U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 50-440/87026(DRSS)

Docket No. 50-440

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License No. NPF-58

Licensee: Cleveland Electric Illuminating Company P.O. Box 5000 Cleveland, OH 44101

Facility Name: Perry Nuclear Power Plant, Unit 1

Inspection At: Perry Site, Perry, Ohio

Inspection Conducted: December 7-11, 1987

Inspector: D. E. Miller WDShafes for

Accompanying Inspector: M. A. Kunowski

Approved By: L. R. Greger, Chief Facilities Radiation Protection Section WDShafe for

12-30-87 Date

12-30-87 Date

Date

Inspection Summary

Inspection on December 7-11, 1987 (Report No. 50-440/87026(DRSS)) Areas Inspected: Routine, unannounced inspection of the operational radiation protection program. Also reviewed were the 98% power radiation measurement and chemical and radiochemical startup tests; past inspection findings; procedures on operation of the inclined fuel transfer system; radiological controls for drywell access during spent fuel movement; and the licensee's actions on Information Notices No. 86-103 and 87-32.

Results: No violations or deviations were identified.

DETAILS

1. Persons Contacted

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*R. Bowers, Corporate Health Physicist

- *W. Devine, Operations Procedures Writer, Perry Plant Operations Department (PPOD)
- *K. Donovan, Lead, Reactor Engineering Unit, Perry Plant Technical Department (PPTD)
- *G. Dunn, Compliance Supervisor, PPTD
- *M. Gmyrek, Senior Operations Coordinator, PPOD
- W. McCoy, Health Physics Supervisor, Radiation Protection Section (RPS), PPTD
- *J. Traverso, Health Physics Engineer, Engineering Project Support Services (EPSS), Nuclear Engineering Department (NED)
- *L. VanDerHorst, Plant Health Physicist, RPS, PPTD
- *F. Whitaker, Senior Health Physics Supervisor, RPS, PPTD
- S. Wojton, General Supervising Engineer, RPS, PPTD

*K. Connaughton, NRC Senior Resident Inspector

The inspectors also contacted several licensee technicians, specialists, supervisors, contractors, and consultants.

*Denotes those at the exit meeting.

2. General

This inspection, which began at 1:30 p.m. on December 7, 1987, was conducted to review the licensee's operational radiation protection program. Also reviewed were the 98% power radiation measurement and chemical and radiochemical startup tests; past inspection findings, including several open items; procedures on operation of the inclined fuel transfer system; radiological controls for drywell access during spent fuel movement; and the licensee's actions of Information Notices No. 86-103 and 87-32. Tours of licensee facilities were made to review implementation of radiological controls and housekeeping.

3. Licensee Action on Previous Inspection Findings (IP 92701)

(Open) Open Item (440/86031-01): Apparent need for additional health physics technicians. Since previously discussed, two additional technicians have been hired. The licensee is actively recruiting additional technicians and plans to substantially increase the technician staffing level.

(Closed) Open cem (440/87006-01): Need to clarify Procedure OM3A: SOI-F42, and alter labeling on Unit Supervisor's console. discussed in Inspection Report No. 50-440/87015(DRSS), the licensee initiated Engineering Design Change (EDC) Request No. 870418 to accomplish the labeling and drawing changes; appropriate procedures were to be revised after EDC completion. During this inspection, a more indepth review of this matter was performed. The inspectors found additional problems with switch labeling, access and switch key control, and procedural inconsistencies concerning operation of electrical interlocks, which control access to (locks) the Inclined Fuel Transfer System (IFTS) valve rooms in the shield building, during irradiated fuel movement through the IFTS. Because of the noted problems, it appears uncertain that access to the valve rooms would be positively controlled during periods when irradiated fuel is moved through the IFTS. The inspectors discussed with the licensee during the inspection and at the exit meeting, the need to perform an extensive review of appropriate drawings and procedures, and make necessary changes, to assure procedures are adequate and accurate and to assure that access to the IFTS valve rooms is positively controlled; such reviews and changes to be completed before irradiated fuel is transported through the IFTS. The licensee's response is presented in Section 14. Because of the change in scope, Open Item No. 440/87006-01 is closed and a new item initiated (Open Item No. 440/87026-01).

