



March 19, 2003
NUH03-03-12

Ms Mary Jane Ross-Lee
Spent Fuel Project Office
U. S. Nuclear Regulatory Commission
11555 Rockville Pike
Rockville, MD 20852

Subject: Final Safety Analysis Report (FSAR) for the Standardized Advanced NUHOMS® Horizontal Modular Storage System For Irradiated Nuclear Fuel, Revision 0.

- References:**
1. William Brach Letter to Alan Hanson dated January 9, 2003; Certificate of Compliance (CoC) No. 1029 for the Standardized Advanced NUHOMS® System (TAC No. L23372).
 2. U. B. Chopra Letter to Mary Jane Ross-Lee dated January 28, 2003; Updated Schedule of 2003 TN Licensing Activities.

Dear Ms. Ross-Lee:

Transnuclear, Inc. (TN) herewith submits Revision 0 of the subject FSAR following approval of its application (Reference 1).

The FSAR update reflects the changes implemented to the SAR analysis to address issues listed in SER Chapters 8, 9, and 15 in accordance with the requirements of 72.248(a)(2).

In addition, changes were implemented to the system under the provision of 10CFR 72.48 to provide clarification, enhance fabricability of the components or correct minor inconsistencies. This FSAR update incorporates all such 72.48 changes. These changes are included to facilitate your staff's review of a forthcoming amendment application to CoC 1029 (Reference 2).

Each change has been identified with a change indicator shown in the margin adjacent to the content revised. Also enclosed is a summary of changes incorporated in FSAR Revision 0 with a brief justification and a cross reference to the 72.48 screenings/evaluations performed.

Please note that this submittal includes proprietary information. In accordance with 10CFR2.790, we are providing an affidavit specifically requesting that you withhold this proprietary information from public disclosure.

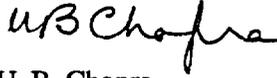
Please contact me at 510-744-6053 if you require any additional information in support of this submittal.

Nmssol

Ms Mary Jane Ross-Lee
Spent Fuel Project Office, NMSS

NUH03-03-12
March 19, 2003

Sincerely,



U. B. Chopra
Licensing Manager

Docket 72-1029

- Enclosures:
1. Affidavit.
 2. Summary of Changes Incorporated in Advanced NUHOMS FSAR, Revision 0.
 3. Five (5) copies of FSAR Revision 0 and one CD (Proprietary version).
 4. Two (2) copies of FSAR Revision 0 (Non-proprietary version).

**AFFIDAVIT PURSUANT
TO 10 CFR 2.790**

Transnuclear, Inc.)
State of California) SS.
County of Alameda)

I, Jayant R. Bondre, depose and say that I am Manager of Engineering and Licensing of Transnuclear, Inc., duly authorized to make this affidavit, and have reviewed or caused to have reviewed the information which is identified as proprietary and referenced in the paragraph immediately below. I am submitting this affidavit in conformance with the provisions of 10 CFR 2.790 of the Commission's regulations for withholding this information.

The information for which proprietary treatment is sought is contained in Enclosures 3 of this submittal and as listed below:

- Final Safety Analysis Report (FSAR) for the Standardized Advanced NUHOMS® Horizontal Modular Storage System for Irradiated Nuclear Fuel, Revision 0 (5 sets and 1 CD of the Proprietary Version).

This document has been appropriately designated as proprietary.

I have personal knowledge of the criteria and procedures utilized by Transnuclear, Inc. in designating information as a trade secret, privileged or as confidential commercial or financial information.

Pursuant to the provisions of paragraph (b) (4) of Section 2.790 of the Commission's regulations, the following is furnished for consideration by the Commission in determining whether the information sought to be withheld from public disclosure, included in the above referenced document, should be withheld.

