

U.S. NUCLEAR REGULATORY COMMISSION
REGION III

Report Nos. 50-254/94002(DRSS); 50-265/94002(DRSS)

Docket Nos. 50-254; 50-265

License Nos. DPR-29; DPR-30

Licensee: Commonwealth Edison Company
146C Opus Place
Downers Grove, IL 60515

Facility Name: Quad Cities Nuclear Generating Station, Units 1 and 2

Inspection At: Quad Cities Site, Cordova, Illinois

Inspection Conducted: January 31 through February 4, 1994

Inspectors: *M.A. Knowlton for*
R. A. Paul

3/9/94
Date

P.L. Loudon
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3/9/94
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J. McCormick-Barger, Chief
Radiological Programs Section 1

3/9/94
Date

Inspection Summary

Inspection from January 31 through February 4, 1994 (Report Nos. 50-254/94002(DRSS); 50-265/94002(DRSS))

Areas Inspected: Routine announced inspection (Inspection Procedure (IP) 83750) of the radiological control program before the Unit 1, 13th. cycle refueling outage (QIR13) including, organization and management controls, ALARA, audits, appraisals and Problem Identification Forms (PIFs), and licensee actions on previous inspection findings.

Results: Two violations were identified (Sections 2 and 3) concerning failure to control high radiation area (HRA) boundaries and contaminated material and equipment. In addition, a concern was identified with worker response to electronic dosimeter alarms (Section 5). Overall, the radiation protection program appeared to be effective, and sufficient preparatory attention appeared to have been given to high dose jobs for the upcoming outage.

DETAILS

1. Persons Contacted

- *G. Campbell, Station Manager
- *R. Baumer, Regulatory Assurance NRC Coordinator
- *A. Lewis, Assistant to the Plant Manager
- *D. Winchester, Station Quality Verification
- *N. Chrissotimos, Regulatory Assurance Supervisor
- *R. Moravec, Engineering and Nuclear Construction Site Manager
- G. Powell, Lead Health Physicist, Technical
- M. Zinnen, Lead Health Physicist, Operating
- *S. Sober, Radiation Protection Manager
- *B. McGaffigan, Assistant Superintendent - Work Planning
- L. Tucker, Technical Services Superintendent

- *T. Taylor, Senior Resident Inspector, NRC
- R. Walton, Resident Inspector, NRC

The inspectors also contacted other licensee and contractor employees including personnel from engineering, operations, maintenance, and plant support.

* Present at the Exit Meeting on February 4, 1994

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

(Closed) Inspection Followup Item (IFI) (50-254/93006-02; 50-265/93006-02): Licensee identified problems associated with High Radiation Area (HRA) controls during the latter part of 1992 and early part of 1993. Corrective actions included installation of swing gates across step off pads leading into HRAs which provided assurance the area was barricaded and conspicuously posted, and inclusion of a video training tape on HRA controls as part of the station orientation program. Since the implementation of those corrective actions, the licensee identified two more HRA control events. On August 14, 1993, a normally locked access door to a high radiation area (dose rates greater than 1000 millirem/hr (10 mSv/hr)) near the main condenser tube pull pit area was found unlocked and unattended. And on November 25, 1993, a door leading into another high radiation area, the backwash receiving tank room (dose rates greater than 100 millirem/hr (1 mSv/hr) but less than 1000 millirem/hr (10 mSv)), was found propped open. Although both these events had low safety significance and were identified by the licensee, a violation is being cited because of failure of the earlier corrective actions to prevent recurrence. Failure to maintain HRA and LHRA doors locked is a violation of Technical Specification 6.12.1.a. requirements (Violation 254/94002-01; 265-94002-01).

One violation was identified.

