APPENDIX

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Inspection Report: 50-313/94-28
50-368/94-28

Licenses: DPR-51
NPF-6

Licensee: Entergy Operations, Inc.
Route 3, Box 137G
Russellville, Arkansas

Facility Name: Arkansas Nuclear One, Units 1 and 2

Inspection At: Russellville, Arkansas

Inspection Conducted: December 5-9, 1994

Inspectors: Wesley L. Holley, Senior Radiation Specialist
Facilities Inspection Programs Branch

Thomas H. Andrews Jr., Radiation Specialist
Facilities Inspection Programs Branch

Approved: Blaine Murray 12/28/94
Blaine Murray, Chief Date
Facilities Inspection Programs Branch

Inspection Summary

Areas Inspected (Units 1 and 2): Routine, announced inspection of the licensee's implementation of the revised 10 CFR Part 20, in accordance with Temporary Instruction (TI) 2515/123.

Results (Units 1 and 2):

- The radiation worker training, radiation protection technician training, and contract radiation protection technician training adequately addressed the hazards, procedural requirements, and worker responsibilities associated with controlling and accessing high and very high radiation areas (Section 1.1.1).

- Appropriate procedures have been implemented for guidance in controlling access and work in high and very high radiation areas (Section 1.1.2).

- Controls of high and very high radiation areas have been effectively implemented (Section 1.1.3).

- The procedure dealing with declared pregnant women and embryo/fetus doses has been developed to reflect requirements of the revised 10 CFR Part 20 and provide the necessary guidance to determine embryo/fetus radiation doses (Section 1.2.2).

- Respiratory protection training appropriately addressed the importance of maintaining low workers' total effective dose equivalent (TEDE) (Section 1.3.1).

- Implementing procedures provided sufficient guidance to radiation protection personnel to enable them to determine if the use of respiratory protection equipment was the proper means to achieve the lowest TEDE (Section 1.3.2).

- The licensee achieved good results in maintaining low total dose (Section 1.3.3).

- Appropriate guidance was available to conduct a planned special exposure (Section 1.4).

- Overall, the licensee's implementation of these provisions of the revised 10 CFR Part 20 was appropriate (Section 1.5).

Attachment:

- Attachment - Persons Contacted and Exit Meeting

DETAILS

1 IMPLEMENTATION OF THE REVISED 10 CFR PART 20 (TI 2515/123)

1.1 High and Very High Radiation Areas

1.1.1 Training

The inspectors interviewed training representatives and reviewed training handouts/lesson plans and determined the following:

- In radiation worker training (General Employee Training 2 [GET-2]), access controls and entry requirements for high radiation areas and very high radiation areas were presented. Areas were defined and postings were discussed. Workers were instructed as to their responsibilities for reporting violations such as entering unauthorized areas, not wearing proper protective clothing, and moving posted warning signs and barriers. Industry events and lessons learned were discussed. Radiation Protection Technician Training included in-depth training in the revisions to 10 CFR Part 20, industry events, and lessons learned.

- Training for contract radiation protection technicians addressed the posting of areas, requirements for entry into a high radiation area, and the steps that must be performed prior to entry in a high radiation area, locked high radiation area, and a very high radiation area. The training for licensee radiation protection technicians and contract radiation protection technicians included a demonstration on the proper method to survey and post an area.

- Licensed reactor operators were provided training with respect to operations that could change plant radiological conditions and which could result in the creation of high radiation areas.

1.1.2 Procedures

The inspectors compared the licensee's implementing procedures for control of access to high radiation areas and control of access to very high radiation areas with the guidance contained in Regulatory Guide 8.38.

The primary implementing procedure was 1012.016, Revision 0, "Administration of the ANO Radiation Protection Program." Other procedures with related guidance included:

- 1012.017, Revision 1, "Radiological Posting and Entry/Exit Requirements"
- 1012.018, Revision 1, "Administration of Radiological Surveys"
- 1012.019, Revision 1, "Radiological Work Permits"
- 1012.066, Revision 0, "Radiation Protection Procedures"

These procedures provided good agreement with the guidance discussed in Section 1.2 of Regulatory Guide 8.38.

