72-1004

TRANSNUCLEAR WEST

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

Subject: Summary Report of CoC Condition 9 Changes Implemented in NUHOMS® FSAR, Revision 5 and Associated Safety Evaluations

References:

1. Certified Safety Analysis Report (CSAR) for the Standardized NUHOMS® Horizontal Modular Storage System For Irradiated Nuclear Fuel, Revision 4A.
2. U.S. Nuclear Regulatory Commission Letter to VECTRA Technologies, Inc., "Demand for Information," dated January 13, 1997 (Docket 72-1004).
3. U.S. Nuclear Regulatory Commission Inspection Report 72-1004/98-209 dated October 30, 1998.

Dear Mr. Baggett:

Transnuclear West Inc. (TN West) herewith submits the subject report which provides a brief description of the changes to the NUHOMS® system implemented under the provisions of Condition 9 of CoC No. 1004 since June 1996 (Reference 1 issue date) through March 31, 2000.

Changes listed in the subject report have been grouped together according to the following six categories: Dry Shielded Canister (DSC), Horizontal Storage Module (HSM), Transfer Cask (TC), Procedural, Code Exceptions, and Miscellaneous Issues. Further, in many instances, a single safety evaluation (SE) addressed multiple changes to a given component. Hence, for clarity of presentation, the contents of the report have been arranged such that each change description is followed by a summary of the safety evaluation for that specific change.

A large majority of the changes listed in the subject report result from the corrective actions implemented in response to Reference 2. A comprehensive license compliance review of the licensed NUHOMS® system identified deficiencies with the DSC structural calculations. Upon

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completion of the required remedial activities associated with these and other deficiencies, the NRC authorized full resumption of fabrication activities of the NUHOMS® cask (Reference 3). Reference 3 specifically concluded that "TN West's reevaluation of the DSC calculation sufficiently demonstrated that the proposed design changes identified by the reevaluation were bounded by the NUHOMS CSAR and that no amendments to the CoC were necessary."

TN West implemented similar enhancements to the HSM and TC calculations. All of the changes listed in the subject report were evaluated and determined not to require an amendment to the CoC or constitute an unreviewed safety question.

Should you or your staff require additional information to support review of this report, please do not hesitate to contact Mr. U. B. Chopra (510-744-6053) or me (510-744-6020).

Sincerely,

Robert M. Grenier

President and Chief Operating Officer

Docket 72-1004

Attachment: Summary Report of CoC Condition 9 Changes Implemented in NUHOMS® FSAR, Revision 5 and Associated Safety Evaluations

SUMMARY REPORT OF CoC CONDITION 9 CHANGES IMPLEMENTED IN NUHOMS® FSAR REVISION 5 AND ASSOCIATED SAFETY EVALUATIONS

Prepared by: Phillip R. Kich **Date:** 9/14/00
Phil Kich

Reviewed by: UB Chopra **Date:** 9/14/00
U. B. Chopra

Approved by: [signature] **Date:** 9/15/00
R. Grubb

SUMMARY REPORT OF CoC CONDITION 9 CHANGES IMPLEMENTED IN NUHOMS® FSAR REVISION 5 AND ASSOCIATED SAFETY EVALUATIONS

24P DSC CHANGES

SAFETY REVIEW SCREEN (SRS) 72-1013 (with SE 72-1018 and 72-1024)

These SEs address modifications to the 24P DSC shell and basket configurations as described in Appendix E.1.1 drawings. Changes and clarifications to the loading definitions and acceptance criteria were also made. The text, tables and figures shown in SAR Chapters 1.2, 1.3, 3.2, 3.3, 3.4, 4.2, 8.1, and 8.2 were revised accordingly to agree with the revised configuration, and reflect the revised results from the supporting structural and criticality calculations.

1. For each DSC guidesleeve, the four guidesleeve clips located at the bottom surface of the bottom spacer disc were removed.

   The clips were installed to restrain the guidesleeves during unloaded DSC transport and during fuel assembly insertion/extraction operations. The previous design assumed that the clips "failed" during a drop event and allowed the guidesleeves to move. The removal of the clips will maintain this load scenario. There are no requirements for the guidesleeves to be supported by the spacer disk, as the guidesleeve is held down by gravity during fuel loading/unloading operations and during storage the guidesleeve is contained within the DSC cavity. The change has no significant impact on the thermal, shielding, criticality or mechanical performance of the DSC. A temporary guidesleeve restraint will be used during transport of the unloaded DSC.

2. Added two new stainless steel extraction stops per guidesleeve (0.75"wide, 2.5" long and 0.06" thick) located between the second and third spacer disc.

   The design of the new, not important to safety (NITS), extraction stops prevents removal of the guidesleeve from the basket if a fuel assembly becomes stuck during insertion or removal. The location of the stops is such that once the closure plates are installed, the gaps between the end of the guidesleeves and the DSC cavity control and the extraction stops are not loaded. Therefore, the guidesleeves are still not attached to or supported by the spacer disk at any load during storage. The change has no significant impact on the thermal, shielding or criticality performance of the DSC. There is no significant change to the mechanical performance as the addition of the stops does not result in any new interferences and the loading and closure operations are unaffected.

3. Increased the length of the guidesleeves by 0.5" and add scallops to the bottom of guidesleeves.

   The increased length of the guidesleeves accounts for removal of the guidesleeve clips, which held the guidesleeves 0.5" above the inner bottom cover plate. The result is that the axial positioning of the guidesleeves is unchanged. There is no adverse impact upon the basket during a vertical drop as the guidesleeve is not connected, thus the additional 0.5" has no impact. The increase in tributary weight supported by the bottom spacer disk under a side drop is such that the unchanged tributary length supported by the top spacer disk still controls. The cut-outs at the bottom of the guidesleeves allow for quick and complete draining of any water in the guidesleeve interior space. The increase in compressive stress due to the additional length and reduction in area at the cutouts has been shown to be acceptable. The change has no significant impact on the thermal, shielding or criticality performance of the DSC. The mechanical performance is improved as the scallops allow for more effective draining of the DSC cavity and will not be as susceptible to blockage from fuel assembly debris.

4. Revised the DSC guidesleeve corner weld from an intermittent weld to a continuous weld and revised oversleeve and guidesleeve weld size requirements.

   The increase to a continuous weld enhances the strength of the guidesleeve by a factor of three. Required weld sizes were determined to be sufficient to ensure that weld stress allowables are met

for a design basis drop accident. The change has no significant impact on the thermal, shielding, criticality or mechanical performance of the DSC.

5. Revised the DSC support rod diameter from 3.00" to 3.25". Revised the support rod material from SA-36 carbon steel or SA-479 Type 304 stainless steel to SA-479 Type XM-19 stainless steel.

