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BY OVERNIGHT MAIL

October 10, 2000

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Subject: USNRC Docket No. 72-1014
HI-STORM License Amendment Request 1014-1, Revision 1, Supplement 1 (**Non-Proprietary Version**)

References:
1. Holtec Project 5014
2. Holtec Letter, B. Gutherman, to NRC Public Document Room, dated September 1, 2000
3. Holtec Letter, B. Gutherman, to NRC Public Document Room, dated October 6, 2000

Dear Sir:

On September 1, 2000 Holtec International submitted the non-proprietary version of License Amendment Request (LAR) 1014-1, Revision 1 to the NRC (Ref. 2). On October 6, 2000 Holtec submitted the proprietary version of Supplement 1 to License Amendment Request (LAR) 1014-1, Revision 1 to the NRC (Ref. 2). Enclosed herewith is the supplemental non-proprietary information from LAR 1014-1, Revision 1, Supplement 1 for placement in the public document room. This submittal augments the Reference 2 submittal package by providing the following non-proprietary information:

- Replacement versions of proposed changes to Limiting Condition for Operation (LCO) 3.1.2 from Appendix A to CoC 1014, and its associated Bases for Appendix 12.A of Proposed Revision 1 to the HI-STORM Final Safety Analysis Report (FSAR).
- Replacement versions of Bill-of-Material 1477, Sheets 1 and 2.
- Proposed FSAR Revision 1 Figures 3.1.2, 3.1.3, 3.4.2, and 3.4.5.

The balance of the non-proprietary information submitted under Reference 2 remains valid. If you have any questions or require additional information, please contact me at (856) 797-0900, extension 668.

Sincerely,

Brian Gutherman, P.E.
Licensing Manager

cc: Mr. Christopher Jackson, USNRC (cover letter only)

Document ID: 5014404

Enclosures: As Stated

NMSS01Public

3.1 SFSC INTEGRITY

3.1.2 SFSC Heat Removal System

LCO 3.1.2 The SFSC Heat Removal System shall be ~~OPERABLE~~ *operable*

APPLICABILITY: During STORAGE OPERATIONS.

ACTIONS

----------NOTE----------
Separate Condition entry is allowed for each SFSC.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. SFSC Heat Removal System inoperable.	A.1 Restore SFSC Heat Removal System to ~~OPERABLE~~ *operable* status.	8 hours
B. Required Action A.1 and associated Completion Time not met.	B.1 Perform SR 3.2.3.1.	Immediately and ~~every~~ *once per* 12 hours thereafter
	<u>AND</u>	
	B.~~3~~ *2*.1 Restore SFSC Heat Removal System to ~~OPERABLE~~ *operable* status.	48 hours
	<u>OR</u>	
	B.~~3~~ *2*.2 Transfer the MPC into a TRANSFER CASK.	48 hours
	<u>OR</u>	
	B.3.1 Verify an alternate method of heat removal is available.	*24 hours*
	<u>AND</u>	
	B.3.2 Restore SFSC heat removal system to operable status.	*7 days*

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.1.2.1	Verify all OVERPACK inlet and outlet air ducts are free of blockage.	24 hours
	OR	
	For OVERPACKS with installed temperature monitoring equipment, verify *that* the difference between the average OVERPACK air outlet temperature and ISFSI ambient temperature is $\leq$ *126°F.* ~~99° F (for the MPC-24) and $\leq$ 105° F (for the MPC-68 and MPC-68F)~~	24 hours

3.1 SFSC INTEGRITY

3.1.2 SFSC Heat Removal System

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APPLICABILITY: During STORAGE OPERATIONS.

ACTIONS

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A. SFSC Heat Removal System inoperable.	A.1 Restore SFSC Heat Removal System to operable status.	8 hours
B. Required Action A.1 and associated Completion Time not met.	B.1 Perform SR 3.2.3.1.	Immediately and once per 12 hours thereafter
	AND	
	B.2.1 Restore SFSC Heat Removal System to operable status.	48 hours
	OR	
	B.2.2 Transfer the MPC into a TRANSFER CASK.	48 hours
	OR	
	B.3.1 Verify an alternate method of heat removal is available.	24 hours
	AND	
	B.3.2 Restore SFSC heat removal system to operable status.	7 days

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B 3.1 SFSC Integrity

B 3.1.2 SFSC Heat Removal System

BASES

BACKGROUND

The SFSC Heat Removal System is a passive, air-cooled, convective heat transfer system which ensures heat from the MPC canister is transferred to the environs by the chimney effect. Relatively cool air is drawn into the annulus between the OVERPACK and the MPC through the four inlet air ducts at the bottom of the OVERPACK. The MPC transfers its heat from the canister surface to the air via natural convection. The buoyancy created by the heating of the air creates a chimney effect and the air is forced back into the environs through the four outlet air ducts at the top of the OVERPACK.

