ENCLOSURE 2

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Facility:	Arkansas Nuclear One, Units 1 and 2
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Attachment:	Partial List of Persons Contacted; Inspection Procedures Used; Items Opened, Closed, and Discussed; and List of Acronyms Used

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EXECUTIVE SUMMARY

Arkansas Nuclear One, Units 1 & 2
NRC Inspection Report 50-313/96-16, 50-368/96-16, 72-13/96-01

This NRC team inspection included a comprehensive review of the Arkansas Nuclear One (ANO) program for moving spent fuel into dry cask storage in the Independent Spent Fuel Storage Installation (ISFSI) located within the protected area of ANO. The inspection included reviews of procedures, training, and observation of the dry run exercise conducted by ANO to meet the requirements of 10 CFR Part 72, Subpart K, and the Certificate of Compliance for the VSC-24 Cask. The inspection team consisted of personnel from the ANO Resident Inspector's office, Region IV Division of Nuclear Materials Safety, Region IV Division of Reactor Safety, NRC Headquarter's Spent Fuel Project Office, NRC Headquarter's Office of Nuclear Reactor Regulation, and consulting support. The following is a summary of the findings of this inspection.

- Based on the items reviewed, the evaluation conducted by the licensee to satisfy the requirements of 10 CFR Part 72, Subpart K, was found to be thorough and complete (Section 1).

- The licensee followed procedures and demonstrated knowledge in the use of equipment used for loading, unloading, and movement of the spent fuel and casks during the dry run exercise. Management controls were strong with an excellent focus on safety and problem solving. Health physics activities associated with the dry run demonstrated an active involvement by the health physics organization in the development and implementation of the dry cask storage program (Section 2).

- The licensee had actively monitored the construction and operation of the dry cask storage system. The licensee monitored the fabrication of the casks, nondestructive examinations, testing, and construction. The licensee's quality assurance and quality control process was proactive in identifying problems (Section 3.2).

- The licensee identified and effectively resolved several potential problems including conditions that were classified as significant by the licensee. Resolution of these issues involved changes to crane operations and changes to the movement of the cask loading pit tilt gate over the spent fuel pool. The number and nature of nonconformance reports initiated during the development of the dry cask storage program covered many different areas and a review of selected reports indicated that the licensee was appropriately addressing the issues (Section 3.2).

- Contrary to the procedural requirements for storage of the multi-assembly sealed basket (MSB) lids, two MSB lids were not stored in

accordance with Level D storage requirements. This resulted in surface corrosion forming on the threaded surfaces used to lift and transport the MSB, because environmental moisture was not effectively prevented from entering the MSB lid bolt holes. This was identified as a Severity Level IV violation (Supplement I). Since the corrective actions completed during the inspection appeared to provide an adequate level of assurance that the problem will not recur, this violation is closed as part of this inspection report (Section 3.3).

- The licensee had developed a comprehensive set of procedures to support the activities related to the dry cask storage program. These procedures incorporated a checklist format with cautions, warnings, hold points, and verification steps built into the appropriate procedural steps (Section 4).

- Based on the review of procedures, interviews with the licensee, and observation of the dry run, procedures and controls provided adequate assurance that the planned loading of spent fuel assemblies into the multi-assembly sealed basket (MSB) will meet the requirements of the Certificate of Compliance (Section 5).

- Training records of the crane operators were reviewed and found to be complete. Lesson plans for the crane operator training were appropriate for the movement of the spent fuel and casks (Section 6).

- Cranes, rigging, and lifting equipment were tested in accordance with licensee procedures. The testing adequately demonstrated the ability of the equipment to support the anticipated loads required during the dry cask storage program activities (Section 6).

- The rail car and dolly for moving the storage cask and transfer cask were found by the licensee to have several unacceptable welds. These welds have been repaired (Section 6).

- The welding program was well planned. The lead welder was very knowledgeable in welding techniques and the process to be used with the VSC-24 casks. An in-house process to open the MSBs was available, though ANO's preferred method would involve an outside contractor. Creative ideas were developed for welding the MSB lid, including prearranging welding shims and the use of a temporary lid for radiation shielding (Section 7).

- Within the scope of the inspection, the design review program at ANO related to the dry cask storage program was comprehensive and effectively implemented. The design changes completed by the licensee in accordance with 10 CFR 72.48 and reviewed by the NRC

inspection team confirmed the conclusions reached by ANO for the design review packages examined (Section 8).

- No significant fire or explosion hazards concerning the movement and storage of the casks were identified. The licensee had implemented comprehensive administrative controls to preclude a train fire from impacting site storage and transportation of the spent fuel. Engineering evaluations of the fire potential at the ISFSI pad provided a basis for determining that the storage casks will not be at risk due to a fire (Section 9).

- Licensee radiation protection personnel were cognizant of the various activities to be performed as part of the dry cask storage program including the expected controls necessary to inform workers of radiological conditions. Licensee contingency procedures that were developed to resolve potential problems were appropriate. During the dry-run exercise, plans and preparations for controlling radiological work related to the fuel movement activities were effectively demonstrated. Discussions with personnel indicated an appropriate sensitivity to as low as is reasonably achievable (ALARA) requirements and to safety (Section 10).

- Requirements established in the Storage Cask Certificate of Compliance related to dose rates and contamination levels had been adequately incorporated into procedures. Personal dosimeters were used effectively and in accordance with requirements for monitoring external exposure (Section 10).

- The controlled area around the ISFSI pad met the requirements of 10 CFR Part 72. Thermoluminescent dosimeters (TLDs) were located around the ISFSI pad to monitor environmental radiation levels (Section 10).

- The licensee's emergency plan and classification procedures were found to have the capability to properly detect and classify emergency events associated with cask loading and ISFSI operations. Proper emergency response actions to such events could be conducted according to existing operating and emergency procedures (Section 11).

- During the fabrication of the components important to safety, the licensee maintained close quality control oversight of the process and components used. The fabrication specifications for the VSC-24 system identified the components important to safety. To ensure that the required quality controls are implemented during procurement, the approved plant procurement program would be used to purchase necessary components (Section 12).

- The ISFSI was located within the existing protected area and provisions for ISFSI security were encompassed by the existing site security program. No major changes were determined to be necessary to this program (Section 13).

- The licensee had established a formal training program for site personnel involved with the dry cask storage program. This program incorporated the required training identified in the VSC-24 Certificate of Compliance and was comprehensive and well documented (Section 14).

- The licensee's procedure for reportability was determined to be appropriate with excellent logic tree aids provided. The procedure included the required notification criteria established in 10 CFR Part 72 (Section 15).

Report Details

1 NRC Regulatory Requirements for Dry Cask Storage

1.1 Inspection Scope (60854)

A nuclear facility may store spent fuel at an ISFSI in accordance with the provisions of a general licensee under 10 CFR Part 72, Subpart K, "General License for Storage of Spent Fuel at Power Reactor Sites." Use of the general license requires that the facility possess a Part 50 license and that the cask to be used is certified by the NRC. Certified casks are listed in 10 CFR 72.214.

In addition to the requirements established in 10 CFR Part 72, the licensee must also comply with the conditions set forth in the Certificate of Compliance for the cask selected. The criteria in the Certificate of Compliance establish the bounding technical conditions for the use of the cask. Site specific deviations from these conditions are allowed through the use of a design review process as described in 10 CFR 72.48.