   The rod design was improved in order to meet the requirements of ASME Subsection NF, Appendix F interaction criteria for stability under drop conditions,. SER Section 3.0 defines the DSC basket as a ASME Subsection NF component for stress analysis and allowables. The support rod interaction ratios were shown to be acceptable. The increase in weight due the larger rods was shown to be insignificant. The effects of the change had a negligible effect on thermal, shielding, and criticality performance of the DSC. The mechanical performance of the DSC is unchanged.

6. The DSC Level D internal pressure loading is separated into a Level C and a Level D load case with correct pressure magnitudes specified for each case. The Level C pressure of 41 psig is to be applied to the DSC inner top and bottom cover plates. The Level D pressure of 50.3 psig remains unchanged and is to be applied to the inner and outer top and bottom cover plates. This change revises the SAR Load Combination Table 3.2-6.

   The revision to the SAR Table does not result in an adverse impact on the DSC nor a reduction in margin. The C of C contains no requirements for 50.3 psig to be evaluated against ASME Level C stress criteria and the SER acceptance criteria are not altered. Thermal, shielding, criticality and mechanical performance are not affected by the change.

7. The DSC Level A/B/C/D loads for insertion into the HSM are all redefined as 80 kips, and the Level A/B/C/D loads for extraction from the HSM are redefined as 60/60/80/80 kips. This represents an increase to the Level A, B and C loads. However, the maximum load of 80 kips is unchanged.

   The revision to the SAR Design Loading Table 3.2-1 does not adversely impact to the DSC or reduce margin. The C of C contains no requirements for the insertion/extraction loading. The SAR/SER design loadings are increased for the same acceptance criteria and the maximum load of 80 kips is unchanged. Using the new loadings and acceptance criteria, results in a component (DSC) that meets and exceeds the previous loadings and criteria. Thermal, shielding, criticality and mechanical performance are not affected by the change.

8. Seismic loadings for the DSC shell and basket assemblies are clarified. Specifically, the acceleration values required is noted to be very conservative and the more accurate values from Reg. Guide 1.6 are stated. However, evaluations are still performed using the previous conservative accelerations.

   The revision to the SAR description for seismic loading given in SAR section 8.2.3 does not adversely impact the DSC or reduce margin. The C of C contains no requirements for DSC seismic loading other than limits on the ISFI pad. Furthermore, the acceleration values used in the analyses are not changed. Thermal, shielding, criticality and mechanical performance are not affected by the change.

9. The acceptance criteria for weldment of the support rod to the spacer disks has been revised to utilize a complete ASME Subsection NF stress acceptance criteria, including weld and base metal checks.

   The revision to the SAR description regarding the weld stress acceptance criteria does not result in an adverse impact on the DSC nor a reduction in margin. The C of C contains no specific requirements for the support rod / spacer disk weldment criteria and the NF acceptance criteria is consistent with the SER section 3.0 statement that the basket is an NF component. Furthermore, the use of NF stress criteria is more conservative than that used previously. Thermal, shielding, criticality and mechanical performance are not affected by the change.

10. The stability criteria for the support rods was augmented to address all possible criteria, including the ASME Code Subsection NF and Appendix F interaction criteria and the use of a factored (2/3) analytically calculated failure load.

    The revision to the SAR description regarding the expanded description of the support rod stability criteria does not result in an adverse impact on the DSC nor a reduction in margin. The C of C contains no specific requirements for the support rod stability criteria. The alternative evaluation criteria are contained within ASME Subsection NF and Appendix F, which is the acceptance criteria stated in the SAR and SER for the basket. The margins required by ASME Subsection NF were met. Thermal, shielding, criticality and mechanical performance are not affected by the change.

SE 72-1327

This SE addresses reanalyses of the DSC components using the updated weights for selected load conditions. The text and tables shown in SAR Chapters 3.2, 8.1 and 8.2 were revised accordingly to agree with the revised structural calculations and to reflect a reformatting of the DSC load combination tables. The thermal, shielding, criticality and mechanical performance of the DSC is unaffected by these changes.

1. An evaluation of the DSC components and strongback for a 20 psig load associated with DSC blowdown during fuel loading was made. The load combination results for the DSC inner top cover plate are reported in SAR Tables 8.1-10, and 8.2-11.

   The stress results are shown to be within allowable stresses required in the SER. The DSC reanalysis did not require any physical changes to the DSC or strongback design.

2. This change corrected an omission in SAR Tables 8.1-1 and 8.1-2 to reflect the applicability of external pressure loads due to flooding. It also adds the results of DSC flood load evaluations to the SAR. Stresses resulting from DSC reflood operations were addressed as being bounded by the 20 psig blowdown discussed in Item 1 above.

   The stress results are shown to be within allowable stresses required in the SER.

3. The DSC load combination table (SAR Table 3.2-6) has been reformatted to agree with the NUHOMS® Standard Design DSC Design Requirements Document (DRD). In addition, a new table (SAR Table 8.2-24) has been added to the SAR to provide a detailed description of all the applicable loads to be considered for the DSC analysis.

   The DRD, which provides guidelines for the reverification of the structural analysis of the NUHOMS® Standard Design 24P and 52B DSCs, is in compliance with the NUHOMS® Certificate of Compliance (CoC 72-1004). Therefore, the updating of the load cases and load combinations is acceptable.

SE 96-437 (with SE 96-315 and 96-361)

These SEs address modifications to the 24P DSC shell configuration as described in Appendix E.1.1 drawings. There were no SAR text changes associated with these changes.

1. Corrected DSC shell material from ASTM to ASME.

   The correction to the shell material on the parts list from ASTM to ASME is not a design change; the change reverses an incorrect drafting change made in CSAR Revision 3A to make the drawing consistent with the analysis and SAR text. NO DSC shell assemblies have been fabricated using the ASTM specification, since the DSC procurement drawings did not contain this drafting error. The structural analysis qualified the shell to ASME Code allowable stresses based on ASME material

properties. There is no change to the thermal, shielding, criticality or mechanical performance of the DSC as a result of this change.

2. Revised the outer bottom cover plate weld prep thickness to two decimal places.

   The reduction in decimal places dimensioned for the weld prep thickness represents only a change to the format which results in a negligible potential increase in weld throat size from 0.625" to 0.63". The minimum weld throat requirement of 0.5" is unchanged. The supporting calculation assumes a 0.5" minimum throat. The change has no significant impact on the thermal, shielding, criticality or mechanical performance of the DSC.

3. Revised the material callout for siphon tube, a NITS item, to add TP 316 as an alternate material.

   The siphon tube is required to function only during loading/unloading operations and only supports its own self weight and a low internal pressure. The optional TP 316 stainless material has similar material properties, allowable stresses and corrosion resistance as the original TP 304 material. Therefore, the functionality of the siphon tube is not reduced. The change has no significant impact on the thermal, shielding, criticality or mechanical performance of the DSC.

