UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
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ARLINGTON, TEXAS 76011-4005

February 7, 2003

Craig Anderson, Vice President Operations
Arkansas Nuclear One
Entergy Operations, Inc.
1448 S.R. 333
Russellville, Arkansas 72801-0967

SUBJECT: NRC INSPECTION REPORT 50-313/03-09; 50-368/03-09; 72-13/03-01

Dear Mr. Anderson:

On January 14-15, 2003, the NRC completed the routine annual inspection of your Independent Spent Fuel Storage Installation (ISFSI) located at the Arkansas Nuclear One, Units 1 and 2 facilities (ANO) and observed the crane tests for the new fuel building crane. The results of the inspection are documented in the enclosed inspection report and were discussed with members of your staff during the exit meeting held on January 15, 2003.

This inspection focused on ANO's compliance with regulatory requirements and license commitments associated with your ISFSI and with the onsite qualification program to certify your crane as a single failure proof crane. There were no violations identified during this inspection.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room).

Should you have any questions concerning this inspection, we will be pleased to discuss them with you.

Sincerely,

/RA DBSpitzberg acting for/

Ken E Brockman, Director
Division of Nuclear Materials Safety

Docket Nos.: 50-313
50-368
72-13
License Nos.: DPR-51
NPF-6

Enclosure:
NRC Inspection Report
50-313/03-09; 50-368/03-09; 72-13/03-01

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ENCLOSURE

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Docket Nos.: 50-313; 50-368; 72-13

License Nos.: DPR-51; NPF-6

Report No.: 50-313/03-09, 50-368/03-09; 72-13/03-01

Licensee: Entergy Operations, Inc.

Facility: Arkansas Nuclear One, Units 1 and 2
Arkansas Nuclear One, Independent Spent Fuel Storage Installation

Location: 1448 S. R. 333
Russellville, Arkansas 72801

Date: January 14-15, 2003

Inspector: J. V. Everett, Senior Health Physicist

Approved by: D. Blair Spitzberg, Ph. D., Chief
Fuel Cycle & Decommissioning Branch

Attachments: 1) Supplemental Information
2) List of Loaded VSC-24 Casks at ANO

EXECUTIVE SUMMARY

Arkansas Nuclear One, Units 1 and 2
NRC Inspection Report 50-313/03-09; 50-368/03-09; 72-13/03-01

The Independent Spent Fuel Storage Installation (ISFSI) at Arkansas Nuclear One currently contains 23 Ventilated Storage Casks (VSC)-24 casks loaded with spent fuel. One more VSC-24 cask will be loaded and placed in the ISFSI to complete the loading of all VSC-24 casks planned for storage at ANO. During 2003, ANO plans to begin loading a new cask design. The Holtec Hi-Storm 100 cask will be used and will be stored on a new pad area adjacent to the VSC-24 casks. The Hi-Storm 100 cask is a stainless steel cask that is slightly heavier than the VSC-24 cask. As a result, the crane in the fuel building has been upgraded from a 110-ton capacity crane to a 130-ton capacity crane. This upgrade also included certifying the crane as a single failure proof crane in compliance with the Eberer Topical Report EDR-1, which was approved by the Nuclear Regulatory Commission on January 2, 1980.

Operation of an ISFSI

- The licensee had loaded 23 casks. The 24th and last VSC-24 cask to be loaded is scheduled for February 2003 (Section 1).

- The ISFSI thermoluminescent dosimeter (TLD) environmental data for the second and third quarters of 2002 were reviewed during this inspection. Radiological conditions were consistent with levels observed during previous inspections (Section 1).

- Selected condition reports were reviewed. These reports document unexpected conditions related to the casks and ISFSI. All issues were adequately addressed by the licensee and adequate documentation generated concerning actions taken to resolve the problem (Section 1).

Review of 10 CFR 72.48 Safety Evaluations

- Safety screenings performed for the dry cask storage related activities for the period of August through October 2002 were reviewed. Eight screenings were performed during this period. None of the safety screenings required a full safety evaluation (Section 2).