APPLICABLE SAFETY ANALYSIS

The thermal analyses of the SFSC take credit for the decay heat from the spent fuel assemblies being ultimately transferred to the ambient environment surrounding the OVERPACK. Transfer of heat away from the fuel assemblies ensures that the fuel cladding and other SFSC component temperatures do not exceed applicable limits. Under normal storage conditions, the four inlet and four outlet air ducts are unobstructed and full air flow (i.e., maximum heat transfer for the given ambient temperature) occurs.

Analyses have been performed for the complete obstruction of two, three, and four inlet air ducts. Blockage of two inlet air ducts reduces air flow through the OVERPACK annulus and decreases heat transfer from the MPC. Under this off-normal condition, no SFSC components exceed the short term temperature limits.

Blockage of three inlet air ducts further reduces air flow through the OVERPACK annulus and decreases heat transfer from the MPC. Under this accident condition, no SFSC components exceed the short term temperature limits.

(continued)

BASES

APPLICABLE SAFETY ANALYSIS (continued)

The complete blockage of all four inlet air ducts stops air cooling of the MPC. The MPC will continue to radiate heat to the relatively cooler inner shell of the OVERPACK. With the loss of air cooling, the SFSC component temperatures will increase toward their respective short-term temperature limits. The limiting component is OVERPACK concrete temperature, which, by analysis, approaches its temperature limit in 33 hours if no action is taken to restore air flow to the heat removal system. The analysis assumed a 72 hour duration. At 72 hours, the fuel cladding temperature remains below the short term temperature limit.

LCO

The SFSC Heat Removal System must be verified to be ~~OPERABLE~~ *operable* to preserve the assumptions of the thermal analyses. Operability of the heat removal system ensures that the decay heat generated by the stored fuel assemblies is transferred to the environs at a sufficient rate to maintain fuel cladding and other SFSC component temperatures within design limits.

APPLICABILITY

The LCO is applicable during STORAGE OPERATIONS. Once an OVERPACK containing an MPC loaded with spent fuel has been placed in storage, the heat removal system must be ~~OPERABLE~~ *operable* to ensure adequate heat transfer of the decay heat away from the fuel assemblies.

ACTIONS

A note has been added to the ACTIONS which states that, for this LCO, separate Condition entry is allowed for each SFSC. This is acceptable since the Required Actions for each Condition provide appropriate compensatory measures for each SFSC not meeting the LCO. Subsequent SFSCs that don't meet the LCO are governed by subsequent Condition entry and application of associated Required Actions.

(continued)

BASES

ACTIONS
(continued)

A.1

If the heat removal system has been determined to be inoperable, it must be restored to ~~OPERABLE~~ *operable* status within eight hours. Eight hours is reasonable based on the accident analysis which shows that the limiting SFSC component temperature will not reach its temperature limit for 33 hours after a complete blockage of all inlet air ducts. This time frame allows for the 24 hour surveillance interval (assuming complete blockage immediately after successful performance of the previous surveillance) plus eight hours (typically, one operating shift) to take action to remove the obstructions in the air flow path.

B.1

If the heat removal system cannot be restored to ~~OPERABLE~~ *operable* status within eight hours, the innermost portion of the OVERPACK concrete may be affected. Therefore, Surveillance Requirement (SR) 3.2.3.1 is required to be performed to determine the effectiveness of the radiation shielding provided by the concrete. This SR must be performed immediately and repeated every twelve hours thereafter to provide timely and continued evaluation of whether the concrete is providing adequate shielding. As necessary, the cask user shall provide additional radiation protection measures such as temporary shielding. The Completion Time is reasonable considering the expected slow rate of deterioration, if any, of the concrete under elevated temperatures.

B.2.1

In addition to Required Action B.1, efforts must continue to restore cooling to the SFSC. Efforts must continue to restore the heat removal system to ~~OPERABLE~~ *operable* status by removing the air flow obstruction(s) unless optional Required Action B.2.2 is being implemented.

(continued)

BASES

ACTIONS
(continued)

This Required Action must be complete in 48 hours. The Completion Time reflects a conservative total time period without any cooling of 80 hours, assuming all of the inlet air ducts become blocked immediately after the last previous successful Surveillance. The results of the thermal analysis of this accident show that the fuel cladding temperature does not reach its short term temperature limit for more than 72 hours. It is also unlikely that an unforseen event could cause complete blockage of all four air inlet ducts immediately after the last successful Surveillance.

B.2.2

Since the thermal analyses show that the concrete approaches its short term temperature limit at 33 hours, action must be taken to ensure the fuel in the MPC does not exceed its short term temperature limit. In lieu of implementing Required Action B.2.1, transfer of the MPC into a TRANSFER CASK will place the MPC in an analyzed condition and ensure adequate fuel cooling until actions to correct the heat removal system inoperability can be completed. Transfer of the MPC into a TRANSFER CASK removes the SFSC from the LCO Applicability since STORAGE OPERATIONS does not include times when the MPC resides in the TRANSFER CASK.