1.2 Observations and Findings

ANO Engineering Report 95-R-0015-01, dated May 4, 1996, was reviewed to verify completion of the evaluations required by 10 CFR Part 72 to demonstrate that ANO is in compliance with the requirements for use of the VSC-24 cask system. A line-by-line evaluation of the 10 CFR Part 72 requirements and the requirements of Certificate of Compliance No. 1007 for the VSC-24 cask were incorporated into the Engineering Report as Appendix A. This report was comprehensive and provided documentation that the required evaluations were completed.

The evaluations included a review of the conditions established by the Certificate of Compliance for the use of the cask, verification that the storage pad and areas had been adequately designed to support the static loads of the cask, that the radiological criteria established in 10 CFR 72.104 had been met, and that the reactor site parameters, including analysis of earthquake intensity and tornado missiles, were enveloped by the cask design.

Special evaluations were performed on the seismic, tornado, and flooding aspects of the ANO site in relation to the Certificate of Compliance requirements. The concrete and steel structure of the VSC-24 design provided for the protection against missiles created during high winds or a tornado. For flooding, a maximum probable flood would cover the storage cask lower air ducts by 1 foot 4 inches of water. In addition, if the flooding is combined with a catastrophic failure of an upstream dam, the lower air ducts would

be covered by 4 feet, 5 inches of water. In either case, adequate fuel cooling would still be maintained due to annulus air flow into and out of the upper air ducts. Licensee calculations also demonstrated that the flood water velocity would be insufficient to move or tip the storage cask.

The licensee's evaluation determined that site seismic and high wind conditions were bounded by the VSC-24 design. The VSC-24 was designed for 0.25g horizontal and 0.17g vertical seismic events, which envelope the site seismic design of 0.10g horizontal and 0.067g vertical for the design basis earthquake and 0.20g horizontal and 0.133g vertical for the safe shutdown earthquake. In order to tip the cask during a seismic event, a 5-foot vertical displacement would be necessary. ANO evaluated potential cask tipping at the pad and on the rail car and found it to be a noncredible event. In addition, the design seismic spectrum in Unit 1 and 2 on the spent fuel pool operating floors were determined to be of insufficient magnitude to adversely effect the safe loading of the spent fuel.

1.3 Conclusions

Based on the items reviewed, the evaluation conducted by the licensee to satisfy the requirements of 10 CFR Part 72, Subpart K, was found to be thorough and complete.

2 Dry Run Exercise

2.1 Inspection Scope (60854)

The Certificate of Compliance for the VSC-24 cask requires that a dry run exercise be conducted by the licensee prior to actual loading of spent fuel assemblies into the casks. The dry run exercise is intended to validate new procedures and provide for training of the staff on the activities related to the spent fuel movement activities. The licensee conducted a dry run during the week of May 6, 1996. This dry run was observed by the NRC inspection team and included observation by team members on all shifts during which significant activities were performed.

2.2 Observation and Findings

The dry run was conducted in accordance with ANO Procedure 1409.520, "Dry Spent Fuel Storage Project Loading Exercise (Without Fuel)." The dry run included the movement of the multi-assembly sealed basket (MSB) and the transfer cask (MTC) into and out of the cask loading pit, loading of a dummy fuel assembly, decontamination of the MSB/MTC, setup for sealing and drying of the MSB, movement of the MSB/MTC to the turbine building and into the storage cask, and transport of the storage cask to the ISFSI pad. The activities related to the sealing and cover gas backfill of the MSB had

previously been performed on a mock-up MSB. The opening of an MSB, using the mock-up, was not performed as part of this dry run. However, the licensee demonstrated through the availability of procedures, tools, and qualified personnel and an extensive walk-through of the process that the capability of safely opening an MSB existed at ANO.

The dry run was coordinated from a centralized control center by the project manager in the same way that the actual loading will be coordinated. Video cameras of the work areas were available to monitor progress. The focus by management during the dry run was on safety and problem solving. Activities were not rushed in order to meet a schedule, and all problems identified by the staff were addressed constructively by the management team. Overall, excellent management control and oversight was demonstrated throughout the dry run exercise.

Preshift briefings were conducted with the workers prior to starting work for the shift. Industry experience was included in the briefings and special emphasis was placed on key aspects of the work to be performed during the shift, including health physics precautions. If a problem occurred during the shift, work was halted, and the problem was resolved. The team was briefed on corrective actions, and the work was resumed. Special information such as the spent fuel pool boron concentration and the time remaining before draining of the cask was tracked and posted.

All work observed by the inspection team was performed safely. Workers implemented procedures effectively and in a manner that would parallel the actual conduct of irradiated fuel handling. Health physics controls were established, and workers were observed complying with the controls. Health physics presence during activities was evident, and health physics personnel were knowledgeable of the potential radiological problems that could be experienced during the fuel movement activities.

During the dry run, a problem was encountered with the placement of the dummy fuel assembly into the preselected MSB sleeve location. The crane operator was unsuccessful in inserting the dummy assembly into the sleeve, even after several attempts to fine tune the assembly's orientation. After consultation with the operations supervisor, the crane operator moved the assembly to an adjacent cell and inserted the assembly into the new location without difficulty. The reactor operator then disengaged the assembly from the lift, moved the crane, returned to the assembly location, and relifted the assembly out of the MSB.

The problem with the original attempt to insert the dummy fuel assembly into the MSB was reviewed with the licensee. The dummy fuel assembly was nominally dimensioned and slightly heavier than

the actual ANO fuel assemblies due to the use of steel rods in place of fuel rods. The insertion problem with the dummy fuel assembly had occurred on a previous practice exercise and was determined to be an orientation problem associated with the fuel handling machine aligning the dummy fuel assembly exactly with the sleeve. Once the correct orientation and starting grid location had been established for the fuel handling machine by loading the assembly into another sleeve location, the dummy fuel assembly was then successfully inserted into the first location without a problem. The inspectors agreed with the licensee that the problem was related to the process of establishing the initial fuel assembly orientation.

To ensure that the sleeves had the correct dimensions for accepting the fuel assemblies, the inspectors reviewed the ANO program for verifying sleeve dimensions. Upon receipt of the MSB from the vendor, the sleeves were checked by the quality control group to ensure proper tolerances by insertion of simulated assemblies with the correct dimensions. No problems had occurred during the receipt inspection verification of sleeve dimensions. As an added precaution to prevent damage to the fuel assemblies during insertion into the sleeves, a load cell on the crane prevents the crane from operating if the load reduces to 1600 pounds, indicating that the fuel assembly is becoming lodged in the sleeve. Based on the review by the inspectors, the potential for a problem occurring with an actual fuel assembly, similar to the problem with the dummy fuel assembly, and the potential for damage to occur during the insertion process due to incorrect orientation of the fuel assembly or incorrect dimensions of the sleeve appear to be unlikely.

For the actual loading of fuel, Procedure 1022.012, "Storage, Control, and Accountability of Special Nuclear Material," requires that each assembly be placed in a specific preselected location in the MSB. If problems occur during the insertion of the assembly, the assembly cannot be inserted in another location at the discretion of the operator or the control center. Placement of the assembly into another location required a revision to the nuclear fuel transfer report form and approval by the operations manager, reactor engineer, and an independent reviewer. For the dry run exercise, however, the crane operator's instructions were simply to load a dummy fuel assembly into the MSB. No specific location was required by the procedure for the dry run.

2.3 Conclusion

The licensee followed procedures and demonstrated knowledge in the use of equipment used for loading, unloading, and movement of the spent fuel and casks during the dry run exercise. Management controls were strong with an excellent focus on safety and problem solving. Health physics activities associated with the dry run demonstrated an active involvement by the health physics

organization in the development and implementation of the dry cask storage program.