Pre-Operational Testing of an ISFSI

- The licensee conducted the 125 percent load test of their new spent fuel building crane. The new crane has a load capability of 130 tons to accommodate the new heavier casks to be used for future dry cask storage of ANO's spent fuel. An Inspection Followup Item will be tracked regarding a discrepancy between the crane manufacturer's test procedure and the ANO procedure related to the tolerances allowed for the load tests to be considered acceptable (Section 3).

Report Details

Summary of ISFSI Operations

The licensee had placed 23 Sierra Nuclear Ventilated Storage Casks (VSC-24) into their ISFSI. A total of 24 casks will be loaded with the last cask anticipated for loading by February 2003. The licensee then plans during mid-2003 to begin loading a new cask design. Entergy has selected the Holtec Hi-Storm 100 cask system. A new concrete storage pad has been constructed adjacent to the concrete pad where the VSC-24 casks are stored.

A list of the VSC-24 casks that have completed the loading process and technical data concerning each cask is provided as an attachment to this report.

1 Operation of an ISFSI (60855)

1.1 Inspection Scope

A tour of the ISFSI was conducted and discussions held with the licensee concerning the current status of the loading campaign for the VSC-24 casks.

1.2 Observation and Findings

The spent fuel currently in storage at the ANO ISFSI is stored in VSC-24 casks licensed under the general licensing provisions of 10 CFR Part 72. The current Certificate of Compliance in use at ANO for the VSC-24 casks is Certificate No. 1007, Amendment 3, dated May 21, 2001.

The licensee has loaded 23 of the planned 24 casks into the ISFSI. The last cask is planned for loading in February 2003. Cask loading activities have become routine with minimal problems. Radiological controls and work practices have successfully maintained exposures low. No unexpected radiological problems have occurred. No contamination has been detected on the ISFSI pad since the first cask was placed on the pad in 1996. The pad is roped off and posted as a radiation area.

Technical Specification 1.2.11 required the licensee to place the casks on the storage pad in an array with spacing of at least 15 ft ± 1 foot center-to-center. During a tour of the ISFSI, placement of the casks was confirmed based on a visual inspection of the location of the casks.

Two thermoluminescent dosimeters placed at the fence boundary at approximately 45 feet from the ISFSI pad are evaluated by the licensee on a quarterly frequency to monitor ISFSI environmental radiation levels. The fenced area surrounding the ISFSI pad is located inside the licensee's protected area. The TLD data for the second and third quarters 2002 was reviewed. The average doses were 300 mrem/quarter (2^{nd}) and 247 mrem/quarter (3^{rd}) for TLD #34 and 313 mrem/quarter (2^{nd}) and 245 mrem/ quarter (3^{rd}) for TLD #35. These values are consistent with previous quarters.

In accordance with 10 CFR 72.212(b)(1)(ii), the licensee is required to register the use of each cask with the NRC no later than 30 days after using the cask to store spent fuel. Entergy submitted a letter to the NRC on September 17, 2002, registering casks #22 and #23. Cask #22 was placed in service on August 30, 2002. Cask #23 was placed in service on September 11, 2002.

During this inspection, several condition reports related to dry cask storage activities were reviewed for the period between August 2002 and January 2003. These reports document unexpected conditions related to the casks and ISFSI. The reports covered a variety of issues including:

- fit-up problems with one of the lids (CR-ANO-2-2002-00969),
- position of the canister in VSC-23 close to the inlet ventilation opening (CR-ANO-2-2002-01876),
- a metal box placed near the air vent for a cask that could have limited air flow (CR-ANO-2-2002-01911),
- failure of the cask loading pit gate to fully seal (CR-ANO-2-2002-00697),
- leak in the air pallet used to move the casks (CR-ANO-2-2002-01094),
- missed sign-off on a procedural step (CR-ANO-2-2002-01877),
- problems with the L3 monorail hoist and stop arm (CR-ANO-2-2002-01381),
- a rubber mat that had blown against the air vent opening of a cask. The cask was not loaded with a canister at the time (CR-ANO-2-2002-01679).