4. Added an option for a fillet weld at the bottom of the siphon and vent block.

   The optional weld addition would be used to assist in fitup. The additional weld is not relied upon for strength and will not cause interferences. The change has no significant impact on the thermal, shielding, criticality or mechanical performance of the DSC.

5. Revised the callout of welds for the lifting lug to add a requirement for a fillet weld at the lower end of the lifting lug. Also, revised the weld of the DSC top shield plug support ring to the DSC shell to require a continuous length of fillet weld on the bottom of the support ring to the shell, centered under each lug.

   The lugs are only used to lift an empty DSC and the addition of weld at the bottom of the lug increases the capacity of the lugs. The addition of continuous weld at the bottom of the support ring in the region of the lug provides additional margin in the stresses, increasing the capacity. In both cases, the stresses are within the ASME code allowables. The modifications to the welds bring the design configuration into compliance with the structural analysis of the lug. The changes have no significant impact on the thermal, shielding, criticality or mechanical performance of the DSC.

6. Revised the weld details of the DSC inner top cover plate to DSC shell weld from a ¼" minimum throat groove weld to a 3/16" minimum throat groove weld.

   The reduction in weld size minimizes welding distortion of the inner top cover plate and allows fabrication of the required throat under extreme joint fitup conditions. The increased stress has been shown in the structural evaluation to be well within ASME Code allowables. The change has no significant impact on the thermal, shielding, criticality or mechanical performance of the DSC.

7. Reduced the minimum combined thickness of the top closure plates from 10.16" to 10.04" " to allow for a recess of the top outer cover plate to improve closure welding.

   The reduction in combined thickness allows for a recess of the outer top cover plate to improve closure welding. The revised minimum stackup thickness of the top closure plates was evaluated and shown to meet all stress criteria. The increase in dose was calculated and shown to be acceptable for its impact on total occupational exposure. The thermal impact due to the change was determined and shown to have a negligible effect on the temperature distribution. The change in minimum plate stack-up thickness has no impact on the criticality performance of the DSC.

8. Revised Note 14 of the DSC Main Assembly drawing to make the use of lubricant in the closure plate lift holes optional rather than required.

   The lubricant helps in seating the temporary hoist ring and prevents galling of the male thread and the stainless steel inner and outer top cover plates. The lubricant also limits corrosion of the carbon steel shield plug when immersed in the fuel pool. The use of lubricant is an operational convenience as it assists in loading/unloading operations. However, it is not a requirement, as proper caution can also prevent galling and the amount of potential corrosion of the shield plug is small. There is no impact on the structural, thermal, shielding or criticality performance of the DSC.

9. Corrected the inner top cover plate diameter to 65.82".

   The change is a correction of a reference dimension of the inner top cover plate to reflect the actual geometry, based on the required gap, which has not changed. There is no impact on the structural, thermal, shielding or criticality performance of the DSC since there is no change to the DSC physical configuration.

SRS 72-1344 (with SE 72-1315)

This SRS/SE addresses a modification to a gap tolerance for the 24P DSC shell given in Appendix E.1.1 drawings. There were no SAR text changes associated with these changes.

1. Provided flexibility in acceptance criteria for the radial gaps between the DSC shell and the top shield plug.

   Local weld-induced distortions occur in the shell due to welding of the support ring, and siphon and vent block to the shell. The increase in gap tolerances address these local deformations. The support ring has been shown to provide continuous support of the shield plug for the increased gap tolerance. The bearing stresses due to an end drop remain within allowables. An evaluation of shielding showed that the increase in dose due to the increased gap tolerance is not significant. The change has no impact on the thermal and criticality performance of the DSC.

52B DSC CHANGES

SE 72-1033 (with SE 72-1026, 96-315, 96-361 and 96-437)

These SEs address modifications to the 52B DSC shell and basket configurations as described in Appendix E.1.2 drawings. Changes and clarifications to the loading definitions and acceptance criteria were also made. The text, tables and figures shown in SAR Chapters 1.2, 1.3, 3.2, 3.3, 3.4, 4.2, 8.1, and 8.2 were revised accordingly to agree with the revised configuration, and reflect the revised results from the supporting structural and criticality calculations.

1. Replaced the existing four (4) SA-479 Type 304 stainless steel or SA-36 carbon steel 3.00" ∅ support rods with six (6) support assemblies consisting of a series of sleeves (3.25" ∅ OD, 1.33" ∅ ID, SA-564, Type 630) and a rod (1.25" ∅ OD, SA-564, Type 630). The purpose of this change is to increase the strength of the support assemblies. The overall length of the support rod assemblies is unchanged from that of the support rods. The location of the 2 new assemblies is at the 0 and 180 azimuths. The rod and sleeve assemblies will be preloaded to "lock" the basket together during fabrication and installation. The maintenance of this preload is not a design requirement.

   The revised support rod assembly was evaluated per the ASME Code. For all load conditions, the axial-bending interaction was shown to be acceptable. The basket assembly was evaluated for enveloping conditions of fixed and pinned connectivity at the support rod assembly / spacer disk interface. The fixed condition represents preloaded support rods and sleeves while the pinned condition represents a loss of preload. The spacer disk stresses were shown to be within allowables. The revised basket assembly has no significant impact on thermal, shielding, criticality and mechanical performance and results in no new interferences.

2. The thickness of the top spacer disk is increased from 2.50" to 3.00" and the material is changed from SA-516 Gr. 70 to SA-537, Class 2 carbon steel. The impact requirements for the spacer disk material are unchanged. The fuel cell openings in the top spacer disk contain no slots, only a square hole with the same 6.00" width dimension. The top spacer disk has also been relocated 2" higher in the basket.

   The modification to the top spacer disk design is required to support the weight of the neutron absorber plates during end drop conditions. The new design was incorporated into the evaluation discussed in Item 1 above. Stresses were shown to be within allowables for the enveloping conditions of fixed and pinned connections at the support rod assembly / spacer disk connections. The revised top spacer disk design has no significant impact on thermal, shielding, criticality and mechanical performance and results in no new interferences.

3. The connection of the neutron absorber plates to the top spacer disk was changed although the plates themselves were not changed. The neutron absorber plate's are now connected to the bottom of the top spacer disk and do not pass through the top spacer disk. The neutron absorber plate support bar is welded to the bottom of the top spacer disk and there are an additional 2 connecting screws, for a total of five screws per neutron absorber plate, that connect the neutron absorber plate to the spacer disk support bar. As a result of the relocation of the top of the neutron absorber plate downward, and other changes listed above and in item 2, the neutron absorber plate is shifted 2.00" lower in the basket. This will reduce the clearance between the bottom of the neutron absorber plate and the DSC inner bottom cover plate from 4.0" to 2.0".

