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NUH03-06-87

Mr. Joseph Sebrosky
Spent Fuel Project Office, NMSS
U. S. Nuclear Regulatory Commission
11555 Rockville Pike M/S 0-6-F-18
Rockville, MD 20852

Subject: Report of 72.48 Evaluations Performed for the Standardized NUHOMS® System for the Period 07/01/04 to 02/03/06

References: 1. UFSAR for the Standardized NUHOMS® Horizontal Modular Storage System For Irradiated Nuclear Fuel, Revision 9, Submitted February 3, 2006

Dear Mr. Sebrosky:

Pursuant to the requirements of 10 CFR 72.48(d)(2), Transnuclear, Inc., (TN) herewith submits the subject 72.48 Summary Report. This report provides a brief description of changes, tests and experiments, including a summary of the 72.48 evaluation of each change implemented from 07/01/04 to 02/03/06.

Enclosure 2 provides a listing of the 72.48 changes implemented in the text of Reference 1. Enclosure 3 provides a listing of the 72.48 changes implemented in the drawings of Reference 1. Enclosure 4 provides a listing of changes implemented in Reference 1 as a result of incorporation of NRC approved amendments.

Please contact me at 510-744-6053 or Dr. Jayant Bondre at 410-910-6881, if you require any additional information in support of this submittal.

Sincerely,

U. B. Chopra
Licensing Manager

Docket 72-1004

Enclosures:

1. Report of 72.48 Evaluations Performed for the Period 07/01/04 to 02/03/06
2. Listing of 72.48 Changes Implemented in the Text in Standardized NUHOMS® UFSAR Revision 9
3. Listing of 72.48 Changes Implemented in the Drawings in Standardized NUHOMS® UFSAR Revision 9
4. Listing of Approved Amendment Changes Implemented in the Standardized NUHOMS® UFSAR Revision 9

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Enclosure 1 to NUH03-06-87

REPORT OF 72.48 EVALUATIONS PERFORMED FOR THE PERIOD 07/01/04 to 02/03/06

(REFERENCE: STANDARDIZED NUHOMS® UFSAR, NUH-003, REVISION 9)

NOTE: The "SRS", "SE", "LR" and "FCN" terms are internal Transnuclear designations used to identify the safety reviews, evaluations and FSAR change notices for the cask system.

Prepared by: for D J Shaw **Date:** 7/26/06
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Approved by: U B Chopra **Date:** 7/26/06
U. B. Chopra

REPORT OF 72.48 EVALUATIONS PERFORMED FOR THE STANDARDIZED NUHOMS® SYSTEM FOR THE PERIOD 07/01/04 TO 2/03/06 (REFERENCE NUHOMS® UFSAR REVISION 9)

DESIGN CHANGES

SE 721004-045

Change Description

This 72.48 evaluation addresses the qualification of the HSM Model 152, which provides considerably more shielding than either the HSM Model 80 or HSM Model 102 for inclusion in the "Updated Final Safety Analysis Report (UFSAR) for the Standardized NUHOMS® Horizontal Modular Storage System." This change involves the addition of HSM Model 152 drawings and the associated safety analyses to the UFSAR.

Evaluation

Principal Design Criteria - The principal design criteria for the HSM Model 152 are the same as those specified for the HSM Model 80 and Model 102 in the NUHOMS® UFSAR, including the various DSCs that can be stored, together with the overall structural features and the decay heat removal requirements. There is no change in the design criteria.

Structural Evaluation – A new structural evaluation, using the same methodology as described in the UFSAR, was generated to qualify the HSM Model 152 for all applicable normal, off-normal, and accident condition loads described in Chapter 8 of the UFSAR. The evaluation demonstrated that the design of the Model 152 concrete components, DSC support structure, shield door, embedments, heat shields, miscellaneous components, and structural welds are all adequate to handle the normal, off-normal, and accident condition loads in accordance with the UFSAR evaluation criteria. The evaluation determined that a free standing HSM Model 152 with the end shield walls in place is stable against overturning and sliding when subjected to the seismic, design basis tornado wind, tornado missile and flood events as described in the UFSAR.

Thermal Evaluation – A new thermal analysis, using the same methodology as described in the UFSAR was generated to qualify the HSM Model 152 for all applicable normal, off-normal and accident thermal loading conditions. The analysis determined that the HSM (concrete) temperatures and the resulting fuel cladding temperatures for each of the licensed payloads (DSCs) were lower than previous allowable temperatures, except for the blocked vent conditions ("accident"). Since the "accident" condition temperatures are shown to exceed 177°C (350°F), elevated temperature testing of the exact concrete mix (cement type, additives, water-cement ratio, aggregates, proportions) was performed for the HSM Model 152. The testing demonstrated that the level of strength reduction is less than the 10% that was applied in the calculation, and showed that the increased temperatures did not cause deterioration of the concrete. The use of high temperature concrete testing is explicitly accepted by the NRC.

The analysis demonstrated that the DSC shell temperatures within the HSM Model 152 are either bounded by temperatures used in the previous DSC analysis, or that the temperature increases are small (~ 2-3%), and remain within the acceptance criteria. In turn, fuel cladding temperatures are bounded or increase slightly, but remain below the allowable temperatures.

Shielding Evaluation – A new shielding evaluation, using the same methodology as described in the UFSAR, documented an evaluation of the HSM Model 80 and Model 102, taking into consideration the maximum surface dose rates for all the currently licensed CoC 72-1004 DSCs (24P, 52B, 24PT2, 61BT, 32PT, and 24PHB), in order to identify the bounding dose rates. The analysis concluded that the dose rates on the surface and vents of the HSM Model 80/102 bounded those of the HSM Model 152, because the Model 152 provides considerably more shielding than either the HSM Model 80 or HSM Model 102.

REPORT OF 72.48 EVALUATIONS PERFORMED FOR THE STANDARDIZED NUHOMS® SYSTEM FOR THE PERIOD 07/01/04 TO 2/03/06 (REFERENCE NUHOMS® UFSAR REVISION 9)

Criticality Evaluation - Inclusion of the HSM Model 152 in the UFSAR does not require any criticality reanalysis because the criticality safety analyses performed for the HSM Model 80/102 are not adversely affected by the different configuration of the Model 152.

Operations/Maintenance Evaluation - The external interfaces with the HSM Model 152 such as the docking of the Transfer Cask are unchanged and still involve the use of a cask restraint system. In addition, the Temperature Monitoring System (TMS) is controlled using the same type and configuration of roof thermowells as those for the HSM Model 80 and HSM Model 102. Also, there is no adverse effect on the insertion/withdrawal operations of the DSC into/from the HSM Model 152.

SRS 721004-074

Change Description

Generic HSM procurement documents are changed as follows:

The rail length of the DSC Support Structure is increased by ¼" to accommodate the PWR DSC increased length of 0.26".

A grammatical correction is made to DSC Support Structure diamond note 9.

Maximum and minimum standard dimensions for the washer to plate contact areas are added to the faying (unpainted) surface of the rail mounting plate.

The flatness criteria for the horizontal plates in the upper and lower vent liner embedments is revised from 0.06" to 0.125" for ease of fabrication.

Evaluation

These changes do not adversely affect the system design as described in the UFSAR, or the method of performing or controlling a design function, nor the methods of evaluation as described in the UFSAR and, thus, were screened out. However, since they did result in a change to a UFSAR Figure and two UFSAR drawings, they are reported here for completeness.

SE 721004-093

Change Description

This 72.48 evaluation addresses the differences in the length of the neutron absorber plates (NAP), aluminum compartment plates and the height of the retention plates as shown on the 32PT DSC procurement drawings relative to the 32PT DSC licensing drawings. Specifically, the length of the NAP and aluminum compartment plates is shorter on the procurement drawings (164.1" versus 166.1"). The height of the retention plate is also different, i.e., 2.5" on the procurement drawing and 0.75" on the licensing drawing.