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

During previous inspections, the inspector noted that several Radiation Occurrence Reports (RORs) were written earlier in 1993 for contaminated tools or equipment found outside the Radiological Controlled Area (RCA), but within the protected area. These items, found during routine surveys, apparently had not been surveyed prior to release from the RCA. With the exception of a piece of equipment which read about 100,000 dpm/100 cm² fixed contamination, the tools and equipment had only low levels of fixed and loose contamination. Existent practices to prevent this problem included reduction of the volume of material unconditionally released from the RCA, strengthening administrative limits, installing more sensitive automated monitoring devices, and reducing the number of exits from the RCA. Additional corrective actions taken during the Q2R12 outage included changing the main access/egress control point to a lower radiation background area, and improved equipment decontamination methods. Further planned actions included establishing a centralized tool crib in the main RCA and removing radioactive machining and equipment decontamination activities from the administrative building to a new building adjoining the main RCA early in 1994.

However, despite these actions, it was noted during this inspection that the licensee identified a recent instance on January 7, 1994, and several instances in 1993 of contaminated tools and equipment found outside the RCA for which surveys had not been performed. Release of the tools and equipment from the RCA without a survey is contrary to Quad Cities Radiation Protection procedure (QRP-1000) and a violation of Technical Specification 6.3., which requires that radiation protection procedures be adhered to (Violation 50-254/94002-02; 50-265/94002-02). A violation is being cited because the corrective actions for the previous similar problems were not effective.

One violation was identified.

4. Intake of Radioactive Material (IP 83750)

The inspectors reviewed the circumstances surrounding an incident in which several workers received intakes of radioactive material over several days while working at the upper hatch in the drywell. The inspectors contacted health physicists, radiation protection technicians (RPTs), the workers involved, and reviewed radiation protection (RP) records including results of bioassays, surveys, and the licensee's investigation of the incident.

Several employees involved between November 15 and 17, 1993, with replacing thermocouples in the upper hatch of the drywell were found to have intakes (about 50 nanocuries of cobalt-60) of radioactive material. Prior to the job, the RP group determined that respirator use was not ALARA because the hazards from the heat and confined space were considered greater than the risk intakes that could occur from working in the area where some relatively high contamination levels existed. During subsequent entries, workers expressing concern over probable

intakes were allowed the option of wearing respirators during subsequent entries, but only exercised the option once owing to the adverse working conditions.

The licensee determined the intakes were considerably below the 40 MPC-hour control level described in 10 CFR 20.103. The inspectors reviewed the licensee assessment and agreed with the conclusion. Worker whole body count (WBC) results were also reviewed and were found to be consistent with worker occupancy time and air sample data (nine Maximum Permissible Concentrations (MPCs)).

No violations of NRC requirements were identified.

5. Worker Response to Electronic Dosimeter Alarms (IP 83750)

The inspectors also reviewed the circumstances of a job in which worker response to electronic dosimeter (ED) alarms did not meet station expectations. This problem was documented by the licensee on a Problem Identification Form (PIF).

On November 10, 1993, an operator was required to perform an out of service (OOS) on a valve in the unit 1 reactor water cleanup (RWCU) heat exchanger room. The operator contacted the RP group before the entry to discuss the nature of the work, job location, and projected time in the area. The radiological survey map indicated general area dose rates around 600 mrem/hour (6 mSv/hr). The room was controlled as a locked high radiation area (LHRA), and the operator wore an ED set to alarm at 500 mrem/hour (5 mSv/hr) and an RPT was assigned to perform timekeeping. The operator entered the room, but could not close the valve, so he left. Later, another operator and a mechanical maintenance man entered the room using similar radiological controls in an attempt to close the valve. Timekeeping was performed by the same RPT. Afterward, personnel in the RP office noted that one of these workers had exceeded the daily administrative limit of 100 mrem (1 mSv) by 2 mrem (2 microsieverts) (uSv) and initiated an investigation.

The investigation identified the following:

- a. The location of the valve where the work was performed was about ten feet off the floor, an area not reflected on the survey map used during the pre-job review. RP was not aware work was to be performed at that location, so no pre-job survey was performed, and the RPT performing timekeeping did not enter the area to verify the work location, a good practice for RPTs covering high dose rate jobs. A subsequent survey showed radiation fields ranging from 1 R/hour (10 mSv/hr) on contact with the valve to about 750 mrem/hour (7.5 mSv/hr) at chest level.
- b. The general radiation fields at the expected work area ranged from 600 to 650 mrem/hr (6 to 6.5 mSv/hr), however, the EDs were set to alarm at 500 mrem/hr (5 mSv/hr). Dose rate alarms are generally

set higher than the working field to warn a worker of unexpected elevated dose rates.

