U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Reports No. 50-456/94009(DRSS); 50-457/94009(DRSS)

Dockets No. 50-456; 50-457 Licenses No. NPF-72; NPF-77

Licensee: Commonwealth Edison Company
Executive Towers West III
1400 Opus Place, Suite 300
Downers Grove, IL 60515

Facility Name: Braidwood Station, Units 1 and 2

Inspection At: Braidwood Site, Braidwood, Illinois

Inspection Conducted: March 7 through May 19, 1994

Inspector: _____ 6-1-94
for R. A. Paul Date
Senior Radiation Specialist

Approved By: _____ 6-1-94
for J. McCormick-Barger, Chief Date
Radiological Control Section

Inspection Summary

Inspection on March 7 through May 19, 1994 (Reports No. 50-456/94009(DRSS); 50-457/94009(DRSS))
Areas Inspected: Routine, announced inspection of the licensee's radiation protection program (Inspection Procedure (IP) 83750) including changes in organization, audits and appraisals, external exposure control, internal exposure control including a specific related concern, control of radioactive materials and contamination, and implementation of revised 10 CFR Part 20 requirements. Also reviewed were items identified in previous inspections (IP 83750).
Results: Observations of planning activities outside of the main radiologically controlled area and of work activities in the Unit 1 containment indicated that the radiation protection program was well implemented. Some concerns related to the radiation safety program and certain radiological work practices were partially substantiated, others were not. A non-cited violation was issued because of the apparent failure of two workers to follow radiological control procedures (Section 2).

DETAILS

1. Persons Contacted

+K. Kofron, Plant Manager
+J. Roth, Regulatory Assurance
+E. Roche, Health Physics Services Supervisor and Radiation Protection Manager (RPM)
+T. Simpkin, Nuclear Licensing
+P. Zolan, Operating Experience Coordinator, Regulatory Assurance
+S. Jerz, Quality Verification
+B. McCue, Operations
+D. Miller, Technical Superintendent
R. Dralle, Master Instrument Mechanic
C. Chovan, Master Maintenance Mechanic
M. Sayers, ALARA Coordinator
R. Thacker, Lead Health Physicist, Technical Group
J. Gosnell, Radwaste Planner

+S. DuPont, NRC Senior Resident Inspector
+B. L. Jorgensen, Chief, NRC Region III, Projects Section 1A

+Attended the preliminary exit meeting on March 25, 1994.

The inspector also interviewed other licensee personnel.

2. Licensee Action on Previous Inspection Findings (IP 83750)

(Closed) Unresolved Item 50-456/94005-02

The inspector reviewed the circumstances of a job in which two workers crossed over a step-off pad into a posted Contaminated Area without the required protective clothing. This problem was documented by the licensee on a Problem Identification Form (PIF).

On February 8, 1994, two equipment attendants (EAs) were in the process of returning to service a portion of the Chemical Volume Control System (CVCS) required for RWST makeup. One of the valves in which an out-of-service card was to be removed was located in the Unit 1 Curved Wall Area (CWA). After entry into this area, which was posted and controlled as a contaminated area, and realizing what they had done, they chose to continue on to finish their work. A radiation protection technician noticed the EAs exiting the area and whole body frisked them; no contamination was detected. Corrective actions to prevent recurrence included briefing the entire site of the event and taking appropriate disciplinary action against the workers. The failure to follow requirements found in Braidwood Administrative Procedure (BwAP) 100-10 is a violation of Braidwood Technical Specification 6.11. However, since the licensee took adequate corrective actions and there had been no similar events in the last year, the violation is not being cited because the criteria specified in Section V.A. of the enforcement policy were satisfied.

One non-cited violation was identified.

3. Changes in Organization, Training and Qualifications of Personnel (IP 83750)

The inspector reviewed changes in the licensee's health physics organization. A major revision was recently made in the Radiation Protection (RP) organization affecting departmental and personnel changes. Some of these changes resulted in a relatively inexperienced RP supervisory staff, however, all RP supervisory staff changes met the technical qualification requirements. In addition, within the past year several RP technical staff and management persons left the RP department. Most of those were replaced from within the department and some others (degreed health physicists) were recently hired. Although these changes have reduced the experience level of the professional staff, their overall experience and qualifications appeared sufficient to effectively manage technical and operational matters. The RPT staff remained at about thirty and all but two who are still in training, met the required ANSI qualifications.