Evaluation

Structural Evaluation - The NAP and compartment plates are not relied upon to support the basket grid from a structural standpoint, other than self-weight support and bearing between the fuel assemblies and the basket cell plates. Since the axial stresses in the plates, as determined in the

structural analysis, are proportional to the length of the plates, the shorter plates have lower axial stresses than the plates with the analyzed length of 175 inches. Therefore, it is concluded that the shorter NAP length is acceptable.

Thermal Evaluation – The NAP and compartment plates are relied upon for axial and radial heat transfer capabilities within the basket. However, since this region at the bottom of the basket is beyond the active fuel region, its effect on the thermal analysis results is negligible.

Shielding Evaluation - The NAP and compartment plates are not relied upon for shielding. Therefore, this change does not result in an adverse shielding impact.

Criticality Evaluation - The issue of concern is the shorter NAPs, since the NAPs are relied upon for criticality control. During fuel loading, when the DSC is in a vertical position, the active region of the fuel assembly starts above the height of the retention plate. Hence, the active region of the fuel is covered by the shorter NAP in the vertical position. During transfer operations and storage, the DSC will be in the horizontal position. However, prior to downending of the DSC and transfer cask, the DSC is vacuum dried and backfilled with helium. The fuel assemblies are subcritical in the dry condition, even without the presence of NAPs. Therefore, the possible shifting of the basket grid, NAPs and the fuel assemblies relative to each other in dry condition need not be addressed.

Mechanical Evaluation - There is no change in the interfaces during loading or unloading operations.

LR 721004-171 R1

Change Description

The as-built weight data for the Standardized Transfer Cask is incorporated into the UFSAR.

Evaluation

These changes do not adversely affect the system design as described in the UFSAR, the method of performing or controlling a design function, or the methods of evaluation as described in the UFSAR and, thus, were screened out. However, since changes to the UFSAR did result, they are reported here for completeness.

SE 721004-172

Change Description

This 72.48 evaluation addresses an increase in the maximum (wet) payload from 90,000 lbs to 97,950 lbs, and in the maximum (dry) payload from 80,000 to 93,300 lbs for the Standardized Transfer Cask (TC). The maximum allowed TC weight of 200,000 lbs remains unchanged.

Evaluation

Principal Design Criteria – There is no change in the design criteria, and the changes in the maximum payloads do not involve any design change to the Standardized TC.

Structural Evaluation - The Standardized TC components and the Lifting Trunnions are evaluated in new/revised calculations. The calculations demonstrate that the TC components and the Lifting Trunnions meet the stress criteria for normal, off-normal, and accident load conditions for the increased allowed payload. Therefore, the Standardized TC is acceptable for handling an increased wet payload of 97,950 lbs, and an increased dry payload of 93,300 lbs. No revision to the Lifting Trunnion analysis is required.

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Thermal Evaluation - There is no change in the design basis decay heat load for the Standardized Transfer Cask. Therefore, all of the thermal analyses performed for the various DSC designs in the Standardized TC remain valid.

Since this change does not involve any design change to the DSC or the Standardized TC, the shielding, criticality, confinement, operations and mechanical functions are not adversely affected.

SRS 721004-188

Change Description

The 32PT DSC main assembly drawings, shell assembly drawing, and basket assembly drawings in the UFSAR are revised to add new notes to enhance fabrication flexibility and to incorporate a drafting presentation correction.

Evaluation

These changes do not adversely affect the system design as described in the UFSAR, nor the method of performing or controlling a design function, nor the methods of evaluation as described in the UFSAR and, thus, were screened out. However, since changes to UFSAR drawings did result, they are reported here for completeness.

LR 721004-250

Change Description

Table K.3.1-2, ASME Code Exceptions for the NUHOMS-61BT DSC Confinement Boundary, in the UFSAR is revised to add a statement that clarifies that the inner top cover weld around the vent and siphon block is per Code Case N-595-1 and to add a statement that the weld between the shell and the vent and siphon block of the 61BT DSC is a code exception.

Evaluation

The proposed activity involves clarification type changes that are added to the Code Exception Table, K.3.1-2, in the UFSAR. These clarifications do not adversely affect the 61BT DSC design or function, or the method of performing or controlling a design function, or the methods of evaluation as described in the UFSAR and, thus, were screened out. However, since they did result in changes to the UFSAR Table K.3.1-2, they are reported here for completeness.

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LR 721004-206

This 72.48 evaluation addresses changes to the design of the HSM-H, which are implemented to incorporate fabricator's input, operational experience, past practices, ease of fabrication, etc. and are documented in Licensing drawing NUH-03-7001-SAR, Rev. 1. In order to implement the HSM-H design, generic procurement drawings have been developed based on the HSM-H licensing drawings to provide the level of detail required for HSM-H fabrication. This 72.48 evaluation also addresses HSM-H procurement drawing changes.

Change Descriptions

Change 1

Shield Wall Configuration (Refer to Enclosure 3 for the detailed changes.)

The end shield wall design has changed from a horizontal lap joint with horizontal primary reinforcement to a vertical lap joint with vertical primary reinforcement. The Type A rear wall is deleted and replaced by a 3' square corner piece. The through-bolt connections that connect the shield walls to the base unit are changed to 1-1/2" diameter ASTM A193 GR B7 bolts with 1-1/2" thick ASTM A194 washer plates, the embedments are changed to 1-1/2" and the through-holes in the walls are changed to 3-1/2" diameter.

Change 2

Outlet Vent Cover (Refer to Enclosure 3 for the detailed changes.)

The outlet vent cover clear span length and total length have been changed to 12'-10" and 14'-10", respectively.

Two through-bolts are used to attach the vent cover to the roof instead of four bolts.

Change 3

DSC Support Structure (Refer to Enclosure 3 for the detailed changes.)

The ASTM A572, GR 50 material specifications for the DSC Stop Plate Assembly is changed to ASTM A36.

The thickness of the rail extension baseplate is changed from 1 1/4" to 1" thick.

Change 4

DSC Support Structure Connections (Refer to Enclosure 3 for the detailed changes.)

a. The front wall bolted connections are changed to two 1 1/2" diameter ASTM A325 bolts (without washers) for each rail, bolted to individual threaded embedments.
b. The rear wall bolted connections are redesigned.
c. The attachment of the leveling nuts and rear connection plates to the lower flanges are replaced with 1/8" fillet welds to attach the leveling nuts, and 5/16" fillet welds to attach the rear connection plates to the lower flanges.
d. 1" nominal grout layer thickness is changed to ¾" nominal grout layer thickness.

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Change 5

Roof Louvered Heat Shield and Fasteners (Refer to Enclosure 3 for the detailed changes.)

a. The mounting bar material is changed from A240, Type 304 stainless steel to aluminum Type 1100.
b. The dimensions of the louvered panels are changed for ease of fabrication.
c. The cross section dimension of each louver plate of 2" x 1/8" and the distance separating each louver plate of 1" are added to the drawings.
d. The connection detail of the heat shields to the roof are changed from a stainless steel bracket type connection to a ¾" diameter schedule 40 aluminum pipe welded to the mounting bar.

Change 6

Side Heat Shield (Refer to Enclosure 3 for the detailed changes.)

a. This change implements a side heat shield design without fins for heat loads up to 31.2 kW.

Change 7

Bird Screens (Refer to Enclosure 3 for the detailed changes.)

b. The inlet and outlet vent screen open area is changed from 80% to 70%.

Change 8

Concrete Components (Refer to Enclosure 3 for the detailed changes.)

a. The "min" designation for the door opening and the inside diameter of the cask docking flange are deleted.

Change 9

Door Type A (square) and Type B (round) (Refer to Enclosure 3 for the detailed changes.)

a. The door reinforcement detailed as #4 @ 6" E.W. (each way) is changed to "each way, each surface".
b. The stitch fillet weld joining the door's outer plate with the inner plate is changed from 1/4" 2-10 to 5/16" 2-6.
c. The door's square outer plate size of 7'-10" is changed to 7'-3 3/4" to match the diameter of the round door.