An engineering evaluation must be performed to determine if any concrete deterioration has occurred which prevents it from performing its design function. If the evaluation is successful and the air flow obstructions have been cleared, the OVERPACK heat removal system may be considered ~~OPERABLE~~ *operable* and the MPC transferred back into the OVERPACK. Compliance with LCO 3.1.2 is then restored. If the evaluation is unsuccessful, the user must transfer the MPC into a different, fully qualified OVERPACK to resume STORAGE OPERATIONS and restore compliance with LCO 3.1.2

(continued)

BASES

ACTIONS

B.2.2 (continued)

In lieu of performing the engineering evaluation, the user may opt to proceed directly to transferring the MPC into a different, fully qualified OVERPACK or place the TRANSFER CASK in the spent fuel pool and unload the MPC.

The Completion Time of 48 hours reflects a conservative total time period without any cooling of 80 hours, assuming all of the inlet air ducts become blocked immediately after the last previous successful Surveillance. The results of the thermal analysis of this accident show that the fuel cladding temperature does not reach its short term temperature limit for more than 72 hours. It is also unlikely that an unforseen event could cause complete blockage of all four air inlet ducts immediately after the last successful Surveillance.

B.3.1

If the SFSC heat removal system cannot be restored to operable status within the Completion Time of Required Action B.2.1 and it is not desirable or feasible to transfer the MPC into a TRANSFER CASK, users may perform an analysis or provide alternate cooling system (or a comb nation of both) to confirm adequate heat removal is taking place to prevent short term fuel cladding temperature limits from being exceeded. For example, if a flooding event submerges all inlet ducts, it is acceptable to show by analysis that, given the actual decay heat load in the cask and ambient conditions, adequate heat removal is still taking place with only the upper vents available or with alternate means of cooling. The Completion Time of 24 hours is considered a reasonable amount of time to perform such an analysis but is short enough to reflect the safety significance of the Condition.

continued

BASES

ACTIONS (continued)

B.3.2

Notwithstanding the alternate verification of adequate heat removal allowed by Required Action B.3.1, the SFSC heat removal system must be restored to operable status within seven days. Seven days is considered a reasonable amount of time to restore the system to operable status in the event of a natural phenomenon such as a flood, which submerges all four inlet air ducts.

SURVEILLANCE REQUIREMENTS

SR 3.1.2.1

The long-term integrity of the stored fuel is dependent on the ability of the SFSC to reject heat from the MPC to the environment. There are two options for implementing SR 3.1.2.1, either of which is acceptable for demonstrating that the heat removal system is OPERABLE.

Visual observation that all four inlet and outlet air ducts are unobstructed ensures that air flow past the MPC is occurring and heat transfer is taking place. Complete blockage of any one or more inlet or outlet air ducts renders the heat removal system inoperable and this LCO not met. Partial blockage of one or more inlet or outlet air ducts does not constitute inoperability of the heat removal system. However, corrective actions should be taken promptly to remove the obstruction and restore full flow through the affected duct(s).

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.1.2.1 (continued)

As an alternative, for OVERPACKs with air temperature monitoring instrumentation installed in the outlet air ducts, the temperature rise between ambient and the OVERPACK air outlet may be monitored to verify operability of the heat removal system. Blocked inlet or outlet air ducts will reduce air flow and increase the temperature rise experienced by the air as it removes heat from the MPC. Based on the analyses, provided the air temperature rise is less than the limits stated in the SR, adequate air flow and, therefore, adequate heat transfer is occurring to provide assurance of long term fuel cladding integrity. The reference ambient temperature used to perform this Surveillance shall be measured at the ISFSI facility.

The Frequency of 24 hours is reasonable based on the time necessary for SFSC components to heat up to unacceptable temperatures assuming design basis heat loads, and allowing for corrective actions to take place upon discovery of blockage of air ducts.

REFERENCES

1. FSAR Chapter 4
2. FSAR Sections 11.2.13 and 11.2.14

BILL OF MATERIALS FOR 32-ASSEMBLY HI-STAR 100 PWR MPC.(BM-1477)
(E.I.D. 2849)

REF. DWG. 1392 & 1393.

REV. NO.	PREP. BY & DATE	CHECKED BY & DATE	PROJ. MANAGER & DATE	QA. MANAGER & DATE
9	J.A. 4-11-00 ECO 1023-1, ECO 5014-6	B.G. 9/13/00	9/13/00	S.S. 9/13/00.