4. Braidwood Morale Issue

There appeared to be a significant morale problem in the Braidwood RP department. Contributing to this problem are Radiation Protection Technicians (RPTs) and other department members concerns related to insufficient staffing, budget tightening, job insecurity, lack of respect for some RP managers and first line supervisors, lack of respect of RP by other departments, fragmented job scheduling, fear of criticism, and for some RPTs fear of repercussion from management. In addition, some RPTs perceived that recent RP programmatic changes were made to accommodate other departments, and by doing so undermined RPT credibility. These changes included reduction of some routine surveillances, relaxation of controls governing personnel entry into certain radiation areas, and allowing the use of digital dosimeters to be used as dose rate instruments for ALARA purposes (See Section 9). The license had an ongoing program to evaluate the most efficient use of its resources, including use of RPTs to perform radiation protection coverage and controls.

Following an inspection of this matter the inspector concluded that: (1) there did not appear to be degraded staff performance as a result of poor morale due to apparent staff conscientiousness and pride, (2) the potential for degraded performance as a result of the problem was real and needed to be seriously addressed (performance had been degraded at other stations as a result of morale problems) and (3) management needed to assure all personnel that fear of criticism for making a mistake is unfounded and should not inhibit their willingness to make necessary decisions concerning health and safety matters. The investigation into the root causes and the corrective actions taken to address this issue is discussed in a Level II PIF issued for adverse trends on radiation worker practices. This matter was discussed at the exit interview and will be reviewed during future inspections.

No violations of NRC requirements were identified.

5. Audits and Appraisals (IP 83750)

The inspector reviewed audits and appraisals performed since the last inspection. A comprehensive, performance-based audit of the radiation protection program conducted by an offsite team was also reviewed. With the exception of three findings for which adequate corrective actions were taken (weaknesses in the RWP and radiation control program, use of uncalibrated electronic dosimeters (EDs), and variation between thermoluminescent dosimeters (TLDs) and self reading dosimeters), the audit found the station had implemented an effective radiation protection program. An inspector concluded from a review of the identified weaknesses that they were not programmatic and the actions taken to prevent recurrence were effective.

In addition, the inspector reviewed the results of an Off-Site Quality Verification (SQV) performance based audit which examined radiation work practices during the A2R03 refueling outage. With the exception of one Level III Finding issued for work (grinding) performed without the proper permit, the audit concluded the station had provided an effective radiological control program for that outage. In addition, a self assessment of radiation protection activities was performed by health physics personnel. At the request of radiation protection, SQV assigned an inspector to work with the radiation protection personnel performing the audit; SQV helped develop and guide them through the assessment process. A review of the results of this self assessment will be performed during a future inspection.

No violations of NRC requirements were identified.

6. External Exposure Control (83750)

The licensee read their TLDs with an in-house installed system and which was National Voluntary Accreditation Program (NVLAP) certified in eight categories. Sets of the TLDs were spiked quarterly with gamma radiation by one of the Commonwealth Edison Company (CECo) station's irradiators used for calibration; neutron and beta irradiations were performed by a contract vendor. The results of the spiked samples were part of an interstation comparison study which is used to ensure that all processing locations maintained consistent performance. The NVLAP tolerance limit for all categories was 0.5 and for each of the CECo stations it was 0.1 for the photon category and 0.2 for the beta category. Results in excess of these more conservative tolerance limits were investigated. A review of the interstation comparison study for the last quarter 1993, was performed; no problems were noted.

During a previous inspection (Inspection Report Nos. 50-456/93019; 50-457/93019) it was noted that increased noble gas in the Unit 2 containment was caused by the Unit 2 fuel leak. Persons entering containment at power were exposed to levels of airborne noble gas ranging up to 180 Derived Air Concentrations (DACs). As a result, it was determined that thermoluminescent dosimeter readings for those persons, and all others exposed to noble gas, had to be corrected for

the low energy beta radiation of Xenon-133. These corrections were made in accordance with procedural guidance and the shallow dose equivalent for some persons ranged up to 3 Rem. A review of the technical basis for these changes was performed by the inspector, no problems were identified.

No violations of NRC requirements were identified.