Change 10

Errors, Omissions, Clarification (Refer to Enclosure 3 for the detailed changes.)

a. Depiction of roof keys in Section J is corrected to reflect the correct cut. The cut view is changed to show the reinforcement details for the back key.
b. The slot cross section dimensions have been added.

The intermittent 5/16" fillet weld between the support rail flange or extension baseplate (items 5 or 6) and the slotted plate (item 8) is identified on the drawing.

d. The callout for the 3/8" fillet weld between the support structure stop plate assembly and the rail is clarified.
e. The door steel plate thicknesses are specified in the Parts List for items 15 and 16, and the door thickness is changed to a reference dimension.

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Evaluations

Evaluation of Change 1

Structural Evaluation - The listed changes affect only the end shield walls and are made for ease of fabrication, shipping, and installation of the fabricated units. The listed changes are evaluated and are shown to meet the evaluation criteria described in the UFSAR. Therefore, there is no adverse effect on the structural analysis of the HSM-H.

Thermal Evaluation – The listed changes have no adverse effect on the thermal performance of the HSM-H because the shield walls' thickness and the shield wall placement around the HSM-H module have not changed. None of the changes are relevant to the thermal response of the HSM-H.

Shielding Evaluation - There is no adverse effect on the shielding performance of the HSM-H due to the listed changes.

Criticality Evaluation – The listed changes do not affect the criticality performance of the NUHOMS® System.

Weight/Mechanical Evaluation - The revised shield walls arrangement uses the same amount of space as the original arrangement and are all of the same thickness. Thus, the total weight is not changed.

Evaluation of Change 2

Structural Evaluation - Changes are evaluated and determined to meet the evaluation criteria. Therefore, the changes do not adversely affect the structural performance of the HSM-H.

Thermal Evaluation – These changes do not adversely affect the thermal performance of the module.

Shielding Evaluation – Even with the small change in dimensions of the outlet, the component still fully covers the outlet vent area opening. Thus, there is no adverse shielding effect.

Criticality Evaluation - None of the changes listed are relevant to the criticality analysis.

Weight/Mechanical Evaluation - The small dimensional changes of the outlet cover component produce a minimal weight increase (on the order of less than 10 lbs), which is considered negligible. The outlet cover does not serve any function during loading or unloading of the DSCs into or out of the HSM-H.

Evaluation of Change 3

Structural Evaluation - The listed changes affect only the HSM-H DSC support structure and are made to facilitate fabrication of the support structure. A new structural analysis, using the same methods as described in the UFSAR, shows that the changes meet the structural design criteria for the HSM-H steel support structure as described in the UFSAR.

Thermal Evaluation – The listed changes involve minor design modifications to the steel support structure that have no effect on the thermal performance of the HSM-H.

Shielding Evaluation - The support structure is not relied upon for any shielding function. Therefore, the changes do not affect the shielding performance of the HSM-H as described in the UFSAR.

None of the changes listed are relevant to the criticality or mechanical functions of the HSM-H.

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Evaluation of Change 4

The listed changes affect only the HSM-H DSC support structure connection to the concrete base. The structural, thermal, shielding, criticality and mechanical functions of the system are not adversely affected by the listed changes.

Evaluation of Change 5

Structural Evaluation - The listed changes are applicable to the louvered roof heat shield and are evaluated in a new structural analysis. It is shown that the changes do not adversely affect the structural performance of the HSM-H as described in the UFSAR.

Thermal Evaluation – The changes do not have any effect on thermal performance of the HSM-H, as the mounting bar is below the level of detail considered in the thermal analysis.

Shielding Evaluation - The shielding analysis of the HSM-H includes the louvered roof heat shield modeled as an equivalent plate. The changes listed have no effect on the shielding as modeled. Therefore, the changes do not affect the shielding performance of the HSM-H, as described in the UFSAR.

Mechanical Evaluation - The changes listed do not affect the design function of the HSM-H during storage. The change does not affect DSC insertion, DSC storage and DSC retrieval operations.

Evaluation of Change 6

Structural Evaluation - This change provides additional fabrication and installation details of the side heat shield without fins. For completeness these additional details are added to the UFSAR drawings and the fabrication drawings. The side heat shield design details have been evaluated and do not adversely affect the structural performance of the HSM-H as described in the UFSAR.

Thermal Evaluation – The design details described do not affect the thermal analysis or performance of the HSM-H without fins as described in the UFSAR.

Shielding Evaluation - The shielding analysis of the HSM-H includes the side heat shield modeled as an aluminum plate. The fins are a level of detail not credited in the shielding analysis. The design details have been evaluated and do not affect the shielding performance of the HSM-H.

Weight/Mechanical Evaluation – The design details that implement the design of the side heat shield without fins do not affect the mechanical function of the HSM-H. The changes do not affect DSC insertion, DSC storage and DSC retrieval operations.

Evaluation of Change 7

The change in the open area of the inlet/outlet bird screens has no effect on the structural, shielding, criticality or mechanical performance of the HSM-H.

Thermal Evaluation – This is an editorial correction. The specified open area requirement of 80% is changed to 70% to be consistent with the value that is used in the design basis analysis. Therefore, the change does not affect the thermal performance of the HSM-H, as described in the UFSAR.

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Evaluation of Change 8

The "min" requirement for the noted dimensions is deleted because these are not critical dimensions. Therefore, the changes do not adversely affect the structural, thermal, shielding, criticality or mechanical performance of the HSM-H as described in the UFSAR.

Evaluation of Change 9

Structural Evaluation - The reinforcement call out was modified to clarify that the reinforcement is to be applied to all exposed surfaces. The changes are made for fabrication convenience and have a negligible effect on the structural performance of the HSM-H as described in the UFSAR.

These changes are minor design modifications to the door design and have no effect on the thermal, shielding, criticality, or mechanical performance of the HSM-H.

Evaluation of Change 10

These errors, omissions, and clarifications changes have no effect on the structural, thermal, shielding, criticality or mechanical performance of the HSM-H, and therefore, they do not affect any of its safety functions.

LR 721004-218

Change Description

The 32PT DSC drawings are revised to incorporate clarification and fabricability changes identified by the DSC fabricator (Refer to Enclosure 3 for the detailed changes).

Evaluation

These changes do not adversely affect the system design as described in the UFSAR, or the method of performing or controlling a design function, or the methods of evaluation as described in the UFSAR and, thus, were screened out. However, since they did result in changes to the UFSAR drawings, they are reported here for completeness.

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LR 721004-294

This 72.48 evaluation addresses changes to the 24PTH DSC licensing drawings. These changes allow the fabricator additional flexibility to facilitate fabrication of the DSC and basket assembly.

Change Description

Change 1 (Refer to Enclosure 3 for the Detailed Changes.)

The change consists of a minor increase in the maximum length of the 24PTH-S-LC DSC.

Change 2 (Refer to Enclosure 3 for the Detailed Changes.)

The change consists of a minor increase in the maximum length of the 24PTH-S-LC DSC.

Change 3 (Refer to Enclosure 3 for the Detailed Changes.)

The change consists of text revision to diamond Note 4 to describe the diametrical gap that is required between the DSC shell ID and the OD of the basket assembly. A range for the size of the basket OD to shell ID gap is specified, instead of a single nominal value.

Change 4 (Refer to Enclosure 3 for the Detailed Changes.)

The change consists of adding alternate configurations for attaching the R45 transition rails to the basket structure, which allows fabrication flexibility for mounting the transition rails to the basket assembly, i.e., the R45 transition rails are mounted separately from the aluminum inserts.

Change 5 (Refer to Enclosure 3 for the Detailed Changes.)

The change consists of adding a new Note 9 anchored to View A-A. This change provides flexibility for fabrication of the R90 transition rails as single or 3 longitudinal segments.

Change 6 (Refer to Enclosure 3 for the Detailed Changes.)

This change adds the details for the alternate design configurations for attaching the optional aluminum inserts separate from the R45 transition rails.

Evaluations

Evaluation of Changes 1 and 2

The effect of this minor increase in the maximum length of the 24PTH-S-LC DSC on the stress evaluation of the DSC shell is insignificant. Since this change may result in a potential interference with the cavity length of the Standardized Transfer Cask due to differential thermal expansion, the interface with the Standardized TC has been evaluated, and it has been concluded that the Standardized TC cavity is able to accommodate the increased maximum length of the DSC without interference.