ITEM NO.	QTY.	MATERIAL	DESCRIPTION	NOMENCLATURE
1A	5	ALLOY "X" SEE NOTE 1.	PLATE 9/32" THK.X 55.59" W. X 176 1/2" LG	BASKET CELL PLATE
1B	2	ALLOY "X" SEE NOTE 1.	PLATE 9/32" THK X 37.15"W. X 176 1/2"LG.	BASKET CELL PLATE
1C	38	ALLOY "X" SEE NOTE 1.	PLATE 9/32" THK X 8.937" (REF) W. X 176 1/2"LG.	BASKET CELL PLATE
9 3A	52	BORAL	.101"THK. X 7.5"W. X 156" LG.PER DET.DWG.1392. SEE NOTE 2.	NEUTRON ABSORBER
9 4A	52	ALLOY "X" SEE NOTE 1.	.075" THK. SHEATHING PER DET. DWG. 1392.	SHEATHING
5A	32		PLATE 3/8"THK X 8.5" SQ.	LOWER FUEL SPACER END PLATE
5B	32		PLATE 3/8"THK X 8.5" SQ.	LOWER FUEL SPACER END PLATE
6	1		1/2" THK X 68 3/8" O.D. X 187 5/8" LG. CYLINDER.	SHELL
7	1		BASEPLATE 2 1/2" THK X 68 3/8" O.D.	BASEPLATE
8A	4		PLATE 5/16"THK.X 14" APPROX. W X 168" LG. PER DET. DWG.1392.	BASKET SUPPORT
8B	8		PLATE 5/16"THK. X 14" APPROX.W X 168" LG. PER DET.DWG. 1392.	BASKET SUPPORT
8C	--		DELETED	----
9 9A	12		1" WIDE X 168" LG. THICKESS AS REQD.	BASKET SUPPORT SHIM
9 9B	---	---	DELETED	----
9C	---	---	DELETED	----
9 9D	AS REQD.	ALLOY "X" SEE NOTE 1.	AS REQD.	BASKET SUPPORT
9 9E	---	---	DELETED	----
10	4	ALLOY "X" SEE NOTE 1.	PLATE 3/4" THK. X 3 1/2" WIDE X 8 3/4" LG.	LIFT LUG
11	4		PLATE 3/4" THK. X 3" WIDE X 4" LG.	LIFT LUG BASEPLATE
12	1		BAR 3 3/4" OD. x 5 7/8" LG.	DRAIN SHIELD BLOCK
9 13A	2	304 S/S	BAR Ø 2 11/16 X 6 3/4" LG, DIMENSION SHOWN ON DWG 1393 SHT4	VENT AND DRAIN TUBE
9 13B	2	304 S/S	BAR Ø 2 1/4 X 2 1/4" LG, DIMENSION SHOWN ON DWG 1393 SHT4	VENT AND DRAIN TUBE CAP
14	1	ALLOY "X" SEE NOTE 1.	PLATE 9 1/2" THK. X 67 1/4" O.D.	MPC LID
9 15	1	ALLOY "X" SEE NOTE 1.	RING 3/8" THK.X 53 1/4" ID. X 67 5/8" O.D.	MPC CLOSURE RING
16	1	S/S	2-1/2 SCH 10 PIPE 150" LG W/FUNNEL	DRAIN GUIDE TUBE

BILL OF MATERIALS FOR 32-ASSEMBLY HI-STAR 100 PWR MPC.(BM-1477)
(E.I.D. 2850)

REF. DWG. 1392 & 1393.

REV. NO.	PREP. BY & DATE	CHECKED BY & DATE	PROJ. MANAGER & DATE	QA. MANAGER & DATE
10	J.A. 4-11-2000 INCORPORATED ECO 5014-6, ECO-1021-7 & 8	B.G. 9/13/00	9/13/00	S.S. 9/13/00