- 1) The information sought to be withheld from public disclosure is licensing drawings and supporting safety analysis relating to the NUHOMS® Cask, which is owned and has been held in confidence by Transnuclear, Inc.
- 2) The information is of a type customarily held in confidence by Transnuclear, Inc. and not customarily disclosed to the public. Transnuclear, Inc. has a rational basis for determining the types of information customarily held in confidence by it.
- 3) The information is being transmitted to the Commission in confidence under the provisions of 10 CFR 2.790 with the understanding that it is to be received in confidence by the Commission.
- 4) The information, to the best of my knowledge and belief, is not available in public sources, and any disclosure to third parties has been made pursuant to regulatory provisions or proprietary agreements which provide for maintenance of the information in confidence.
- 5) Public disclosure of the information is likely to cause substantial harm to the competitive position of Transnuclear, Inc. because:

- a) A similar product is manufactured and sold by competitors of Transnuclear, Inc.
- b) Development of this information by Transnuclear, Inc. required thousands of man-hours and hundreds of thousands of dollars. To the best of my knowledge and belief, a competitor would have to undergo similar expense in generating equivalent information.
- c) In order to acquire such information, a competitor would also require considerable time and inconvenience related to the development of a design and analysis of a dry spent fuel storage system.
- d) The information required significant effort and expense to obtain the licensing approvals necessary for application of the information. Avoidance of this expense would decrease a competitor's cost in applying the information and marketing the product to which the information is applicable.
- e) The information consists of description of the design and analysis of a dry spent fuel storage and transportation system, the application of which provides a competitive economic advantage. The availability of such information to competitors would enable them to modify their product to better compete with Transnuclear, Inc., take marketing or other actions to improve their product's position or impair the position of Transnuclear, Inc.'s product, and avoid developing similar data and analyses in support of their processes, methods or apparatus.
- f) In pricing Transnuclear, Inc.'s products and services, significant research, development, engineering, analytical, licensing, quality assurance and other costs and expenses must be included. The ability of Transnuclear, Inc.'s competitors to utilize such information without similar expenditure of resources may enable them to sell at prices reflecting significantly lower costs.

Further the deponent sayeth not.





Jayant R. Bondre
Manager, Engineering/Licensing
Transnuclear, Inc.

Subscribed and sworn to me before this 19th day of March, 2003, by Jayant R. Bondre.



Notary Public

Summary of Changes Incorporated in Advanced NUHOMS® FSAR, Revision 0

Chg. No	Brief Description of Change	Ref. SRS/SE	Justification
All Chapters			
1.	Update References in all Chapters to reflect the current version of the referenced documents.	NA	Editorial change.
2.	<ul style="list-style-type: none"> • Revise entire document to replace the term “Transnuclear West” or TN West with “Transnuclear, Inc” or “TN”. • Implement minor editorial type corrections in the entire document as identified. 	N/A	<ul style="list-style-type: none"> • The change reflects the name of the holder of CoC 1029. • Editorial corrections.
Chapter 1			
3.	Delete statement on page 1.2-1 regarding a model number for each AHSM similar to that used for the 24PT1-DSC.	721029-27	No requirement exists to specify a model number for the AHSM. No change to the design configuration of the AHSM.
4.	Add a statement on page 1.2-2 which addresses the design function of the fuel spacers	72-1680	Provide clarification to the description of the DSC basket. No new component is added, since the fuel spacers are currently included in the DSC drawings.
5.	Add a statement on page 1.2-2 which addresses the design function of the Failed Fuel Cans.	721029-25	Provide clarification to the description of the DSC basket. No new component is added, since the fuel cans are currently included in the SAR drawings and analyzed in the SAR.
6.	Revise FSAR sketches (Figures 1.1-1, 1.2-1)	721029-23	Pictorial changes to the FSAR sketches to reflect the changes implemented to the AHSM SAR drawings.

