

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

REGION III

Report No. 50-010/77-30; 50-237/77-27; 50-249/77-26

Docket No. 50-10; 50-237; 50-249 License No. DPR-2; DPR-19; DPR-25

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

Facility name: Dresden Nuclear Power Station, Units 1, 2, and 3

Inspection at: Dresden Site, Morris, IL

Inspection conducted: September 26 and October 5, 6, and 12-14, 1977

Inspectors: L. R. Greger

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J. W. Hiatt

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*W. L. Fisher*

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Inspection Summary

Inspection on September 26 and October 5, 6, and 12-14, 1977 (Report No. 50-010/77-30; 50-237/77-27; 50-249/77-26)

Areas Inspected: Routine, announced inspection of radiation protection program, including: qualifications; training; instruments and equipment; exposure control; posting, labeling, and control; surveys; notifications and reports; and licensee event reports. The inspection involved 68 inspector-hours on site by two NRC inspectors.

Results: Of the eight areas inspected, no items of noncompliance or deviations were found in seven areas; one apparent item of noncompliance was found in the remaining area (infraction - inadequate control of liquid radwaste release - Paragraph 11).

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## DETAILS

### 1. Persons Contacted

- \*D. Adam, Radiation Chemistry Supervisor
- \*J. Bowers, Assistant Technical Staff Supervisor
- J. Bowman, Radiation Protection Foreman
- B. Dionne, Health Physicist
- P. Duggan, Engineer
- D. Eggett, Chemist
- G. Myrick, Health Physicist
- D. O'Keefe, Radiation Protection Foreman
- \*J. Parry, Health Physicist
- W. Rath, Engineering Assistant
- D. Santanna, Engineer
- C. Sargent, Technical Staff Supervisor
- T. Schneider, Chemist
- R. Schumacher, Radiation Protection Foreman
- L. Scott, Chemist
- \*N. Scott, Lead Operating Engineer
- \*B. Stephenson, Station Superintendent
- K. Weaver, Health Physicist (La Salle)

The inspectors also contacted several other licensee employees, including members of the technical and engineering staffs.

\*denotes those attending the exit interview.

### 2. Radiation Protection Organization

The basic radiation protection organization remains unchanged from previous inspections. The individual unit Health Physicists and Chemists function under a lead Health Physicist and a lead Chemist. The Radiation Chemistry Supervisor coordinates the activities of the Chemists and the Health Physicists as well as the approximately thirty Radmen (plus three foremen). The three unit Health Physicists have assumed their positions within the preceding year.

No items of noncompliance or deviations were identified.

3. Licensee Internal Audits

While reviewing the licensee's results of investigations of non-routine events (Paragraph 10), the inspectors noted that the licensee had identified two items requiring corrective action per technical specification requirements. Corrective actions had been completed for both items.

4. Training

Radiation protection orientation training consists of a half-day combination lecture/videotape presentation. A one-hour videotape presentation is utilized annually for retraining. The inspectors observed an initial training session and reviewed records of initial training and retraining of selected personnel. No discrepancies from the licensee's procedural requirements were noted during the record review. It was noted during the training session that certain items were only marginally addressed. The specific items which should receive more extensive coverage are: (1) applicable provisions of NRC regulations and licenses for the protection of workers from exposures to radiation and radioactive material, (2) the individual's responsibilities regarding reporting of actual or potential violations of NRC regulations or licenses to the licensee and/or the NRC, and (3) the specific radiation exposure reports which workers may request pursuant to 10 CFR 19.13. The licensee does not conduct quizzes in conjunction with the orientation training.

An abbreviated radiation protection orientation is utilized in the special situations described in procedure DRP 1910-2. The abbreviated training was instituted during 1977 to include those visitors who do not attend the half-day orientation training. At the time of this inspection, the abbreviated radiation protection orientation had not been fully implemented. It was also noted that procedure DRP 1120-1 "Dresden Station General Radiation Protection Instructions" does not incorporate use of the abbreviated training. These items will be reviewed further during a future inspection.

The radiation chemistry technician retraining, commenced during early 1977, was approximately sixty percent complete. The retraining program, which includes a fairly detailed review of radiation protection fundamentals, will be conducted approximately biennially. The current retraining effort is expected, according to licensee personnel, to be completed by early 1978.

No items of noncompliance or deviations were identified.

5. Instruments and Equipment

Inventories and calibrations of radiation and contamination survey instruments, fixed radiation monitors, and personnel contamination monitors were selectively reviewed. Calibrations were noted to conform to the licensee's procedural requirements for frequency and technique. The semi-portable (AC powered) GM counters<sup>1/</sup> were noted to have been calibrated within the previous quarter.

No items of noncompliance or deviations were identified.