1.1.3 Implementation

The inspectors toured the radiologically controlled areas within the Unit 1 and Unit 2 auxiliary building to observe posting and access control processes. All the very high radiation areas and locked high radiation areas were locked, and tamper seals were installed on the doors to allow verification of potential unauthorized access. These areas were properly posted. High radiation areas were posted primarily using barricading in accordance with Regulatory Guide 8.38.

Procedure 1012.017, Revision 1, "Radiological Posting and Entry/Exit Requirements," requires that keys to locked high radiation areas and very high radiation areas be maintained in separate key lockers at the radiologically controlled area access point. The key to the locked high radiation area key locker was under the control of the health physics supervisor or his/her designee. The key to the very high radiation area key locker was maintained by the radiation protection manager or her designee. Log entries indicated the date and person to whom keys were issued. A separate set of "master" keys for locked high radiation areas and very high radiation areas was maintained by the shift superintendent and were controlled in accordance with Procedure 1015.005, "Operations Key Control." These master keys were to only be used in emergency situations. Proper key control was verified by the inspectors during their tour of the radiologically controlled area.

The licensee was in compliance with Unit 1 Technical Specification 6.11.1 and Unit 2 Technical Specification 6.13.1 for access control/posting requirements for high radiation areas. They were also in compliance with Unit 1 Technical Specification 6.11.2 and Unit 2 Technical Specification 6.13.2 regarding access control and posting requirements for very high radiation areas.

The licensee had implemented the use of special color tags (yellow text on magenta background) to call attention to high radiation area, locked high radiation area, and very high radiation area postings. The implementation of the special color tags was primarily the result of previous experience where radiation warning signs were not conspicuous enough to make them any different from the many other signs used in the plant.

The licensee stated that they have had problems with personnel entering the radiologically controlled area without proper dosimetry. The security keycard reader at the entrance now requires the insertion of the self-reading dosimeter into a bar code reader to activate the keycard reader. The licensee had implemented this method of ensuring that personnel have a self-reading dosimeter prior to entering the radiologically controlled area.

1.2 Declared Pregnant Women and Embryo/Fetus Doses

1.2.1 Training

The inspectors reviewed the licensee's radiation worker training (General Employee Training 2 [GET-2]) lesson plans/student handouts and noted that exposure limits and worker responsibilities were discussed. Interviews with

licensee personnel indicated that employees were well informed regarding the licensee's implementation of the "declared pregnant woman" policy.

1.2.2 Procedures

The inspectors reviewed Procedure 1012.021, Revision 1, "Exposure Limits and Controls," and noted that the instructions regarding "declared pregnant workers" were consistent with 10 CFR 20.1208. Furthermore, licensee Online Policy No. RP-101, "Prenatal Exposure," requires that women who have voluntarily declared themselves as being pregnant were not allowed to enter high radiation areas or posted airborne contamination areas (excluding noble gas areas).

1.2.3 Implementation

The inspectors noted that some women at the site have implemented Procedure 1012.021. To date, there has been no need for declared pregnant worker internal dose assessments be performed using the guidance of Regulatory Guide 8.36. The licensee stated that they would use commercially available computer codes that comply with the requirements of Regulatory Guide 8.36 to perform this calculation, should it be necessary.

1.3 Total Effective Dose Equivalent/As Low As Reasonably Achievable and Respiratory Protection

1.3.1 Training

The inspectors reviewed information presented in radiation worker training (General Employee Training 2 [GET-2]) and noted that there was discussion of comparison of TEDE for jobs with respirators versus TEDE for jobs without respirators to ensure that good ALARA practices were implemented.

Interviews with respirator-qualified radiation workers confirmed that they were aware of the potential for ingestion of radioactive material as a result of not wearing a respirator and that their individual TEDE may be higher for a job but that the overall cumulative dose for the job would be lower. The people interviewed demonstrated a strong teamwork attitude by indicating that their individual dose may be higher for a particular job, but they saved someone else from having to accumulate dose to complete the work.

1.3.2 Procedures

Procedure 1012.026, Revision 2, "Respiratory Protection," provided guidance regarding the conditions where dose savings can be achieved by not wearing respirators. The procedure requires that engineering, process, and procedural controls be considered prior to using respiratory protection equipment. If these controls were impractical, then a TEDE ALARA assessment will be performed.