Chg. No	Brief Description of Change	Ref. SRS/SE	Justification
Chapter 2			
7.	Revise Table 2.5-1 to list additional components and their respective safety classification	721029-27	No new components are added. Each of the added components is currently included in the SAR drawings and evaluated in the SAR. The level of detail in Table 2.5-1 is enhanced by listing additional components not listed previously.
Chapter 3			
8.	Add a paragraph on page 3.1-4 to provide a description of the design features of the Failed Fuel Can provided to store damaged fuel assemblies.	72-1798	This change provides a description of the Failed Fuel Cans. No new component is added, since the Failed Fuel Cans are currently included in the SAR drawings and analyzed in the SAR.
9.	Correct a sentence in the last paragraph of section 3.1.1.2 (page 3.1-5) to say "AHSM cask restraint" instead of "AHSM docking collar".	721029-27	Correction of the terminology used. No change in any design features.
10.	On page 3.1-7, section 3.1.2.1.3.2, 3 rd paragraph, delete first sentence and add "fuel spacers" to the list of basket components that are not affected by the internal pressure loads. Also, revise section 3.6.1.2.5 (pages 3.6-10 and 3.6-11) to document the supporting structural analysis of the modified configuration of the top and bottom fuel spacers. This change is also incorporated in 24PT1 DSC drawings.	72-1680	The configuration of the top and bottom fuel spacers was modified to provide holes in both ends to demonstrate that they remain intact during hypothetical accident conditions. This revised configuration of the fuel spacers and the supporting analysis is documented in RAI responses for addition of 24PT1 DSC to MP 187 Cask (CoC 9255, Revision No. 6).
11.	Add a sentence to section 3.1.2.2.1 (page 3.1-9) that clarifies that the ACI-318 requirements for air entrainment controls are only applicable to sites subject to freeze/thaw environments.	721029-27	Provide clarification that air entrainment requirements for the AHSM concrete design mix, per ACI-318, are applicable to those sites where the AHSMs are susceptible to freeze/thaw conditions. No new criteria are being specified.
12.	Revise SAR Table 3.6-9 to reflect the stress analysis results of the support rods with optional thread reliefs. This change also affects 24PT1 DSC Assembly drawing NUH-05-4010, sheets 3 and 4.	72-1803	The optional thread relief in the support rods results in a small increase in support rod calculated stress. This increased value remains less than the allowable
13.	<ul style="list-style-type: none"> • Revise FSAR sketches (Figures 3.1-6, 3.1-7, 3.2-2, 3.6-15). • Figure 4.4-1 in Chapter 4 and Figure 5.1-3 in Chapter 5 also revised for the same reason. 	721029-23	Pictorial changes to the FSAR sketches to reflect the changes implemented to the AHSM SAR drawings.

Chg. No	Brief Description of Change	Ref. SRS/SE	Justification
14.	Revise Table 3.6-1 to change the internal pressure values from psi to psig.	721029-27	Terminology change to eliminate ambiguity, no change to actual parameter values or any change in analysis.
15.	<ul style="list-style-type: none"> • Revise SAR section 3.6.2.4.4 to reflect the increase in span length for the heat shield supports (from 39" to 42") to accommodate longer heat shields, resulting in a change in reported frequencies. • In accordance with SAR drawing NUH-05-4010, Note 23, stainless steel fasteners with equivalent strength were added as alternates for AHSM components. In addition, changes in AHSM key reinforcement details to incorporate fabricability review comments. • Revise the width of the stiffeners on the DSC support steel rails. Update the stiffener plate stress ratios reported in SAR Table 3.6-19. • Updated the qualification of removable inlet (lower) vent cover and simplified the rebar design. 	721029-35	<ul style="list-style-type: none"> • The calculated stress ratio for the heat shield supports (studs) remains less than 1.0 as reported in SAR section 3.6.2.4.4. • The revised capacities and stress ratios for the affected components are reported in SAR Table 3.6-21. The alternate stainless steel fasteners are qualified since the ratios remain less than 1.0. The SAR Table 3.6-21 is also updated to reflect the increase in capacities from the key reinforcement changes. • The revised structural analysis qualifies the reduced width of the stiffeners. As shown in the revised SAR Table 3.6-19, the stress ratios remain less than 1.0. • The removable inlet (lower) vent cover is not a load carrying member and is provided for shielding purposes only. SAR Tables 3.6-14 and 3.6-15 are revised accordingly for Item B4.

