

U.S. NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT

REGION III

Report No. 50-254/80-24

Docket No. 50-254

License No. DPR-29

Licensee: Commonwealth Edison Company
P. O. Box 767
Chicago, IL 60690

Facility Name: Quad-Cities Nuclear Generating Plant, Unit 1

Inspection At: Quad-Cities Site, Cordova, IL

Inspection Conducted: September 9-12, 1980

Inspector: *L. J. Hueter*
L. J. Hueter

10-21-80

Approved By: *W. L. Fisher*
W. L. Fisher, Chief
Fuel Facility Projects and
Radiation Support Section

10-21-80

Inspection Summary:

Inspection on September 9-12, 1980 (Report No. 50-254/80-24)

Areas Inspected: Routine, unannounced inspection of operational radiation protection program during refueling and maintenance, including: organization and staffing; training; radiation protection procedures; planning, preparation, and ALARA; exposure control; posting and control; material control; surveys; missing fission chamber; industrial accident; film badge versus pencil dosimeter discrepancy; and IE Bulletin No. 80-10. The inspection involved 36 inspector-hours on site by one NRC inspector.

Results: No items of noncompliance were identified in any of the 12 areas inspected.

DETAILS

1. Persons Contacted

- *N. Kalivianakis, Plant Superintendent
- *L. Gerner, Assistant Superintendent, Administrative and Support Services
- *R. Flessner, Technical Staff Supervisor
- *J. Heilman, Quality Assurance Engineer
- *T. Kovach, Lead Health Physicist
- *S. DuPont, NRC Resident Inspector
- W. Walschot, Lead Chemist
- R. Carson, Health Physicist
- E. Cole, Training Instructor

The inspector also contacted other plant staff personnel.

*Denotes those present at the exit interview.

2. General

This inspection, which began about 9:00 a.m. on September 9, 1980, about a week and a half into a planned Unit 1 refueling and maintenance outage, included tours of the control room, Trackway II (temporary waste storage area), turbine building and various areas in the reactor building, including the refueling floor and entrances to both the drywell and the torus. Housekeeping, although in need of further improvement, was perceptibly better than that observed in previous outages. This matter was discussed in the exit interview. Radiological controls appeared to be generally adequate.

3. Licensee Action on Previous Inspection Findings

(Closed) Infraction No. 1 (265/79-27): Failure in three instances to adhere to a temporary procedure for draining Unit 2 RHR Service Water Piping resulting in an unplanned radioactive liquid effluent release. The significance of this problem with emphasis placed on the necessity for strict adherence to procedures was discussed with personnel involved, and was discussed in department meetings and Station Department Head meetings. Reprimands and disciplinary actions were taken against certain individuals. Although the draining of the system to outside the station was terminated on discovery of the problem and no similar drainings have been approved or conducted since that time, the licensee asserts that should such draining be contemplated in the future, the procedure will include steps for sampling and analysis before re-initiation of draining operations after valve line-up changes. This should detect possible contamination before release and prevent uncontrolled release to the environment.

(Closed) Infraction No. 3 (265/79-27): Failure to continuously monitor an unplanned release which began on December 9, 1979. The technical specifications permit this to be accomplished either by operating the radiation monitor on the discharge line or by the discharge bay sampler being operable or grab samples being taken in the discharge bay during the discharge. The composite samplers on the spray canal blowdown line and on the south diffuser pipe are now normally operated continuously so that any unplanned releases via either release path will be monitored.

(Closed) Infraction No. 2 (265/79-27): Failure to provide authorization by a SWP or continuous H.P. surveillance (as required by procedure) for two workers who received greater than 50 mrem dose on December 9, 1979. The individuals involved were reinstructed on the applicable requirements when they expect to receive daily doses exceeding 50 mrem.

The annual retraining program for Station employees has been updated to clarify and emphasize requirements regarding this matter.

(Closed) Violation (254/80-13): Failure to limit radiation dose rate to 200 millirem per hour at any point on the external surface of a closed transport vehicle. The licensee changed procedure QP 1352, Rev. 4, May 1980, to require surveys of the top, bottom, front, back, and both sides of transport vehicles, and retrained involved personnel regarding the procedure change.

(Closed) Infraction (2254/80-17): Failure to securely attach the top to a bin to provide a strong tight package for LSA material. A communications problem (misunderstanding between package loader and the one supervising the activity) was determined to significantly contribute to this occurrence. To preclude recurrence of this problem, supervisory responsibility in the radwaste department has been redefined and implemented to require oversight and direct inspection of all radwaste packages and shipments. As an additional precaution, all bins are now secured with metal bands in addition to the bolts.