3 Quality Assurance

3.1 Inspection Scope (60851, 60854)

The existing quality assurance program, approved by the NRC for plant operations, was used for the dry cask storage program. The inspection team reviewed the application of the site quality assurance program to activities related to the dry cask storage program. Emphasis was placed on those activities which could affect the quality of identified structures, systems, and components to the extent commensurate with the importance to safety and as necessary to ensure conformance with the requirements of the approved design for the VSC-24 cask system.

3.2 Observations and Findings

The licensee had performed several audits, surveillances, and self assessments of the dry cask storage program to identify problems. These audits recommended several improvements to the dry cask storage activities, which the licensee implemented.

When the casks were under construction and before acceptance by the site, the licensee used the corporate quality assurance and nonconformance report process to document problems. After the casks were accepted by the site, the licensee's condition report process was used when conditions adverse to quality were identified. The licensee had issued condition reports on several potential problems including their dry run preparation effort, design basis assumptions for the cask, weld cracks on the railroad car and transfer dolly, crane problems, and lifting the cask load pit gate over the spent fuel pool. The inspectors reviewed selected condition reports and found them to be thorough and well documented.

Two condition reports identified issues that were determined by the licensee to be significant. One condition report issue involved the cask transfer pit gate being rotated over the spent fuel pool. The other condition report issue involved continuing problems with the licensee's cranes. The licensee issued LER 96-04 concerning the cask transfer pit gate and took actions to improve crane operations. LER 96-04 involved the movement of the cask transfer pit gate over a portion of the spent fuel pool where spent fuel was stored. The gate exceeded the weight limit allowed for movement over that portion of the spent fuel pool. Actions taken by the licensee for both issues were determined to be appropriate. Closure of the LER will be documented in a future inspection report.

The licensee's quality control efforts were extensive and included both monitoring the construction of the storage casks at the site and vendor surveillances during the construction of the transfer casks and MSBs. The licensee issued 98 separate nonconformance reports on the storage casks with 64 of the nonconformance reports affecting multiple storage casks.

In reviewing the descriptions of the nonconformance reports, the inspectors noted that several different aspects of construction, including rebar placement, welder qualifications, concrete placement and testing, training of workers, and the conduct of testing were found to involve quality control issues. The inspectors also found that the majority of nonconformance reports were identified early in the construction process of the storage casks with a decreasing number identified as the program progressed, indicating that an aggressive initial role by the quality control group had been successful.

In addition to the nonconformance reports related to the storage casks, the licensee issued 22 nonconformance reports on the MSB construction and 9 on the transfer cask construction. The subjects of these nonconformance reports included weld defects, excessive gaps, and weld preheats.

The inspectors reviewed selected nonconformance reports to determine if appropriate dispositioning of the issues had been implemented. No inadequately dispositioned nonconformance reports were identified.

The inspectors also noted that the licensee monitored and verified the construction of all MSBs and transfer casks at the fabrication shops. The licensee issued surveillance reports and nonconformance reports for problems during the fabrication process.

3.3 (Closed) Violation 50-313/96016-01: Improper Storage of MSB Lids

During tours of the dry cask component laydown areas, the storage of various dry cask components was observed. The inspectors noted that the MSB lids were supported above the ground with dunnage, but the tops of the lids were not covered. The tops of the MSB lids had accumulated rainwater. Plugs for the lifting bolt holes were not installed on two of the lids, and rust was observed on the threads in the lifting bolt holes. The lifting bolts, which will be installed in the lifting bolt holes of the lids, will hold the weight of the MSB during movement into the transfer cask and during lowering from the transfer cask into the storage cask after being filled with spent fuel elements.

The inspectors reviewed licensee quality assurance requirements and questioned whether the observed storage level was appropriate.

Requirements established in 10 CFR Part 50, Appendix B, Section XIII states, in part, that measures shall be established to control the handling, storage, shipping, cleaning, and preservation of material and equipment in accordance with work and inspection instructions to prevent damage and deterioration.

Fabrication Specification AMSB-92-001, Revision 3, notes that the MSB lid is a quality-related (Q) component. Purchase Requisition PR 81552 established the MSB and lids as Level D storage. The requirements for different levels of storage are noted in ANSI N45.2.2-1972, "Packaging, Shipping, Receiving, Storage and Handling of Items for Nuclear Power Plants." The licensee's quality assurance manual implements ANSI N45.2.2-1972.

Licensee Procedure 1033.002, Revision 27, "Control of Material," controls the handling, storage, and shipment of materials. Section 6.3.4 of Procedure 1033.002 defines the storage requirements of Level D items. Section 6.3.4 states, in part, that, "Level D items require protection from one or more of the following: physical damage, detrimental corrosion or contamination, and openings into items shall be capped, plugged, and sealed." The failure of the licensee to store the MSB lids according to Procedure 1033.002 was identified as a violation of 10 CFR 50, Appendix B, Criterion XIII.

Following identification of the issue, the licensee initiated Condition Report (CR)-C-96-0106. Immediate corrective actions included performing an evaluation for degradation and acceptance for the amount of rust on the threads. This evaluation concluded that the small amount of rust present did not have a detrimental effect on the ability of the threads to perform their function. The plugs had apparently been removed during receipt inspection of the threads and had been unintentionally left out. Personnel involved with handling the casks were aware that the plugs should have been reinstalled.

Other prompt corrective action was performed to clean out the water, remove the rust, coat the threads, reinstall the plugs, and cover the lids. These activities were completed prior to the NRC inspection team leaving the site. The condition report generated on this finding prompted the licensee to perform a root-cause analysis. As a result, longer term corrective actions were identified in the condition report. These included, (1) an evaluation of the adequacy of maintenance procedures to ensure materials storage is adequately addressed, (2) train personnel to heighten awareness of procedural requirements, (3) cause the Superintendent of Stores Operations to provide stores personnel instructions on procedural requirements, (4) develop a site position on designated storage areas consistent with ANSI N45.2.2, and (5) perform a walkdown of material staging areas to ensure that all storage requirements are adequate.

3.4 Conclusion

The licensee had actively monitored the construction and operation of the dry cask storage system. The licensee monitored the fabrication of the casks, nondestructive examinations, testing, and construction. The licensee's quality assurance and quality control process was proactive in identifying problems.

The licensee identified and effectively resolved several potential problems including two conditions that were classified as significant by the licensee. Resolution of these two issues involved changes to crane operations and changes to the movement of the cask loading pit tilt gate over the spent fuel pool. The number and nature of nonconformance reports initiated during the development of the dry cask storage program covered many different areas and a review of selected reports indicated that the licensee was appropriately addressing the issues.

Contrary to the procedural requirements for storage of the multi-assembly sealed basket (MSB) lids, two MSB lids were not stored in accordance with Level D storage requirements. This resulted in surface corrosion forming on the threaded surfaces used to lift and transport the MSB, because environmental moisture was not effectively prevented from entering the MSB lid bolt holes. This was identified as a Severity Level IV violation (Supplement I). Since the corrective actions completed during the inspection appeared to provide an adequate level of assurance that the problem will not recur, this violation is closed as part of this inspection report.

4 Procedures/Technical Specification Reviews

4.1 Inspection Scope (60854)

Implementation of the dry cask storage program requires the use of procedures to control activities related to cask handling, loading, movement, unloading, surveillances, and maintenance of the VSC-24 system. These procedures are to be consistent with the Technical Specifications established in the Certificate of Compliance. In addition, a mechanism should be in place to document activities as a record of completion of the Certificate of Compliance requirements. The inspection team reviewed procedures and observed procedure implementation during the dry run.