   There is no adverse impact upon the basket during a vertical drop. As discussed in Item 2 above, the top spacer disk has been evaluated for the entire mass of the neutron absorber plates. The absorber plate support bars and connection screws have been evaluated and stresses were shown to be within allowables. Therefore, the design assumption that the absorber plates are axially supported by the top spacer disk for all conditions is maintained. Criticality performance is maintained as the active

fuel regions of all fuel types evaluated for storage remain covered by the relocated absorber plates. The change has no significant impact on thermal, shielding and mechanical performance, and no interferences result from the shift in the absorber plate location.

4. The slots in the bottom 8 spacer disks to restrain the neutron absorber plate have been reduced in length. The extension of the slot beyond the edge of the fuel cell opening is reduced from 0.28" to 0.20". This increases the ligament width at the cross location.

   The reduction in slot length adds structural strength to the spacer disks in the region of the ligaments between fuel cell cutouts. The new configuration was included in the evaluation discussed in Item 2 above. Stresses were shown to be within the allowables. The modified spacer disk design has no significant impact on thermal, shielding, criticality and mechanical performance and results in no new interferences.

5. Relocated the two (2) keyways in the top spacer disk. They are shifted clockwise 7° ± 1° from the 0° and 180° positions to avoid the two new support assemblies now at 0° and 180°. The width and depth of the keyway in the top spacer disk are unchanged.

   The purpose of the keyways is to "lock" the basket from rotating inside the DSC shell during unloaded transport of the DSC and thus prevent damage to the siphon tube. The size of the keyway has not been changed; only the location is shifted to avoid interference caused by the new support rod assemblies (see Item 1 above). The function of the relocated keyway is unchanged. The relocation of the keyways has no significant impact on thermal, shielding, criticality and mechanical performance and results in no new interferences.

6. Replaced the coating on the basket from a thermal spray aluminum to an electroless nickel coating for all of the spacer disks and top shield plug. The coating is revised in accordance with IEB 96-04 requirements for control of hydrogen gas generation during loading/unloading operations. The selection of the nickel coating has been submitted and accepted by the NRC for the 52B design.

   The revised coating requirement has no significant impact on structural, thermal, shielding, criticality, and mechanical performance of the spacer disks and top shield plug. The use of the nickel coating resolves the hydrogen gas generation issue documented in IEB 96-04.

7. The DSC Level D internal pressure loading is separated into a Level C and a Level D load case with correct pressure magnitudes for each case. The Level C pressure of 41 psig is to be applied to the DSC inner top and bottom cover plates. The Level D pressure of 50.3 psig remains unchanged and is to be applied to the inner and outer top and bottom cover plates. This change revises the SAR Load Combination Table 3.2-6

   The revision to the SAR Loading Table does not result in an adverse impact on the DSC nor a reduction in margin. The C of C contains no requirements for 50.3 psig to be evaluated against ASME Level C stress criteria and the SER acceptance criteria are not altered. Thermal, shielding, criticality and mechanical performance are not affected by the change.

8. The DSC Level A/B/C/D loads for insertion into the HSM are all redefined as 80 kips, and the Level A/B/C/D loads for extraction from the HSM are redefined as 60/60/80/80 kips. This represents an increase to the Level A, B and C loads. However, the maximum load of 80 kips is unchanged.

   The revision to the SAR Design Loading Table 3.2-1 does adversely impact to the DSC or reduce margin. The C of C contains no requirements for the insertion/extraction loading. The SAR/SER design loadings are increased for the same acceptance criteria and the maximum load of 80 kips is unchanged. Using the new loadings and acceptance criteria results in a component (DSC) that meets

and exceeds the previous loadings and criteria. Thermal, shielding, criticality and mechanical performance are not affected by the change.

9. Seismic loadings for the DSC shell and basket assemblies in SAR section 8.2.3 are clarified. Specifically, the acceleration values required is noted to be very conservative and the more accurate values from Reg. Guide 1.60 are stated. However, evaluations are still performed using the previous conservative acceleration values.

   The revision to the SAR description for seismic loading does not adversely impact the DSC or reduce margin. The C of C contains no requirements for DSC seismic loading other than limits on the ISFI pad. Furthermore, the acceleration values used in the analyses are not changed. Thermal, shielding, criticality and mechanical performance are not affected by the change.

10. The stability criteria for the support rods was augmented to address all possible criteria, including the ASME Code Subsection NF and Appendix F interaction criteria and the use of a factored (2/3) analytically calculated failure load.

    The revision to the SAR description regarding the expanded description of the support rod stability criteria does not result in an adverse impact on the DSC nor a reduction in margin. The C of C contains no specific requirements for the support rod stability criteria. The alternative evaluation criteria are contained within ASME Subsection NF and Appendix F, which is the acceptance criteria stated in the SAR and SER for the basket. The margins required by ASME Subsection NF were met. Thermal, shielding, criticality and mechanical performance are not affected by the change.

11. Provided flexibility in acceptance criteria for the radial gaps between the DSC shell and the top shield plug.

    Local weld-induced distortions occur in the shell due to welding of the support ring, and siphon and vent block to the shell. The increase in gap tolerances address these local deformations. The support ring has been shown to provide continuous support of the shield plug for the increased gap tolerance. The bearing stresses due to an end drop remain within allowables. An evaluation of shielding showed that the increase in dose due to the increased gap tolerance is not significant. Thermal, criticality and mechanical performance is not impacted by the gap tolerances.

12. Reduced the minimum required combined thickness of the top closure plates from 9.91" to 9.79" to allow for a recess of the top outer cover plate to improve closure wedding.

    The reduction in combined thickness allows for a recess of the outer top cover plate to improve closure welding. The revised minimum stackup thickness of the top closure plates was evaluated and shown to meet all stress criteria. The increase in dose was shown to not significantly increase occupational exposure. The change in minimum plate stack-up thickness has no impact on the criticality performance of the DSC.

13. Revised the callout of welds for the lifting lug to add a requirement for a fillet weld at the lower end of the lifting lug to bring the design configuration into compliance with the structural analysis of the lug.

    The lugs are only used to lift an empty DSC and the addition of weld at the bottom of the lug provides additional margin in the stresses, increasing the capacity of the lugs. The change has no significant impact on the thermal, shielding, criticality or mechanical performance of the DSC.

14. Revised the weld details of the DSC inner top cover plate to DSC shell weld from a ¼" minimum throat groove weld to a 3/16" minimum throat groove weld.

    The reduction in weld size minimizes welding distortion of the inner top cover plate and allows

fabrication of the required throat under extreme joint fitup conditions. The increased stress has been shown to be well within ASME Code allowables. The change has no significant impact on the thermal, shielding, criticality or mechanical performance of the DSC.