Therefore, this change does not adversely affect the structural, thermal, criticality, shielding, and confinement functions of the 24PTH-S-LC DSC.

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Evaluation of Changes 3 and 5

Thermal Evaluation

Because the gaps sizes have generally increased, the main effect of this change is on the thermal analysis results due to the added resistance to heat transfer. The thermal evaluation of the above gap size range shows that the overall effect is an increase in the fuel cladding temperatures of 10°F and a corresponding increase in the basket component temperatures of 12°F, resulting in the bounding fuel cladding temperature for normal storage conditions increasing from 708°F to 718°F, well below the allowable temperature limit of 752°F. Similarly, for the blocked vent accident condition the fuel cladding temperature increases from 878°F to 888°F; again, well below the allowable temperature limit of 1058°F. The maximum temperatures for the transfer condition are not affected.

Structural Evaluation

The range of gap size has no significant effect on the basket component stresses due to thermal expansion, as the basket gaps accommodate free thermal expansion. The increased basket component stresses due to higher component temperatures remain below the ASME code allowables.

Therefore, this change does not adversely affect the structural, thermal, criticality, shielding, and confinement functions of the 24PTH DSC.

Evaluation of Changes 4 and 6

The alternate R45 transition rail connection details and addition of optional aluminum inserts have been evaluated for structural integrity and shown to meet the criteria specified in the UFSAR. Those details have no adverse effect on the thermal, shielding, criticality, or confinement functions of the basket.

LR 721004-301

Change Description

This 72.48 evaluation addresses a supplementary thermal evaluation for the 24PTH DSC during Storage and Transfer Conditions. The supplementary thermal analysis considers a 31.2 kW heat load and revised thermal properties, i.e., the contribution of the basket material to the effective thermal properties of the 24PTH basket. Also, the steel emissivity of the transfer cask and DSC stainless steel shells is changed from 0.46 to 0.587 to be consistent with the property values reported in UFSAR.

Evaluation

Thermal Evaluation

The 24PTH basket effective axial heat flow is evaluated using a more rigorous finite element model of a section of the basket, explicitly considering the geometry and materials of the basket. The emissivities of the cask and DSC shell stainless steel materials are revised to be consistent with those documented in the UFSAR. This thermal calculation documents that the maximum fuel cladding and component temperatures for a 31.2 kW heat load are conservative for the transfer condition.

The new and revised thermal calculations do not adversely affect the structural, shielding, criticality or confinement functions of the DSC.

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LR 721004-309

Change Description

This 72.48 evaluation addresses the incorporation of six clarification/editorial changes in the Standardized NUHOMS® UFSAR.

On Page P.3.4-5 it is clarified that lubricants and cleaning agents used on the NUHOMS®24PTH DSC should be selected for compatibility with the spent fuel pool water chemistry and the DSC materials.

A footnote was added to Table P.4-15 on Page P.4-85, Table P.4-21 on Page P.4-91, and Table P.4-22 on Page P.4-92 to clarify that the temperatures are conservative and to reference the source table for calculated values.

On Page P.8-7 Step 21 is revised to clarify that this is an optional activity (i.e., Helium leak test).

On Page P.9-1 two changes are made to clarify that the inner bottom cover weld is inspected in accordance with Article NB-5231 only when the weld joint design is per Figure NB-4243-1 and the outer bottom cover weld is dye penetrant tested.

Evaluation

These changes do not adversely affect the system design as described in the UFSAR, or the method of performing or controlling a design function, or the methods of evaluation as described in the UFSAR and, thus, were screened out. However, since changes are incorporated into the UFSAR, they are reported here for completeness.

LR 721004-313

Change Description

This change evaluation addresses the fabrication of HSM important to safety welds in accordance with AWS D1.1-96, instead of AWS D1.1-98.

Evaluation

The HSM-H structural calculation, and the procurement drawings and specification all identify the AISC 1989 steel code as the applicable code for design of structural steel components for the HSM-H. The AISC steel code includes the design of weldments and implements, by reference, essentially all requirements of the AWS D1.1-98 welding code, but permits the use of newer versions of AWS D1.1, with Engineering approval. Accordingly, the AWS welding code is not used for the design of weldments, and thus, the welding code has no effect on the analyses or design of the HSM-H steel components.

Since, this change does not adversely affect the system design as described in the UFSAR, or the method of performing or controlling a design function, nor the methods of evaluation as described in the UFSAR, it was screened out. However, since it did result in a change to a UFSAR drawing, it is reported here for completeness.

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LR 721004-317

Change Description

This evaluation addresses incorporation of a new Figure 4.2-15a, NUHOMS 75 Ton Transfer Cask Lifting Yoke on Page 4.7-7 in the Standardized NUHOMS® UFSAR to provide an illustration of the NUH06L 75 Ton Transfer Cask Lifting Yoke. The lifting yoke is a 10 CFR Part 50 "safety related" assembly for which a basic description is included in the 10 CFR Part 72 UFSAR.

Evaluation

This change does not adversely affect the system design as described in the UFSAR, or the method of performing or controlling a design function, or the methods of evaluation as described in the UFSAR and, thus, was screened out. However, since one new illustration figure is incorporated into the UFSAR, it is reported here for completeness.

LR 721004-345

Change Description

This evaluation addresses the incorporation of changes to three 61BT DSC drawings in the Standardized NUHOMS® UFSAR.

The hold down ring is shorter for the damaged fuel variation, so it no longer "sees" the support ring. Therefore, a 1" spacer pad was added to the shell and the spacer pads on the hold down ring plates were removed in order to simplify fabrication. These changes result in the damaged fuel 61BT DSC hold down ring configuration being equivalent to that of the intact fuel 61BT DSC.

A chamfer is added to the step of the vent/siphon block.

Evaluation

The revised design of the hold down ring does not require reanalysis because the damaged fuel hold down ring is equivalent to that of the intact fuel design. The chamfer on the vent/siphon block step requires no analysis because the chamfer is below the level of detail contained in the shielding models for similar features, and thus, does not affect that evaluation.

The described changes do not adversely affect the system design as described in the UFSAR, or the method of performing or controlling a design function, or the methods of evaluation as described in the UFSAR and, thus, were screened out. However, since changes are incorporated into UFSAR drawings, they are reported here for completeness.

REPORT OF 72.48 EVALUATIONS PERFORMED FOR THE STANDARDIZED NUHOMS® SYSTEM FOR THE PERIOD 07/01/04 TO 2/03/06 (REFERENCE NUHOMS® UFSAR REVISION 9)

NON CONFORMANCES (NCRS) AND CORRECTIVE ACTION REPORTS (CARS)

SE 721004-137

Change Description

This 72.48 evaluation addresses "use-as-is" disposition of a NCR describing tack welds in the DSC that were not incorporated into the final weld and are visible in the skip joint area. The condition of non-incorporated welds is in violation of the ASME NG-4231.1 tack weld requirements.

Evaluation

An evaluation of the condition of the DSC determined that the minimal increase in material due to the tack welds results in a negligible effect on the thermal, shielding and criticality analyses. There is no effect on the confinement capabilities of the DSC.

Structural Evaluation - The tack welds have less then minimal effect on the safety and structural performance of the fuel compartments.

Mechanical Evaluation - The fuel gauge free path test during fabrication ensures that the nonconformance has not introduced any interference, so the loading and unloading of the fuel assemblies will not be affected.

LR 721004-233

Change Description

This 72.48 evaluation addresses an NCR describing a fabricator's errant attempt to make four stainless steel to stainless steel fusion welds in locations which were not over the stainless steel straps as designed, i.e., the welds were attempted over areas that had borated aluminum and aluminum plate behind the stainless steel tubes.