Chg. No	Brief Description of Change	Ref. SRS/SE	Justification
Chapter 4			
16.	<p>Add a new paragraph in Section 4.1-2 (page 4.1-2) to provide a cross reference to the new section 4.8.2.</p> <p>Add a new section 4.8.3 which provides validation of the thermal analysis methodology using the HEATING7 model for 24PT1 DSC basket. This includes a new Table 4.8-1, which provides the results of the validation against NUHOMS-7P test data.</p> <p>Add a new section 4.8.4, which provides an alternative confirmatory analysis of the 24PT1 DSC. This includes new Tables 4.8-2, Table 4.8-3, Figures 4.8-1 thru 4.8-3 which provide the results of the alternative confirmatory analysis and comparison against test data.</p>	721029-27	<p>Addresses SER 15.2.2.2 open item to perform a validation of the thermal analysis methodology for the 24PT1 DSC prior to future 72.48 evaluation or submittal of an amendment to CoC 1029.</p> <p>The confirmatory analysis is based on an alternate methodology to that used for the HEATING7 model and provides confirmation of the peak cladding temperatures and critical basket component temperatures presented in the SAR. The alternate analysis is also validated against test data.</p>
17.	<p>Revise the third paragraph in section 4.4.2.2 (page 4.4-4) to reflect the solar insolation value recommended by NUREG-1536 of 123 BTU/hr-ft². Also, Table 4.1-1 is revised to reflect these revised insolation values.</p> <p>In addition, delete the fourth paragraph on the same page which provides justification for the ASHRAE methodology, since these values are non conservative.</p>	721029-33	Addresses SER item 15.2.2.1 related to the use of a non-conservative solar insolation value. The supporting thermal analysis is revised to reflect the correct NUREG 1536 value of 123 BTU/hr-ft ² and the SAR is updated accordingly.
18.	Revise Table 4.4-7 to specify the correct MOX/SC fuel temperature limits of 1058/806 degrees F for the 0° F case.	721029-27	Correction of a typographical error in Table 4.4-7. This change makes the fuel cladding limits stated in this Table consistent with those stated in Table 4.1-3. No new or revised requirements are added.

Chg. No	Brief Description of Change	Ref. SRS/SE	Justification
Chapter 5			
19.	<ul style="list-style-type: none"> • Add a new paragraph to page 5-1 to provide a cross-reference to the new section 5.5.2 added. • Add a new section 5.5.2 which provides the results using a new 3-D shielding analysis using MCNPX code. It also provides a comparison of the results of the 3-D analysis against the 2-D shielding analysis results reported in Sections 5.1 through 5.4 performed using the DORT code. • The 3-D shielding analysis is also validated against actual measured dose rate data obtained from an operating ISFSI facility. 	721029-27	<ul style="list-style-type: none"> • Addresses SER 15.2.1 open item to perform a 3-D analysis that has been validated against actual test data. • Demonstrates that the results of the 3-D shielding analysis are bounded by a 2-D shielding analysis (DORT).
Chapter 6			
20.	<ul style="list-style-type: none"> • Revise Table 6.1-1 to incorporate the sensitivity analysis for the fuel clad ID (thickness based on nominal fuel clad ID vs maximum fuel clad ID) evaluation from Table 6.4-6. Revise section 6.4.5 (page 6.4-5) to reflect this clarification. • Add a footnote to Table 6.3-2 to document that modeling of the aluminum cladding and core matrix of BORAL[®] separately is within the statistical uncertainty of the criticality analysis results currently reported in this table using homogenization. 	721029-27	<ul style="list-style-type: none"> • This change addresses SER open item 15.2.3.1 to use the bounding tolerance values in the criticality analysis prior to future 72.48 evaluations or submittal of an amendment to CoC 1029. • The supporting criticality analysis has been revised to reflect the modeling of the aluminum cladding and core matrix of BORAL[®] separately. The results are reflected in SAR Table 6.3-2. This change addresses SER open item 15.2.3.2.
Chapter 8			
21.	Revise section 8.1.1.1 (steps 1 and 6), and section 8.1.1.2 (steps 5, 6, and 8) to specifically address the loading of damaged fuel into failed fuel cans. In addition, revise Figure 8.1-1 to address placement of failed fuel cans into the DSC, as required.	72-1798	Revise the sequence of steps listed in Chapter 8 to explicitly address the loading of damaged fuel into failed fuel cans. This change addresses the exception noted in SER section 8.1.1.
22.	Add a caution statement to sections 8.1.1.5, 8.1.1.6, and 8.2.1 to cross reference the Technical Specifications regarding the requirements of lifting height and ambient temperature requirements for loading and transfer.	721029-27	Provide clarification to the user of the NUHOMS system. This change highlights applicability of Technical Specifications for specific operational steps and does not implement any changes to the operational procedures.

