UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
1600 EAST LAMAR BLVD
ARLINGTON, TEXAS 76011-4511

January 17, 2014

Mr. Jeremy Browning, Site Vice President
Arkansas Nuclear One
Entergy Operations, Inc.
1448 SR 333
Russellville, AR 72802-0967

SUBJECT: ARKANSAS NUCLEAR ONE, UNITS 1, 2, AND INDEPENDENT SPENT FUEL STORAGE INSTALLATION (ISFSI) INSPECTION REPORT 05000313/2013013, 05000368/2013013, AND 07200013/2013001

Dear Mr. Browning:

This letter refers to the inspection conducted on December 16 - 18, 2013, of the dry cask storage activities associated with your Independent Spent Fuel Storage Installation (ISFSI). The enclosed inspection report documents the inspection results which were discussed on December 18, 2013 with members of your staff.

The inspection examined activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your license. The inspection reviewed compliance with the requirements specified in the Technical Specifications associated with Holtec Certificate of Compliance 1014, the Holtec Final Safety Analysis Report (FSAR), and Title 10 of the Code of Federal Regulations (CFR) Part 72, Part 50, and Part 20. Within these areas, the inspection included a review of the construction activities associated with the site's Cask Transfer Facility (CTF), quality assurance, corrective action program, and safety evaluations. No violations of NRC regulations were identified.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response, if you choose to provide one, will be made available electronically for public inspection in the NRC Public Document Room or from the NRC's Agencywide Document Access Management System (ADAMS), accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html. To the extent possible, your response should not include any personal, privacy, or proprietary information so that it can be made available to the Public without redaction.

Should you have any questions concerning this inspection, please contact the undersigned at 817-200-1191 or Mr. Lee Brookhart at 817-200-1549.

Sincerely,

/RA/

D. Blair Spitzberg, Ph.D., Chief
Repository & Spent Fuel Safety Branch
Division of Nuclear Materials Safety

Dockets: 50-313, 50-368, 72-13
Licenses: DPR-51; NPF-6

Enclosure:
Inspection Report 05000313/2013013,
05000368/2013013 and 07200013/2013001

w/attachments:
1. Supplemental Information
2. Casks Loaded at the ANO ISFSI

cc w/attachments: Listserv®

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FINAL: R:_Reactors_ANO\2013\ANO 2013013-ISFSI-LEB.docx ML14017A161

SUNSI Rev Compl.	**X Yes** ☐ No	ADAMS	**X Yes** ☐ No	Reviewer Initials	*LEB*
Publicly Available	**X Yes** ☐ No	Sensitive	☐ Yes **X No**	Sens. Type Initials	

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01/ 17/2014	01/17/2014			

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Letter to Jeremy Browning from D. Blair Spitzberg, dated January 17, 2014.

SUBJECT: ARKANSAS NUCLEAR ONE, UNITS 1, 2, AND INDEPENDENT SPENT FUEL STORAGE INSTALLATION (ISFSI) INSPECTION REPORT 05000313/2013013, 05000368/2013013, AND 07200013/2013001

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U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Dockets:	050-00313; 050-00368; 072-00013
Licenses:	DPR-51; NPF-6
Report Nos.:	05000313/2013013; 05000368/2013013; 07200013/2013001
Licensee:	Entergy Operations, Inc.
Facility:	Arkansas Nuclear One, Units 1, 2, and Independent Spent Fuel Storage Installation (ISFSI)
Location:	1 Nuclear Plant Road Russellville, AR 72801
Dates:	December 16-18, 2013
Inspector:	Lee Brookhart, Senior ISFSI Inspector Repository & Spent Fuel Safety Branch
Approved By:	D. Blair Spitzberg, Ph.D., Chief Repository & Spent Fuel Safety Branch Division of Nuclear Materials Safety

Enclosure

SUMMARY OF FINDINGS

IR 05000313/2013013; 05000368/2013013; and 07200013/2013001; 12/16 - 12/18/2013; Arkansas Nuclear One, Units 1, 2, and Independent Spent Fuel Storage Installation; Routine ISFSI Inspection Report