4.2 Observations and Findings

The licensee had approximately 35 procedures related to the dry cask storage activities of which about half were new procedures. The procedures covered all required activities and had been developed using a format that provided documentation of activities completed.

This checklist format included caution statements and warning statements incorporated into the procedure prior to directing the user to complete the activity. Space was provided for sign-off of each step in the procedure. Hold points and verification signatures were clearly marked for radiation protection, quality assurance, and project management to ensure the identified activity was performed under the correct conditions and oversight. Inter-department coordination and notifications were also incorporated into the procedure. Procedural steps were detailed with concise action statements.

Special attention during this inspection was directed toward the cask loading and cask unloading procedures. The cask loading procedure provided a comprehensive listing of the Certificate of Compliance requirements in the section on limits and precautions. Spaces were provided throughout the procedure to document required data such as the MSB boron level, spent fuel pool temperature, and results of the pressure test. Attachments were provided to the procedure which included information on system component weights, tracking log, and placement of the MSB back into the cask loading pit, if the cask could not be drained within the required time frame.

The cask unloading procedure was very detailed. The procedure included provisions for sampling the MSB cavity gas before removing the structural lid. A formal management briefing was required if the cavity atmosphere was not helium. Provisions to limit the formation of steam and minimize cask internal pressure during reflood were also incorporated into the procedure.

The procedure recognized the potential for damaged or oxidized fuel and changing radiological conditions via appropriate steps and caution statements. The procedure reflected the licensee's awareness that unloading the cask is not simply a reversal of the loading process.

4.3 Conclusion

The licensee had developed a comprehensive set of procedures to support the activities related to the dry cask storage program. These procedures incorporated a checklist format with cautions, warnings, hold points, and verification steps built into the appropriate procedural steps.

5 Fuel Verification

5.1 Inspection Scope (60854, 60855)

Fuel to be loaded into the MSB must meet certain requirements established in the VSC-24 Certificate of Compliance. The

requirements on the fuel ensure that the peak fuel rod temperatures, maximum surface doses, and nuclear criticality effective neutron multiplication factor are below the design values. Furthermore. the fuel weight and type ensured that structural conditions of the Safety Analysis Report bound those of the actual fuel being stored. Immediately before insertion of a spent fuel assembly into an MSB, the identity of each fuel assembly shall be independently verified and documented. The inspectors reviewed the licensees plans and procedures for fuel verification.

5.2 Observations and Findings

The licensee had developed Procedure 1302.028, "Fuel Selection Criteria for Dry Storage," to control the selection of the spent fuel elements for placement into the MSB. Selection of the fuel assemblies will be based on review of reactor engineering records and custodial records to ensure compliance with the requirements of the Certificate of Compliance. The candidate fuel assemblies were listed in a spreadsheet database, which had been peer reviewed, and subjected to quality control and software control. The selected fuel assemblies were pre-staged in the pool. Prior to cask loading, the procedure requires that each side of the fuel assembly be visually inspected with a video camera to verify the absence of gross cladding defects.

Procedure 1302.028 contained provisions for verification of fuel identification prior to loading into the MSB and for independent verification of fuel identification and basket location after loading. The procedure included verification steps to document that the fuel assemblies meet the limiting parameters specified in Table 1 of the Certificate of Compliance.

5.3 Conclusion

Based on the review of procedures, interviews with the licensee, and observation of the dry run, procedures and controls provided adequate assurance that the planned loading of spent fuel assemblies into the multi-assembly sealed basket (MSB) would meet the requirements of the Certificate of Compliance.

6 Heavy Load

6.1 Inspection Scope (60854)

Implementation of the dry cask storage program requires the lifting and movement of the MSB and the transfer cask using the plant cranes and the movement of the storage cask from the plant to the ISFSI pad. This inspection reviewed the licensee's capability to safely complete the movement of these heavy loads. The criteria in

NUREG-0612, "Control of Heavy Loads at Nuclear Power Plants," was used by the licensee in the development of their program.

6.2 Observations and Findings

The training program for the crane operators was reviewed to verify that lesson plans had incorporated the required training necessary for the crane operators. Training records were reviewed for the crane operators to verify that training had been completed. The training program for the crane operators was found to be adequate for the planned activities.

The NRC had identified deficiencies with the licensee's cranes during a Fuel Integrity and Reactor Subcriticality inspection in September 1993. At that time, the inspectors observed an attempted move of the reactor vessel head using the containment building polar crane. During that operation, the licensee raised the head several inches, halted motion, and attempted to continue raising the head. Instead of raising the head, the hoist slipped and the head dropped. The inspection report for the September 1993 inspection identified this as an Inspection Follow-up Item (IFI 50-313/9326-02, 50-368/9326-02).

During a subsequent inspection reported in NRC Inspection Report (50-313/94-22, 50-368/94-22), inspectors found that the licensee had identified other crane anomalies that had been addressed only as far as necessary to make the cranes functional. The follow-up item was left open. During an inspection conducted in June 1995 reported in NRC Inspection Report (50-313/95-20, 50-368/95-20), the inspectors reviewed the licensee's actions taken to that date and also the proposed actions to be taken for the spent fuel building overhead crane that would be used for the dry spent fuel storage cask movement.

During the June 1995 inspection, the inspectors found that the licensee had taken appropriate actions to address the polar crane issues and developed appropriate steps to assure the spent fuel building overhead crane would perform as designed during the movement of the dry spent fuel storage casks.

During this current team inspection, the licensee's actions related to the spent fuel building crane were reviewed. Although the crane successfully lifted 120 tons in 1994, the licensee tested the crane again in July/August of 1995 using the same methodology as was used on the polar crane. The licensee tested the crane with the brakes engaged, causing the motor's rotor to be locked with maximum current. During this testing, the licensee found that the saturable reactors did not saturate as expected. Saturable reactors are magnetic amplifying devices which provide the control current to the

polar crane motors. Because of the problem noted, the licensee ordered new saturable reactors.

The saturable reactors were replaced in March 1996. On March 30, 1996, the licensee, with assistance from the crane vendor, tested the spent fuel building overhead crane at 100 tons. The testing was conducted in accordance with Job Order 00945635 which referenced Procedure 1402.081, "Load Testing of Crane L3, Unit 1 Aux. Fuel, 2L35, L7," Revision 1, Procedural Change 1, Temporary Change 1. During the testing, the licensee noted that a fuse was blown in the circuit of one of the saturable reactors. The licensee found that the saturable reactors had been reinstalled in parallel in accordance with Drawing 101E6751, "Wiring Diagram," Revision 5. The team noted that this drawing had been revised in 1981 in accordance with Drawing Change Request 445 which was issued on July 22, 1976. The drawing change request should have been for the auxiliary hoist only; however, the drawing for the saturable reactor circuitry for the main hoist was also revised. The licensee corrected this condition and continued with the testing. The licensee then performed additional testing to verify crane capabilities and to ensure the saturable reactors were functioning properly. The team reviewed the test data and noted that the voltage drop across the saturable reactors was approximately 4.5 volts. The acceptance criteria was a voltage drop of less than 20 volts.

The condition of the Unit 1 and Unit 2 turbine building cranes were also reviewed. These cranes will be used to move the MSB and the transfer cask from the fuel building onto the rail car. The licensee tested each of these cranes in accordance with Job Orders 00945486 and 00945497, Unit 2 and Unit 1, respectively. The licensee identified a problem with the saturable reactor for the Unit 1 turbine building crane. It did not perform as expected, and the licensee replaced it. During testing, a load of 100 tons was successfully lifted.