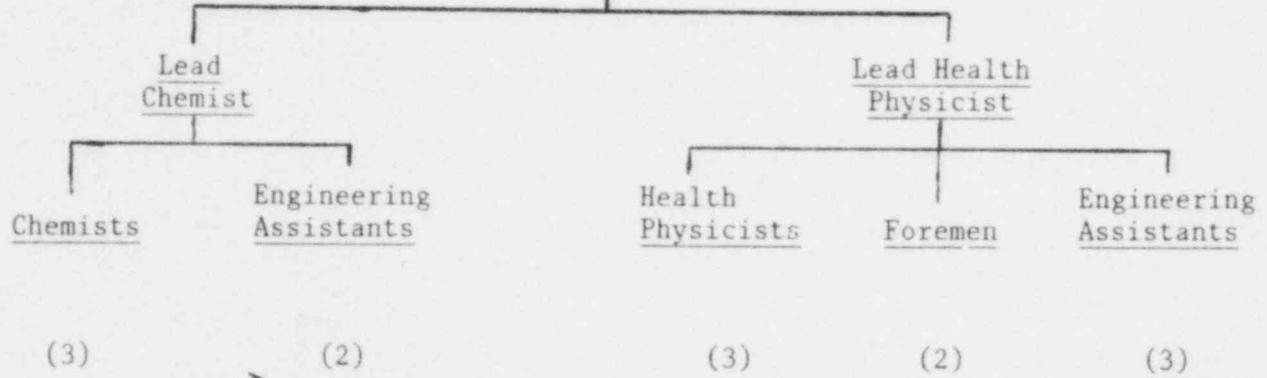
4. Organization and Staffing

The structure and staffing of the radiation protection organization during this outage is as follows:

Plant Superintendent

Assistant Superintendent for Administration
and Support Services

Radiation Chemistry Supervisor



Radiation Chemistry Technicians

(22)

In addition to these plant personnel, the licensee has the services for this outage of five Rad-Chem technicians (RCT's) and a foreman from Byron Station on the day shift. These individuals have had previous outage experience at the plant. The licensee also has arranged to obtain the assistance of contract HP's on rather short notice, if necessary.

The Lead Health Physicist currently is engaged in a training program to become a licensed reactor operator. Therefore, his health physics effort during the outage is limited to evenings and weekends. However, management stated that should the need arise, the Lead Health Physicist could be pulled from the training program.

Also of note, two experienced health physicists terminated employment with the licensee in early summer this year. Replacements were obtained in June by hiring two graduates of the Purdue University Health Physics Training program. One of the two had been employed the previous summer to assist in health physics activities in the corporate office. The third health physicist position, a new position, is filled by a plant chemist with several years experience.

The Rad-Chem Supervisor, both Health Physics Foremen, and the majority of the RCT's have many years of experience. Following the outage and completion of the licensed operator training for the Lead Health Physicist, some organizational changes are scheduled. The current Rad-Chem Supervisor will be promoted to Technical Staff Supervisor and the current Lead Health Physicist will step up to Rad-Chem Supervisor position, leaving the Lead Health Physicist position to be filled.

No items of noncompliance or deviations were identified.

5. Training

The inspector reviewed the orientation training program and determined that it meets the requirements of 10 CFR 19.12 regarding instruction of workers. The inspector selected at random certain contractor personnel who had been issued film badges and checked training records to verify that they had received the training. Records of training were available for all selected individuals.

No items of noncompliance or deviations were identified.

6. Procedures

A limited review of the following radiation protection and radwaste related procedures identified no significant problems:

QRP 100-1 7-74 Radiation Control Standards

QRP	100-3	5-80	Exposure Control
QRP	100-11	5-80	Termination Bioassay
QRP	100-17	5-80	Self-Contained Breathing Apparatus Inspection
QRP	100-46	3-80	Removal, Repair, or Replacement of Reactor Feedwater Sparger Lines
QRS	400-1	4-80	Sampler Operability
QRS	100-59	3-80	Daily and Weekly Surveillance Test Assignment Sheet
QEP	360-2	6-80	High Radiation Evacuation

7. Planning, Preparation, and ALARA

Weekly outage preplanning meetings with the operations and maintenance outage planners began about a month before the outage.

At the end of a refueling outage, meetings are held with the Rad-Chem Technicians to discuss problems encountered during the outage in the interest of avoiding or minimizing similar problems in the future.