The report covers an announced inspection by one regional inspector. No findings or violations associated with U.S. Nuclear Regulatory Commission (NRC) regulations were identified. The significance of any Part 50 findings are indicated by their color (Green, White, Yellow, or Red) using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process". The cross-cutting aspect is determined using IMC 0310, "Components Within the Cross-Cutting Areas." Findings for which the significance determination process does not apply may be Green or be assigned a severity level after the NRC management review. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 4, dated December 2006. In accordance with IMC 0612 "Power Reactor Inspection Reports," all of the Part 72 ISFSI inspection findings follow the traditional enforcement process and are not dispositioned through the Reactor Oversight Process or the Significance Determination Process.

A. NRC-Identified Findings and Self-Revealing Findings

No findings were identified.

B. Licensee-Identified Violations

None.

PLANT AND ISFSI STATUS

Arkansas Nuclear One's (ANO) Independent Spent Fuel Storage Installation (ISFSI) stored twenty four Energy Solutions Ventilated Storage Cask (VSC) VSC-24 casks that had been loaded from 1996 to 2003. On the north side of the VSC-24 pad, ANO had loaded and stored thirty-seven Holtec casks with room on the pad to store eleven more. For the Holtec casks, two canister designs were used at ANO. The Multi-Purpose Canister (MPC) MPC-24 canister stored a maximum of twenty-four assemblies. The MPC-32 canister stored a maximum of thirty-two assemblies. All Unit 1 spent fuel was stored in the MPC-24 canister. Unit-2 spent fuel was stored in both the MPC-24 and MPC-32 canisters. The licensee used two versions of the Holtec HI-STORM concrete storage cask overpack designs at the ISFSI. The first twelve Holtec casks placed on the ISFSI pad were HI-STORM 100S overpacks (with nine MPC-24 canisters and three MPC-32 canisters). Since then, the HI-STORM 100S Version C overpacks have been used (containing eleven MPC-24 canisters and fourteen MPC-32 canisters).

REPORT DETAILS

4. OTHER ACTIVITIES

4OA5 Other Activities

.1 Operations of an Independent Spent Fuel Storage Installation at Operating Plants (60855.1)

a. Inspection Scope

(1) Cask Transfer Facility Overview

There had been no loading operations performed since the last ISFSI inspection performed in December 2012. ANO had halted loading activities to construct a Cask Transfer Facility (CTF) outside the refueling building. This action was necessitated from an ANO internal review which identified errors in their trainbay floor loading calculations during a seismic event. This issue was previously reviewed by the NRC inspectors and was documented in the last ISFSI inspection report (ML13057A986).

ANO had performed a number of construction activities and purchased a variety of new equipment, since the last NRC ISFSI inspection, to support continued dry cask loading operations utilizing a Cask Transfer Facility. The CTF was classified as a Part 72 Important to Safety (ITS) structure. The CTF will support the stack-up configuration of a fully-loaded HI-TRAC, Mating Device, HI-STORM, and the Vertical Cask Transporter (VCT) during MPC transfer operations from the HI-TRAC into the HI-STORM. The ANO CTF is a passive reinforced concrete structure. The structure is composed of a base slab, four walls, and a top slab. The CTF features a 12'-8" x 12'-8" by approximately 14 feet deep cavity in the ground for placement of the empty HI-STORM prior to the MPC transfer. Inside of the cavity, four removable Upper Lateral Restraints and four removable Lower Lateral Restraints would be installed in the cavity to horizontally restrain the HI-STORM and assist in energy absorption and transferring loads to the surrounding soil during a seismic event. The CTF was designed to accommodate both the HI-STORM 100S, Version C, and HI-STORM 100S, which are currently in use at ANO. The CTF was designed to

support the combined loads of a fully-loaded HI-STORM 100S, Version C with high density concrete shielding during both placement and retrieval. In addition, the CTF is designed to physically accommodate the potential future use of HI-STORM 100S, Version B and HI-STORM Forced Wind (FW), both using high density concrete shielding.