All issues were adequately addressed by the licensee. Documentation was on file concerning actions taken to resolve the problems.

1.3 Conclusions

The licensee had loaded 23 casks. The 24th and last VSC-24 cask to be loaded is scheduled for February 2003.

The ISFSI thermoluminescent dosimeter (TLD) environmental data for the second and third quarters of 2002 were reviewed during this inspection. Radiological conditions were consistent with levels observed during previous inspections.

Selected condition reports were reviewed. These reports document unexpected conditions related to the casks and ISFSI. All issues were adequately addressed by the licensee and adequate documentation generated concerning actions taken to resolve the problem.

2 Review of 10 CFR 72.48 Evaluations (60857)

2.1 Inspection Scope

Selected safety screenings and evaluations performed by the licensee related to the ISFSI were reviewed to verify compliance with the requirements in 10 CFR 72.48.

2.2 Observation and Findings

Eight safety screenings between August and October 2002 were reviewed related to dry cask storage. None of the screenings required a full safety review. The issues discussed in the screenings included:

- implementation of the Unit 1 Improved Technical Specifications and verification of no conflicts with the VSC-24 and Hi-Storm cask systems (ANO-2002-0021)
- modification to the work platform used at the cask loading pit (ANO-2002-0022)
- review of Revision 4 of the VSC-24 SAR and whether the changes had any impact on ANO's operation (ANO-2002-0023)
- use of a filtration unit on the water transfer system used to transfer water to the cask loading pit (ANO-2002-0024)
- editorial changes to procedure 1506.001, Fuel and Control Component Handling (ANO-2002-0025)
- revision to procedure LI-112, 10CFR72.48 Review Program (ANO-2002-0026)
- review of the work plan associated with the spent fuel handling area ventilation (ANO-2002-0027)
- adjustment of the setpoints for the overload operation of the Unit 1 spent fuel pool handling machine (ANO-2002-0028)

All screenings were determined to be adequately evaluated.

2.3 Conclusions

Safety screenings performed for the dry cask storage related activities for the period of August through October 2002 were reviewed. Eight screenings were performed during this period. None of the safety screenings required a full safety evaluation.

3 Pre-Operational Testing of an ISFSI (60854)

3.1 Inspection Scope

The licensee was completing the final installation and testing of their new 130 ton crane for the spent fuel building. During this inspection, the 125 percent load test of the crane was completed.

3.2 Observation and Findings

By February 2003, ANO plans to have the last VSC-24 cask loaded and placed in the ISFSI. Future dry cask storage activities will utilize the Holtec Hi-Storm 100 cask. This cask is slightly heavier than the VSC-24 cask and required ANO to upgrade their crane to handle the 122-ton load. The upgrade of the spent fuel pool crane (L3) involved the purchase of a new trolley, which included a new rope, block and hook.

ANO replaced their existing 110-ton capacity L3 trolley with a new 130-ton single failure proof trolley manufactured by Ederer that meets the requirements of NUREG-0554

"Single Failure Proof Cranes for Nuclear Power Plants. This modification also replaced the 10 ton auxiliary hook with a 15-ton hook. Both changes utilize the existing box girder support of the existing L3 crane along with all existing limits and electrical power connections. Structural impacts on the existing box girder supports and walls were reviewed including seismic and load requirements.

In 1980, the NRC completed a review of the Ederer Generic Licensing Topical Report EDR-1 "Ederer's Nuclear Safety Related eXtra Safety And Monitoring (X-SAM) Cranes," Revision 1. The topical report described the design and testing of the single failure proof features included in the Ederer X-SAM crane intended for handling spent fuel casks and other safety related loads at nuclear power plants. As a result of the review, the NRC issued a letter on January 2, 1980, which accepted the Ederer X-SAM crane as a single failure proof crane meeting the requirements of NUREG-0554 and stated that Topical Report EDR-1, Revision 1, may be referenced as accepted for use in crane systems for nuclear power plants.