- c. The first operator's ED alarmed on dose rate but he continued to work, and upon departure did not inform the RPT of the alarm. The EDs on the other workers also alarmed on dose rate and depending on their work location they repositioned themselves until it stopped. Upon departure from the area, they informed the RPT of the alarms. In both cases, the workers did not leave the area as instructed when the alarm sounded because they assumed they were working in dose rates at or near the rate used for the set point.

Although the radiation fields at the actual work location were higher than expected, no significant unplanned radiation exposure occurred. Discussions with licensee personnel and a review of other PIFs indicated this event was isolated; however, the inspectors were concerned about personnel not meeting expectations regarding ED alarms. This matter was discussed at the exit interview and corrective actions will be reviewed during a future inspection (IFI 50-254/94002-03; 50-265/94002-03).

No violations of NRC requirements were identified.

6. Planning and Scheduling for the Upcoming Unit 1 Outage (IP 83750)

The inspectors reviewed the licensee's planning and scheduling activities for work to be performed during the upcoming Unit 1 13th. cycle refueling outage, Q1R13. The outage was to commence around March 14, 1994 and continue for sixteen weeks. Of approximately 150 modifications scheduled, 52 had been completed. According to individuals in the modifications group, most of the remaining modifications were not dose intensive activities and that all of the remaining design reviews would be completed by the Q1R13 start date.

The inspectors reviewed selected ALARA packages for higher dose work to be performed by contract vendors. These packages appeared thorough in nature and included breakdowns of tasks with associated dose goals, photographs taken during planning walkdowns to assist in pre-job meetings, and total job dose goals which would be used as a performance parameter in the vendor's contract. The contract ALARA group appeared to interact well with station RP staff in providing planning packages so that job setup (i.e., scaffolding, shielding, surveys, etc.) would be adequately placed in the schedule to ensure the area was ready for the work groups.

Discussions with the outage planning staff indicated that the Project-2 (P-2) scheduling system was being used to include lead time for area setup and was also being reviewed to identify other jobs to be performed in a given area to mitigate overcrowding. Planning staff indicated a good relationship existed with the RP individual assisting in evaluating high dose areas. However, planning staff did indicate that they were stressing the system to get all the activities appropriately placed in the schedule before the projected start date.

The inspectors reviewed one particular job package involving the re-coating of the inner torus. This job was estimated to take 75 days to complete with an exposure goal of 80 person-rem (0.8 person-Sieverts). A contract RP individual was hired to act as the ALARA coordinator for the job and crews of contract RPTs were dedicated to the work. The job will involve bead blasting the paint from the inner torus and re-coating of each torus bay. The vendor performing the service will work several crews on a continuous shift basis for six days a week. Based on the inspectors' review, the job appeared well thought out and included plans for ventilation control, contamination control, radioactive waste management, and exposure/monitoring control. The inspectors will monitor the completion of the torus re-coat effort during future inspections.

At the time of the inspection, the RP department estimated that approximately 600 to 700 RWPs would be generated for the outage. The RP RWP writing staff will be enhanced with additional personnel to assist in RWP generation. Cognizant staff indicated that they could complete most of the reviews and RWPs by the outage start date, and were in the process of chronologically prioritizing the jobs to facilitate RWP development. Again, no clear areas of concern were identified by the inspectors; however, the licensee indicated that the work load was stressing their system. At the exit meeting (Section 8), the inspectors indicated to station management that attention must be given to the completion of work packages to ensure RP had sufficient lead time to perform the necessary reviews.

Overall, the inspectors did not note any obvious deficiencies in the planning process other than the indications from the planning and RWP writing staff that the system was being stressed.

No violations of NRC requirements were identified.