Supplies of NIOSH approved respiratory equipment on hand for this outage appeared adequate. Also, supplies of calibrated, operable survey instruments of various types and covering a wide range of exposure rates appeared adequate.

It was noted that certain appropriate procedures specifically address the ALARA concept.

To reduce exposures during the modification of the Unit 1 torus the licensee is using similar measures (and some new measures) as were used for hydrolazing Unit 2 during a previous outage. Hydrolazing and vacuuming of sludge were used for cleaning. Contoured, water filled shield tanks were used to reduce exposure rate by about 50 percent for some torus work. The filter tank for torus water cleanup was placed on the Unit 2 side in a low occupancy area and was shielded with block walls.

Jet pump beam bolt inspection was conducted using an underwater test fixture which was developed at Dresden Station. An underwater camera was used for another required visual inspection.

During this outage, the licensee plans to install decontamination flanges on the ends of the scram discharge valve headers to allow

hydrolazing for reduction of crud (as was done at Dresden Station) and resulting reduction of radiation levels.

For the core spray piping work, some grating was cut out to permit entry from the top where exposure rates were lower. Much lead shielding was also used for exposure reduction on this task.

During this outage, the licensee is modifying the Unit 1 clean-up system by relocating the suction of the clean-up pump to draw from the cooler side of the system in the interest of reducing the frequency of pump seal failures and resulting exposure in replacing seals. An identical modification was completed on Unit 2 in April this year with no seal problems experienced since that time. Much lead shielding is being used for exposure reduction during this modification.

The licensee has recently modified the original urea formaldehyde (UF) facility to utilize the DOW waste solidification system in the interest of exposure reduction to workers. The system is designed to use 50-cubic-foot liners. The system is in the "shakedown phase"; some solidification problems have been encountered to date. Efforts to make the system fully operational are continuing.

The inspector was informed that some welder certifications and metal prefabrication done normally at other facilities in an area outside of the controlled radiation area was being done here in the reactor building. This item was discussed at the exit interview.

No items of noncompliance or deviations were identified.

8. Exposure Control

a. External Exposure

The licensee was in the early stages of a refueling and maintenance outage, which was pretty well on schedule. Work related exposures received to date were in line with expectations. The licensee continues to use dosimeters for daily indications of dose received, with daily updates and the use of control lists as individuals reach various dose levels. Film badges continue to normally suffice for the official dose indicator; on occasion, TLD's are used as additional indication and for comparison. The licensee continues to use the long established Safe Work Permit (SWP) system for job planning and radiation safety prerequisites.

No items of noncompliance or deviations were identified.

b. Internal Exposures

Selected air sample records were reviewed since the refueling outage began for the Unit 1 turbine building and for the refuel-

ing floor, dry well, and torus in the reactor building. Respiratory protection assigned for the areas appeared to be appropriate. The mask issuance/MPC-hours log and SWPs were also selectively reviewed for outage related work. No specific problems were identified.

The licensee utilizes a whole body count (WBC) program involving both an incoming WBC and another on termination to evaluate the overall effectiveness of their internal exposure control program. No problems were identified with this program as implemented.

No items of noncompliance or deviations were identified.

9. Posting and Control

Posting and controls were observed during tours of the control room, Trackway II (temporary waste storage area), turbine building, and various areas in the reactor building, including the refueling floor and entrances to both the drywell and the torus. Instructions to workers required by 10 CFR 19.12 were posted.

One of the 33 Radiation Area Monitors (RAM) was alarming in the control room. The unit, located at the reactor building mezzanine floor access, was slightly above the one mR/hr alarm set point. An inquiry indicated that it had just started alarming that day due to radiation from a nearby pipe. An interim decision to slightly raise the set point was made until other measures, such as attempts to flush the pipe for decon purposes and/or construct a shield for the pipe could be conducted.

The calibrated RAM unit on the refueling floor, serving as a criticality monitor, has visual and audible indication both locally and in the control room. The monitor also has an alarm set point of 5 mR/hr to meet the requirements of 10 CFR 70.24(a)(2).

Several barrels (with no lids) labeled "Radioactive LSA," some containing potentially contaminated water and some containing potentially contaminated pieces of board, were located at Trackway II with no means of limiting access to the potentially contaminated material. This matter was discussed at the exit interview.

Selected Safe Work Permits (SWP's) were reviewed for proper radiation protection precautions, signed approvals, and verification of radiation protection training for assigned workers. No problems were identified.