Chg. No	Brief Description of Change	Ref. SRS/SE	Justification
Chapter 9			
23.	Revise first paragraph of section 9.1.3 (page 9.1-2) to clarify that the qualifications specified in SNT-TC-1A are applicable to both site and fabricator personnel who perform the leak tests.	721029-27	This change addresses the exception noted in SER section 9.1.2.
24.	<ul style="list-style-type: none"> • Revise section 9.1-7, fourth paragraph (page 9.1-3), to change the sample size requirements from 1 inch² to 1 cm² square in accordance with the requirements specified in Chapter 9 of the SER. • Add 2 new paragraphs at the end of section 9.1-7 to specify two alternate methods of determining the 95/95 confidence level for the neutron absorber tests. 	721029-27	<ul style="list-style-type: none"> • Address open item from SER section 9.1.3 (second last paragraph, page 9-2). • Address the recommended sampling technique from SER page 9-2, first paragraph. Also added an alternative sampling technique.
Chapter 10			
25.	Revise section 10.3.1.5 to add a cautionary statement regarding limiting personnel access during an array expansion when the shield wall is removed.	721029-27	This is the addition of a specific cautionary step during an ISFSI array expansion to ensure ALARA is practiced. There are no changes involved to the operational steps for an ISFSI expansion.
Chapter 11			
26.	Revise section 11.2.1.2.1 to document the additional analysis case performed using a friction coefficient of 0.8 between AHSM and the pad surfaces. The results of the study were previously provided in Table 11.2-2 during response to RAI No. 1. This change revises the text to clarify this sensitivity evaluation was performed.	721029-27	This change incorporates RAI No. 1 response into the SAR and makes the updated SAR consistent with the SER.
27.	Add a new section 11.2.1.2.7 to document OS197 transfer Cask response to a 1.5g earthquake when mounted on the transfer trailer.	721029-27	The response to a 1.5g seismic event for a loaded OS197 during transfer is bounded by an 80" HAC cask drop analyzed in the SAR.
Chapter 12			
28.	The contents of Chapter 12 are now contained as Attachments A and B to CoC 1029. To avoid duplication, delete the contents of Chapter 12. Instead, add a new table that provides a cross-reference to the individual list of Technical Specifications and associated Bases.	721029-27	Avoid redundancy and minimize errors in maintaining 2 sets of identical documents. No changes are made to any of the Technical specifications.

Chg. No	Brief Description of Change	Ref. SRS/SE	Justification
NUHOMS 24PT1-DSC Drawing NUH-05-4010 Changes			
29.	<ul style="list-style-type: none"> • Revise the DSC Basket Assembly drawing to change the configuration of the Bottom and Top Fuel Spacers (change the fuel spacers to have holes in both ends, add tolerances to the height dimension). • Add a clarification statement for the weld around the grapple ring drain hole. This weld connects the key to the grapple ring support. 	72-1680	<ul style="list-style-type: none"> • The configuration of the top and bottom fuel spacers was modified to provide holes in both ends to demonstrate that they remain intact during hypothetical accident conditions. This revised configuration of the fuel spacers and the supporting analysis is documented in RAI responses for addition of 24PT1 DSC to MP 187 Cask (CoC 9255, Revision No. 6). • The revised structural analysis qualifies this revised weld detail.
30.	Add Flag Note 50 to allow thread reliefs for the support rods (item 12).	72-1803	The optional thread relief in the support rods slightly increases the total stress in the rods. This increase remains less than allowable as documented in SAR Table 3.6-9.
31.	<p>Revise the DSC guide sleeve configuration to add notches at the top of the guide sleeve to allow proper interface with the Failed Fuel Can Top Lid Assembly's bolting hardware. A new Flag Note 42 is added to make these cutouts mandatory for guide sleeves that will house the Failed Fuel Cans and limit locations where the these guide sleeve are to be located in the basket assembly.</p> <p>A new Flag Note 47 is added to make these cutouts optional for all the guide sleeves in the DSC to allow flexibility in fabrication of the guide sleeves.</p>	72-1798	The addition of four notches to the guide sleeve has a negligible effect on the structural analysis. For an end drop scenario, there is a small increase in the axial stress. In a side drop scenario there is no impact on the analysis since the lateral load is absorbed by the spent fuel assembly's end fittings.
32.	Revise the Failed Fuel Can top lid assembly to interface with the fuel handling equipment provided by the licensee. Also, the mesh drain on the side of the can liner is modified while remaining compliant to Note 31 requirements (equivalent screen area).	721029-25	SAR Section 3.6.1.2.5 states that the Failed Fuel Can structural analysis is enveloped by the guide sleeve structural analysis contained in Section 3.6.1.2.2. These changes in the Failed Fuel Can top lid assembly do not alter this conclusion.
33.	Add a new Flag Note 51 to allow cutouts in the Type A Guide Sleeves flares to eliminate interference with the DSC Support Ring and Siphon and Vent block. In addition, add a new Flag Note 52 to identify the specific locations where these modified guide sleeves are to be installed into the basket assembly.	721029-21	The revised structural analysis demonstrates that the maximum calculated stresses remain below the allowables for this modified DSC Guide Sleeve configuration.

