APPENDIX B

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Inspection Report: 50-313/94-15
50-368/94-15

Operating Licenses: DPR-51
NPF-6

Licensee: Entergy Operations, Inc.
Operations, Arkansas Nuclear One
Route 3, Box 137G
Russellville, Arkansas 72801

Facility Name: Arkansas Nuclear One

Inspection At: Russellville, Arkansas

Inspection Conducted: April 11-15, 1994

Inspectors: Anthony D. Gaines, Radiation Specialist
Facilities Inspection Programs Branch

Ronald K. Brewer, Radiation Specialist
Facilities Inspection Programs Branch

Approved: Blaine Murray 5/4/94
B. Murray, Chief, Facilities Inspection Programs Branch — Date

Inspection Summary

Areas Inspected: Routine, announced inspection of the radiation protection program, including audits and appraisals; changes; planning and preparation; training and qualifications of personnel; external exposure control; internal exposure control; control of radioactive materials and contamination, surveys, and monitoring; and maintaining occupational exposure ALARA.

Results:

- Very good audits and surveillances were performed by qualified individuals (Section 1.1).
- A violation was identified for the failure of an individual to log in on a radiological work permit (Section 1.1).
- Only minor personnel changes were made since the last NRC inspection of this area (Section 1.2).

- Management provided strong support for the radiation protection including the allocation of resources for new equipment and upgrading existing equipment (Section 1.2).
- Outage management performed an excellent job of preparing for and defining the scope of the 2R10 refueling outage (Section 1.3).
- Contract radiation protection technicians were qualified and trained (Section 1.4).
- External radiation exposure controls were good (Section 1.5).
- Good internal exposure controls were implemented (Section 1.6).
- Respirator use during the refueling outage was significantly reduced (Section 1.6).
- A good decontamination effort was performed at the start of the 2R10 refueling outage (Section 1.7).
- Controls of radioactive materials and contamination, surveys, and monitoring were good (Section 1.7).
- A noncited violation was identified for the failure to response test radiation survey instruments (Section 1.7).
- Excellent ALARA planning and preparation were performed for the refueling outage (Section 1.8).
- Personnel exposure during the refueling outage was below the licensee's goal (Section 1.8).

Inspection Finding:

Violation 313/9415-01; 368/9415-01 was opened (Section 1.1).

A noncited violation was identified (Section 1.7).

Attachment:

Attachment - Persons Contacted and Exit Meeting

DETAILS

1 OCCUPATIONAL RADIATION EXPOSURE (83750 and 83729)

The licensee's program was inspected to determine compliance with Unit 1 Technical Specifications 6.3, 6.8, 6.10, and 6.11; Unit 2 Technical Specifications 6.3, 6.8, 6.11, and 6.13; and the requirements of 10 CFR Part 20 and agreement with the commitments in Chapters 11 and 12 of the Updated Safety Analysis Reports for Unit 1 and 2, respectively.

1.1 Audits and Appraisals

The inspectors reviewed Quality Assurance Audit Report - QAP-3-94, dated March 31, 1994. The audit was performed from February 2 through March 11, 1994, by qualified quality assurance personnel. The audit was comprehensive and contained one finding, five recommendations, and five observations. The finding, recommendations, and observations were very good. The corrective actions for the finding were appropriate and timely. Four quality assurance surveillances were performed since the last NRC refueling outage inspection in November 1993. The surveillances were reviewed and were good quality. Qualified personnel performed the surveillances.

The inspectors reviewed radiological information reports and condition reports from January 1993 to the present and noted that they were handled appropriately. During the inspection the licensee informed the inspectors of Condition Report C-94-0054 which had just been written. The condition report was about an individual who the licensee identified had entered a radiological controlled area without logging in on a radiological work permit. On April 12, 1994, the individual had difficulty logging off a radiological work permit and asked for help. The radiation protection technician who helped the individual concluded that the individual could not log out because he had not logged in on a radiological work permit. The individual was immediately barred from further entry into controlled access. A subsequent investigation of security logs and radiological controlled area computer entry transactions by the licensee indicated that from February 24 through April 12, 1994, the individual had made a total of 11 entries into a radiological controlled area which was posted "RWP REQUIRED FOR ENTRY," and had not logged on a radiological work permit. A followup interview by the licensee with the individual indicated that he had a learning disability and had difficulty with the training. The licensee reviewed the individual's training records and noted that he had failed the training required for access to a radiological controlled area twice before he passed with the minimum passing grade. The individual was a contract laborer hired to perform fire watch duties. The individual was terminated on April 12, 1994, after his interview. The licensee plans to implement a policy for general employee training to address failures and retesting, evaluate the general employee practical factors training, and request quality assurance to perform a followup surveillance of this problem area during the 1R12 refueling outage.