To support transportation from the refueling building to the CTF, ANO had constructed two passive reinforced concrete turning pads with an embedded rail spur and a new rail heavy haul path that extended from the currently loaded ISFSI pads to the north-end of the ANO site to where the new CTF was located. The new CTF facility with haul path and turning pads will facilitate: (1) unloading of the fully-loaded HI-TRAC/MPC from the Holtec Railcar; (2) transfer of the fully-loaded HI-TRAC/MPC to the CTF for placement of the MPC within the HI-STORM; and (3) transfer of the fully-loaded HI-STORM from the CTF to the ISFSI pad. At the time of the inspection the CTF was outside the existing site' Protected Area (PA). Eventually the PA fence will be extended around the new CTF facility. In the future, ANO plans to build four reinforced concrete storage pads which will provide for 94 storage casks with four temporary storage locations for placement of casks after the current ISFSI pads are filled.

The new equipment that ANO purchased included a new VCT, a low profile transporter, new MPC downloading slings, new HI-STORM slings, and new VCT special lifting device brackets to carry the HI-STORMs.

(2) Design and Evaluations of the Cask Transfer Facility

The ANO CTF was a reinforced concrete structure with designed minimum concrete compression strength of 4,500 psi at 28 days. All compressive strength test results that were reviewed demonstrated that the concrete compression strength exceeded the design requirement and were found to be greater than 5,000 psi. The CTF Environmental and Design Conditions were contained in the Holtec FSAR Section 2.3.3.1 B. The Design Basis Earthquake (DBE) event applicable to the CTF is in Holtec FSAR Section 2.3.3.1 B.vii and stated that the DBE should be specified as a set of response spectra or acceleration time-histories for use in the CTF structural and impact consequence analyses. Engineering Calculation (CALC)-13-D-2001-14, "ANO CTF Seismic/Structural Report," provided a summary of the seismic-structural analyses, which were performed for the stack-up configuration of a fully-loaded HI-TRAC, Mating Device, and HI-STORM during MPC transfer operations from the HI-TRAC to the HI-STORM.

Other analyses were preformed that demonstrated continued compliance to the Holtec FSAR for environmental hazards which included flooding, lightning strike, explosions, fires, tornado winds, and tornado missiles. These analyses were documented in CALC-ANO-CS-13-00004, "ANO CTF Hazards Technical Summary Report."

Inspectors reviewed the design of the heavy haul path from the existing ISFSI docking station to the ANO CTF. Engineering Change Report 45253 provided the design of the haul path based on the weight of a fully loaded HI-STORM and the weight of the VCT. Calculation-13-D-2001-12 "Structural Evaluation of Haul Path at ANO" evaluated the maximum bearing pressure under the concrete tracks, stability

of the haul path, including sliding and overturning, and the reinforcement for the concrete tracks. The calculation determined that the maximum calculated bearing pressure of 3,245 psf was less than the allowable designed bearing pressure of 3,500 psf, the calculated factors of safety for sliding was 2.77 and the overturning was 4.91 which exceeded the minimum required factor of safety of 1.5 from NUREG-0800, Section 3.8.5. Also the steel reinforcement sizes, configurations, and lap splices lengths demonstrated compliance with the American Concrete Institute (ACI)-318 and ACI-349 requirements. All concrete compressive strength test results that were reviewed exceed their design requirements.

(3) Design and Evaluations of the Vertical Cask Transport

Inspectors reviewed documentation that demonstrated that the VCT had been load tested to 125 percent of its rated load. The VCT is rated to lift a maximum of 415,000 lbs. The 125 percent load test lifted slightly more than 518,750 lbs, meeting the requirement. A loaded HI-STORM 100S with high density concrete was documented as weighing 389,025 lbs. The loaded HI-STORM 100S weighs more than the loaded HI-STORM Version C with high density concrete (382,470 lbs). The reason for the higher load rating was to accommodate the future use of the HI-STORM FW which contains more fuel assemblies than the HI-STORM 100S or HI-STORM Version C.