7. Maintaining Occupational Exposures ALARA (IP 83750)

a. ALARA Organization

The station's ALARA organization is staffed as follows:

The Operational Lead Health Physicist (HP) acts as the overall coordinator of ALARA activities at the station. This individual also acts as the job planning interface with the work control group.

An RP individual is assigned to the Mechanical Maintenance Department (MMD) to act as coordinator for MMD work.

Another RP individual has recently been assigned similar responsibilities with the valve maintenance group. This individual also coordinates hydrolyzing activities.

Two other RP individuals perform shielding reviews and RWP writing and interface with all necessary staff to accomplish these tasks.

The station also has a contract individual who is assigned to the Site Engineering and Construction (SEC) staff to perform early ALARA reviews and dose monitoring of work performed by contract groups. The inspectors interviewed modifications department management who indicated that this individual was very active in design change reviews to input ALARA concerns early in the review process. This individual also is assisted by vendor ALARA personnel who together coordinate job reviews, pre-job meetings, and exposure monitoring during the accomplishment of contract work. Station RP individuals indicated that a good working relationship existed between their staff and the contract group.

b. Interdepartmental Interfaces

The inspectors interviewed MMD and Systems Engineering staff to determine the relationship of their groups with RP and to determine their internal efforts to maintain doses ALARA.

Both groups indicated a good relationship existed with RP representatives and the MMD group indicated that having an RP individual assigned to their shop allowed for a more thorough review of work packages than in previous outages.

Even though the establishment of the RP point-of-contacts has been a benefit to the station, the inspectors noted that departmental ownership of exposure warranted improvement. Meaning, personnel internal to each respective department were not aggressively pursuing dose reduction ideas on their own. This concept was discussed at the exit meeting (Section 8) and presented as a challenge to the station.

c. Source Term Reduction Efforts

The inspectors reviewed the station's source term reduction (STR) efforts and plans for Q1R13.

A Systems Engineering individual is assigned STR coordination responsibilities and interfaces with RP and responsible systems engineers to address STR initiatives. This individual's main focus has been the routine chemical decontamination of the recirculation and reactor water cleanup systems. During Q1R13, these systems will be decontaminated along with the residual heat removal system. The inspectors attended a chemical decontamination meeting and noted good involvement from various departments.

The STR coordinator also indicated that the station was reviewing the possibility of performing zinc-injection and would be

monitoring the effectiveness of such an effort at LaSalle Station which is planning to begin zinc-injection this month.

d. Q1R13 Exposure Goals

The station had established an exposure estimate of 1,400 person-rem (14 person-Sv) for 1994. This estimate was still somewhat dependent on the final scope of Q1R13 and if the planned Unit 2 outage would be delayed until January 1995. The station monitors outage doses on a daily basis and provides each department with exposure update either daily or weekly depending on the amount of work activities within each department. The inspectors discussed at the exit meeting (Section 8) the importance of close exposure monitoring throughout the year given the large work scope facing the station to ensure exposures do not greatly exceed estimates. The station performance in this area will be monitored throughout the year by the inspectors.

Overall, the inspectors noted no problems with the make-up and functioning of the station's ALARA efforts. However, the station was challenged to enhance departmental ownership of exposure goals and monitoring of exposures as they are accumulated.

No violations of NRC requirements were identified.

8. Exit Meeting

The scope and findings of the inspection were reviewed with the licensee representatives (Section 1) at the conclusion of the inspection on February 4, 1994. The licensee did not identify any documents as proprietary. The following matters were specifically discussed by the inspectors:

- * the violations concerning failure to control HRAs and the release of radioactive material to unrestricted areas (Sections 2 and 3),
- * worker response to ED alarms (Section 5),
- * the absence of large problems with the ALARA program; however, the need for close monitoring of exposures (Sections 6 and 7),
- * the need for management attention to ensure priority is given to the completion of work packages, ALARA reviews, and RWPs (Sections 6 and 7), and
- * a challenge to the station in departmental ownership of doses, and more aggressive involvement of department personnel to take on such ownership (Section 6).