6. External Exposure Control

Film badges, indirect-reading pocket dosimeters, and timekeeping are used to monitor personal exposures. Film exchange records for the first two quarters of 1977 were reviewed; no doses in excess of 10 CFR 20.101 limits were noted. Selective review of NRC-4's for personnel who received greater than 1.25 rems during one quarter did not reveal any problems. The erroneous film badge results for the two-week badge period ending March 6, 1977,<sup>2/</sup> had been corrected on the licensee's microfilm records but not on the vendor's records, which are maintained on file at the site. Indirect-reading pocket dosimeter and film badge records are routinely compared. Review of these records revealed several individuals with significant film badge exposures but with no indirect-reading pocket dosimeter exposures recorded. Licensee personnel stated that problems had been experienced in the past with Unit 1 construction workers leaving their badges at the construction site during nonworking hours. The construction site radiation levels are slightly elevated due to Unit 1 operation.

The overnight storage arrangement for film badges has become overcrowded due to the large number of nonlicensee workers onsite during major outages and presents problems regarding locating and identifying film badges and indirect-reading pocket dosimeters.

A film badge spiking program, defined in procedure DRP 1250-2 "Film Badge Spiking," is conducted each badge period. Review of the program results for 1977 indicated that the vendor's reported exposures were consistently less than the calculated

1/ IE Inspection Report No. 50-010/77-07.

2/ Ibid.

exposures by approximately ten percent (with a one sigma error of about ten percent). The discrepancy, although not extremely significant, may be indicative of a systematic error either in the spiking process or the readout process.

According to licensee personnel, leak tests and calibration checks of the indirect-reading pocket dosimeters are conducted on a sampling basis. No specific testing interval or quantities are specified nor are records of the testing maintained.

7. Posting, Labeling, and Control

During inspection of the licensee's facilities, the inspectors examined radiation caution sign postings, high radiation access controls, radiation work permit usage, and survey postings for conformance to regulatory requirements and the licensee's procedures. Radiation and contamination controls and postings appeared adequate. However, several instances of poor health physics practices were noted: (1) contaminated areas designated by radiation rope but not posted, (2) unused radiation rope and signs left in work areas, and (3) contamination clothing and respirator facepieces left in controlled areas. These items will be reviewed further during a future inspection.

Areas containing radiation fields in excess of 100 mR/hr were noted to be maintained locked. High radiation area keys are controlled by the shift and operating engineers. It was noted, however, that the locked barriers did not, in all cases, provide equivalent protection against unauthorized entry. Several high radiation areas were noted to utilize barriers of approximately four feet in height to discourage unauthorized entries while others utilized floor to ceiling barriers.

Radiation work permits are required under defined conditions for work performed in controlled areas. The inspector selectively reviewed the licensee's radiation work permits, radiation occurrence reports, and radiation protection logs. It was noted, through discussions with licensee personnel and review of licensee records, that the radiation occurrence report system was not used uniformly. This item will be reviewed further during a future inspection.

The documents required to be posted pursuant to 10 CFR 19.11 were noted to be posted as required.

No items of noncompliance or deviations were identified.

8. Surveys

The licensee's direct radiation and contamination survey records for the period since the preceding radiation protection inspection were selectively reviewed. No significant discrepancies were identified.

The licensee's records of sealed source leak tests and inventories were also reviewed. The most recent leak tests were conducted during July 1977. No leaking sources have been identified since the preceding radiation protection inspection.

No items of noncompliance or deviations were identified.

9. Notifications and Reports

Reports to employees and the NRC appear to have conformed to the requirements of 10 CFR 19, 10 CFR 20, and the technical specifications.

10. Review of Nonroutine Events

The inspectors reviewed the licensee's actions with respect to the radiological aspects of the following licensee event reports.

LER 50-10/77-34: Offgas Explosion (September 25, 1977)

LER 50-10/77-33: Laundry Drain Tank Discharge (September 16, 1977)

LER 50-237/77-20: Low Pressure Coolant Injection Heat Exchanger Leakage (May 29, 1977)

LER 50-10/77-15: Offgas Monitor Failure (May 22, 1977), Revised (September 19, 1977)

LER 50-237/77-18: Offgas Monitor Failure (May 15, 1977)

One item of noncompliance was identified during review of the licensee event reports. The licensee had identified and taken appropriate corrective actions regarding two additional technical specification requirements.

Further discussion regarding LER 50-10/77-33, 50-237/77-20, and 50-10/77-34 are contained in Paragraphs 11, 12 and 13.



11. Laundry Drain Tank Discharge (LER 50-10/77-33)

Approximately 900 gallons of liquid radwaste was discharged from "B" Laundry Drain Tank on September 16, 1977. The release exceeded the condenser cooling water discharge canal concentration limit (T.S. 3.8.C.2) based on the gross beta analysis performed before the release. A subsequent gamma isotopic analysis revealed that the release concentrations specified in 10 CFR Part 20 (unrestricted areas) were not exceeded during the release. The release, a result of numerically identical yet independent errors by two licensee personnel, totalled approximately five millicuries of activity. No changes in the licensee's release procedures appear warranted as a result of this event.