ANO had performed analyses to demonstrate the structural integrity and kinematic stability of the VCT under dead and seismic loads. These analyses were documented in CALC-ANO-CS-13-00009 “Generic VCT Seismic Technical Summary Report” and CALC-ANO-CS-13-00007 “VCT Technical Summary Report.” The VCT that was purchased by ANO was found to be qualified to perform all operations associated with the loading activities at ANO.

(4) Special Lifting Devices and Slings

Documentation associated with the newly purchased special lifting devices for the HI-TRAC and HI-STORM were documented in Purchase Specification (PS)-2301-02 “Purchase Specification for ANO HI-STORM/HI-TRAC Integrated Lifting Brackets”. The special lifting devices were documented as meeting American National Standard Institute (ANSI) N14.6 requirements as specified by the Holtec FSAR. Additionally, all special lifting devices were load tested to 300% of the rated load as required by ANSI N14.6. These lift tests were documented in Documentation Package (DP) 13158-001 “Lift Brackets for ANO”.

The MPC downloader slings and HI-STORM slings that were purchased by ANO were proof load tested to 200 percent of their rated load. These proof load tests were documented in Certificate of Conformance (CoC) 13158-002 “Lift Bracket Slings for ANO” and CoC 13268-001 “MPC Downloader Slings for ANO”. The tests were performed in accordance with American Society of Mechanical Engineers (ASME) B.30.9 requirements.

(5) Corrective Action Program

A list of condition reports issued since the last NRC inspection in December of 2012, was provided by the licensee for ISFSI activities. Of the list of condition reports

provided relating to the ISFSI and new CTF construction activities, four condition reports were selected by the NRC inspector for further review. The condition reports reviewed were well documented and properly categorized based on the significance of the issue. The corrective actions taken were appropriate for the situations. No NRC concerns were identified related to the condition reports reviewed.

(6) Observed Activities and Loading Procedures

During the week of the NRC inspection, ANO was in the process of performing the site acceptance testing of their new VCT. The inspector observed the raising and lowering of a weighted dummy MPC with the site's new downloading slings and the VCT. The VCT raised and lowered the weighted dummy MPC with no issues. ANO had prepared a new loading procedure to address the use of the CTF and VCT. The NRC inspector reviewed Procedure 3406.005 "HI-STORM and HI-Track Transport Operations Using LPT, VCT, and Holtec Rail Car" for the use of the new equipment.

b. Findings

No findings were identified.

4OA6 Meetings, Including Exit

Exit Meeting Summary

On December 18, 2013 the inspectors presented the inspection results to Mrs. Stephanie Pyle, and other members of the licensee staff. The licensee acknowledged the inspection details presented. The inspector asked the licensee whether any materials examined during the inspection should be considered proprietary. No proprietary information was identified.

SUPPLEMENTAL INSPECTION INFORMATION

KEY POINTS OF CONTACT

Licensee Personnel

D. Bauman, Project Manager
B. Clark, Licensing
D. Eichenberger, Project Manager
M. Estep, Engineering
S. Pyle, Regulatory Assurance Manager
M. Smith, Project Manager
C. Walker, Engineering

INSPECTION PROCEDURES USED

IP 60855.1	Operations of an ISFSI at Operating Plants
IP 60856.1	Review of 10 CFR 72.212(b) Evaluations at Operating Plants
IP 60857	Review of 10 CFR 72.48 Evaluations

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

None

Discussed

None

Closed

None

LIST OF DOCUMENTS REVIEWED

The following is a list of documents reviewed during the inspection. Inclusion on this list does not imply that the NRC inspectors reviewed the documents in their entirety, but rather, that selected sections of portions of the documents were evaluated as part of the overall inspection effort. Inclusion of a document on this list does not imply NRC acceptance of the document or any part of it, unless this is stated in the body of the inspection report.