No items of noncompliance or deviations were identified.

10. Material Control

No problems were identified in the review of the licensee's methods

and procedures for movement and control of radioactive material within the controlled area and for removal of material from the controlled area. In light of some past outage problems, the need to keep close watch and control of the machine shop area was discussed.

11. Surveys

Inspection effort relative to airborne activity surveys is summarized in Paragraph 8.b. Selected direct radiation and surface contamination survey data collected during the outage from the drywell areas, the reactor building, and the turbine building were reviewed. No problems were identified. Independent surveys were conducted during the plant tour with an Eberline RO III A survey meter. Radiation levels were found to be as posted and/or as shown on survey data sheets for the areas checked.

No items of noncompliance or deviations were identified.

12. Radiation Safety Review of Previously Reported Missing Fission Chamber

By letter dated July 25, 1980, the licensee provided the Region III office, in accordance with 10 CFR 73.71, information concerning the loss of a type NA04 fuel loading chamber Serial No. 6584075 containing two grams of enriched U-235. The loss was first noted during an NRC material accountability inspection, July 9 to 11, 1980. A total of 54 man-hours were spent attempting to locate the missing material during a three-day period immediately after the loss was noted. This effort involved an extensive physical search, a review of various documentation for possible information, and interviews of several plant personnel. It was concluded that a clean-up crew disposed of the chamber as contaminated trash in one of many waste barrels on the refueling floor. This waste was then shipped to the Hanford, Washington, radioactive waste burial site for disposal.

New procedures and new plexiglass covered storage containers to allow for easy inventory of fission chambers are included in actions taken to prevent recurrence.

The fission chamber had been exposed to neutrons. To assess the radiological aspects involved, a radiation survey was performed by the licensee on a similarly exposed chamber, which showed a net exposure rate of about 4 mR/hr on contact and about 1500 cps smearable contamination.

No evidence was found to suggest disposition of the fission chambers other than that concluded by the licensee. It is concluded that disposition in this manner would present no significant health or radiation hazard to the public.

13. Industrial Accident

The licensee promptly reported the severance of the tips of the index and middle fingers of the left hand of a worker by the impact of the sharp end of a pipe which slipped and fell when the worker was involved in the internal torus (Unit 2) modification on the morning of February 8, 1980. The worker was accompanied to a local hospital by an RCT, who took surveys and returned to the plant the glove which had been on the patient's hand. No personal or off site contamination resulted.

No items of noncompliance or deviations were identified.

14. Occurrences of Significant Discrepancies Between Film Badge and Dosimeter Dose Measurements

In the period from late January to early August 1980, the film badges of three employees (all contractors) showed exposures significantly higher than indicated by direct reading dosimeters and/or indirect reading dosimeters and TLD's. In all three cases, detailed studies by the licensee, of numerous other workers in the same work area (torus) and doing the same type of work, showed that the exposure to the film badges was not representative of the exposure to the workers. On this basis, doses determined by other means were assigned for each two-week period in question. As to the possible cause, the licensee investigation of the matter provided evidence that in some instances, either by accident or design, workers were picking up and using film badges of fellow workers who either were on a different shift or who had terminated earlier in the two-week badge period but whose film badge was still in the open film badge rack at the guardhouse. To eliminate this apparent problem, film badges of contractor personnel are now secured, issued, and collected by guard personnel, who check for proper identity of the badge wearer. No further problems have been encountered to date since implementation of the new badge program in late August.

Two of three individuals (the two who had already terminated when their specific problem became known) had not been personally contacted by the licensee to discuss the problem and the assigned dose corrections. This matter was discussed in the exit interview.

15. IE Bulletin No. 80-10

The above bulletin titled "Contamination of Nonradioactive System and Resulting Potential for Unmonitored, Uncontrolled Release of Radioactivity to Environment," issued May 6, 1980, described a possibly generic problem and requested the recipients of the bulletin to take action as appropriate in three areas. The findings and/or actions taken by the licensee in the three areas are detailed below. Much of the information given below is excerpted from a June 6, 1980, summary

(identified as NJK-80-207) and an On-Site Review Report (OSR No.80-19) identifying actions taken in response to the subject bulletin. The latter includes a 10 CFR 50.59 safety evaluation justifying continued operation of two systems currently contaminated or which have been contaminated on occasion.