ITEM NO.	QTY.	MATERIAL	DESCRIPTION	NOMENCLATURE
17	---	---	DELETED	---
10 18	AS REQD	ALLOY "X" SEE NOTE 1.	AS REQUIRED	BASKET SUPPORT
19	2	ALLOY "X" SEE NOTE 1.	PLATE 3/8" THK. X 3 7/8"OD.	PORT COVER PLATE
20	32	A-193-B8 OR SIMILAR	3/4"-10UNC X 1 3/8"LG. HEX. BOLT FULL THRD.	UPPER FUEL SPACER BOLT
10 21	AS REQD	ALLOY "X" SEE NOTE 1.	3/4" X 2" X THICKNESS AS REQUIRED.	LIFT LUG SHIM
22	---	---	DELETED	---
23	4	A-193-B8 OR SIMILAR	1 3/4"-5UNC X 2 3/4" LG SOCKET SET SCREW	LID LIFT HOLE PLUG
24	32	ALLOY "X" SEE NOTE 1.	3"-SCH 80 PIPE LGTH AS REQD.	UPPER FUEL SPACER PIPE
25	1 SET	ALLOY "X" SEE NOTE1.	LENGTH, WIDTH AND THICKNESS AS REQ'D.	LID SHIM
10 26	1	S/S	COUPLING	COUPLING
10 27	AS REQD	ALLOY "X" SEE NOTE 1.	3/4" X 5" DIAMETER	UPPER FUEL SPACER END PLATE
28	1	ALLOY "X" SEE NOTE1.	BAR 3 3/4" OD. X 5.5" LG.	VENT SHIELD BLOCK
29	4	ALLOY "X" SEE NOTE1.	BAR 3/4" OD. X 1/2" LG.	VENT SHIELD BLOCK SPACER
30	1	ALLOY "X" SEE NOTE1.	2"-SCH 10 PIPE X 173 1/2"APPROX. LG	DRAIN LINE
10 31	4	S/S	SOCKET SET SCREW 1/4-20 1/4" LG	COVER PLATE PLUG
10 32	32	ALLOY "X" SEE NOTE1.	PLATE 3/8" THK X 4" OD.	UPPER FUEL SPACER END PLATE
33	32	S/S SEE NOTE 5	6" SQ. X 1/4" WALL TUBE LGTH AS REQD.	LOWER FUEL SPACER CLUMN
10 34	AS REQD.	ALUM. 1100	1/8" THK. ALUM. SHEET AS REQD X 176 1/2" LG (153" LG APP. AT DRAIN PIPE LOCATION) WITH S/S SPRINGS.	HEAT CONDUCTION ELEMENTS
35	2	ALUMINUM	0.065" THK X 1.484 OD, .250 HOLE	SEAL WASHER
36	2	S/S	1/4" DIA X 3/8" LG	SEAL WASHER BOLT
37	2	ALLOY "X" SEE NOTE1.	1/8" THK	DRAIN LINE
10 38	---	--------	DELETED	---------

NOTES: (FOR SHEET 1 & 2)

1. ALLOY X IS ANY OF THE FOLLOWING ACCEPTABLE STAINLESS STEEL ALLOYS: ASME TYPE 316, 316LN, 304, 304LN. THE ALLOY TO BE USED SHALL BE SPECIFIED BY THE LICENSEE.
2. MINIMUM BORAL B-10 LOADING IS 0.0372 g/cm_2 . BORAL TO BE PASSIVATED PRIOR TO INSTALLATION.
3. ALL DIMENSIONS ARE APPROXIMATE DIMENSIONS.
4. ITEMS 8A,8B,9A,9D,18 AND 34 MAY BE MADE FROM MORE THAN ONE PIECE. THE ENDS OF THE PIECES DO NOT NEED TO BE WELDED TOGETHER BUT THEY MUST BE FLUSH WITH EACH OTHER WHEN INSTALLED.
5. (10) MUST BE TYPE 304, 304LN, 316, OR 316LN TENSILE STRENGTH>75 ksi, YIELD STRENGTH>30ksi, AND CHEMICALS PER ASTM A554 .