15. Revised the outer bottom cover plate weld prep thickness to two decimal places.

    The reduction in decimal places dimensioned for the weld prep thickness represents only a change to the format which results in a negligible potential increase in weld throat size from 0.625" to 0.63". The minimum weld throat requirement of 0.5" is unchanged. The supporting calculation assumes 0.5" minimum throat. The change has no significant impact on the thermal, shielding, criticality or mechanical performance of the DSC.

16. Revised the material callout for siphon tube, a NITS item, to add TP 316 as an alternate material.

    The siphon tube is required to function only during loading/unloading operations and only supports its own self weight and a low internal pressure. The optional TP 316 stainless material has similar material properties, allowable stresses and corrosion resistance as the original TP 304 material. Therefore, the functionality of the siphon tube is not reduced. The change has no significant impact on the thermal, shielding, criticality or mechanical performance of the DSC

17. Added an option for a fillet weld at the bottom of the siphon and vent block.

    The optional weld addition would be used to assist in fitup. The additional weld is not relied upon for strength and will not cause interferences. The change has no significant impact on the thermal, shielding, criticality or mechanical performance of the DSC.

18. Revised the weld of the DSC top shield plug support ring to the DSC shell to require a continuous length of fillet weld on the bottom of the support ring to the shell, centered under each lug.

    The change does not have any adverse effects on the form, function, or operation of the DSC. The lugs are only used to lift an empty DSC and the addition of weld at the bottom of the support ring in the region of the lug provides additional margin in the stresses, increasing the capacity. The stresses remain within the ASME allowables. The changes have no significant impact on the thermal, shielding, criticality or mechanical performance of the DSC.

19. Corrected the inner top cover plate diameter to 65.82".

    The change is a correction of a reference dimension of the inner top cover plate to reflect the actual geometry, based on the required gap, which has not changed. There is no impact on the structural, thermal, shielding or criticality performance of the DSC since there is no change to DSC physical configuration.

20. Revised Note 14 of the DSC Main Assembly drawing to make the use of lubricant in the closure plate lift holes optional rather than required.

    The lubricant helps in seating the temporary hoist ring and prevents galling of the male thread and the stainless steel inner and outer top cover plates. The lubricant also limits corrosion of the carbon steel shield plug when immersed in the fuel pool. The use of lubricant is an operational convenience as it assists in loading/unloading operations. However, it is not a requirement, as proper caution can also prevent galling and the amount of potential corrosion of the shield plug is small. There is no impact on the structural, thermal, shielding or criticality performance of the DSC.

21. Revised Note 8 of NUH-03-1032 to replace "never seeze" with "nuclear grade nickel based anti-seize lubricant" and to require use on both screw and nut.

Previously, only one of the connected parts was required to be wiped with the lubricant. The new requirement to wipe both parts is to further minimize the introduction of corrosion products into the fuel pool, although the potential for corrosion of the screw and nut is small. A generic nickel-based lubricant is now allowed to provide flexibility for the fabricator. There is no structural, thermal, shielding, or mechanical impact for this change.

SE 72-1327

This SE addresses reanalyses of the DSC components using the updated weights for selected load conditions. The text and tables shown in SAR Chapters 3.2, 8.1 and 8.2 were revised accordingly to agree with the revised structural calculations and to reflect a reformatting of the load combination tables. The thermal, shielding, criticality and mechanical performance of the DSC is unaffected by the changes.

1. An evaluation of the DSC components and strongback for a 20 psig load associated with DSC blowdown during fuel loading was made. The load combination results for the DSC inner top cover plate are reported in SAR Tables 8.1-11, and 8.2-12.

   The stress results are shown to be within allowable stresses required in the SER. The DSC reanalysis did not require any physical changes to the DSC or strongback design.

2. This change corrects an omission in SAR Tables 8.1-1 and 8.1-2 to reflect the applicability of external pressure loads due to flooding. It also adds the results of flood load evaluations to the SAR. Stresses resulting from DSC reflood operations are addressed as being bounded by the 20 psig blowdown discussed in Item 1 above.

   The stress results are shown to be within allowable stresses required in the SER.

3. The DSC load combination table (SAR Table 3.2-6) has been reformatted to agree with the NUHOMS® Standard Design DSC Design Requirements Document (DRD). In addition, a new table (SAR Table 8.2-24) has been added to the SAR to provide a detailed description of all the applicable loads to be considered for the DSC analysis.

   The DRD, which provides guidelines for the reverification of the structural analysis of the NUHOMS® Standard Design 24P and 52B DSCs, is in compliance with the NUHOMS® Certificate of Compliance (CoC 72-1004). Therefore, the updating of the load cases and load combinations is acceptable and the change has no adverse impact to safety.

SE 72-1514

This SE addresses a revision to the shielding analysis to include dose rate calculations for the BWR canister system. The text and tables in SAR Chapter 7.3 are revised accordingly to reflect the revised results from the shielding calculation.

No additional personnel are required as a result of this change and no additional time is required to perform the tasks associated with the HSM load. Therefore, there is no significant increase in occupational doses.

LONG CAVITY DSC CHANGES

SRS 72-1061 (with SE 72-1018, 72-1024, 72-1048, 72-1175, 96-361 and 96-437)

These SEs address modifications to the 24P Long Cavity DSC shell and basket configurations as described in Appendix E.1.3 drawings. Changes and clarifications to the loading definitions and acceptance criteria were also made. The text, tables and figures shown in SAR Chapters 1.2, 1.3, 3.2, 3.3, 3.4, 4.2, 8.1, 8.2 and Appendix H were revised accordingly to agree with the revised configuration, and reflect the revised results from the supporting structural and criticality calculations.

Change Items 1 through 16 below are identical to changes applicable to the 24P Standard DSC. See above summary for 24P Standard DSC changes for equivalent summaries of the safety evaluations for Items 1 through 16. Change Item 17 (SE 72-1175) is unique to the 24P Long Cavity DSC.

1. For each DSC guidesleeve, the four guidesleeve clips located at the bottom surface of the bottom spacer disc were removed.

2. Added two new stainless steel extraction stops per guidesleeve (0.75"wide, 2.5" long and 0.06" thick) located between the second and third spacer disc.

3. Increased the length of the guidesleeves by 0.5" and add scallops to the bottom of guidesleeves.

4. Revised the DSC Guidesleeve corner weld from an intermittent weld to a continuous weld and revised oversleeve and guidesleeve weld size requirements.

5. Revised the DSC support rod diameter from 3.00" to 3.25". Revised the support rod material from SA-36 carbon steel or SA-479 Type 304 stainless steel to SA-479 Type XM-19 stainless steel.