4OA5.1 Other Activities

Calculations

NUMBER	TITLE	REVISION / DATE
Calc-13-D-2001-12	Structural Evaluation of Haul Path at ANO	Revision 0
Calc-13-D-2001-13	Thermal Evaluation of HI-STORM System in CTF at ANO	Revision 0
Calc-13-D-2001-14	ANO CTF Seismic/Structural Report	Revision 0
Calc-ANOC-CS-13-00004	ANO CTF Hazards Technical Summary Report	Revision 0
Calc-ANOC-CS-13-00007	VCT Technical Summary Report	Revision 0
Calc-ANOC-CS-13-00009	Generic VCT Seismic Technical Summary Report	Revision 0
Calc-ANOC-CS-13-00005	CTF FSAR Compliance Report	Revision 0

Procedures

NUMBER	TITLE	REVISION / DATE
3406.005	HI-STORM and HI-Track Transport Operations Using LPT, VCT, and Holtec Rail Car	Draft
2203.052	Dry Fuel Storage Emergencies	Revision 0
3403.005	HI-STORM 100 System Loading Operations	Revision 31D

Design Basis Documents

NUMBER	TITLE	REVISION / DATE
	10 CFR 72.212 Evaluation Report App B ANO Specific Information for ISFSI Using Holtec HI-STORM	Revision 6
	Certificate of Compliance 72-1014 HI-STORM 100 Cask System	Amendment 5
	Holtec International Final Safety Analysis Report for the HI-STORM 100 Cask System	Revision 7

Miscellaneous Documents

NUMBER	TITLE	REVISION / DATE
EC-15295	ANO ISFSI Facility Expansion Civil-Structural Design	Revision 0

Miscellaneous Documents

NUMBER	TITLE	REVISION / DATE
EC-39526	Commercial Fire Hydrant, Outside North SOCA Fence, Near Truck Access Gate	Revision 0
EC-40667	ANO ISFSI Facility Expansion Utility Interferences	Revision 0
EC-45077	ANO Cask Transfer Facility	Revision 0
EC-45253	ANO ISFSI Facility Expansion Heavy Haul Path	Revision 0
EC-18160	ANO ISFSI Facility Expansion-Electrical Design	Revision 0
CoC 13158-002	Lift Bracket Slings for ANO	Revision 0
DP 13158-001	Lift Brackets for ANO	Revision 0
PS-2301-02	Purchase Specification for ANO HI-STORM/HI-TRAC Integrated Lifting Bracket	Revision 0
HI-2135644	Structural Evaluation of HI-STORM/HI-TRAC Integrated Lifting Bracket	Revision 0
CoC 13268-001	MPC Downloader Slings for ANO	Revision 0
PS-2301-01	Purchase Specification for ANO CTF	Revision 0
CoC 13157-001	CTF Components for ANO	Revision 0
CoC 13157-002	CTF Components for ANO	Revision 0
CoC 13157-003	CTF Components for ANO	Revision 0
CoC 13157-004	CTF Components (CTF Cover) for ANO	Revision 0
CoC 13157-005	CTF Components (Wedge Spacer Weldment) for ANO	Revision 0
CoC 13157-006	CTF Components (4 Wedge Assemblies) for ANO	Revision 0
CoC 13157-007	CTF Components (9021-300) for ANO	Revision 0
	Concrete Compression Test Results from ARK-CON Testing Service Inc. for CTF Bottom Slab, Walls, Top Mat	October 2013
	ARK-CON Testing Service Inc. Soil Testing Data	October 2013
PS 2301-03	Purchase Specification for ANO Low Profile Transporter	Revision 1
DOC-1027-121-424	LPT for ANO	Revision 0
CoC 13308-001	VCT Cask Restraint Straps for ANO	Revision 0
HPP-2301-7	Entergy-ANO Factory Acceptance Test Procedure	Revision 0
HPP-2301-10	VCT415 Site Acceptance Test at ANO	Revision 0