Chg. No	Brief Description of Change	Ref. SRS/SE	Justification
NUHOMS AHSM Drawing NUH-05-4011 Changes			
34.	The SAR drawing parts list descriptions for Items 20, 40, 45 and 68 is changed from "WASHER, HARDENED" to "WASHER", for consistency with the procurement drawing.	721029-23	This is a drawing correction. There are no structural requirements that these washers be hardened.
35.	The SAR drawing depicts four base plates on the DSC Support Structure that are bolted and grouted to the angled concrete supports inside the module. The SAR drawing is changed to require only two connections at the rear of the structure without grouting the fasteners. This change affects Sections D, E, and P, Detail 5, the DSC Support Structure Assembly view, and the parts list quantity of Items 13, 28, and 54 thru 57. The threaded fasteners are changed from set screws to studs (Item 54).	721029-23	The base plates and fasteners are provided for construction purposes only; they provide a means to level and secure the DSC Support Structure during final rail alignment and grouting. There are no design loads thru the base plates and fasteners, and their design, which has large oversized slotted holes, does not interfere with the thermal expansion of the rails.
36.	The SAR drawing is changed to add two additional Lower Heat Shield supports. This change affects Sections D and H and the parts list quantity of Items 27, 49, 63 and 64. The associated calculation changes for the additional supports are screened and evaluated in SRS 721029-35.	721029-23	The two additional supports is a conservative improvement that helps maintain the gap between the concrete and heat shield and lowers stresses in the heat shield.
37.	The SAR drawing incorrectly identified the material specification for the DSC Support Structure Cross Beam, as ASTM A240 (Type 304). This is a plate specification. The applicable standard is ASTM A479 (Type 304). Both standards are stainless steel type 304, but for different rolled shapes (e.g., plate vs angles). The SAR drawing is corrected to specify ASTM A479 for Item 14 in the parts list.	721029-23	There is no change to material properties, just clarification of the appropriate standard used for structural angles.
38.	Add Flag Note 29 to allow alternate material form for the cross beam. Add Flag Note 30 to allow alternate weld for connecting the cross beam to the gusset plate.	72-1787	The alternate material form is added to provide fabrication flexibility. The revised structural analysis qualifies the alternate weld.
39.	The SAR drawing identifies the embedments used to secure the front of DSC Support Structure as Dayton Superior F-57 NC, which is for 1" fasteners. These are revised to be 1 1/2" fasteners, which require the Dayton Superior F-61 NC embedment. The SAR drawing is changed to show and identify the correct size embedment. This change affects the parts list description of Item 37.	721029-23	This is a correction that does not have an adverse affect on the structural, shielding, thermal, criticality analyses or design functions as described in the SAR.