The inspectors concluded that the cranes, rigging, and lifting equipment had been successfully tested in accordance with licensee procedures. The tests had adequately demonstrated the ability of the equipment to support the anticipated loads without compromising the licensing basis margins and were compatible with the activities needed to support the dry cask storage program.

During the preparations for the movement of the storage cask in May 1996, the licensee discovered a number of cracked and undersized welds and welds with lack of fusion on the rail cars used to transport the MSB and storage cask on site. This situation was documented in Condition Report CR-C-96-0104, "Weld Deficiencies in Storage Cask Rail Car and MSB Dolly," dated May 8, 1996. Although two weld indications were readily apparent on the MSB dolly, the other indications found were located in limited access locations

beneath the storage cask rail car. The condition report suggested repairing all deficiencies as the corrective action. Engineering Request Response 963105E101, "Evaluation of the Storage Cask and Transfer Cask Rail Cars for the High Level Waste Storage," dated May 8, 1996, found the rail cars acceptable for use during the dry run, but recommended further inspection and repairs before actual fuel movement.

The licensee reviewed the drawings for the rail car and determined that some welds were missing, and the welds for the support beams should have been 3/4-inch instead of 3/8-inch. The licensee initiated CR-C-96-0130 documenting these problems.

Subsequent to this inspection, the licensee completed the repair of the rail car and dolly. Between June 4 and June 7, 1996, the inspectors visually examined the weld repairs to the dolly and rail car. The licensee added stiffener plates and built up certain welds from 3/8-inch to 3/4-inch. The licensee intends to inspect the rail car and dolly prior to each cask movement to assure no further weld problems have occurred.

6.3 Conclusion

Training records of the crane operators were reviewed and found to be complete. Lesson plans for the crane operator training were appropriate for the movement of the spent fuel and casks.

Cranes, rigging, and lifting equipment were tested in accordance with licensee procedures. The testing adequately demonstrated the ability of the equipment to support the anticipated loads required during the dry cask storage program activities.

The rail car and dolly for moving the storage cask and transfer cask were found by the licensee to have several unacceptable welds. These welds have been repaired.

7 Welding Program

7.1 Inspection Scope (60854)

Welding of the MSB lid is a critical activity associated with sealing the spent fuel from the environment. The welding program, including procedures, records, and welder qualifications was reviewed. The actual demonstration of welding of the MSB lid, the helium leak testing, and opening an MSB had been successfully completed prior to this inspection.

This inspection did not review the concerns associated with the hydrogen problem identified at Point Beach. The ANO response to the generic communication issued by the NRC on July 5, 1996, will be

reviewed prior to fuel being moved to the ISFSI to ensure adequate actions have been taken by ANO to address the concerns identified in the generic communication.

7.2 Observation and Findings

Welding procedures, welding procedure specifications, procedure qualification records, and welder qualifications were reviewed and found to be acceptable. The dry cask storage welding program was thorough and well planned in regard to welding quality and ALARA considerations. The lead welder was knowledgeable in welding techniques and concepts and in integrating the welding process into the overall dry cask storage program. In particular, the licensee demonstrated innovative use of a temporary shield lid during welding and helium leak check operations and a method for prefitting of welding shims using a power assisted ram. This showed a committed effort to reduce worker dose, decrease the time required to weld the MSB, and increase the overall quality of the MSB closure welds.

The welding procedures used by the licensee for the MSB shield and structural lids did not include preheat or post-weld heat treatment. Requirements and exceptions for preheat and post-weld heat treatment are contained in the ASME Code, Section III, NC-4600. The inspectors discussed the issue of weld preheat with the licensee. The licensee presented a justification for welding without preheat as described in the Technical Basis for the 10 CFR 72.48 evaluation, "Preheat Requirements for the Multi-Assembly Sealed Basket Lid Welds." Based on the demonstrated impact resistance, base material, low preheat temperature, and weld joint configuration, the inspectors found the licensee's justification acceptable.

In the event that cutting open the MSB should be necessary, the licensee had developed plans to use an experienced contractor. ANO had also developed a backup method using in-house personnel, equipment, and procedures to cut open the MSB. While the mechanical cutting method used by the contractor would remove the lid without damaging the MSB, the torch cutting proposed by the licensee would most likely result in the MSB being unusable after opening. The inspectors observed the MSB lid mock-up where both manual and semiautomatic cutting operations had been previously performed. ANO provided procedures and equipment to demonstrate their capability. A walk-through of the process was provided by the licensee to demonstrate the knowledge and capability to open an MSB. The licensee's actions demonstrated the capability to meet the Certificate of Compliance Condition 1.1.6.6 concerning opening an MSB (using a mock-up MSB) for the physical opening of the shield and structural lids.

During the dry run, the licensee attempted to demonstrate the helium leak test but could not obtain the correct readout on the thermal

conductivity cell type leak detector using the leak standard. After unsuccessfully attempting to get the second detector calibrated, the licensee stated that the backup course of action, if this had occurred during actual loading, would be to use a mass spectrometer from the chemistry department.

Staff members in the chemistry department verified the adequacy of the mass spectrometer to perform the leak detection of the MSB welds. Use of the mass spectrometer would require development of procedural guidance for use on the MSB to describe details such as positioning and attachment of the leak detector probe to a motorized fixture for automated detection, radiological safety concerns associated with using the device in a high radiation area, training of personnel to use the mass spectrometer, and calibration of the device. Though the mass spectrometer could be used as a backup to the helium leak detectors, the licensee had not established an adequate procedural process to actually use it during actual loading.

On June 28, 1996, the licensee demonstrated to the resident inspector, the capability to perform the helium leak test using a helium leak detector and the mass spectrometer. The demonstration involved the shield lid mock-up and a known concentration of helium. The inspectors observed the ability to detect a helium leakrate of 1×10^{-4} and 4×10^{-5} cubic centimeters/second using both the helium leak detector and the mass spectrometer, respectively.

7.3 Conclusions

The welding program was well planned. The lead welder was very knowledgeable in welding techniques and the process to be used with the VSC-24 casks. An in-house process to open the MSBs was available, though ANO's preferred method would involve an outside contractor. Creative ideas were developed for welding the MSB lid, including prearranging welding shims and the use of a temporary lid for radiation shielding.

8 Design Change Reviews

8.1 Inspection Scope (60851, 60854, 37001)

Provisions are established in 10 CFR 50.59 and 10 CFR 72.48 to allow a licensee to make modifications or changes to the VSC-24 system and program as long as these changes do not involve an unreviewed safety question or change to the Technical Specifications. The process established by ANO to make changes to the dry cask storage program was reviewed, including the documentation related to a number of changes that had been implemented.

8.2 Observations and Findings

The licensee had completed a thorough review of the various issues related to the implementation of the dry cask storage program and had documented these reviews as Appendix G to the Engineering Report (95-R-0015-01). The effort by ANO was thorough and comprehensive.

The original plant design and licensing for ANO considered the loading and transport of spent fuel casks. Several sections in both the ANO Safety Analysis Report and the NRC Safety Evaluation Report discussed moving fuel from the spent fuel pool in shipping casks. In this context, shipping casks would include both casks intended to be shipped immediately off site and casks intended to remain on site for storage until shipping to a federal repository was allowed.