Condition Reports

CR-ANO-C-2013-00575 CR-ANO-C-2013-02482 CR-ANO-C-2013-02484
CR-ANO-C-2013-02977

LIST OF ACRONYMS

ACI	American Concrete Institute
ADAMS	Agencywide Documents Access and Management System
ANSI	American National Standard Institute
ANO	Arkansas Nuclear One
ASME	American Society of Mechanical Engineers
Calc	Calculation
CoC	Certificate of Compliance
CTF	Cask Transfer Facility
CFR	Code of Federal Regulations
DBE	Design Basis Earthquake
DNMS	Division of Nuclear Material Safety
DP	Documentation Package
FHD	Forced Helium Dehydrator
FSAR	Final Safety Analysis Report
FW	Forced Wind
IMC	Inspection Manual Chapter
IP	Inspection Procedure
ISFSI	Independent Spent Fuel Storage Installation
ITS	Important to Safety
kW	kilo-watt
MPC	Multi-Purpose Canister
MWd/MTU	megawatt days/metric ton uranium
NRC	U.S. Nuclear Regulatory Commission
PA	Protected Area
PS	Purchase Specification
U-235	Uranium 235
VCT	Vertical Cask Transporter
VSC	Ventilated Storage Cask

ATTACHMENT 2

LOADED CASKS AT THE ANO ISFSI

VSC-24 CASKS

LOADING ORDER	VSC ID No.	Unit	DATE ON PAD	HEAT LOAD (kW)	BURNUP MWd/MTU (max)	MAXIMUM FUEL ENRICHMENT %	PERSON-REM DOSE
1	24-01	Unit 1	12/17/96	5.2	19,905	2.07	0.185
2	24-03	Unit 1	01/28/97	10.7	32,599	3.19	0.384
3	24-05	Unit 2	04/02/97	4.2	20,318	1.93	0.291
4	24-06	Unit 2	04/06/97	6.2	30,149	2.94	0.469
5	24-12	Unit 2	09/23/98	10.8	34,938	3.38	0.900
6	24-11	Unit 2	10/01/98	8.0	33,075	2.94	0.553
7	24-07	Unit 2	10/21/98	8.0	34,891	3.33	0.567
8	24-02	Unit 2	10/30/98	8.1	34,773	3.34	0.483
9	24-04	Unit 1	04/13/99	9.1	33,051	3.06	0.236
10	24-08	Unit 1	04/27/99	9.2	33,255	3.06	0.231
11	24-09	Unit 1	05/18/99	9.1	33,194	3.21	0.189
12	24-13	Unit 1	06/16/99	7.3	33,066	3.05	0.112
13	24-14	Unit 1	07/14/99	10.7	34,646	3.21	0.383
14	24-10	Unit 2	04/18/00	12.2	40,211	3.37	0.602

LOADING ORDER	VSC ID No.	Unit	DATE ON PAD	HEAT LOAD (kW)	BURNUP MWd/MTU (max)	MAXIMUM FUEL ENRICHMENT %	PERSON-REM DOSE
15	24-15	Unit 2	06/06/00	9.86	40,220	3.37	0.603
16	24-16	Unit 1	07/25/00	13.37	40,180	3.21	0.528
17	24-18	Unit 1	01/21/01	14.67	38,794	3.45	0.628
18	24-17	Unit 2	06/06/01	14.23	41,188	4.01	0.695
19	24-19	Unit 2	06/26/01	14.17	41,193	4.01	0.659
20	24-20	Unit 2	07/25/01	14.24	41,204	4.01	0.554
21	24-21	Unit 2	08/14/01	14.26	40,931	4.01	0.666
22	24-22	Unit 1	08/30/02	14.69	38,909	3.46	0.407
23	24-23	Unit 1	09/11/02	14.66	38,981	3.46	0.567
24	24-24	Unit 2	06/12/03	9.36	36,021	3.49	0.296

Unit 1: 11 casks loaded, average heat load = 10.8 kW; average man-hours to load = 1374 hrs; average dose = 0.350 person-rem
Unit 2: 13 casks loaded, average heat load = 10.3 kW; average man-hours to load = 1477 hrs; average dose = 0.564 person-rem
Note: Unit 2 fuel is 18 inches longer than Unit 1 fuel.