The inspectors reviewed the radiological incident reports and condition reports from January 1993 to the present for previous problems with individuals entering the radiological controlled area without logging in on a radiological work permit. The inspectors identified nine radiological incident reports where personnel failed to log in on a radiological work permit. Subsequent discussions with the licensee indicated that nine instances was a very low frequency of occurrence of the total number of transactions for that period. The inspectors reviewed previous NRC Inspection Reports and noted that a noncited violation was identified by the NRC in Inspection Report 50-313/93-11; 50-368/93-11, for failure to log on the appropriate radiological work permit, which was similar to the failure to log in on a radiological work permit.

Technical Specification 6.8.1.a for Units 1 and 2 requires, in part, that written procedures be established, implemented, and maintained covering the applicable procedures recommended in Appendix A of Safety Guide 33 and Regulatory Guide 1.33, respectively; which, in turn, recommends radiological work permits be covered by procedures. Section 6.3.3.A of Procedure 1012.017, Revis[illegible] 1, "Radiological Posting and Entry/Exit Requirements," states, in part, [illegible]he entry requirements for entry into a radiological controlled area [illegible]uch that, "when posting includes 'RWP REQUIRED FOR ENTRY,' then personnel must be logged on an appropriate radiological work permit." On April 12, 1994, the licensee identified an individual who had entered a radiological controlled area which was posted "RWP REQUIRED FOR ENTRY," and had not logged on a radiological work permit. The failure to log on a radiological work permit when required is considered a violation of Technical Specification 6.8.1.a. (313/9415-01; 368/9415-01).

1.2 [illegible]nges

There were only minor personnel changes in the radiation protection organization since it was reviewed in NRC Inspection Report 50-313/93-30; 50-368/93-30. The changes did not adversely affect the radiation protection program.

Licensee management showed an excellent commitment to the radiation protection program in the resources allocated for the purchase of new equipment and the upgrade of other equipment. The licensee performed a computer system upgrade of their radiological information management system. The new system, which is called the Entergy Radiological Information Management System, incorporated the new 10 CFR Part 20 requirements and was upgraded with new hardware and software features. The licensee experienced some software problems associated with the upgrade, but they did a very good job of identifying and correcting the problems. The licensee should be commended for their radiation protection instrument upgrade project. The licensee expanded their telemetry capabilities by adding telemetric survey instruments and continuous air monitors. The licensee also purchased survey meters that had bar code reading capabilities and installed bar codes at specified locations to help standardize routine surveys.

1.3 Planning and Preparation

The licensee supplemented the permanent radiation protection staff in health physics operations with approximately 57 senior radiation protection technicians and 18 junior radiation protection technicians during the 2R10 refueling outage. The licensee also supplemented the dosimetry, ALARA, radwaste, laundry, and decon groups with additional contract technicians. Contract technicians were brought onsite in order to complete onsite training. The contract force included a large number of persons who had worked previous outages at Arkansas Nuclear One.

The inspectors determined that the licensee had ample supplies of temporary shielding, radiation detection instrumentation, air monitoring equipment, portable ventilation, and protective clothing to support outage activities.

Outage management performed an excellent job of planning for the 2R10 refueling outage. The scope of 2R10 was defined early enough prior to the start of the outage which allowed adequate time for review by all departments, especially ALARA. Detailed radiological controls reviews of outage related activities were performed.

1.4 Training and Qualifications of Personnel

The licensee used a screening examination to aid in the selection of contract radiation protection technicians. The inspectors reviewed selected records of contract technicians and noted that the individuals had passed the screening examination with the appropriate score to be a senior or a junior radiation protection technician.

The licensee had established very good procedural guidance for assessing the experience of contract personnel. The inspectors reviewed selected resumes of contract radiation protection technicians and determined that they met qualification requirements.

Selected training records of contract radiation protection technicians were reviewed, and the inspectors noted that the individuals had been given appropriate training.

1.5 External Exposure Control

The inspectors observed individuals entering the radiological controlled area and noted that they wore appropriate personnel monitoring devices. A review of records indicated that personnel who were required to use multi-badging during the refueling outage were issued multiple dosimeters.

Radiological work permits provided good guidance to individuals working in the radiological controlled area. Worker compliance with radiological work permit requirements was good.