A review of the systems designed to be nonradioactive resulted in identification of the following systems that may become contaminated from interfacing radioactive systems due to leakage, valving errors, or other operating conditions. Also listed are the monitoring or sampling presently performed on each system to expedite detection of contamination:

<u>SYSTEM</u>	<u>MONITORING/SAMPLING PROGRAM</u>
Service Water	Service water monitors; composite samplers
RBCCW	Weekly grab samples
TBCCW	Weekly grab samples
Service Air	Monitored by Main Chimney sample point
Turbine Oil	Grab sample before discharged
Sparging Air	Monitored by Main Chimney sample point
Heating Boilers	Monthly grab sample; composite samplers
Heating System Deaerator	Monthly grab sample; composite samplers
Wastewater Treatment & Oil Separators	Monthly composite sample
Sewage Treatment	Monthly composite sample
Clean Demineralized Water	Weekly grab sample
Facility Yard Storm Drainage	Monthly grab sample; composite sampler (weekly)

The inspector reviewed the results with the licensee with special attention given to the causal factors of (a) variation in systems as-built when compared to the as-designed systems; (b) system degradations

and failures; (c) inadequate procedures or failure to adhere to procedures; and (d) use of systems for purposes not specifically considered in design.

The heating boilers have some low-level residual contamination from a leak that occurred three years ago (254/77-28). Gross beta analysis shows activity concentrations of $<1 \text{ E-7 } \mu\text{Ci/ml}$ during boiler "lay up" conditions but typically $1 \text{ E-6 } \mu\text{Ci/ml}$ during boiler operation. The heating boilers contain 1.6 E+6 ml of water.

The heat exchangers of the Residual Heat Removal System have on several occasions in the past leaked activity to the service water discharge. These leaks have been reported (265/77-16 and 265/78-21) and there is no evidence of current leakage.

A safety evaluation was performed in accordance with 10 CFR 50.59 for both of the above systems in consideration of current and/or past leakage status and with regard to criteria contained in Technical Specifications, 10 CFR 20, 40 CFR 190, and 10 CFR 50. The evaluations include consideration of the concentration of activity in the water reaching the river and the doses to the whole body and specific organs by using the proposed offsite Dose Calculation Manual for Quad-Cities Station (prepared for future demonstration of compliance with Appendix I of 10 CFR 50). The evaluations identified no unreviewed safety questions and showed that the two systems could continue to be operated under the contaminated conditions evaluated.

16. Exit Interview

An exit interview was held with Mr. Kalivianakis and others (denoted in Paragraph 1) of his staff on September 12, 1980. The following matters were discussed:

- a. The purpose and scope of the inspection.
- b. The continued need for improved housekeeping was discussed, although discernible improvement was noted. The licensee stated that they are expending much effort toward housekeeping. The area appearing to need most attention was the entrance to the dry well. The licensee stated that prompt attention would be given to this area. (Paragraph 2)
- c. The inspector noted the recent loss of two experienced health physicists and their replacement with two individuals recently graduated from a university health physics training program. Also noted was the scheduled advancement of two supervisory personnel currently in the Rad-Chem Department, resulting in the removal of one of these from the department. The inspector commented that this situation would, for the near term, appear

to leave the licensee somewhat weak in health physics supervisory capability and could have an adverse effect if any major problem developed. The inspector suggested that consideration be given to filling the upcoming vacant position with an experienced individual. The licensee acknowledged the suggestion but noted the difficulty in hiring an experienced health physicist at the supervisory level. (Paragraph 4)

- d. The inspector noted that he had learned that some welder certifications and metal prefabrication being conducted in the reactor building could possibly be performed elsewhere in areas of lower radiation levels. The licensee said this matter would be reviewed: to see what work of this nature was being done in the reactor building (stating that much of it was being done in a separate area); to determine the levels of radiation in the reactor building where the alleged work is being conducted; and to determine the feasibility (in consideration of A. A. R. A.) of conducting the work elsewhere. (Paragraph 7)
- e. The matter of some barrels with no lids, labeled "Radioactive LSA," which contained potentially contaminated material located at Trackway II with no means of limiting access to the potentially contaminated material was discussed. The licensee had been informed of this concern before the exit. At the time of the exit, the material was reportedly being segregated and placed behind a rope barrier with posting of precautionary instructions. (Paragraph 9)
- f. The inspector noted that two of the three individuals (both terminated), whose recent film badge exposures were found after detailed evaluations to be in error, had not been contacted to discuss the matter and to obtain any input they might have regarding the matter. The licensee agreed to make a reasonable effort to contact these individuals to discuss the matter. (Paragraph 14)