12. Low Pressure Coolant Injection Heat Exchanger Leakage (LER 50-237/77-20)

Leakage out of the low pressure coolant injection (LPCI) system into the containment cooling service water (CCSW) system by way of heat exchanger tube leakage was identified on May 29, 1977, when a service water radiation monitor alarm occurred during a monthly surveillance test that required use of the CCSW system and the leaking LPCI heat exchanger. Subsequent investigation revealed that radioactive water had been released to the service water system on several occasions in the past.

Review of the licensee's release calculation by the inspector revealed that the licensee had not included the unidentified fraction of the activity in the circulating water canal activity calculation. Inclusion of the unidentified activity yields a concentration of approximately 60 times the MPC (maximum permissible concentration) instead of 0.77 times the MPC as reported by the licensee. The radioactive material concentrations in the circulating water canal are diluted during their transit of the cooling lake before a portion of the circulating water is diverted to the river. There was no documentation available to ascertain the dilution provided by the cooling lake. This matter is considered unresolved pending evaluation of the dilution provided by the cooling lake.

Additional matters raised by this event are: (1) inability of the service water monitor to quantify releases, (2) service water monitor "noise" due to external radiation sources, and (3) the need to identify causes of release monitor indications. According to

licensee personnel, procedural changes have been initiated to address item 3 above and a design change has been initiated to replace the service water monitor; thereby resolving items 1 and 2 above. These items will be reviewed further during future inspections.

13. Offgas Explosion (LER 50-10/77-34)

On September 25 during reactor operation at 93 MWe with an offgas release rate of approximately 10,000  $\mu\text{Ci}/\text{sec}$ , an explosion occurred in the Unit 1 offgas system. The offgas release rate initially increased to approximately 30,000  $\mu\text{Ci}/\text{sec}$  then peaked several times between 20,000  $\mu\text{Ci}/\text{sec}$  and 25,000  $\mu\text{Ci}/\text{sec}$  before steadying at approximately 20,000  $\mu\text{Ci}/\text{sec}$  where it remained until unit shutdown was commenced about one and one-half hours after the explosion. (No immediate justification of the gaseous monitor oscillations after the initial spike was available.) Both rupture diaphragms were breached due to the pressure increase; the gaseous releases from the rupture diaphragms were routed to the steam jet air ejector room and then to the D1 chimney via the ventilation system. The force of the explosion destroyed the offgas HEPA filter which was on service. The other HEPA filter was DOP tested and found not to have been damaged. Analysis of iodine and particulate sampling media revealed that the technical specification release limit had not been exceeded. A small amount of radioactive material was apparently released at the base of the chimney due to leakage by the chimney access door seal.

The explosion apparently resulted from the ignition of radiolytic hydrogen and oxygen in the offgas system. The origination of the explosion is not known. The offgas HEPA filters had been electrically grounded after a previous offgas explosion.<sup>3/</sup> The recombiner and charcoal portions of the offgas system were not in use at the time of the explosion.

The inspector will review the licensee's findings regarding the origin of the explosion during a future inspection. The following items will also be reviewed further during future inspections: (1) environmental sampling results, (2) the oscillatory response of the chimney gaseous monitor, and (3) the leakage pathway by the chimney door seal.

No items of noncompliance or deviations were identified.

3/ CO Inspection Report No. 50-010/71-07.



14. Supplied Air Hoods

The licensee was noted to be using supplied air hoods for respiratory protection during the current Unit No. 2 refueling outage. Licensee personnel were not aware of any evaluation which had been conducted either by quantitative testing or by available test information regarding the protection afforded by the supplied air hoods. The licensee stated that a quantitative test would be conducted on the supplied air hoods if further review of available documentation did not uncover evidence of a previous evaluation. This item is considered unresolved and will be reviewed further during a future inspection.

15. Unresolved Items

Unresolved items are matters about which more information is required in order to ascertain whether they are acceptable items, items of noncompliance, or deviations. Unresolved items disclosed during the inspection are discussed in Paragraphs 12 and 14.

16. Exit Interview

The inspector met with licensee representatives (denoted in Paragraph 1) at the conclusion of the inspection on October 14, 1977, and further discussed the inspection findings with Mr. Stephenson by telephone on October 31, 1977. The inspectors summarized the scope and findings of the inspection and further stated that the items specified in Paragraph 13 relating to the Unit 1 offgas explosion would be reviewed further during a future inspection. The licensee made the following remarks in response to certain items discussed by the inspector:

- a. Stated that the radiation protection orientation training would be upgraded in the noted areas. (Paragraph 4)
- b. Stated that film badge spiking methods, indirect-reading pencil dosimeter calibration checks, and film badge and pencil dosimeter storage arrangements would be reviewed regarding the inspection findings. (Paragraph 6)
- c. Stated that radiation occurrence report usage and certain controlled area housekeeping matters would receive increased management attention. (Paragraph 7)

- d. Stated that the dilution afforded by the D 2/3 cooling lake would be examined. (Paragraph 12)
- e. Stated that an evaluation of the protection provided by supplied air hoods would be performed if it cannot be ascertained that such an evaluation was performed previously. (Paragraph 14)