The inspectors made several tours of the radiological controlled area, including containment, and observed that areas were properly posted and controlled.

The inspectors attended the pre-job briefing for Radiological Work Permit 1994-0233 for the Unit 2 reactor building sump closeout inspection and correction of deficiencies. The pre-job briefing was very good and included good discussions among the persons involved. The inspector observed part of the work performed on the sump and noted that the personnel used the dosimetry required by the radiological work permit. There was one weakness noted by the inspector. The service air for the cyclone separator was not turned on prior to the start of work. The workers had entered the hot particle zone and locked high radiation area, readied the suction tube to suck water out of the sump, and discovered that the service air was not turned on by operations to power the cyclone separator. It took approximately 15 minutes before operations turned on the service air.

The inspectors noted that the licensee had changed from a monthly processing frequency to a quarterly frequency for processing thermoluminescent dosimeters (TLDs). Discussions with the licensee's staff and a review of procedures indicated that the appropriate procedures were revised to reflect the changes. Measures were incorporated into the procedures to exchange TLDs prior to their quarterly exchange, if warranted.

1.6 Internal Exposure Control

The inspectors reviewed respiratory protection equipment issue records and verified that the individuals who were issued respiratory protection equipment met qualification requirements, and that they received equipment of the proper size. The licensee's new computer issuance of respirators was very effective in ensuring that only respirators with maintenance checks that were not expired were issued to qualified individuals.

The licensee used portable ventilation units with high efficiency particulate filters where practical as a means of reducing airborne contamination. The inspectors noted that the licensee had continued to dramatically reduce the use of respirators during outages. The use of respirators was mainly confined to industrial use or for power entrys prior to the refueling outage. Bubble suits were used for steam generator entries during the refueling outage.

The inspectors noted that individuals identified with facial contamination were routinely whole-body counted to determine if internal exposure resulted. Licensee representatives performed reviews of whole-body counts of individuals that indicated possible internal intake.

1.7 Controls of Radioactive Materials and Contamination, Surveys, and Monitoring

The inspectors observed entrance and exit access controls at the radiological controlled area and found them to be good. Housekeeping within the radiological controlled area was good.

The inspectors reviewed selected survey records and determined that the licensee had implemented a good radiation area survey program. Survey results were documented properly. Independent surveys performed by the inspectors were in good agreement with surveys performed by the licensee. The licensee had a good supply of calibrated radiation survey instruments. The inspectors noted that the licensee no longer calibrated their radiation survey instruments on site, but instead used the calibration facility at another Entergy site to calibrate their radiation survey instruments. The licensee had not experienced any major problems with this arrangement.

During a tour of Unit 2 containment, the inspectors noted that four portable contamination survey instruments had not been response tested on April 9 and 10, 1994. This was brought to the attention of the radiation protection supervisor who was with the inspectors. The licensee wrote a condition report for the incident and took immediate corrective actions. The corrective actions included:

- An investigation was performed and it was determined that two of the survey instruments were used for contamination surveys on the days they were not response tested.
- The four portable contamination survey instruments were response tested and found to be satisfactory.
- Records were reviewed and the instruments had responded satisfactorily.
- The radiation protection manager met with the reactor building health physics supervisors and discussed the event with emphasis on the expectations of their performance in oversight of reactor building activities.
- The reactor building health physics supervisors met with their technicians and reviewed the event and stressed the importance of attention to detail, including verification of instrument daily response tests.
- The temporary foremen for the activity were counseled relative to the event.
- The technicians involved in the response test of instruments have reviewed this event and were counseled on attention to detail and expectations for their performance in completing this task.
- The temporary foremen in charge of instrumentation reviewed the event and revised the method by which verification of response checks were assured.
- The licensee scheduled this activity to be reviewed during the 1R12 refueling outage via surveillance by the quality assurance organization.

Technical Specification 6.8.1.a for Units 1 and 2 requires that written procedures be established, implemented, and maintained covering the applicable procedures recommended in Appendix A of Safety Guide 33 and Regulatory Guide 1.33, respectively; which, in turn, recommends radiation surveys be covered by procedures. Section 6.1.3 of Procedure 1012.022, Revision 1, "Control/Use of Portable HP Instrumentation," states, in part, that portable HP survey instruments shall be response checked daily or prior to use. The failure to response test the containment portable contamination survey instruments prior to use is a violation of Technical Specification 6.8.1.a. The inspectors concluded that the licensee's corrective actions were prompt and effective. Therefore, this violation is not being cited because the criteria specified in Section VII.B.1 of Appendix C to 10 CFR Part 2 were satisfied.