VSC-24 Casks # 1 through 14 were loaded to CoC No. 1007, Amendment 0, FSAR Revision 0
VSC-24 Casks # 15 through 16 were loaded to CoC No. 1007, Amendment 1, FSAR Revision 1
VSC-24 Casks # 17 was loaded to CoC No. 1007, Amendment 2, FSAR Revision 1
VSC-24 Casks # 18 through 21 were loaded to CoC No. 1007, Amendment 3, FSAR Revision 2
VSC-24 Casks # 22 and 23 were loaded to CoC No. 1007, Amendment 3, FSAR Revision 4
VSC-24 Casks # 24 was loaded to CoC No. 1007, Amendment 4, FSAR Revision 5
All VSC-24 Casks are being monitored to CoC No. 1007, Amendment 4, FSAR Revision 5

NOTES:
- Heat load (kW) is the sum of the heat load values for all spent fuel assemblies in the cask
- Burn-up is the value for the spent fuel assembly with the highest individual discharge burn-up
- Fuel enrichment is the spent fuel assembly with the highest individual “initial” enrichment per cent of U-235

LOADED HI-STORMS CASKS

LOADING ORDER	MPC Serial #	HI-STORM 100S No.	Unit	DATE ON PAD	HEAT LOAD (kW)	BURNUP MWd/MTU (max)	MAXIMUM FUEL ENRICHMENT %	PERSON-REM DOSE
1	Serial No. 24-3	Serial No. 44	Unit 1	12/13/03	16.4	41,045	3.50	0.525
2	Serial No. 24-4	Serial No. 23	Unit 1	01/13/04	16.7	41,130	3.50	0.755
3	Serial No. 24-2	Serial No. 24	Unit 1	01/21/04	17.5	41,044	3.50	0.707
4	Serial No. 24-1	Serial No. 43	Unit 1	02/15/04	15.5	39,807	3.50	0.667
5	Serial No. 24-5	Serial No. 45	Unit 1	02/23/04	12.1	38,697	3.50	0.267
6	Serial No. 24-6	Serial No. 46	Unit 1	03/05/04	10.5	37,751	3.50	0.277
7	Serial No. 24-10	Serial No. 52	Unit 2	09/10/04	14.4	42,043	4.02	0.498
8	Serial No. 24-14	Serial No. 47	Unit 2	09/19/04	17.7	45,798	4.02	0.745
9	Serial No. 24-43	Serial No. 48	Unit 2	09/25/04	18.6	47,116	4.02	0.492
10	Serial No. 32-1	Serial No. 49	Unit 2	11/16/04	18.3	43,960	4.02	0.430
11	Serial No. 32-2	Serial No. 50	Unit 2	11/20/04	18.6	42,934	4.02	0.355
12	Serial No. 32-9	Serial No. 51	Unit 2	12/03/04	21.0	43,903	4.01	0.511
13	Serial No. 32-3	Serial No. 96	Unit 2	12/12/04	18.2	43,840	4.01	0.422
14	Serial No. 24-44	Serial No. 97	Unit 1	07/01/05	18.02	40,158	3.50	0.755