Evaluation

Mockups were made of the existing basket configuration condition after the welds were attempted, and the results showed that the stainless steel was completely melted in the area of the attempted welds, while the borated aluminum was partially melted. There was no effect on the pure aluminum plate behind the borated aluminum plate and the damage to the borated aluminum plate was limited on the backside. To bound the detrimental effect of the attempted welds, the maximum affected diameter measured is assumed to be a void for evaluation purposes.

Structural Evaluation - The structural evaluation of the errant welding condition assumes that the structural tube material corresponding to the four localized affected areas is absent. The four holes are made up of two pairs, each hole in a pair spaced ~5" apart, and each pair spaced ~24" apart. The holes are located on the same face of the four sided compartment tube.

The average stress at a section through the location of a pair of holes is conservatively estimated. The stresses on the affected tube ligament at the section through a pair of holes are calculated and determined to be 0.07 ksi for deadweight load and 5.5 ksi for the controlling 75g side drop accident. Therefore, sufficient margin exists to accommodate the nonconforming condition.

Thermal Evaluation - The effect of the errant welding condition on the 24PTH DSC thermal performance is negligible because the Type 1100 aluminum plate is unaffected, and the thermal conductivity of the borated aluminum is lower than that of the Type 1100 aluminum plate.

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Shielding Evaluation - As assumed in the shielding evaluation, the stainless steel and aluminum materials provide the same shielding capability because the material is still fused to the adjacent material within each plate. Therefore, there is no effect on the surface dose rates for the HSM-H and no effect on the site dose evaluations involving this canister.

Criticality Evaluation - Calculations were performed to determine the effect of the errant attempted welds between the stainless steel tubes and the borated aluminum plates. Pure aluminum material is assumed in the melted areas instead of borated aluminum. Very conservative assumptions were made to simplify the evaluation and aggressively bound the actual condition. The evaluation concluded that no statistically significant change in the bounding k_{eff} occurred.

Confinement Evaluation - The assumed degraded weld areas in the basket do not affect the confinement capability of the canister.

Operating Systems Evaluation - The normal gage testing of the fuel compartments after final installation of the basket in the canister shell will verify the operability of the fuel basket. Vacuum drying operations will be unaffected since the plates are still tightly packed sheets intermittently welded together.

LR 721004-251

Change Description

This 72.48 evaluation addresses a "use-as-is" disposition of a Supplier Nonconformance Report (SNR) describing an uneven flatness condition for an ISFSI basemat and approach slab. This uneven flatness condition could potentially lead to gaps between the modules, increased radiation streaming through the gaps, increased front average dose rates, and increased site dose rates.

Evaluation

The ISFSI dose rates with the HSM Model 202 are lower than those for the HSM Model 80 or Model 102, given the same source. The HSM Model 202 is more heavily shielded than the HSM Model 102. The introduction of a conservative gap (up to ¾" average width) between either the adjacent HSM Model 202 modules, or between a HSM Model 202 and an end shield wall could potentially increase the site dose rates. The effect of these gaps on the site dose rates is calculated and it is demonstrated that the side ISFSI dose rates, which are small and bounded by the front dose rates, increase by ~13% when the gaps are considered.

The front ISFSI dose rates decrease by ~8%, when the gaps are added and the HSM-H concrete, previously neglected, is included. Overall, these changes in the ISFSI dose rates are minimal and the ISFSI dose remains below the limit of 25 mrem per year at the site boundary.

LR 721004-290

Change Description

This 72.48 evaluation addresses a "use-as-is" disposition of a NCR related to the required minimum emissivity value of 0.85 for the side heat shields of the HSM-H. The emissivity is required to be established for the temperature range from 70°F to 550°F. This minimum emissivity value was not achieved at elevated temperatures.

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Evaluation

The emissivity value is not a parameter included in the structural, shielding, criticality, or mechanical evaluations for the side heat shield design. Therefore, the minimum emissivity value does not affect the performance of the HSM-H.

The thermal analysis in the UFSAR used an emissivity value of 0.8 for the side heat shields, although the fabrication specification required a value of 0.85 for additional margin. For the normal and off-normal operating conditions, the maximum temperature of the side heat shield is 237°F and the actual emissivity of the anodized aluminum is above 0.8 at that temperature. Therefore, there is no adverse effect on the HSM-H thermal analysis results. For the blocked vents accident condition, the maximum temperature of the side heat shield is 517°F. At this temperature, the actual average emissivity is also above 0.8. Therefore, the HSM-H thermal analysis results for the accident condition are acceptable. The change of the emissivity value of the side heat shield has an insignificant effect on the HSM-H concrete and DSC shell temperatures.

LR 721004-292

Change Description

This 72.48 evaluation addresses a "use-as-is" disposition of a NCR describing a condition in which there is no objective evidence that the VT and PT nondestructive examinations were performed for the ID surface of the weld between a 32PT DSC bottom forging and the shell. These tests and examinations are specifically required to be performed in accordance with written procedures.

The initial RT review indicated a surface condition (undercut) that was to be removed on the ID of the weldment. The removal operation was performed by blending (flapping/grinding). No weld repair involving the addition of weld filler metal was involved. After the undercut was removed, the welds were re-examined by RT and found to fully comply with the fabrication procedure and ASME Code acceptance criteria for RT examination. Post-repair (flapping/grinding) PT and VT examination of the as-left surface of the weld was not performed. The basket was subsequently inserted into the canister shell and the canister top end closure steps were completed, and thus, access to the ID surface of weld is not possible without destructive disassembly of the canister.

Evaluation

ASME Code Subsection NB-4452(c) provides requirements associated with the elimination of surface defects in welds, and specifically permits re-examination by the method which initially detected the defect (in this case RT), when the defect is located on the interior surface and inaccessible for surface examination. Thus, the post-repair RT examination performed on the subject weld provides an equivalent level of NDE as that required by the provisions of NB-4452(c). The weld joint is deemed fully functional and acceptable based on the following:

1. The volumetric exam (RT) would have detected any significant surface defect requiring repair/remediation and none were detected.
2. The potential for the sanding/grinding of the ID surface to cause adverse cold cracking is not credible.
3. The base material and weld deposit are austenitic stainless steels that remain inherently ductile and tough over the range of service temperatures to which the DSC is subjected.

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4. The weld joint location is a low stress area of the confinement boundary that is not subjected to cyclic loading that would generally be detrimental to any undetected surface flaws.
5. A DSC with loaded fuel is welded shut, vacuum dried, pressurized with inert helium gas.
6. The slight undercut condition was fully removed by grinding/blending, as subsequently confirmed by RT.

LR 721004-305

Change Description

This 72.48 evaluation addresses a "use-as-is" disposition of a Supplier Nonconformance Report (SNR) that describes a nonconforming condition in which the center area of the pad (inside the Base) is higher. It also considers the cumulative effect(s) related to 2 separate NCRs: Bent roof heat shield louvers and the emissivity values for the side heat shields on the HSM-H.

As a result of grinding the footprint areas, the center area of the pad (inside the Base) is higher. This difference in surface elevation causes a reduction in the inlet vent area.

Evaluation

The reduced inlet vent area does not have an adverse effect on the structural, shielding and criticality functions of the modules. The HSM-H is not a fission product barrier, and therefore, does not affect a design basis limit for a fission product barrier. The higher center area of the pad does not affect the function of the HSM-H as described in the UFSAR. No procedure changes for loading/unloading or storage are required.

However, the cumulative effect of this condition along with the bent roof heat shield louvers and the decreased emissivity of the side heat shields is evaluated to determine whether the thermal function of the modules is adversely affected.

A sensitivity study shows that a ±8% change in the flow areas of the inlet/outlet openings results in an approximately ±5°F change in the exit air temperature. This is expected to change the DSC shell and HSM-H concrete temperatures by less than ±5°F and results in a change of approximately 2 to 3°F in the fuel cladding temperatures. A uniform ½-inch rise in pad elevation under the inlet vent results in a 6.3% decrease in flow area, so this condition is within the ±8% criteria.