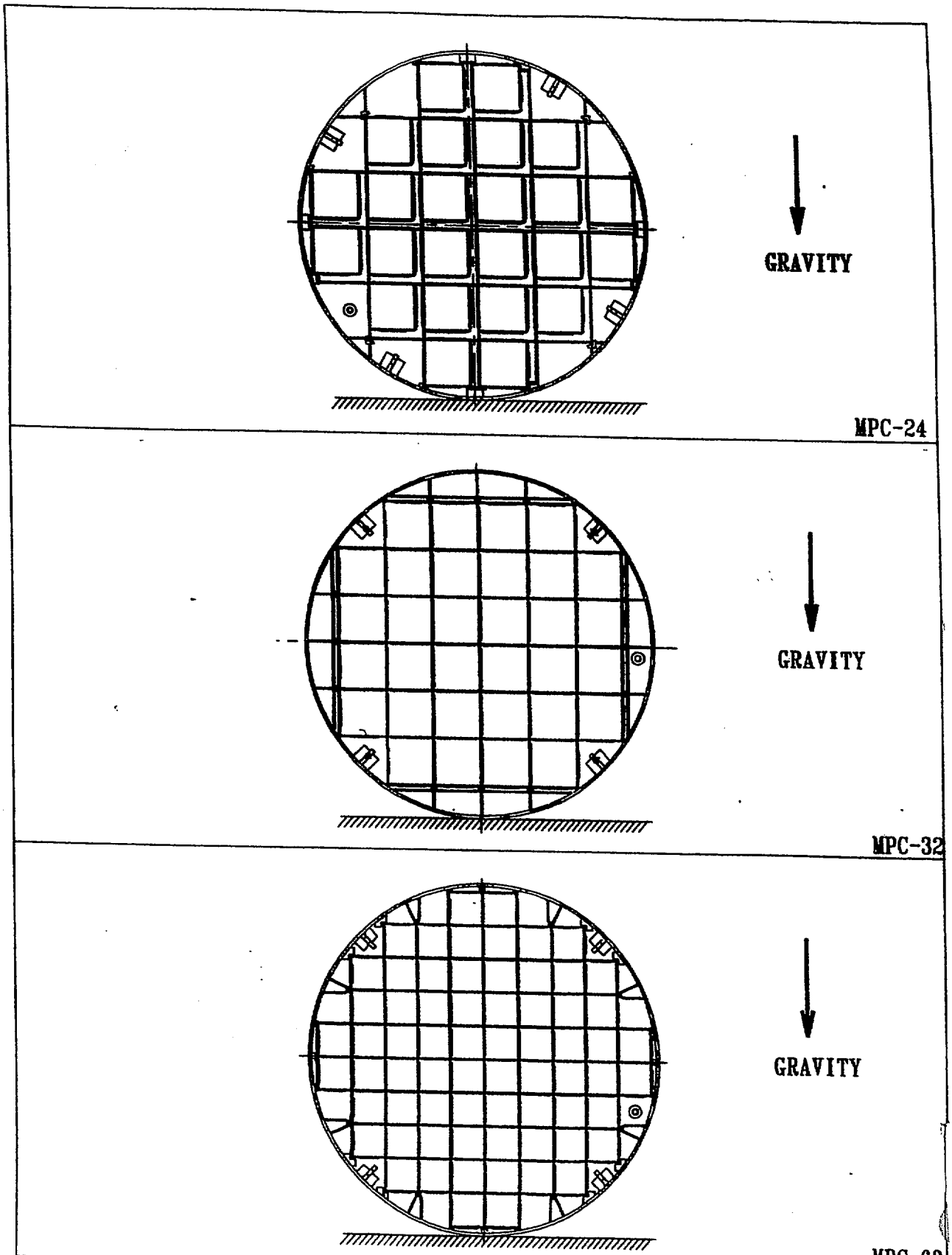
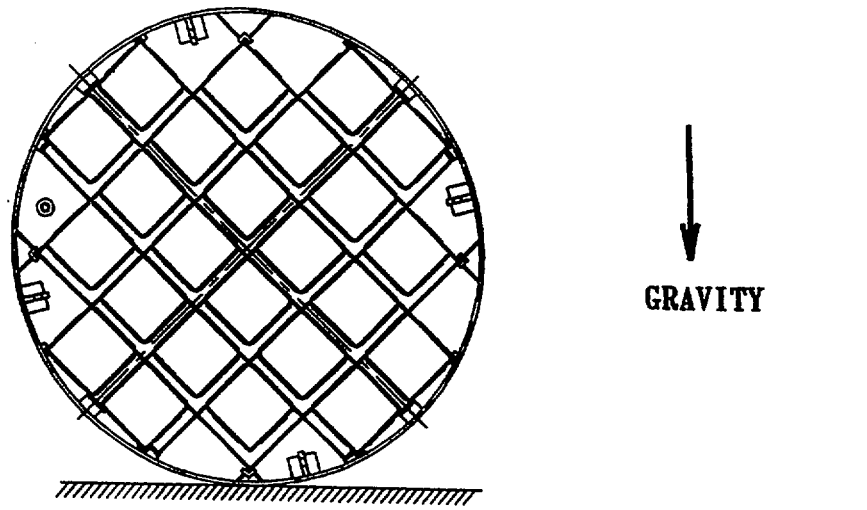
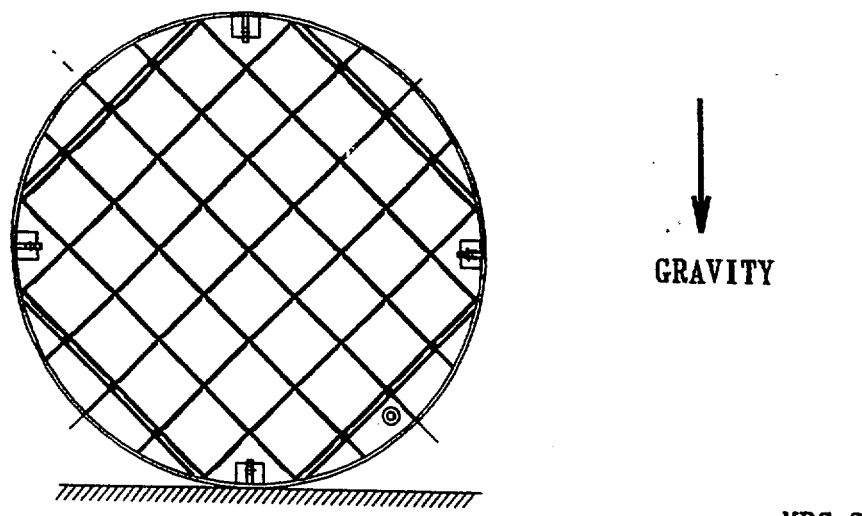