6. The DSC Level D internal pressure loading is separated into a Level C and a Level D load case with correct pressure magnitudes specified for each case. The Level C pressure of 41 psig is to be applied to the DSC inner top and bottom cover plates. The Level D pressure of 50.3 psig remains unchanged and is to be applied to the inner and outer top and bottom cover plates. This change revises the SAR Load Combination Table 3.2-6.

7. The DSC Level A/B/C/D loads for insertion into the HSM are all redefined as 80 kips, and the Level A/B/C/D loads for extraction from the HSM are redefined as 60/60/80/80 kips. This represents an increase to the Level A, B and C loads. However, the maximum load of 80 kips is unchanged.

8. Seismic loadings for the DSC shell and basket assemblies are clarified. Specifically, the acceleration values required is noted to be very conservative and the more accurate values from Reg. Guide 1.6 are stated. However, evaluations are still performed using the previous conservative accelerations.

9. The acceptance criteria for weldment of the support rod to the spacer disks has been revised to utilize a complete ASME Subsection NF stress acceptance criteria, including weld and base metal checks.

10. The stability criteria for the support rods was augmented to address all possible criteria, including the ASME Code Subsection NF and Appendix F interaction criteria and the use of a factored (2/3) analytically calculated failure load.

11. Revised the material callout for siphon tube, a NITS item, to add TP 316 as an alternate material.

12. Added an option for a fillet weld at the bottom of the siphon and vent block.

13. Revised the callout of welds for the lifting lug to add a requirement for a fillet weld at the lower end of the lifting lug. Also, revised the weld of the DSC top shield plug support ring to the DSC shell to require a continuous length of fillet weld on the bottom of the support ring to the shell, centered under each lug.

14. Revised the weld details of the DSC inner top cover plate to DSC shell weld from a ¼" minimum throat groove weld to a 3/16" minimum throat groove weld.

15. Corrected the inner top cover plate diameter to 65.82".

16. Provided flexibility in acceptance criteria for the radial gaps between the DSC shell and the top shield plug.

As stated above, the above change Items 1 through 16 are identical to changes applicable to the 24P Standard DSC. Therefore, see above summary of 24P Standard DSC changes for equivalent summaries of the safety evaluations.

17. Revised the top and bottom shield plug from a solid lead plug configuration to an encased shield plug assembly with stiffeners to bring the configuration into compliance with the results of the revised structural analysis.

    The intent of the design change is to preclude impingement of the shield plug on spent fuel assemblies during a DSC drop scenario. The new shield plug configurations were structurally evaluated and all stresses were shown to be within allowables. The new shield plug design was also evaluated for impact on personnel and offsite doses. The conservative estimate of the increased doses was determined to be acceptable. Thermal and criticality performance are not significantly affected by the new plug design.

SE 72-1327

This SE addresses reanalyses of the DSC components using the updated weights for selected load conditions. The text and tables shown in SAR Chapters 3.2, 8.1 and 8.2 were revised accordingly to agree with the revised structural calculations and to reflect a reformatting of the load combination tables. The thermal, shielding, criticality and mechanical performance of the DSC is unaffected by these changes.

Change Items 1 through 3 below are identical to changes applicable to the 24P Standard DSC.

1. An evaluation of the DSC components and strongback for a 20 psig load associated with DSC blowdown during fuel loading was made. The load combination results for the DSC inner top cover plate are reported in the SAR Tables 8.1-10, and 8.2-11.

   The stress results are shown to be within allowable stresses required in the SER. The DSC reanalysis did not require any physical changes to the DSC or strongback design.

2. This change corrected an omission in SAR Tables 8.1-1 and 8.1-2 to reflect the applicability of external pressure loads due to flooding. It also adds the results of DSC flood load evaluations to the SAR. Stresses resulting from DSC reflood operations were addressed as being bounded by the 20 psig blowdown discussed in Item 1 above.

   The stress results are shown to be within allowable stresses required in the SER.

3. The DSC load combination table (SAR Table 3.2-6) has been reformatted to agree with the NUHOMS® Standard Design DSC Design Requirements Document (DRD). In addition, a new table

(SAR Table 8.2-24) has been added to the SAR to provide a detailed description of all the applicable loads to be considered for the DSC analysis.

The DRD, which provides guidelines for the reverification of the structural analysis of the NUHOMS® Standard Design 24P and 52B DSCs, is in compliance with the NUHOMS® Certificate of Compliance (CoC 72-1004). Therefore, the updating of the load cases and load combinations is acceptable.

HSM CHANGES

SE 72-1319

This SE addresses modifications to the HSM configuration as described in Appendix E.2 drawings. The figures shown in SAR Chapters 4.2, 5.1, and 8.1 were revised accordingly to agree with the revised configuration.

1. Removed unused options of using drilled in concrete anchors for the Heat Shield support. Removed unused option of mounting the shielded door using welds in lieu of clips.

   The removed options were impractical and not recommended due to the significant increase in complexity involved with the field fabrication. The change has no adverse impact on the features, function or performance of the HSM or DSC. Structural, thermal and shielding performance of the HSMs are not adversely affected.

2. Identified the Quality Category of sealant. Updated the washer size and material to indicate wide series of carbon steel.

   The quality category of the sealant is not changed, only identified on the drawing. The sealant is a "not important to safety"(NITS) item. The washers are also NITS and the change is considered a clarification or simplification with no impact to the design or structural qualification. The change has no adverse impact on the features, function or performance of the HSM or DSC. Structural, thermal and shielding performance of the HSMs are not adversely affected.

3. Revised the material specification called out on the parts list for the NITS axial retainer sleeve.

   The original material is not available and the pipe only provides a form during the concrete fill. The change has no adverse impact on the features, function or performance of the HSM or DSC. Structural, thermal and shielding performance of the HSMs are not adversely affected.

4. Expanded the material specification for the nut (Item 3, NUH-03-6018) to include ASTM A194 GR 2H. Also updated the parts list (NUH-03-6024) to (a) clarify the material specification for the 1.5" nut (Item 15) to include ASTM A194 GR 2H (b) revise the material specification for the heat shield wall support bolts (Items 12 and 13) to include ASTM A36.

   The alternate faster material options are structurally qualified in the HSM design calculation. The change has no adverse impact on the features, function or performance of the HSM or DSC. Structural, thermal and shielding performance of the HSMs are not adversely affected.

5. Identified reinforcing bars along the wall edge for the End Module Shield Wall.

   The identification of the bars is not a design change; it is intended to clarify the existing design. The change has no adverse impact on the features, function or performance of the HSM or DSC. Structural, thermal and shielding performance of the HSMs are not adversely affected.

SE 72-1327

This SE addresses reanalysis of the HSM to resolve deficiencies identified in an audit. The text, tables and figures shown in SAR Chapters 3.2, 8.1 and 8.2 were revised accordingly to agree with the new structural and thermal calculations.