Assuming a uniform and a very conservative ¼-inch rise in pad elevation under the inlet vent results in a 3.1% decrease in flow area. Based on the sensitivity study, this will result in a change of less than 2°F in the fuel cladding temperature. The cumulative effect of the higher center area of the pad along with the bent louvers on the roof heat shields and the reduced emissivity of side heat shields is negligible because the total effect would cause the cladding temperature to increase by < 3°F.

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LR 721004-331

Change Description

This 72.48 Safety Evaluation addresses a Condition Report describing foreign material that was inadvertently introduced into a 61BT BWR DSC during fuel loading and closure operations. Specifically, a small piece of paper tag is presumed to have been caught in a fuel assembly (FA). The piece of paper tag is conservatively estimated to be 2-3/4" long and 1-1/4" in wide. The material is most likely plastic coated paper. The loaded DSC has a nominal decay heat of 8.56 kW.

Evaluation

There are two primary structural concerns with regard to the introduction of a small amount of foreign material into a DSC. The first concern is the affect of the material on the corrosion of the DSC pressure boundary. Corrosion rates for stainless steel were researched and a uniform corrosion rate of 0.001 mm/year, or 0.0004 inch/year, was determined for 18 Cr, 8 Ni stainless steel in an industrial atmosphere. The 61BT DSC shell nominal thickness is 0.500", so conservatively assuming a corrosion rate of 0.0004 inch/year, it would require over 125 years to reduce the nominal shell thickness by 10%. The second concern is the effect of the foreign material upon the FA's. The effect of the foreign material on corrosion of the fuel cladding is estimated for a very conservative case of liquid hydrochloric acid on zirconium, which reported a corrosion rate of < 0.001 inch/year. The fuel cladding nominal thickness is 0.030", so full thickness corrosion is estimated to require more than 30 years. Again it is noted that the DSC internal atmosphere is not liquid hydrochloric acid, but dry helium. Thus, both the stainless steel pressure boundary and the zirconium cladding are resistant to corrosion, and it would take many years, even assuming unrealistic environments, to reduce the material thickness to a level of concern. Therefore, corrosion from a very small amount of foreign material in a dry helium (inert gas) atmosphere is not a concern for the pressure boundary or the fuel cladding.

The effect of the foreign material upon DSC pressurization results in a 0.07% increase in calculated pressure and, thus, will not exceed the previously utilized design pressure.

Relative to reflood (unloading), this small amount of foreign material is too small to create a combustible gas concern.

The effect of the foreign material on the amount of "oxidizing" gases within the DSC is assessed and found to be less than the 0.25 volume percent limit assumed in the Bases Conditions of Use (COU) and Technical Specification for Vacuum Drying.

The limiting source term, and therefore, the decay heat load limit of 0.30 kW per FA is unchanged and there are no changes to the acceptance criteria for these fuel types. The volume of the foreign material is not sufficient to alter the DSC internal atmosphere and thus, alter gaseous heat transfer, so there is no adverse thermal effect.

The introduction of a very small volume of foreign material into the DSC does not change the source term limits of the Fuel Qualification table, and thus, does not significantly alter the long-term source term, so there is no adverse shielding effect.

There is no adverse effect on criticality or on confinement capabilities of the DSC.

The canister was successfully vacuum dried, and the foreign material did not interfere with the drying process, so any reflooding operations are expected to be similarly unaffected.

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LR 721004-342

Change Description

The 32PT-DSC fabrication specification requires the DSC shell material to meet the requirements of ASME Code, NB-2000 and Section II. ASME Code NB-2531 specifies a UT examination of the shell plate per ASME SA-578, which requires that a round 25 or 30 mm Ø (diameter) transducer (or 25 mm square) be used for the UT examination.

Contrary to this requirement, a smaller (dual unit 15 mm Ø) transducer was used to perform the UT examination of several 1/2" thick stainless steel DSC shell plates. This 72.48 addresses the "use-as-is" disposition of this nonconformance.

Evaluation

The basis for accepting the subject DSC shell plates is a demonstration that the UT transducer and associated equipment used to perform the original UT examination is capable of detecting the same defects/flaws as the Code specified transducer. The adequacy of the dual unit transducer was demonstrated.

Listing of 72.48 Changes Implemented in the Text in Standardized NUHOMS® UFSAR Revision 9

UFSAR Section/Page Number	Description of Change	Evaluation Category	Applicable LR/SRS/SE
1.1-2a, 1.2-9, 1.3-2, 1.3-9, 1.3-16, 1.3-17, 3.2-1, 3.2-4, 4.1-1, 5.1-1, 7.1-1, 8.1-1, E-2, Appendix R	Add HSM Model 152 to the "Final Safety Analysis Report (FSAR) for the Standardized NUHOMS® Horizontal Modular Storage System for Irradiated Nuclear Fuel" as an alternative to the HSM Model 80 and Model 102.	HSM Design Change	SE 721004-045
4.2-19, Figure 4.2-8 (Proprietary and Nonproprietary)	Increase rail length of the DSC Support Structure.	Minor Design Change	SRS 721004-074
P.3.1-5, P.3.2-2, P.3.4-7, P.3.6-13, P.3.7-17, P.3.7-19	Incorporate the as-built weight for the Standardized (Duke) NUHOMS Onsite Transfer Cask.	Minor Design Change	LR 721004-171
1.3-4, 3.1-4, 3.2-12, 8.1-25, 8.1-58, 8.1-59, 8.1-77, 8.1-80, 8.2-39, 8.2-56, 8.2-71, 8.2-74, 8.2-77, C.2-2, C.3-6, L.3-4, L.3-5	Increase maximum wet and dry payloads for the Standardized Transfer Cask.	Minor Design Change	SE 721004-172
L.3.1-6, Table K.3.1-2	Revise to add a statement that clarifies that the inner top cover weld around the vent and siphon block is per Code Case N-595-1 and to add a statement that the weld between the shell and the vent and siphon block of the 61BT DSC is a code exception.	Clarification Change	LR 721004-250
P.4-84, P.4-85, P.4-86, P.4-87, P.4-90, P.4-91, P.4-92, P.4-93, P.4-95, P.4-96, P.4-98, P.4-100, P.4-101, P.4-102, P.4-103, P.4-155, and P.4-163	Various pages: Increase the maximum length of the 24PTH-S-LC DSC; from 186.55" max. to 186.67" max. (0.06%). Various pages: Add alternate configurations for attaching the R45 transition rails to the basket structure.	Minor Design Change	LR 721004-294
P.4-10, P.4-10a	Incorporate consideration of the thermal property contributions of all Basket components into the DSC thermal evaluations.	Minor Analysis Change	LR 721004-301

Listing of 72.48 Changes Implemented in the Text in Standardized NUHOMS® UFSAR Revision 9

UFSAR Section/Page Number	Description of Change	Evaluation Category	Applicable LR/SRS/SE
P.3.4-5, P.4-85, P.4-91, P.4-92, P.8-7, P.9-1	Various pages: Clarify that lubricants and cleaning agents used on the NUHOMS® 24PTH DSC should be selected for compatibility with the spent fuel pool water chemistry and the DSC materials. Delete reference to lubricant and cleaning agents with chlorine content of less than 1 ppm chloride. Add footnote to clarify that the temperatures are conservative and to reference the source table for calculated values. Clarify that the helium leak test is an optional activity. Clarify unique inspection requirements associated with the NUHOMS® 24PTH DSC.	Clarification & Editorial Changes	LR 721004-309
4.7-7, Figure 4.2-15a	Add new Figure for information.	NUH06L 75 Ton Lifting Yoke New Figure	LR 721004-317
iv, 1.1-1, Table of Contents, P.1-11 v, 1.1-2, 1.1-2a, 1.1-2b, 1.2-3, 1.2-7, 1.2-11, 1.3-3, 1.3-7, 3.1-1, 3.2-6, 3.3-30, 3.3-31, 3.4-4, 4.2-1, 4.2-2, 5.1-1, 7.2-1, 7.3-3, 7.4-1, E-2 1.1-2a, 1.1-2b, 1.2-9, 1.3-2, 1.3-9, 3.2-1, 4.1-1, 5.1-1, 7.1-1, 8.1-1, E-2 3.1-6, K.3.6-2, L.3-15, M.3.6-2, M.10-8, M.10-9, N.5-50, N.6-5, P.3.6-2	Incorporation of editorial corrections, clarification and other miscellaneous administrative changes to the Updated NUHOMS FSAR, Revision 8 text. Administrative Changes The other changes are generally grouped into the following 3 Categories: **Category 1:** Administrative type changes due to the incorporation of CoC 72-1004, Amendment 8, into the FSAR and update the footer of the affected pages of the FSAR, accordingly. **Category 2:** Minor administrative changes to the text to reflect the addition of both HSM Model 152 and HSM-H into the FSAR. **Category 3:** Implement editorial corrections, i.e., typos, clarifications or inconsistencies.	Clarification/ Administrative Changes	LR 721004-377