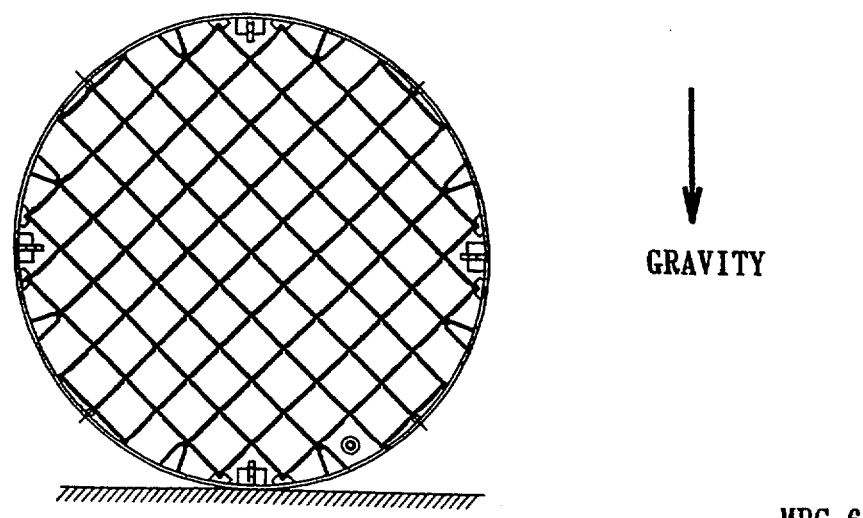
FIGURE 3.1.2; 0° DROP ORIENTATIONS FOR THE MPCs