The 10 CFR 50.59 reviews determined that no changes were required to the ANO Technical Specifications and Operating License. The ANO Safety Analysis Report did require revision to incorporate the ISFSI description and information concerning the movement and storage of the spent fuel at the ISFSI pad.

A total of 73 documented reviews were performed by ANO in accordance with 10 CFR 72.48. The NRC inspection team selected 32 of the 78 reviews and completed an evaluation of the conclusions reached by ANO. The recommended position on all reviews and evaluations was found to be acceptable. No safety concerns were identified, and all NRC reviews of the design change documents supported the conclusions reached by ANO. Engineering evaluations provided confidence that the ISFSI pad, storage cask, and interim storage locations of the MSB/MTC in the work platform in the cask loading pit were designed with appropriate margins to safety.

Design and installation of impact limiting devices provided assurance that plant and dry cask structures, systems, and components would not be damaged beyond design conditions should a drop occur. The licensee appropriately implemented impact limiting devices on the spent fuel pool operation floor, in the cask loading pit, and the auxiliary building. A very extensive evaluation of the impact of a dropped cask during the movement of the MSB/MTC on the refueling floor was performed including the potential impact of structures and rooms below the refueling floor, including the control room. The work platform and the MSB/MTC trunnions were of sufficient design to withstand seismic loads. A good initiative by ANO was their decision to assess the impact of the MSB/MTC on the auxiliary building seismic conditions and facility operations. The evaluation of these situations demonstrated a good questioning attitude and proper safety perspective in that ANO broadened their 10 CFR Part 72 evaluation to include an assessment of the potential impact of dry cask storage operations on reactor operations.

8.3 Conclusion

Within the scope of the inspection, the design review program at ANO related to the dry cask storage program was comprehensive and effectively implemented. The design changes completed by the licensee in accordance with 10 CFR 72.48 and reviewed by the NRC inspection team confirmed the conclusions reached by ANO for the design review packages examined.

9 Fire Protection

9.1 Inspection Scope (60855)

The licensee is required by 10 CFR 72.212 to review the Safety Analysis Report and the Safety Evaluation Report for the VSC-24 cask to ensure that reactor site parameters are encompassed in the cask design basis. Site specific parameters and analysis that are identified in the Safety Evaluation Report that need verification by the licensee include the potential for fire and explosion. The inspectors reviewed ANO's evaluation of the fire and explosion protection afforded to the structures, systems, and components that will transport and store the spent fuel. The review included the ANO Final Safety Analysis Report, licensee evaluations described in Information Request Forms 7927 and 95R-002501 detailing the evaluation of the ISFSI fire protection, and Plant Procedure 1000.047, "Control of Combustible Materials."

9.2 Observations and Findings

The licensee evaluated fire hazard scenarios that have potential to impact spent fuel removal and storage. The scenarios involved the ISFSI storage pad and the train bay located in the turbine building. At the ISFSI storage pad, ANO assumed the catastrophic instantaneous release of diesel fuel oil from a forklift (24 gallons) while on the ISFSI pad and the train engine (600 gallons) located near the pad. The forklift fire would expose approximately nine casks to flame. ANO assumed that the flames would be in direct contact with the MSB steel liner based on the flames being swept up through the storage cask air cooling ducts due to a chimney effect. Flames from the train engine fire were evaluated assuming no contact with the casks due to the horizontal and vertical distances between the ISFSI pad and the train engine. The ISFSI pad is located approximately 3 feet above grade. The distance between the train engine and the casks would be 36 feet. For the scenarios evaluated, ANO concluded that the duration and intensity of the fires would result in minimal damage to the storage cask and transfer cask physical integrity.

To prevent the potential for the fire scenario to occur within the train bay, ANO implemented administrative controls to restrict the entry of the train engine into the train bay. At least one flat-bed

rail car was connected between the train engine and the storage cask flat-bed rail car in order to maintain the train engine outside the building. ANO also planned to station a person at the train engine fuel oil emergency shutoff valves in case of a fuel leak. A second person would be located in the train cab to assist in emergency engine shut down, and two personnel would be located adjacent to the rail cars to monitor train wheel and track engagement. All four persons would be in direct radio communication.

The inspectors noted, however, that ANO had not evaluated the normal fire loading conditions in the spent fuel pool area and train bay or explosion considerations. The inspectors observed that combustibles are stored and in-transit through the areas and that fire detection was not installed in the train bay to alert control room personnel of a fire. The fire protection supervisor acknowledged this observation, conducted a further evaluation and determined that the fire scenarios at the ISFSI bounded the fires within the train bay and/or spent fuel pool area. Also, ANO's explosion assessment confirmed the lack of materials having explosive potential at the ISFSI pad and the barriers mitigating the consequences of a potential explosion within the auxiliary building supported the conclusion that minimal risk was associated with the potential for an explosion.

The ISFSI storage pad and the train bay were observed to have low combustible loading. The area around the ISFSI pad was dirt and gravel with no vegetation available to support a fire hazard. In addition, ANO had implemented monthly inspections of the ISFSI pad to control combustibles at the pad. Within the auxiliary building, combustible and transient material control requirements already existed and were appropriate.

9.3 Conclusion

No significant fire or explosion hazards concerning the movement and storage of the casks were identified. The licensee had implemented comprehensive administrative controls to preclude a train fire from impacting site storage and transportation of the spent fuel. Engineering evaluations of the fire potential at the ISFSI pad provided a basis for determining that the storage casks will not be at risk due to a fire.

10 Health Physics

10.1 Inspection Scope (60854, 60855, 83750)

The radiation protection program related to the dry cask storage program was reviewed to ensure compliance with 10 CFR Part 20, Storage Cask Certificate of Compliance, and applicable sections of 10 CFR Part 72. The review included the plans for controlling

radiation work permits, training of workers, contamination controls, surveys, implementation of an effective ALARA program, and provisions for personnel neutron dosimetry.

Interviews and reviews of selected records were completed to determine if the licensee's radiation protection personnel participating in the preoperational dry run exercise activities had a clear understanding of their duties and responsibilities. Since the qualification process for radiation protection technicians had been reviewed during recent inspections of the licensee's facilities, this inspection evaluated the specialized training activities associated with the handling and transfer of spent fuel and the spent fuel storage casks.

10.2 Observations and Findings

The inspectors reviewed training records for the four radiation protection technicians that had completed training associated with the dry cask storage program. One additional technician had partially completed the training. Two qualified technicians were designated to provide 12-hour shift coverage for the initial cask load operations. The licensee planned to train additional technicians as time permitted to increase the number of technicians available to support the dry cask storage program.

All five individuals were qualified as radiation protection technicians and had received additional training associated with the dry cask storage of nuclear fuel. One of the technicians had participated in and had observed dry cask storage operations at other sites. This technician was then used as a resource by the licensee to develop the training guidelines for the other technicians. The scope of the training adequately covered the necessary topics to ensure that the technicians had a clear understanding of their duties and responsibilities.

The inspectors observed pre-job briefings that were performed during the dry run exercise. Briefings were thorough and discussed hold points and inspection points, expected radiological hazards and controls, and worker actions if an unexpected situation was encountered.

The layout of the areas where actual work activities will be performed was evaluated for adequacy to implement radiological controls and precautions. Potential problems that could arise during fuel movement were discussed with the radiation protection personnel. The radiation protection personnel indicated an awareness of the potential events and identified effective contingency actions. Throughout the dry run exercise, personnel demonstrated good techniques regarding the control of contamination, monitoring of radiation levels, and posting of areas.

