encased within the inner top forging and the bottom forging for the Type 1 and Type 2 baskets. For these baskets, the lead was poured into the forging. For the Type 3 basket, a lead disc is considered in lieu of pouring the lead into the forgings as shown in Drawing NUH24PTH-1001-SAR for the top forging and Drawing NUH24PTH-1002-SAR for the bottom forging. In addition, the thickness of the steel plates was increased within the bottom forging while reducing the thickness of the lead.

Heat dissipation from the top and bottom ends of the DSC is primarily along the axial direction, with very limited heat transfer in the radial direction due to the small thickness of the end plates.

Table P.5-14
Shielding Material Densities

Assembly Region Material Densities

Element	Atomic Number	Number Density (atom/b-cm)			
		Bottom End Fitting	Fuel	Plenum	Top End Fitting
O	8	-	1.35E-02	-	-
Al	13	1.31E-05	3.61E-06	6.39E-05	2.98E-05
Ti	22	9.88E-06	2.72E-06	4.80E-05	2.24E-05
Cr	24	1.88E-03	6.62E-05	1.06E-03	2.99E-03
Mn	25	1.65E-04	-	-	2.49E-04
Fe	26	5.96E-03	8.45E-05	1.29E-03	9.17E-03
Ni	28	1.21E-03	1.44E-04	2.54E-03	2.22E-03
Zr	40	6.23E-03	3.79E-03	3.89E-03	-
Mo	42	1.85E-05	5.08E-06	8.99E-05	4.19E-05
Sn	50	7.81E-05	4.75E-05	4.88E-05	-
U-235	92	-	3.39E-04	-	-
U-238	92	-	6.37E-03	-	-
Total		1.56E-02	2.43E-02	9.03E-03	1.47E-02

Other Shielding Materials

Element	Atomic Number	Number Density (atom/b-cm)							
		NS-3	Concrete	Water	Air	Lead	Carbon Steel	Stainless Steel	Aluminum/BORAL
H	1	4.498E-02	7.767E-03	6.393E-02					
B-10	5	3.054E-04							
C	6	9.595E-03							
N	7				3.587E-05				
O	8	3.704E-02	4.317E-02	3.203E-02	9.534E-06				
Na	11		1.022E-03						
Al	13	6.887E-03	2.343E-03						6.071E-02
Si	14	1.243E-03	1.559E-02						
K	19		6.776E-04						
Ca	20	1.454E-03	2.855E-03						
Cr	24							1.743E-02	
Fe	26	1.042E-04	3.019E-04				8.465E-02	6.128E-02	
Ni	28							7.511E-03	
Pb	82					3.296E-02			
Total		1.016E-01	7.373E-02	9.596E-02	4.540E-05	3.296E-02(1)	8.465E-02	8.622E-02	6.071E-02

Note:

(1) This correspond to a lead density of 11.34 g/cm^3. Note that for the 24PTH-S-LC the Type 3 analysis, lead density employed in the shield plugs model is 11.00 g/cm^3 (or 3.197E-2 atom/b-cm).

All Indicated Changes support the supplemental response to RAI 6-11