MPC-24



MPC-32



MPC-68

FIGURE 3.1.3; 45° DROP ORIENTATIONS FOR THE MPCs

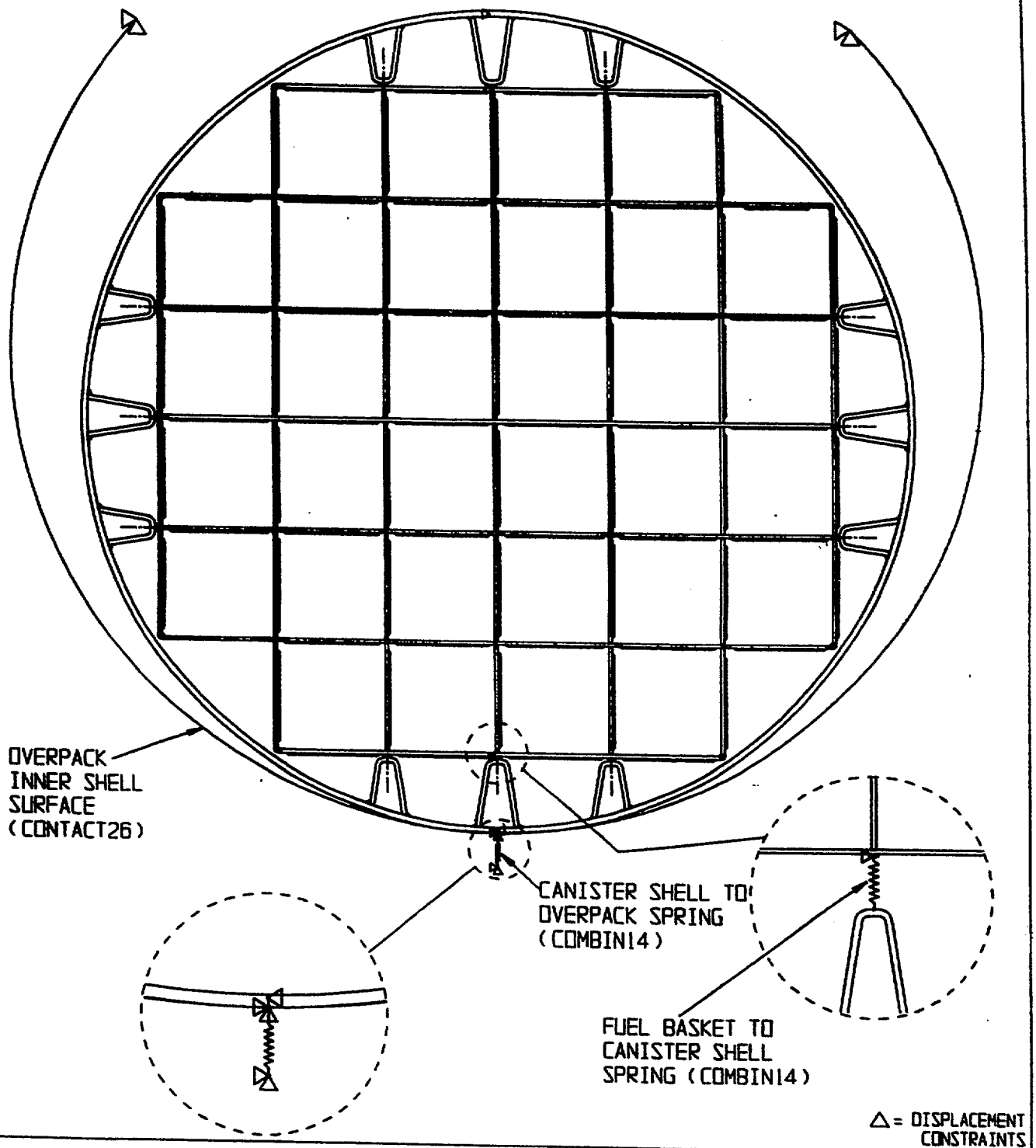


FIGURE 3.4.2; FINITE ELEMENT MODEL OF MPC-32

(0 DEGREE DROP MODEL)

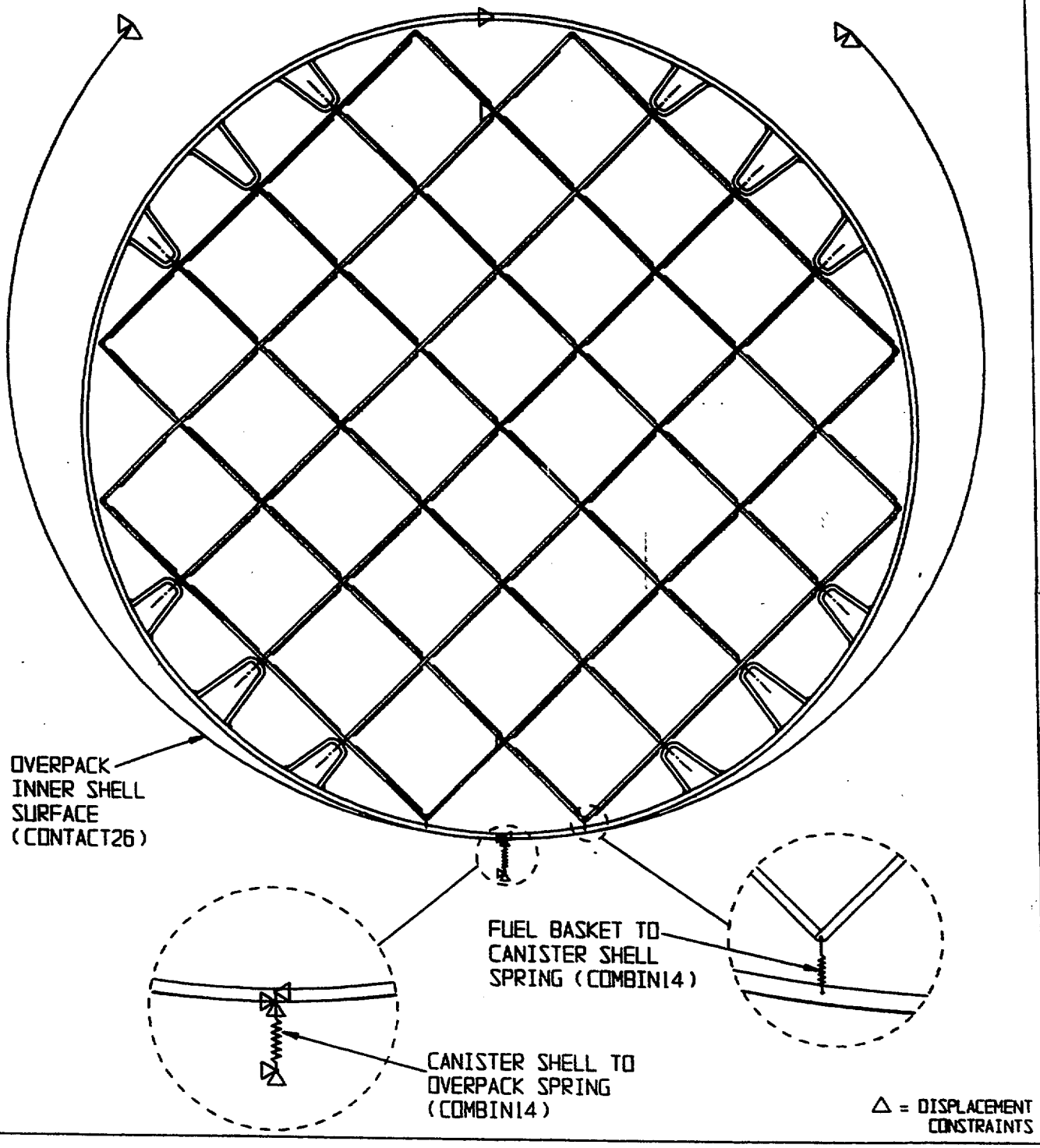


FIGURE 3.4.5; FINITE ELEMENT MODEL OF MPC-32

(45 DEGREE DROP MODEL)