Listing of 72.48 Changes Implemented in the Drawings in Standardized NUHOMS® UFSAR Revision 9

UFSAR Drawing Number	Description of Change	Evaluation Category	Applicable LR/SRS/SE
NUH-03-6400-SAR (In Section R.1.5 of Appendix R)	Add HSM Model 152 to the "Updated Final Safety Analysis Report (UFSAR) for the Standardized NUHOMS® Horizontal Modular Storage System for Irradiated Nuclear Fuel" as an alternative to the HSM Model 80 and Model 102.	HSM Design Change	SE 721004-045
NUH-03-6016NP-SAR, Rev. 2 (Nonproprietary) NUH-03-6016-SAR, Rev. 7 (Proprietary)	Increase rail length of the DSC Support Structure. Made a grammar correction to DSC Support Structure Diamond Note 9. Add maximum and minimum standard dimensions for the washer to plate contact areas. Revise flatness criteria for the horizontal plates in the upper and lower vent liner embedments.	Minor Design Change	SRS 721004-074
NUH-32PT-1001-SAR. Rev. 2, NUH-32PT-1001NP-SAR. Rev 2,	Add a new Note 15 on the 32PT DSC main assembly drawings, NUH-32PT-1001 and NUH-32PT-1001NP to allow drilling one lifting hole in the side of the Top Shield Plug to facilitate handling during coating operations.	Fabrication/ Flexibility Change	SRS 721004-188
NUH-32PT-1002-SAR. Rev. 2, NUH-32PT-1002NP-SAR. Rev. 2,	Add a new Note 5 to the 32PT DSC shell assembly drawings, NUH-32PT-1002 and NUH-32PT-1002NP, to allow a deeper (3/4 in.) siphon tube counterbore in the Alternate 2 Shell Bottom (Item 10) DSC bottom end configuration only and add a new Note 4 to Detail 1 to require a PT of the Shear Key (Item 9) to Alternate Shell Bottom (Item 28) weld, if the Detail C – Alternate 1 configuration is used.		
NUH-32PT-1003-SAR. Rev. 3 NUH-32PT-1004-SAR. Rev. 3	Incorporate a drafting presentation correction of the profile of Item 8 on NUH-32PT-1003 and Item 10 on NUH-32PT-1004.		

Listing of 72.48 Changes Implemented in the Drawings in Standardized NUHOMS® UFSAR Revision 9

UFSAR Drawing Number	Description of Change	Evaluation Category	Applicable LR/SRS/SE
NUH-03-7001-SAR	**Shield Wall Configuration Changes (Sheets 1, 2, 3, 5, 6, & 7 of 10)** a. The end shield wall design has changed from a horizontal lap joint with horizontal primary reinforcement to a vertical lap joint with vertical primary reinforcement. b. The 12'-8" wide Type A rear wall (for single row arrays) has been deleted and replaced with a 3' square corner piece to cover the back of the end shield wall only. This change allows the Type B rear walls to be used as rear walls for both center and end modules. c. The 1" diameter with 1" thick washer plates thru-bolt connections (Item 51, 52, 53) that connect the shield walls to the base unit are changed to 1 -1/2" diameter with 1 -1/2" thick washer plates. The material specification for the bolt and nut is changed from ASTM A325 to ASTM A193 GR B7 and ASTM A563 to ASTM A194, respectively. Correspondingly, the size of the embedments have changed from 1" to 1 ½". The location of the connections between the end shield walls and the module has also changed and includes two thru bolts thru the outlet vent opening at the roof. d. Thru-holes in the walls are changed from 3" to 3 1/2" diameter (nominal) to accommodate increased thru bolt size. **Outlet Vent Cover Changes (Sheet 3 of 10)** a. The outlet vent cover clear span length of 12'-4" and total length of 14'-4" have been changed to 12'-10" and 14'-10", respectively. b. Two thru-bolts are used to attach the vent cover to the roof instead of four bolts. **DSC Support Structure Changes (Sheet 6 of 10)** a. The ASTM A572, GR 50 material specifications for the DSC Stop Plate Assembly (Item 10) is changed to ASTM A36. b. The thickness of the rail extension baseplate is changed from 1 1/4" to 1" thick.	Fabrication /Flexibility Changes	LR 721004-206

Listing of 72.48 Changes Implemented in the Drawings in Standardized NUHOMS® UFSAR Revision 9

UFSAR Drawing Number	Description of Change	Evaluation Category	Applicable LR/SRS/SE
NUH-03-7001-SAR (continued)	**DSC Support Structure Connections Changes (Sheets 1 & 4 of 10)** a. The front wall bolted connections which consisted of four 1" diameter ASTM A490 bolts (with washers) for each rail, bolted to a rail extension embedment assembly are changed to two 1 1/2" diameter ASTM A325 bolts (without washers) for each rail, bolted to individual threaded embedments. b. The rear wall bolted connections (items 35 thru 38) which consist of two side plates (Item 13) with oversized slotted holes and a tapped hole for a leveling stud (jacking screw) (item 14) that is welded to the lower flanges and studs with double nuts and washer plates that connect thru the slots to the base embedment was redesigned. Equivalent rear wall bolted connections are used with consists of four 1"x1" side plates (new item 13) welded to the lower flanges. Studs with double nuts, washer (items 35, 36, 37) and 1" thick plates (new item38) bridge the side plates and connect to the base embedment to clamp down the structure. A nut (item 14) is welded to the edge of the flange for a leveling stud (jacking screw). c. The 1/4" fillet welds used to attach the leveling nuts and rear connection plates to the lower flanges are replaced with 1/8" fillet welds to attach the leveling nuts, and 5/16" fillet welds to attach the rear connection plates to the lower flanges. d. 1" nominal grout thickness is changed to ¾" nominal grout layer thickness.		LR 721004-206

Listing of 72.48 Changes Implemented in the Drawings in Standardized NUHOMS® UFSAR Revision 9

UFSAR Drawing Number	Description of Change	Evaluation Category	Applicable LR/SRS/SE
NUH-03-7001-SAR (continued)	**Roof Louvered Heat Shield and Fasteners Changes (Sheet 10 of 10)** a. The mounting bar material is changed from A240, Type 304 stainless steel to aluminum Type 1100. b. The dimensions of the louvered panels and, thus, the number of panels have changed from 7 to 6 for ease of fabrication. The width dimension of the individual panel has changed from 2'-2" to 2'- 6 1/8" (considering that the 1" width of the mounting bars, the length dimension of each individual louvered plate has changed from 24" to 28.125"). The total width of the assembly has changed from 15'-2" to 15'- 1 3/8" to accommodate a 1/8" separation between panels for thermal expansion. c. The cross section dimension of each louver plate of 2" x 1/8" and the distance separating each louver plate of 1" are added to the Parts List drawing (Item 57) and to Sheet 10, Detail 5, respectively. A 1" long 1/8" fillet weld used to connect the louver plate to the mounting bar at each end of the mounting bar is shown in the fabrication drawing. d. The connection detail of the heat shields to the roof has changed from a stainless steel bracket type connection to a ¾" diameter schedule 40 aluminum pipe welded to the mountain bar. The weld detail consisting of a ¼" flare 1 ½" long weld is shown in the fabrication drawing. The ½" diameter ASTM A193 GR B7 fastener that supports the roof heat shield from the concrete roof has not changed but the fastener details are provided in procurement drawing NUH-03-7112 (the length dimension of each panel is changed from 6'-6" to 6'- 2" due to the revised connection detail from bracket type to pipe section.	Fabrication /Flexibility Changes	LR 721004-206