7. Internal Exposure Control (IP 83750)

During this outage the licensee took steps to implement the new 10 CFR Part 20 requirements. A major initiative to reduce the total effective dose equivalent (TEDE) was made by limiting the use of respirators in areas where the likelihood of receiving dose from external exposure was less than if they had been used. As part of the TEDE evaluation the licensee used previous and current air sample data for similar work obtained during this and previous outages. The inspector reviewed the licensee's program for implementing a TEDE/ALARA review and the air sample and analysis program. These programs appeared sufficient to implement ALARA and assess TEDE. It included guidance on choice of instrumentation, sampling location, the environment to be measured, and working conditions. There were no doses in excess of 1% of the annual limit of intake (ALI).

No violations or deviations were identified.

8. Control of Radioactive Materials and Contamination (IP 83750)

The inspector noted that several PIFs, written since the beginning of this year, identified contaminated tools or equipment found outside the Radiological Controlled Area (RCA) and radiological controlled posted areas, but within the protected area. Most of the material had slightly fixed and loose contamination levels. Because the licensee views these PIFs as a negative trend, they initiated a LEVEL II PIF to determine the root cause and implement corrective actions. As part of this investigation the licensee planned to evaluate the overall effectiveness of the radioactive materials control program. Included in the investigation will be (1) an evaluation to determine if the current policy of having RPT attendance at the RCA exit during day shifts only for both outage and non-outage times provides sufficient coverage to prevent unmonitored releases and (2) a review of the non-RCA survey program to determine that its scope is sufficient to effectively identify materials in non-power block areas of the station. This matter was discussed with the licensee on May 19, 1994. The results of the licensee's investigation will be reviewed at a future inspection and tracked as an Inspection Followup Item.
(IFI 50-456/94009-01; 50-457/94009-01)

No violations or deviations were identified.

9. Radiation Protection Concern (IP 83750)

Concern: A procedure was rewritten with radiological safety considerations subordinated to the job (work) for the convenience of workers.

Discussion: The procedure in question was BwRP 1140-1A5, Revision 2, "Protective Clothing and Equipment Guidelines." In the respirator equipment guideline section of the procedure it stated that "in no case may a person go without a respirator above 2,000,000 dpm/100 cm2." During steam generator work in November 1993, (about the time for which the concern was raised), surveys of the work area indicated a few areas of loose contamination greater than 2,000,000 dpm/cm2. Although the Radiation Work Permit (RWP) governing this work did not require respirators, they were worn at the beginning of the job as directed by RP personnel. Later in the job RP management chose to eliminate their use based on air sample results and because they interpreted the words in the procedure to be used as a guide only, and not a regulatory requirement. There were no documented intakes as a result of removing the respirators. To eliminate any further confusion as to the meaning of that specific guideline, (not regulatory requirement), the procedure was revised to eliminate that section.

Findings: The concern was partially substantiated in that the procedure was revised while the work was in progress. However, the decision to remove the respirators to accommodate the workers could not be established. Based on the inspector's review of the survey sheets associated with this work, it appeared there were a couple of areas underneath the steam generator (SG) manway (area used primarily for SG jumpers who are required to wear respirators) in excess of those described in the guidance. However, the general area contamination levels were all less than those in the guidance.

Concern: There is inadequate RP staff to provide RP sufficient job coverage which has led to jobs being performed without RP coverage.

Discussion: The station recently issued a level 2 PIF for adverse trends on radiation worker practices because the nature of several recent PIFs suggested that performance was declining in this area. Some of these PIFs indicated that used protective clothing continue to be found in areas that were posted as "Not Normally Surveyed" and contaminated protective clothing was found inside a roped off area without step off pads and a hand held frisker nearby, indicating that these rooms were being accessed without RP performing required surveys before entry.

Findings: The aforementioned PIFs indicate that some work may have been performed in violation of station RP procedures and partially substantiated the concern that jobs were performed without RP involvement. However, the inspector had not identified that lack of RP coverage was the root cause of the problem. Additionally it could not be specifically established that it was caused because of an inadequate

RP staff. Factors contributing to this problem could be insufficient training, poor worker practices, and scheduling of work at times when there are insufficient RPTs available to provide coverage. The licensee is currently evaluating the most efficient use of its RPTs to provide work coverage, especially pre and post outage activities.

Concern: The ALARA program is losing effectiveness because the ALARA Analyst has been overruled by RP management.