ANO contracted Ederer to develop and implement a crane testing program specific to the ANO crane installation that would meet the requirements for the site specific testing of the crane to demonstrate that the crane met the requirements of the NRC approved topical report EDR-1, thereby allowing for the ANO crane to be considered a single failure proof crane. One of the required tests was the 125 percent load test, which was observed by the NRC inspector during this inspection. The load test was conducted January 14, 2002. The load test involved lifting and holding a 125% load. Based on the crane rating of 130 tons, a 125 percent load would weigh 162.5 tons. ANO controlled work package CWP# ANO-2000-2688-002/62009-07, "L3 Spent Fuel Crane Uprate," Revision 0, stated in step 8.5.6 that the tolerances on the weights for the test allowed the load to vary by +0 tons to -10 tons for the test. Therefore, the test weights could range from 162.5 tons to 152.5 tons. The weight recorded for the test was 159.4 tons based on adding the total of the concrete blocks used for the test. The load cell recorded a weight of 154.3 tons. Based on the requirements in the ANO controlled work package, the load test was successfully performed within the tolerances stated. However, the Ederer procedure used to conduct the tests, Procedure 250-F2694 "Field Acceptance Inspection and Testing Ederer S.O. No. F-2694 ANO Units 1 & 2 Spent Fuel Pool Crane Single Failure Proof Upgrade," step 9.2.1 stated that the acceptable tolerances for the test were 125 percent of the rated capability of the crane +5 percent to -0 percent. For these tolerances, the weights should have been between 162.5 tons and 169 tons. A review of American National Standard ANSI B30.2.0, "Overhead and Gantry Cranes," stated in section 2-2.2.2 "Rated Load Test" that the test load shall not be more than 125 percent of the rated load unless otherwise recommended by the manufacturer. Therefore, either tolerance value could be considered acceptable based on the ANSI standard. Resolution of which test weight criteria was the correct value to demonstrate compliance with the 125 percent load test to met the NRC approved Topical Report EDR-1 requirements will be tracked as an Inspection Followup Item (72-13/0301-01).

Prior to performing the load tests, the hooks are examined using magnetic particle techniques to verify that no cracks were in the metal. During the magnetic particle examination of the 15-ton auxiliary hook, three linear indications ranging in length from

1/4" to 5/8" were identified in the area around the manufacture's logo. This was documented on NDE Report 103MT001 dated January 8, 2003. Condition report ANO-1-2003-0029 was issued discussing the finding. The Ederer manufacture representative was informed. Indications typically found around a manufacturer's logo can be caused due to the flow of the metal during the forging process. ANO conducted a dye penetrant test (PT) of the area where the indications had been observed. The PT test did not indicate any cracks. This was documented in NDE Report 103PT001 dated January 16, 2003. The auxiliary hook successfully passed the 125 percent load test.

3.3 Conclusions

The licensee conducted the 125 percent load test of their new spent fuel building crane. The new crane has a load capability of 130 tons to accommodate the new heavier casks to be used for future dry cask storage of ANO's spent fuel. An Inspection Followup Item will be tracked regarding a discrepancy between the crane manufacturer's test procedure and the ANO procedure related to the tolerances allowed for the load tests to be considered acceptable.

4 Exit Meeting

The inspectors presented the inspection results to members of the licensee management at the conclusion of the inspection on January 15, 2003. The licensee did not identify that any proprietary information was provided to, or reviewed by the inspectors.