Workers were observed wearing proper personnel dosimetry. As part of the foreign material exclusion process, technicians were observed ensuring workers properly taped dosimetry to clothing without obstructing the dosimeter's beta window.

Implementing procedures contained proper hold points, precautions, and instructions to workers to ensure adequate radiological controls were in place for the performance of various tasks. Limits specified in the Certificate of Compliance were referenced and highlighted in the procedures.

General Requirement 1.2.4 of the Storage Cask Certificate of Compliance specified limits for external dose rates. Procedures were consistent with the Certification of Compliance concerning the radiation limits and the locations where surveys were to be performed.

General Requirement 1.2.5 of the Storage Cask Certificate of Compliance specified for surface contamination limits. The licensee imposed tighter limits within the procedure as part of their ALARA effort, but retained the option to raise the contamination limit on the MSB to those in the Certificate of Compliance.

A controlled area around the ISFSI of at least 100 meters is required by 10 CFR 72.106. The ISFSI was within the plant protected area boundary approximately 20 meters from the nearest fence. Entergy Operations, Inc., owned and controlled the adjacent property outside the fence to a distance that exceeded the minimum 100 meter requirement.

Environmental TLDs had been positioned at various locations to monitor the exposures attributable to the ISFSI. These TLDs were being used to establish the pre-operational background radiation at various points in proximity to the ISFSI pad.

The process of transferring spent fuel from the pool to the MSB is to be performed under water. After an MSB is loaded with fuel, a lid is placed on the MSB, the water level inside the cask is lowered a few inches, and the top welded onto the MSB. Once the welding is completed, the water is drained from the MSB.

As a result of removing water from the MSB, radiation levels are anticipated to increase. The water provides shielding from both gamma and neutron radiation. Neutron dosimetry will be used for personnel working around the cask after fuel is loaded into the cask.

During the dry run exercise, when neutron dosimetry was required for access to certain areas, the inspectors verified that personnel entering the areas had the appropriate dosimetry. Radiation

protection personnel were observed to be checking personnel to ensure proper dosimetry was being worn. Good survey techniques, equipment decontamination practices, and contamination control practices were demonstrated by the technicians. The radiological postings for the exercise were properly placed and marked as simulated postings. This occasionally caused confusion among observers when these signs were placed adjacent to actual posted areas. However, this was a result of the simulations necessary to conduct the dry run exercise and was not expected to be a problem during the actual movement of fuel.

10.3 Conclusion

Licensee radiation protection personnel were cognizant of the various activities to be performed as part of the dry cask storage program including the expected controls necessary to inform workers of radiological conditions. Licensee contingency procedures that were developed to resolve potential problems were appropriate. During the dry-run exercise, plans and preparations for controlling radiological work related to the fuel movement activities were effectively demonstrated. Discussions with personnel indicated an appropriate sensitivity to ALARA requirements and to safety.

Requirements established in the Storage Cask Certificate of Compliance related to dose rates and contamination levels had been adequately incorporated into procedures. Personal dosimeters were used effectively and in accordance with requirements for monitoring external exposure.

The controlled area around the ISFSI pad met the requirements of 10 CFR Part 72. TLDs were located around the ISFSI pad to monitor environmental radiation levels.

11 Emergency Planning

11.1 Inspection Scope (60855, 82701)

The movement and storage of spent fuel involves the handling of very large source terms capable of impacting plant operations should an accident occur. The licensee is required to evaluate the effectiveness and applicability of the site emergency plan for the postulated events that could occur during the movement and storage of the spent fuel. Discussions were held with representatives of the licensee's emergency planning staff to determine the extent to which cask loading and ISFSI operations had been evaluated within the context of emergency planning. Licensee classification emergency actions levels (EALs) were reviewed to ensure that credible emergencies involving cask loading and ISFSI operations could be properly detected and classified.

11.2 Observations and Findings

In preparation for ISFSI operations, the licensee had conducted a review of applicable NRC regulations, NRC guidance, and had gathered and evaluated information from other licensees related to emergency planning for ISFSI operations. In addition, the licensee had performed a review of the ANO emergency plan and implementing procedures to evaluate the need for changes to the emergency preparedness program. As a result of this review, the licensee had determined that cask loading and ISFSI operations were adequately covered by existing emergency plans and procedures and that no changes were warranted. The inspectors noted that the ANO emergency plan did not include detailed facility descriptions other than emergency facilities and; therefore, the licensee determined that no change was necessary to include the ISFSI area.

The inspectors reviewed the classification procedures to determine whether appropriate initiating conditions had been established for the proper detection and classification of emergency conditions involving cask and ISFSI operations. The licensee's representative explained that all credible emergencies involving cask and ISFSI operations could be classified using any of 10 EALs. Four EALs (5.1-5.4) arrived at the emergency classification based on measured or projected activity at the site boundary. Classification using these EALs for spent fuel accidents would require actual measurements. EAL 5.5 arrived at an Alert classification based on measured area or airborne radioactivity levels. EAL 5.6 arrived at a Site Area Emergency classification based on a spent fuel accident. This EAL provided adequate initiating conditions for fuel damage occurring within the spent fuel pool. EALs 9.1-9.4, "Miscellaneous," could be used to classify events which did not meet other, more specific initiating conditions.

The inspectors noted that according to the May 4, 1996, revision of Engineering Report 95-R-0015-01, the cask loading pit was not considered as part of the spent fuel pool for Technical Specification purposes. Further, the initiating conditions contained in EAL 5.6, "Spent Fuel Accident," specifically referenced only the spent fuel pool, refueling canal, or reactor core with head removed as locations where spent fuel accidents could be classified under this EAL. Spent fuel accidents meeting the criteria of EAL 5.6 were classified as a Site Area Emergency. Spent fuel damage which occurred in the cask loading pit (e.g., a heavy load drop in the cask loading pit) could not be classified according to EAL 5.6 and would only reach the level of an Alert when classified using EAL 5.5. This inconsistency was discussed with the licensee during the inspection. The licensee determined that they would make an EAL change to maintain a consistent approach. On May 20, 1996, an EAL change was approved by the licensee which added the cask loading pit and fuel tilt pit to EAL 5.6.

At the time of the inspection, no emergency drills or exercises had been conducted using cask loading or ISFSI operations as a scenario. A tabletop drill was planned for later in May to test classification EALs for a spent fuel cask accident.

11.3 Conclusions

The licensee's emergency plan and classification procedures were found to have the capability to properly detect and classify emergency events associated with cask loading and ISFSI operations. Proper emergency response actions to such events could be conducted according to existing operating and emergency procedures.

12 Procurement Controls

12.1 Inspection Scope (60851)

Procurement of parts that are important to safety, require controls to ensure that specifications and instructions identified in the procurement specifications for the VSC-24 system are complied with. The inspectors reviewed procurement controls for the dry cask storage system parts and components.

12.2 Observations and Findings

Fabrication specifications for the impact limiters, MSB, storage casks, transfer casks, and transfer cask yoke were reviewed. The specifications delineated which components were important to safety. This specification would be used if purchasing additional components or parts. Procurement would be performed under the existing NRC-approved procurement program used at ANO.

During the fabrication of the components important to safety, the licensee maintained close quality control oversight of the process and components used. Upon arrival of the components on site, the licensee verified that the components had not been damaged during transient.

12.3 Conclusion

During the fabrication of the components important to safety, the licensee maintained close quality control oversight of the process and components used. The fabrication specifications for the VSC-24 system identifies the components important to safety. To ensure that the required quality controls are implemented during procurement, the approved plant procurement program would be used to purchase necessary components.