Individuals exiting the radiological controlled area were required to pass through both gamma and beta sensitive personnel contamination monitors. Tool monitors were used to survey hardhats. Radiation protection personnel surveyed handcarried items for contamination prior to release.

Licensee representatives stated that they had identified approximately 1.2 contaminations per 1000 radiological work permit hours. This was slightly above the licensee's goal of 1.0 contaminations per 1000 radiological work permit hours.

The licensee performed a good decontamination effort at the start of refueling outage 2R10. The decontamination allowed the licensee to use less plastic personnel contamination clothing. This, combined with the use of washable laydown mats and reusable mesh bags for tools, contributed to a reduction in the amount of waste generated during the refueling outage.

Surveys, monitoring, and releases of potentially contaminated material to unrestricted areas observed by the inspectors were appropriate.

1.8 Maintaining Occupational Exposure ALARA

The inspectors noted that excellent ALARA planning and preparation was performed for the work scheduled for refueling outage 2R10. The inspectors reviewed selected ALARA packages for jobs performed during the 2R10 refueling outage and noted that they were of good quality and included adequate checklists, estimates of projected man-hours, radiation survey information, radiation exposure projections, and lessons learned from previously accomplished, similar work.

Prior to the 2R10 refueling outage, early boration and peroxide flushing was used to reduce the source term from the Unit 2 reactor coolant system. Hot spot flushing was also performed in selected areas to reduce radiation exposure.

A goal of 180 person-Rem was set for refueling outage 2R10. The licensee had two other incentive goals of 170 and 160 person-Rem. As of April 13, 1994, thermoluminescent dosimeter and self reading dosimeter results indicated an

expenditure of approximately 128 person-Rem which was below the licensee's goal for that date of approximately 149 person-Rem. The licensee stated that they should be able to achieve the incentive goal of 160 person-Rem. Some techniques employed to reduce radiation exposure besides the ones mentioned previously included: mock-up training; the use of video cameras and telemetric dosimetry, air monitors, and radiation survey meters to remotely monitor high dose work; the use of temporary shielding to reduce radiation levels where practical; the decreased use of respirators; and the use of limited access signs to reduce traffic through areas of high exposure rates.

1.9 Conclusions

Very good radiological control audits and surveillances were performed by qualified individuals. A violation was identified for the failure of an individual to log in on a radiological work permit. Only minor personnel changes were made since the last NRC inspection of this area. Management showed an excellent commitment to the radiation protection program in the allocation of resources for upgrading equipment and new equipment.

The licensee properly prepared for the 2R10 refueling outage by supplementing radiation protection staff with qualified contract personnel, removing radioactive material from the reactor coolant system through early boration and peroxide flushing, and ensuring that sufficient quantities of equipment used by the radiation protection organization were available. Outage management performed an excellent job of preparing for and defining the scope of the 2R10 refueling outage.

External radiation exposure controls were good. Good internal radiation exposure controls in the form of respiratory protection, air monitoring, and whole-body counting were implemented. An excellent job of reducing respirator use was performed.

A good decontamination effort at the start of refueling outage 2R10 was performed. Controls of radioactive materials and contamination, surveys, and monitoring were good. A noncited violation was identified for the failure to response test radiation survey instruments.

Excellent ALARA planning and preparation was performed for refueling outage 2R10. Exposures were below the licensee's goals for the 2R10 refueling outage.

ATTACHMENT

1 PERSONS CONTACTED

1.1 Licensee Personnel

*J. Bacquet. Radiation Protection Supervisor
*S. Bennett, Acting Licensing Supervisor
*S. Cotton, Manager, Radiation Protection/Radioactive Waste
*D. Mims, Director, Licensing
D. Moore, Health Physics Superintendent
*S. Pyle, Licensing Specialist
*J. Smith Jr., Radiation Protection Specialist
*D. Snellings, Superintendent, Radiation Protection Technical Support

1.2 NRC Personnel

*L. Smith, Senior Resident Inspector
*K. Weaver, Reactor Engineer

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

2 EXIT MEETING

An exit meeting was conducted on April 15, 1994. During this meeting, the inspectors reviewed the scope and findings of the report. The licensee reviewed the violations discussed by the inspectors and detailed the corrective actions that had been performed and ones that they intended to perform for the violations. The licensee did not identify as proprietary, any information provided to, or reviewed by the inspectors.