1.3.3 Implementation

The licensee has made substantial progress in reducing respirator usage. No respirators were issued in 1994 for radiological work activities. While the procedures implementing the new changes to 10 CFR 20 were not effective till January 1994, the licensee began implementing engineering controls to support this change in 1993. As a result, there were only 85 respirators issued for radiological purposes in 1993. This was a significant reduction compared to the estimated 2,500 - 3,000 respirators issued for radiological purposes in 1992.

The reduction in respirator usage has been achieved without increasing internal exposures. Acceptance of the change in respirator requirements by workers has been good.

1.4 Planned Special Exposures

The licensee has not had any planned special exposures. Procedure 1012.029, Revision 0, "Planned Special Exposures" was established to provide guidelines for the conditions, prerequisites, monitoring, and reporting of planned special exposures. Procedure 1012.029 was briefly covered in radiation worker training (General Employee Training 2 [GET-2]) but was not emphasized. The licensee stated that should the situation arise where a planned special exposure is needed, special training will be conducted to ensure compliance with 10 CFR Part 20 requirements.

1.5 Conclusions

The radiation worker training, radiation protection technician training, and contract radiation protection technician training properly addressed the hazards, procedural requirements, and worker responsibilities associated with controlling and accessing high and very high radiation areas. Comprehensive implementing procedures were used for guidance in controlling access and work in high and very high radiation areas.

The primary implementing procedure dealing with declared pregnant women and embryo/fetus doses was compatible with the revised 10 CFR Part 20 requirements.

Respiratory protection training appropriately addressed the importance of maintaining workers' TEDE low. Implementing procedures offered sufficient guidance to radiation protection personnel to enable them to determine if the use of respiratory protection equipment was the proper means to achieve the lowest TEDE. The licensee achieved excellent results in reducing respirator use while maintaining low total dose.

Appropriate guidance was available to conduct a planned special exposure. No such exposures have occurred.

Based on the above findings, the inspectors concluded that the licensee's implementation of these provisions of the revised 10 CFR Part 20 was appropriate.

ATTACHMENT

1 PERSONS CONTACTED

1.1 Licensee Personnel

Barry Allen, Unit 1 Maintenance Manager
* Craig Anderson, Unit 2 Operations Manager
Steve Bennett, Licensing Supervisor
* Todd Chilcoat, Health Physics Supervisor
* Mike Cooper, Licensing Specialist
* Sherrie Cotton, Radiation Protection/Radwaste Manager
Dave Deal, ALARA Supervisor
Donald Denton, Support Director
Gerry Doran, Health Physics Trainer
* Bill Eaton, Unit 2 Plant Manager
* Randy Edington, Unit 1 Plant Manager
* Rick Espolt, Industry Events Analysis Manager
Alicia Freeman, Technical Trainer
Leonard Hardgrave, Radiation Protection
* Larry Humphrey, Director, Quality
* Nick Kennedy, System Engineering 2 Supervisor
George King, Technical Training Supervisor
Barbara McClerkin, Engineering Support
Bill McKelvy, Chemistry Superintendent
* Dwight Mims, Licensing Director
* Tom Nickels, Radiation Protection Specialist
Chuck Olsen, Unit 2 Operations Training Supervisor (Acting)
Jay Peyton, Waste Control Operator
* Stephanie Pyle, Licensing Specialist
Bob Rego, Licensed Reactor Operator
Jennifer Risinger, Materials Management
Stan Robinson, Senior Health Physics Specialist
Tom Rolniak, Dosimetry Supervisor
Mike Ruder, Plant Assessments Technical Specialist
James Smith, Radiation Protection/Health Physics Operations Superintendent
* Dave Snellings, Radiation Protection/Radwaste Superintendent
* Dennis Ward, Unit 2 Shift Supervisor
* Jerry Yelverton, Operations Vice President

*Denotes personnel that attended the exit meeting. In addition to the personnel listed, the inspectors contacted other personnel during this inspection period.

2 EXIT MEETING

An exit meeting was conducted on December 9, 1994. During this meeting, the inspectors reviewed the scope and findings of the report. The licensee did not express a position on the inspection findings documented in this report. The licensee did not identify as proprietary, any information provided to, or reviewed by the inspector.