1. The HSM thermal calculations were revised to address concerns regarding the application of paint on the HSM heat shields. The HSM structural calculation was revised in its entirety including updating the ANSYS model used in the calculation to reflect the latest HSM geometry and design parameters.

This upgrade superceded several hand calculations and consolidated all of the HSM structural analysis into one calculation. The revised calculation corrected all errors identified in the audit, provided clarification of the methodology and assumptions used, and updated the ANSYS model to reflect the latest HSM configuration. Finally, the revised DSC weights and the revised HSM thermal analysis results were also incorporated into the structural calculation.

The conclusion of the reanalysis of the HSM is that the design of the HSM concrete components, DSC support structure, the HSM door, the miscellaneous steel components, embedments and the welds is adequate for all normal, off-normal and accident loads considered. Also a free standing HSM with the end and rear shield walls is stable against overturning and sliding when subjected to the design basis tornado wind, tornado missile, flood and seismic loads. The HSM structural reanalyses did not result in any physical change to the HSM and has no adverse impact on the function or performance of the HSM. The HSM design described in the SAR is fully qualified by the HSM reanalysis, and meets all the SER requirements. The mechanical functionality, shielding capability and heat transfer capability are not compromised.

SE 96-399 & 96-410

This SE addresses modifications to the HSM configuration as described in Appendix E.2 drawings. The text, tables and figures shown in SAR Chapters 4.2, 4.6, 8.1, and 8.2 were revised accordingly to agree with the revised configuration, and reflect the revised results from the supporting HSM thermal reanalysis.

1. Removed painting requirement for the inside surface of the HSM Heat Shields.

   The HSM was analyzed thermally under normal, off-normal, and accident conditions, with the inside surface of the galvanized heat shields that contained no paint (emissivity = 0.21) or the worst case paint (emissivity = 1.0). Results showed that the effect of the adjusted concrete temperatures is enveloped by the existing HSM analysis documented in the SAR. The varying paint conditions resulted in slightly higher temperatures in the fuel cladding but are still within the acceptance criteria. Although DSC temperatures are also slightly increased as well, the bounding thermal case for the DSC is unchanged. Shielding and criticality performance of the system are not adversely affected.

The remaining SEs summarized below for the HSM changes address modifications to the HSM configuration as described in Appendix E.2 drawings. Changes to the SAR text were not required for these changes.

SE 72-1131

Added a flag note to permit omission of ¾" weld length at an area of the DSC Support Structure with limited access to improve fabricability.

The note allows to exclude the center 3/4" of length of a fillet weld which joins the support rail to the mounting plate due to limited access availability.. The supporting structural analysis conservatively qualifies the weld for the exclusion of the center 1" portion of length. The thermal, shielding, and criticality performance of the HSMs are not adversely affected by the change. Therefore, the reduced length is acceptable.

SE 72-1215

Simplified an option for NITS security welding of the shielded door.

The option to provide additional welded security of the door is not removed, only the unnecessary specification of the weld type, size and location is removed. The HSM design does not rely on these

welds structurally or for security. The change has no adverse impact on the HSM functions of shielding, canister support and protection, or thermal rejection.

SE 72-1251

Reduced the DSC Support Assembly column height by 0.5" to provide additional room for rail alignment.

The reduction in column height does not affect the final elevation or leveling requirements. The DSC support structure is designed to be adjustable for alignment with the HSM front access opening. The change allows the rails to be adjusted downward for a better fit. The change does not affect design basis HSM analyses. Thermal and shielding functions of the HSM are unaffected by the change.

SE 72-1298

Increased the length of the HSM door bolt from 3.25" to 3.75".

The bolt length is increased to accommodate any unevenness in the surrounding concrete which can potentially reduce thread engagement with the docking ring. The basic design of the door attachment is unchanged and the increased bolt length results in no interferences. The structural, thermal, shielding, and criticality performance of the HSMs are not adversely affected by the change.

SE 96-350

Changed the rail setback dimension from a reference dimension to a design dimension and the axial support length from a design dimension to a reference dimension.

The changes allow for easier field verification of the rail axial location. The design is not affected. The structural, thermal, shielding, and criticality performance of the HSMs are not adversely affected by the changes.

SE 96-378

The thermowell located in HSM roof slab was revised to provide a better fit between the thermowell tube and the NPT coupling.

The revision provides better fitup and improves the method of welding. The safety function of the thermowell and slab is not changed. The structural, thermal, shielding, and criticality performance of the HSMs are not adversely affected by the change.

SE 96-385

Clarified tolerances for the HSM concrete fabrication drawings of the base unit, roof slab, and shield walls by adding a note. This note states that the concrete component dimensions shown are nominal and refers to the fabrication specification for all dimension inspections. It also eliminates the drawing block tolerances.

The tolerances removed were inconsistent with the fabrication specification which references ACI 301 for dimensional tolerances. The HSM analyses considered nominal dimensions and the specification tolerances do not significantly affect the analysis results. The HSM design is not affected by this change. The structural, thermal, and shielding performance of the HSM is not affected by the change.

SE 96-391

Reduced weep hole circle on the back cover plate for the HSM Shielded Door Assembly to eliminate interference.

The modification to the weep hole has a negligible effect on the structural, thermal, and shielding properties of the door.

SE 96-398

Revised HSM birdscreen frame joint to a square edge at each corner instead of a mitered cut.

The revised joint eases the fabrication of the birdscreen frames. The birdscreens are NITS items and even a complete loss of the birdscreen assembly does not impact public health or safety. The thermal, shielding, and criticality performance of the HSMs are unaffected by the change.

SE 96-415

Enlarged holes in the HSM Shield Wall tie plates and HSM Roof attachment angle assemblies to improve embedment alignment during installation.

The change to oversize anchor bolt holes is in accordance with the AISC Manual of Steel Construction. The increased hole diameter in the tie plates was structurally evaluated and determined to be acceptable. The roof attachment angles are NITS. The thermal, shielding, and criticality performance of the HSMs are not adversely affected by the change.

SE 96-450

This SE addresses a revision to SAR Chapter 4.2 to clarify the requirements for, and qualification of the aggregates used in the HSM concrete mix.

The changes to the SAR text are intended to clarify the SAR to better state the requirements of the SER and to provide details on how the SER requirements will be met. The test methods to be followed are added. An option is added for testing of concrete strength as affected by elevated temperature as an alternate means to accept aggregates. None of the SAR text changes have any adverse impact on or alter the thermal performance of the HSM or DSC.

SE 96-459

Corrected the extent of the top of HSM base unit side wall U bar reinforcement.