Chg. No	Brief Description of Change	Ref. SRS/SE	Justification
40.	<p>The SAR drawing identified the material specification for the deformed bar anchor in the door plate as ASTM A108, which is applicable for welded studs. The deformed bar anchor is considered a welded stud for welding purposes, but is manufactured as ASTM A496.</p> <p>The SAR drawing is revised to ASTM A496 for Item 2 in the parts list.</p>	721029-23	There is no change to the desired material properties for the anchors, just a correction that identifies the appropriate standard used for deformed bar anchors. The corrected material specification provides the same design attributes as the original material specification.
41.	<p>The SAR Drawing NUH-03-4011, Revision 1, Notes 1 and 6 specified an incorrect effective date for the concrete construction code, ACI 318.</p> <p>SAR drawing Notes 1 and 6 are changed to identify the correct ACI construction code, ACI 318-89(92).</p>	72-1744	This is a correction of a typographical error and does not impose any new requirements. The same change was made in the text of the SAR and screened and evaluated in SRS/SE 72-1744.
42.	The SAR drawing is revised to add flexible material around the rebar connectors and to remove the #3 rebar ties.	721029-23	The flexible material around the connectors is a betterment that helps assure the connection performs as designed by preventing the concrete from loading the connection in shear.
43.	Consistent with the AHSM structural calculation requirements, the rebar details for the Storage Block (Base) were updated and corrected. Changes affect reinforcement of the shear key and shield block (large mass of concrete below the access opening, above the inlet vent).	721029-23	The changes represent betterments and/or an improvement in reinforcement details that either conservatively reduce computed rebar stresses, or simplify details for reinforcement governed by good practice (i.e., not required by analyses).
44.	Rebar details for the Lower (Inlet) Vent Cover were updated. Changes affect the front and rear face reinforcement and the size of the rebar ties for the Lower Vent Cover.	721029-23	The Lower (Inlet) Vent Cover primarily provides shielding and does not provide a direct structural function. The changes represent enhancement and/or an improvement in reinforcement details that simplifies details for reinforcement governed by good practice.
45.	The shape of the Lower (Inlet) Vent Cover was simplified to a rectangular block and the size of the mating recess in the Base was adjusted accordingly.	721029-23	The change is a betterment that simplifies fabrication of the cover and Base. The increase in the Base recess size is considered in the structural analysis and has no adverse affect.

Chg. No	Brief Description of Change	Ref. SRS/SE	Justification
46.	The SAR AHSM door drawing is changed to (a) show #4 bars (at 6" each way) on the outside face and (b) add #4 ties at 6" each way tying the inside face rebar layers to an outside face rebar layer.	721029-23	The design for the primary reinforcement of the door is based on missile impact which requires #8 bars on the inside surface only, with rebar ties joining the inside and outside face rebar layers. Therefore the outside surface reinforcement is simplified to accommodate temperature and shrinkage reinforcement and the required rebar ties are added.
47.	The SAR rebar details for the Top Shield Block (Roof) were updated and corrected drawing to show (a) #6 bars (at 6" each way) instead of #8 bars (Section L) and (b) add identification of #6 U-bars at 6" for key reinforcement (Rear Elevation cut-away view). Changes affected the side face reinforcement and the key reinforcement.	721029-23	There is no change to the structural reinforcement requirements. The reinforcement for the sides of the roof, are not directly determined/computed by analysis, changed from using #8 bars, to #6 bars. The #6 bars provide sufficient reinforcement to satisfy ACI code requirements The Roof key reinforcement details are shown in the SAR drawing for consistency with Base key reinforcement details.
48.	The SAR drawing is changed to (a) eliminate the erroneous lines shown thru the DSC Stop Plate (Item 47) in Section D and (b) add appropriate lines to correctly depict the vertical key and outlet vent recess in Section L for the Roof.	721029-23	This change corrects a drafting error.
49.	The SAR rebar details for the Shield Wall are changed to show #6 bars at 8" on all panel surfaces, except for the primary reinforcement which is satisfied with #8 bars at 8" in the following orientation and panel surfaces: vertical inside face of front end walls (Types LF and RF), horizontal inside face of rear end walls (Types LR and RR) and horizontal inside and outside face of the rear wall.	721029-23	The reinforcement requirements may be satisfied using several bar size and spacing patterns, which is conveyed in SAR drawing Note 6. Reinforcement details for the shield walls are changed to provide a uniform spacing and to show the primary bars at their effective surfaces.
50.	For consistency and completeness, additional weld details are added to show welds for the DSC stop plate and its weld to the rail (Items 3, 4 and 5), and the weld joining the rail extension plate and baseplate to the rail (Items 3, 8 and 10).	721029-23	This change provides consistency of weld details shown on the SAR drawing.