ATTACHMENT 1

PARTIAL LIST OF PERSONS CONTACTED

Licensee

M. Harris, Sr Project Manager-Dry Fuel Storage
S. Pyle, Licensing Engineer
L. Reese, Test Engineer
H. Rideout, Sr. Lead Engineer
J. Wellwood, Engineer
D. Williams, Project Manager-Dry Fuel Storage

INSPECTION PROCEDURES USED

60854 Preoperational Testing of an ISFSI
60855 Operation of an ISFSI
60857 Review of 10 CFR 72.48 Evaluations

LIST OF ITEMS OPENED, CLOSED AND DISCUSSED

Opened

72-13/0301-01	IFI	Acceptance Criteria for Test Load Weights for the 125% L3 Crane Tests

Closed

None

Discussed

None

LIST OF ACRONYMS

ANO	Arkansas Nuclear One
GWd/MTU	gigawatt days per metric ton of uranium (i.e. 1,000 MWd/MTU)
ISFSI	Independent Spent Fuel Storage Installation
kW	kilowatts
mrem/hr	millirem/hour
MWd/MTU	megawatt days per metric ton of uranium
TLD	Thermoluminescent Dosimeter
T.S.	Technical Specification
VCC	Ventilated Concrete Cask
VSC	Ventilated Storage Cask

ATTACHMENT 2

LOADED VSC-24 CASKS AT THE ANO ISFSI

LOADING ORDER	CASK #	UNIT	DATE PLACED ON PAD	HEAT LOAD (kW)	BURNUP MWd/MTU	FUEL ENRICHMENT	MANHOURS TO LOAD	Person-Rem DOSE
1	#1	Unit 1	12/96	5.2	19,905	2.067	not tracked	0.185
2	#3	Unit 1	1/97	10.7	32,599	3.190	1750	0.384
3	#5	Unit 2	4/97	4.18	20,318	1.930	1852	0.291
4	#6	Unit 2	4/97	6.2	30,149	2.939	1463	0.469
5	#12	Unit 2	9/98	10.8	34,938	3.384	2479	0.900
6	#11	Unit 2	10/98	8.0	33,075	2.938	1416	0.553
7	#7	Unit 2	10/98	8.0	34,891	3.328	1844	0.567
8	#2	Unit 2	11/98	8.1	34,773	3.337	1542	0.483
9	#4	Unit 1	4/99	9.1	33,051	3.059	2036	0.236
10	#8	Unit 1	4/99	9.2	33,255	3.059	1186	0.231
11	#9	Unit 1	5/99	9.1	33,194	3.205	1324	0.189
12	#13	Unit 1	6/99	7.3	33,066	3.048	1380	0.112
13	#14	Unit 1	7/99	10.7	34,646	3.213	1130	0.383
14	#10	Unit 2	4/00	12.16	40,211	3.374	1700	0.602
15	#15	Unit 2	6/00	9.86	40,220	3.372	1233	0.603
16	#16	Unit 1	7/00	13.37	40,180	3.206	1233	0.528
17	#18	Unit 1	1/01	14.67	38,794	3.454	1348	0.628

LOADING ORDER	CASK #	UNIT	DATE PLACED ON PAD	HEAT LOAD (kW)	BURNUP MWd/MTU	FUEL ENRICHMENT	MANHOURS TO LOAD	Person-Rem DOSE
18	#17	Unit 2	6/01	14.23	41,188	4.010	1225	0.695
19	#19	Unit 2	6/01	14.17	41,193	4.010	1000	0.659
20	#20	Unit 2	7/01	14.24	41,204	4.010	940	0.554
21	#21	Unit 2	8/01	14.26	40,931	4.010	936	0.666
22	#22	Unit 1	8/02	14.69	38,909	3.460	1420	0.407
23	#24	Unit 1	9/02	14.66	38,981	3.460	929	0.567

Unit 1: 11 casks loaded, average heat load = 10.8 kW; average man-hours to load = 1378 hrs; average dose = 0.350 person-rem
Unit 2: 12 casks loaded, average heat load = 10.3 kW; average man-hours to load = 1469 hrs; average dose = 0.587 person-rem
Note: Unit 2 fuel is 18 inches longer than Unit 1 fuel

Note:

- Heat Load (kW) is the sum of the heat load values for all 24 spent fuel assemblies
- Burnup is the value for the spent fuel assembly with the highest individual discharge burnup
- Fuel Enrichment is the spent fuel assembly with the highest individual enrichment per cent of U-235