A previous change to the drawings that added the U-bars errantly indicated the extent of the bars too far, into the wall junction area. The dimensional correction does not impact the qualification of the HSM as the U-bars were never assumed in the analysis. Shielding, thermal, and criticality performance of the HSM is not altered.

TRANSFER CASK (TC) CHANGES:

SE 72-1317

This SE addresses modifications to the TC configuration as described in Appendix E.3 drawings. Table 8.1.3 was revised accordingly to agree with the alternative materials allowed for the configuration.

1. Implemented miscellaneous clarifications and editorial/drafting corrections to the TC drawings.

2. Allowed the use of alternative materials for the Cask trunnion sleeves (SA-240 Type 304N or SA-182 Type F304N) and the 3" thick Cask top cover plate (SA-516 Grade 70 or SA-240Type 304).

3. Allowed an option to drill and tap holes into the cask components provided prior approval by TN West has been obtained.

4. Limited the use of the single leg neutron shield panel support angle for use only with solid neutron shielding.

5. Permitted the use of alternate lifting hardware.

Items 2, 4 and 5 are supported by calculations that justify the changed and alternative configurations. As stated in Item 3, the option to drill and tap holes is permitted only with approval by TN West. At the time of approval, the proposed holes will be evaluated for impact on safety. The changes identified in Item 1 are minor and do not affect the safety of the cask.

SE 72-1327

This SE addresses reanalysis of the OS197 and Standardized TCs to resolve deficiencies and to incorporate updated weight data. This change did not implement any physical changes to the TC configuration. The text, tables and figures shown in SAR Chapters 3.2, 8.1, 8.2 and Appendix C were revised accordingly to add OS197 TC analysis results and to revise the Standardized TC results, based on the new/revised structural and thermal calculations. An evaluation of the TC analysis results from each of the affected calculations is provided in the following paragraphs:

1. The Standardized TC, including the BWR cask collar, was evaluated to determine the impact of updated DSC weight data. Combined stresses for each TC component remain within ASME Code allowable stresses as required by the SER. Therefore, the safety function of the TC in terms of its mechanical functionality, shielding capability, and heat transfer capability is not compromised.

2. The OS197 TC was reanalyzed to address issues identified in an independent assessment review. The revision added a tornado load analysis and addressed revised thermal and weight data. Combined stresses for each TC component remain within ASME Code allowable stresses as required by the SER. Therefore, the safety function of the TC in terms of its mechanical functionality, shielding capability, and heat transfer capability is not compromised.

3. The OS197 TC liquid neutron shield was reanalyzed to address issues identified in an independent assessment review. The revised analysis considered additional load conditions and limited the evaluation to only the double-sided support angle design. Combined stresses for each TC component remain within ASME Code allowable stresses as required by the SER. Therefore, the safety function of the TC in terms of its mechanical functionality, shielding capability, and heat transfer capability is not compromised.

4. The OS197 TC lifting trunnions were analyzed to address issues identified in an independent assessment review. The new analysis evaluated loads due to lifting, transportation, HSM

loading/unloading and seismic. Combined stresses for each trunnions, sleeves, shell, and connecting welds remain within the allowable stresses defined by NUREG 0612 & ANSI N14.6 for all lift conditions and ASME Code Subsection NC allowables for all other load conditions as required by the SER. Therefore, the safety function of the TC in terms of its mechanical functionality, shielding capability, and heat transfer capability is not compromised and the change does not constitute an unreviewed safety question.

PROCEDURAL CHANGES

SE 72-1327

This SE addresses modifications to procedures given in Chapter 5.1 of the SAR. The following procedural changes were made:

1. Revised the helium test pressure to be consistent with values recommended in the detailed operations procedures for the NUHOMS® system.

2. Added a note to limit the DSC pressure during reflood operations.

3. Clarified the DSC vacuum drying procedures for consistency with the C of C Technical Specification 1.2.2 limits. Added details for releasing and reevacuating helium from the DSC after leak testing in accordance with C of C Technical Specification 1.2.2 limits.

4. Minor changes were made to the sequence of steps related to the installation/removal of the axial retainer.

The revised pressure requirements given in Items 1 and 2 are bounded by the blowdown pressure evaluated for the DSCs. The additional details provided for the vacuum drying and helium leak test steps bring the procedure in compliance with the C of C. The procedural changes related to installation/removal of the axial retainer reflect lessons learned from recent loading campaigns and are relatively minor in significance. The changes provide added guidance and clarifications. There is no change to the shielding materials or source terms, and there is no significant impact on personnel exposure. None of the procedural changes affect the geometry of the DSC internals and thus do not affect criticality.

CODE EXCEPTIONS

SE 72-1327

SAR Chapters 4.8 and 4.9 were added to provide a comprehensive list of exceptions to the ASME Code for the DSC and TC and to provide a justification for these exceptions. The details of the code exceptions do not constitute a change from the intent of the code criteria described in the SAR. Since the listing of the exceptions did not initiate the need for additional analysis or for physical changes to the cask, there is no impact on the safety function of the cask.

MISCELLANEOUS ISSUES

SE 72-1233

In response to a non conforming condition of "as-built" cavity length for a canister, a new calculation was developed to determine the allowed irradiation growth versus the minimum cold cavity length. The text in SAR Chapter 8.1 was revised accordingly to reflect the methodology and results of the supporting calculation.

Acceptability of irradiation growth (in combination with thermal growth) for the design basis fuel with maximum length (B&W 15x15) relative to cavity length was based on the actual irradiation growth data obtained for B&W 15x15 and 17x17 fuel types. The actual irradiated growths were shown to be within the maximum growth allowed based on cold DSC cavity length.

SE 72-1248

This SE addresses an inconsistency between SAR safety classification listings and the DSC drawings in Appendix E of the SAR. The result was to clarify the tables in SAR Chapter 3 to clarify that the Important To Safety (ITS) classification applies only to lead shield plugs associated with the 24P Long Cavity DSC.

The basis for the NITS classification of the carbon steel plugs is that their "failure" (absence) would have no direct significant public health or safety consequence. Furthermore, the monolithic form of the plug is shown to have very low stress levels during a drop event. The criticality, structural, thermal and shielding performances of the DSC are not adversely affected by the clarification. Therefore, the plug will not collapse into the DSC cavity and poses no threat to fuel integrity.

SE 97-482

This SE addresses a revision to SAR Table 7.2-3 to modify the gamma energy spectrum for PWR fuel by doubling the group fractions for the 9.5 MeV, 7 MeV and 5 MeV energy groups. The effect of the changes is evaluated in the shielding calculation.

The revised calculation modified the gamma shielding models to incorporate the revised sources. The results of the analysis demonstrate the change to the PWR gamma spectrum has essentially zero effect on the NUHOMS® system gamma dose rates. Therefore, occupational exposures and general public exposures are unaffected by this change.