Discussion: Primary responsibility for implementing ALARA programs was through the ALARA Analyst who performed pre- and post-job reviews, maintained job history files, and assisted in RWP development. The total projected dose for the current refueling outage (A1R04) was about 207 person-rem and for the current forced Unit 2 maintenance outage about 30 person-rem. To date, it appeared the licensee will have completed both outages at about 207 person-rem, the original projected goal for (A1R04). In addition, the non-outage dose goal was about 2 person-rem per month and for the first two months in 1994 it was about 800 person-mrem. Discussions held with the ALARA analyst and other members of the ALARA staff indicated that although improvements can be made in the program, there is management support for ALARA.

Findings: This concern was not substantiated; the inspector could not find cause to indicate the ALARA program is not effective.

Concern: Some workers used designated electronic dosimeters in the dose rate function instead of reviewing RP surveys to determine radiological conditions prior to containment entry.

Discussion: The licensee's RP program allows designated electronic dosimeters (red digis) to be used by workers as informational devices to check their working-area dose rates. The red digis were issued by RP and their use was governed by a Policy Memo. Authorized persons using the red digis were required by the RWP to also wear their permanent dosimetry and to be familiar with the area dose rates. The digis were not intended to be used without worker pre-knowledge of their radiological conditions.

Conclusion: A review of the RP containment log identified a worker who indicated he had read the survey sheet thought his expected dose rates would be about 1 mR/hr, however, the survey sheet showed the general area dose rates to be about 100 mR/hr. The inspector could not determine that the worker did not read the survey map. However, the entry was of concern because if he had not read the survey sheet and was relying on the red digi as the only source of information, it raises the question of how well trained the worker was in the use of the red digis. One of the work group supervisors of workers who routinely use the red digis indicated that his staff is instructed to be familiar with the radiological conditions, but he could not expect them to remember every recorded dose rate. The inspector could not substantiate that workers are not reading the appropriate surveys maps, or there is general misuse of the red digis.

Concern: RP technicians were not willing to discuss concerns with corporate RP or Quality First personnel due to lack of trust, and their concerns have not been acknowledged.

Discussion: The station recently issued a Level 2 PIF for adverse trends on radiation worker practices. In the investigation of that PIF, the licensee found that some worker lack of openness (fear of repercussion) contributed to the station morale problem. During the interviews of RPTs by the inspector, this matter was specifically discussed.

Findings: This concern was partially substantiated as indicated by the inspector's and licensee's findings. Based on the inspector's review, some of the workers interviewed indicated there was some lack of trust of both station and corporate management. Although there was no overwhelming indication that RPTs feared repercussion for approaching management or Quality First, some indicated fear of criticism for making a mistake. The inspector could not establish that workers concerns were not being acknowledged because, of those RPTs specifically asked, none indicated they had gone to corporate management or Quality First.

9. Plant Tours

The inspector and the station Health Physics Supervisor toured work areas of the auxiliary building on two occasions. On the first tour radiological postings appeared appropriate, however, general housekeeping was poor. Many instances were identified where clean mesh bags and rubber gloves were found lying around clothing change out areas, and the condition of the instrument calibration facility and the Instrument and Electrical hot tool rooms were poor, as evidenced by instruments lying around and general clutter. During the second tour it was noted that considerable improvement was made, however, some areas needed more attention such as the calibration facility.

During a tour of the containment with the senior resident inspector it appeared the licensee maintained good control over work activities and both that containment coordinator and RP supervisor appeared knowledgeable of scheduled work activities; the containment and missile barrier access areas were continuously staffed. Work areas were well maintained and workers were generally using good radiological work practices.

On several occasions the inspector noted that the whole body friskers located in the Unit 1 refuel building during the outage were inoperable because of high radiation background conditions. These conditions were probably caused because (1) the mini purge units in the containment were insufficient to prevent the higher than normal levels of noble gas in the containment from migrating to the refuel building and (2) ongoing refuel activities on the refuel floor. These matters were discussed with the licensee.

10. Exit Interview

The scope and findings of the inspection were preliminarily reviewed with licensee representatives (Section 1) after the conclusion of the inspection on March 25, 1994, and with several members of the staff at the end of the inspection on May 19, 1994. The licensee did not identify any documents as proprietary. The following matters were specifically discussed by the inspector:

- Non-cited violation concerning failure to follow requirements (Section 2);
- Radiation protection morale issue (Section 4);
- Controls of radioactive materials (Section 8); and
- Operability of whole body friskers and effectiveness of containment mini purge systems (Section 9).