LOADING ORDER	MPC Serial #	HI-STORM 100S No.	Unit	DATE ON PAD	HEAT LOAD (kW)	BURNUP MWd/MTU (max)	MAXIMUM FUEL ENRICHMENT %	PERSON-REM DOSE
15	Serial No. 24-45	Serial No. 98	Unit 1	08/09/05	19.99	45,141	3.49	0.776
16	Serial No. 24-46	Serial No. 99	Unit 1	08/18/05	19.31	45,007	3.50	0.624
17	Serial No. 32-19	Serial No. 114	Unit 2	09/17/05	25.38	52,294	4.01	1.001
18	Serial No. 32-26	Serial No. 115	Unit 2	11/14/05	23.33	46,788	4.02	0.624
19	Serial No. 32-49	Serial No. 113	Unit 2	11/21/05	23.39	51,778	4.02	0.378
20	Serial No. 32-16	Serial No. 229	Unit 2	04/05/06	23.50	51,542	4.01	0.331
21	Serial No. 32-24	Serial No. 230	Unit 2	04/10/06	25.91	50,363	4.02	0.376
22	Serial No. 32-25	Serial No. 243	Unit 2	05/19/06	25.57	50,465	4.02	0.358
23	Serial No. 24-47	Serial No. 245	Unit 1	08/05/06	11.51	43,171	3.45	0.274
24	Serial No. 24-48	Serial No. 246	Unit 1	11/10/06	12.54	43,386	3.46	0.189
25	Serial No. 24-49	Serial No. 247	Unit 1	02/11/07	9.74	36,982	3.21	0.079
26	Serial No. 32-67	Serial No. 244	Unit 2	07/27/07	27.64	52,088	4.16	0.665
27	Serial No. 32-66	Serial No. 248	Unit 2	08/04/07	26.67	54,078	4.02	0.485
28	Serial No. 24-50	Serial No. 61	Unit 1	08/24/07	18.16	46,101	3.89	0.409
29	Serial No. 24-51	Serial No. 62	Unit 1	09/01/07	14.31	44,919	3.90	0.182
30	Serial No. 24-52	Serial No. 105	Unit 1	05/04/09	23.21	44,801	4.06	0.499

LOADING ORDER	MPC Serial #	HI-STORM 100S No.	Unit	DATE ON PAD	HEAT LOAD (kW)	BURNUP MWd/MTU (max)	MAXIMUM FUEL ENRICHMENT %	PERSON-REM DOSE
31	Serial No. 32-84	Serial No. 104	Unit 2	05/29/09	26.59	52,605	4.32	0.493
32	Serial No. 32-85	Serial No. 325	Unit 2	11/05/09	26.01	54,232	4.32	0.616
33	Serial No. 24-53	Serial No. 324	Unit 1	12/10/09	10.86	41,358	4.05	0.095
34	Serial No. 24-54	Serial No. 326	Unit 1	09/29/10	10.99	41,478	4.06	0.141
35	Serial No. 32-159	Serial No. 474	Unit 2	10/20/10	26.36	49,952	4.30	0.645
36	Serial No. 32-163	Serial No. 475	Unit 2	10/28/10	26.15	48,000	4.30	0.473
37	Serial No. 32-164	Serial No. 476	Unit 2	11/03/10	26.46	47,778	4.29	0.420

NOTES:
- Heat load (kW) is the sum of the heat load values for all spent fuel assemblies in the cask
- Burn-up is the value for the spent fuel assembly with the highest individual discharge burn-up
- Fuel enrichment is the spent fuel assembly with the highest individual “initial” enrichment per cent of U-235

HI-STORM Casks # 1 through 9 were loaded to CoC No. 1014, Amendment 1, FSAR Revision 1
HI-STORM Casks # 10 through 13 were loaded to CoC No. 1014, Amendment 1, FSAR Revision 2
HI-STORM Casks # 14 through 22 were loaded to CoC No. 1014, Amendment 2, FSAR Revision 3
HI-STORM Casks # 23 through 29 were loaded to CoC No. 1014, Amendment 2, FSAR Revision 4
HI-STORM Casks # 30 through 37 were loaded to CoC No. 1014, Amendment 5, FSAR Revision 7
Use of the Forced Helium Dehydrator (FHD) commenced with HI-STORM Cask #7

The first two digits in the serial number under the column “MPC Serial #” indicates whether the cask is a MPC-24 or a MPC-32
Unit 2 is Combustion Engineering fuel and is 18 inches longer than the Unit 1 Babcock & Wilcox fuel