13 Security

13.1 Inspection Scope (60855)

Storage of spent fuel must be within a protected area which complies with the provisions of 10 CFR 73.55. Provisions for periodic security patrols, illumination, physical barriers, an isolation zone, continuous surveillance, and access controls must be established. The inspectors toured the spent fuel storage area and reviewed security provisions for the ISFSI.

13.2 Observation and Findings

The ANO ISFSI is within the existing protected area for the ANO nuclear facilities, which has undergone numerous security and safeguards inspection by Region IV and has been found to be in compliance with 10 CFR 73.55. The inspectors toured the ISFSI area. The area was within the fenced boundary of the plant and was well lighted. Based on discussions with the plant security supervisor, provisions are incorporated within the site security program for periodic patrols and surveillances of the ISFSI area and for response to a security problem associated with the casks.

13.3 Conclusion

The ISFSI is located within the existing protected area and provisions for ISFSI security are encompassed by the existing site security program. No major changes were determined to be necessary to this program.

14 Training

14.1 Inspection Scope (60854)

Training was required in accordance with the Certificate of Compliance for the VSC-24 system for all personnel involved with the operations of equipment and controls that are important to safety. Training should include an overview of the VSC-24 design, hold and inspection points, stop work criteria, radiological safety issues, off-normal event, responsibilities, procedures, and conditions of the Certificate of Compliance. The training module for the ISFSI training and certification program was reviewed. In addition, the inspectors reviewed the licensee's criteria for determining which personnel required training and the type of training necessary prior to fuel movement.

14.2 Observations and Findings

The licensee had committed to the training program defined by the Certificate of Compliance holder, Sierra Nuclear Corporation, with

an additional commitment to incorporate site-specific issues. The licensee had established a detailed training program for personnel involved with the movement of the spent fuel. Each department involved in any type of fuel movement was required to complete the generic overview training. The generic overview training included the required training specified in the VSC-24 Certificate of Compliance, an overview of the Technical Specifications related to the VSC-24 system, loading/unloading procedures (i.e., transfer cask handling and MSB lowering procedures), and a review of the federal regulations that control dry cask storage.

In addition to the generic overview training, each individual employee involved with fuel movement (i,e., health physics, mechanics, welders, quality control inspectors, etc.) were required to fulfill the dry fuel storage training and qualification requirements. Most of the discipline-specific training included classroom time, performance tests, on-the-job training, completion of qualification cards, and oral boards. Supervisory personnel, who direct operation of equipment and controls that are important to safety, were also required to be certified. As a minimum, the supervisors involved in fuel movement were required to receive the generic overview training.

The licensee had implemented a data base that tracked each individual, by department, with the generic and specific training completed, including results of the written and performance tests. This data base assisted the licensee in keeping track of the individuals who were qualified to perform each of the fuel movement activities. To ensure qualifications were maintained, each individual involved in fuel movement activities was required to take the generic overview training every 6 months, unless they were actually involved in a dry-run or actual fuel movement activity for which on-the-job credit was given.

14.3 Conclusion

The licensee had established a formal training program for site personnel involved with the dry cask storage program. This program incorporated the required training identified in the VSC-24 Certificate of Compliance and was comprehensive and well documented.

15 Notifications

15.1 Inspection Scope (60854)

The licensee is required to notify the NRC at least 90 days prior to first storage of spent fuel and to register each cask within 30 days of use. The licensee is also required to provide notifications and submit various reports as a result of an adverse condition, such as an accidental criticality, loss of special nuclear material,

notification of nonemergency events, and discovery of defects or a significant reduction in the effectiveness of the cask confinement system. The inspectors reviewed the licensee's procedures for NRC reporting and notifications.

15.2 Observations and Findings

The requirements for NRC reporting had been established in Procedure 1062.001, "NRC Reporting." The procedure was very detailed in providing what failures, defects, deviations, etc. were reportable (operator related report), the reporting requirements, and the frequency or time in which the reportability was required. In addition, an NRC reporting flowchart was included in the procedures to further explain the required process.

The initial notification to the NRC concerning ANO's plans to implement a dry cask storage program was provided by a letter dated January 19, 1994. To meet the 30-day notification requirement, ANO had established provisions in Procedure 1062.001, Attachment 2, "NRC Reporting," to notify the NRC within the required 30 days of the use of each cask.

The inspectors verified that procedures were established which defined the required notifications to the NRC for accidental criticalities, loss of special nuclear material, notification of nonemergency events, and discovery of defects or a reduction in the effectiveness of the cask confinement system.

The licensee used a reporting system called TREDS. This is a reportability and evaluation determination system. It provides the licensee with a logic tree that included each of the events organized with the applicable sections of the regulation and a discussion of the reportability requirements. This system was also used to train the operations personnel.

15.3 Conclusion

The licensee's procedure for reportability was determined to be appropriate with excellent logic tree aids provided. The procedure included the required notification criteria established in 10 CFR Part 72.

16 Exit Meeting Summary

The inspectors presented the inspection results to members of licensee management at the exit meeting on May 10, 1996. The licensee acknowledged the findings presented.

ATTACHMENT

PARTIAL LIST OF PERSONS CONTACTED

B. Alumbaugh, Civil Engineering Supervisor
J. Dosa, Licensing Specialist
M. Eisenhower, Lead Welder
M. Ekis, System Engineer
N. Finney, NDE Level III
S. Gann, Chemist
M. Hall, Welding Supervisor
J. Heflin, Electrician, Unit 1
M. Higgins, Security Operations Supervisor
R. Kellar, High Level Waste Project Manager
J. Kowalewski, Superintendent, Electrical Maintenance, Unit 1
L. McCollum, Senior Chemistry Specialist
J. McWilliams, Spent Fuel Operations Supervisor
A. Morgan, Industrial Safety Supervisor
B. Powell, Superintendent, Electrical Maintenance, Unit 2
J. Priore, Senior Engineer
D. Rackley, Welding Specialist
H. Rideout, Senior Design Engineer, Civil and Structural
R. Rispolli, Senior Lead Fire Protection Engineer
J. Scroggins, Senior Design Engineer, Civil and Structural
D. Spond, Metallurgist
L. Waldinger, General Manager, Plant Operations
J. Wellwood, Unit 2 Reactor Operator
D. Williams, Dry Cask Storage Project Lead
P. Williams, Nuclear Engineer

INSPECTION PROCEDURES USED

37001	10 CFR 50.59 Safety Evaluation Program
60850	Fuel Storage and Handling
60851	Design Control of ISFSI Components
60854	Preoperational Testing of an ISFSI
60855	Operation of an ISFSI
81001	Independent Spent Fuel Storage Installation - Security
82701	Operational Status of the Emergency Preparedness Program
83750	Occupational Radiation Exposure

ITEMS OPENED, CLOSED, AND DISCUSSED

Closed

50-313/96016-01 VIO Storage of MSB Lids

LIST OF ACRONYMS USED

ALARA	As Low As is Reasonable Achievable
ANO	Arkansas Nuclear One, Units 1 & 2
CAL	Confirmatory Action Letter
CR	Condition Report
EAL	Emergency Action Level
IFI	Inspection Followup Item
ISFSI	Independent Spent Fuel Storage Installation
LER	Licensee Event Report
MSB	Multi-Assembly Sealed Basket
MTC	MSB Transfer Cask
NCRs	Non-conformance Reports
NRC	Nuclear Regulatory Commission
PDR	Public Document Room
TLDs	Thermoluminescent Dosimeters