Listing of 72.48 Changes Implemented in the Drawings in Standardized NUHOMS® UFSAR Revision 9

UFSAR Drawing Number	Description of Change	Evaluation Category	Applicable LR/SRS/SE
NUH-03-7001-SAR (continued)	**Side Heat Shield Changes (Sheets 1 & 10 of 10)** The following changes are made to the side heat shield: a. This change implements a side heat shield design without fins as allowed by Note 18 of NUH-03-7001-SAR, Sheet 1 for heat loads up to 31.2 kW. This change provides the details of the side heat shield without fins design to the SAR. The panels of the side heat shield without fins are assigned part numbers 71, 72 and 73 in the Parts List. **Bird Screens Changes (Sheet 1 of 10)** a. The inlet and outlet vent screen (Item 44 in Parts List) open area is changed from 80% to 70%. **Concrete Components Changes (Sheet 5 of 10)** b. The "min" designation shown in drawing NUH-03-7001-SAR, Sheet 5, Section F, for the door opening and the inside diameter of the cask docking flange is deleted. The same dimensions are maintained in the procurement drawing, but with a minus 1/8" tolerance. **Door Type A (square) and Type B (round) Changes (Sheet 9 of 10)** a. The door reinforcement detailed as #4 @ 6" E.W. (each way) is changed to "each way, each surface". b. The stitch fillet weld joining the door's outer plate with the inner plate is changed from 1/4" 2-10 to 5/16" 2-6. c. The door's square outer plate size of 7'-10" is changed to 7'-3 3/4" to match the diameter of the round door.		LR 721004-206

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UFSAR Drawing Number	Description of Change	Evaluation Category	Applicable LR/SRS/SE
NUH-03-7001-SAR (continued)	**Errors, Omissions, & Clarifications (Sheets 1, 3, 6, 8, & 9 of 10)** a. Depiction of roof keys in Section J of NUH03-7001-SAR, sheet 6 is corrected to reflect the correct cut. Changed the cut view to show the reinforcement details for the back key. This change is incorporated in procurement drawing NUH-03-7104, sheet 3. b. Section N, Sheet 8 of drawing NUH-03-7001-SAR does not show the slot in the slotted plate (item 8). The slot cross section dimensions has been added to drawing NUH-03-7001-SAR. Similarly, this notch is shown as uniform height across the width of the plate in the fabrication drawing but of variable thickness in the calculations. The angle and cross section dimensions of the individual slots on the slotted plate (item 8) are not specified in the SAR drawing NUH-03-7001-SAR, sheet 8. c. The intermittent 5/16" fillet weld between the support rail flange or extension baseplate (items 5 or 6) and the slotted plate (item 8) is not identified in the SAR drawing NUH-03-7001-SAR, sheet 8. d. The call out for the 3/8" fillet weld between the support structure stop plate assembly and the rail is clarified (the back stop plate weld symbol in the DSC Support Structure indicates a weld on both sides of the joint, but also indicates a weld all around the joint). Detail 6 is added to clarify the weld callouts at the back end of the support structure (SAR drawing NUH-03-7001-SAR, sheet 8). e. In view P-P, sheet 8 the weld between the rail and the extension baseplate is not identified f. In drawing NUH-03-7001-SAR, Sheet 9, the door thickness is identified as a fixed dimension making the door inner plate a variable dimension, which was not the design intent. The door steel plates thicknesses are specified in the Parts List for items 15 and 16, and the door thickness is changed to a reference dimension.	Fabrication /Flexibility Changes	LR 721004-206

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UFSAR Drawing Number	Description of Change	Evaluation Category	Applicable LR/SRS/SE
NUH-32PT-1003-SAR, Rev. 3 NUH-32PT-1003NP-SAR, Rev. 2	Revise Note 16 as follows, "Size Item 10 as needed to fit in the opening and to clear stud. Tack weld or secure with threaded fasteners in place.	Fabrication /Flexibility Changes	LR 721004-218
NUH-32PT-1004-SAR, Rev. 3 NUH-32PT-1004NP-SAR, Rev. 2	Revise Note 17 as follows, "Size Item 12 as needed to fit in the opening and to clear stud. Tack weld or secure with threaded fastners in place.		
NUH-32PT-1006-SAR, Rev. 2	Add a new note to allow an alternative method for attaching the aluminum plug to be installed in the R90 aluminum transition rail in lieu of welding the aluminum plug. Increase the dimension of the siphon tube cutout in the R90 transition rail.		
UH24PTH-1001-SAR, Rev. 2	Increase the maximum length of the 24PTH-S-LC DSC; from 186.55" max. to 186.67" max. (0.06%).	Minor Design Change	LR 721004-294
NUH24PTH-1002-SAR, Rev. 2	Increase the maximum length of the 24PTH-S-LC DSC; from 186.55" max. to 186.67" max. (0.06%).		
NUH24PTH-1003-SAR, Rev. 1	Revise text of diamond Note 4 to "This dimension shall be sized to provide a diametrical gap between the basket assembly and the DSC shell of 0.22" min to 0.35" max." Add alternate configurations for attaching the R45 transition rails to the basket structure.		
NUH24PTH-1004-SAR, Rev. 2	Add a new Note 9 anchored to View A-A, that reads as follows: "R90 transition rails may be fabricated as single or 3 longitudinal segments." Add the details for the alternate design configurations for attaching the optional aluminum inserts off the R45 transition rails.		

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UFSAR Drawing Number	Description of Change	Evaluation Category	Applicable LR/SRS/SE
NUH-03-7001-SAR	Delete drawing reference to date for AWS D1.1 Code.	Clarification Change	LR 721004-313
NUH-61B-1062-SAR, Rev. 3, Sht 2 NUH-61B-1066-SAR, Rev. 4, Sht 1 & 2	Add a chamfer to the step of the vent/siphon block. Add a 1inch spacer pad to the shell and remove the spacer pads on the hold down ring plates.	Minor Design Change	LR 721004-345

Listing of Approved Amendment Changes Implemented in the Standardized NUHOMS® FSAR Revision 9

UFSAR Section or Drawing Number	Description of Change	Evaluation Category	Applicable LR/SE
Replace Pages 1.1-2. and 1.1-3 and add new Page 1.1-2a. Add new Appendix P to the UFSAR to reflect NRC approved application for Amendment 8 to CoC 1004	Addition of NUHOMS-24PTH System changes to the Standard NUHOMS System	COC 72-1004 Amendment No. 8	N/A
Add new or revised pages as Appendices M and N of the UFSAR to reflect NRC approved application for Amendment 8 to CoC 1004 : M.1-4, M.2-3, M.2-13 thru M.2-15, M.2-17 thru M.2-21, M.5-1, M.5-2, M.5-4 thru M.5-8, M.5-8a, M.5-8b, M.5-8c, M.5-89a, M.5-90 thru M.5-99, M.5-99a thru M.5-99g, M.6-2, M.6-4, M.6-4a, M.6-8, M.6-9, M.6-10a, M.6-11, M.6-11a, M.6-12, M.6-30, M.6-32, M.6-34, M.6-42 thru M.6-46, M.6-46a, M.6-47, M.6-48, M.6-48a thru M.6-48d, M.6-49, M.6-49a thru M.6-49c, M.6-50, M.6-56a thru M.6-56z, M.6-56aa thru M.6-56nn. N.2-2, N.2-2a, N.2-7, N.2-9, N.5-1, N.5-1a, N.6-1 thru N.6-3, N.6-5, N.6-6, N.6-27, N.6-39a thru N.6-39i, N.6-40, N.6-46 thru N.6-49.	Additional Changes to the NUHOMS-32PT and -24PHB System	COC 72-1004 Amendment No. 8	N/A