4. External Exposure Control and Personal Dosimetry (IP 83724)

The inspectors reviewed the licensee's external exposure control and personal dosimetry programs, including: changes in facilities, equipment, personnel, and procedures; adequacy of the dosimetry program to meet routine needs; required records, reports, and notifications; and effectiveness of management techniques used to implement these programs.

The inspectors reviewed the licensee's dosimetry program for adherence to the instructions on Form NRC-5 for assessment of whole-body exposures (per 10 CFR 20.401(a)). The licensee monitors whole-body dose to individuals with themoluminescent dosimeters (TLD) obtained from Eberline/TMA. Each dosimeter (badge) is equipped with three LiF chips (Harshaw TLD-100 chips). One chip is covered by 10 mg/cm² thickness of mylar and plastic and is used mainly for assigning skin dose. The other two chips are each covered with 285 mg/cm² of aluminum. Of these two chips, one is used for determining whole-body dose, and the other is not used unless the licensee requests the vendor to process the chip or if the second chip cannot be read accurately. In addition, the licensee requires that individuals in the radiological control area (RCA) wear eye glasses. This requirement can be met with an individual's own eye glasses or with plastic safety glasses (nominal thickness of approximately 360 mg/cm²) issued by the licensee. For areas in the RCA where a potentially significant beta hazard exists, the licensee requires individuals to wear (and issues) crown glass safety glasses with a nominal thickness of 814 mg/cm². From this information, the inspectors concluded that the licensee is conservatively adhering to the instructions on Form NRC-5 for assessment of whole-body dose by recording dose delivered through a tissue-equivalent absorber having a thickness less than 300 mg/cm². In addition, the licensee is requiring individuals in the RCA to wear eye shields (eye glasses), but takes no credit for the protection afforded by the glasses.

Extremity monitoring is accomplished with ring badges containing one TLD chip, or wrist and ankles badges, identical to the whole-body badges except each has an elastic band instead of the spring clip used with the whole-body badges.

The licensee's neutron monitoring program is described in Inspection Report No. 50-440/87018. Extremity, neutron, and whole-body badges are changed monthly. Approximately 2500 persons currently receive whole-body badges. The inspectors reviewed the annual occupational radiation exposure report for whole-body exposures for 1986. Of 3228 individuals who were provided with whole-body monitoring in 1986, 2906 individuals received no measurable exposure, 314 individuals received measurable exposure less than 100 mrem, and eight individuals received exposure ranging 100 to 117 mrem. The greatest exposure for 1986 was 117 mrem. To date in 1987, the licensee has incurred approximately 48 person-rems, well below the station goal of 125 person-rems. The licensee stated to the inspectors that no administrative exposure limits have been exceeded in 1987.

The inspectors also reviewed results of the licensee's monthly TLD spiking. The licensee's procedure for spiking is HPI-B7, "Personnel Dosimetry Performance Certification." Each month, 36 badges from each of the two series of whole-body badges used by the licensee are exposed to predetermined doses of gamma and/or beta radiation. Twelve of the 36 badges are exposed to gamma radiation from a Cs-137 source: 12 are exposed to beta radiation from a depleted uranium (DU) source; and 12 are exposed to both sources. The exposed badges are then returned to the vendor along with the badges worn by personnel during the past month. When the results of the processing of the badges are received, the licensee statistically compares the reported doses of the spiked badges to the known delivered doses. The inspectors' selective review of the results of these comparisons and discussions with licensee representatives involved with the spiking procedure indicated that the licensee is following its spiking procedure and that results of the spiking indicated adequate performance of the TLD processor.

No violations or deviations of NRC requirements were identified.

5. Survey and Counting Equipment (IP 83724)

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The inspectors reviewed the licensee's program for control, use, and calibration of survey and counting equipment, including: procedures; number and type of meters and detectors; and records, frequency, and adequacy of calibrations, periodic source checks, and inventory.

Portable survey equipment (as well as air samplers and respiratory equipment) is dispensed from the main access control area on elevation 599' of the Control Complex Building. Eberline RM-14s and E-520s are routinely used for contamination surveys of work areas, personnel, and equipment; however, the licensee has purchased and set-up Eberline PCM-1B whole-body monitors for personnel surveys at the access control point and at several areas in the plant (Section 7). In addition, a ratemeter with a "Banjo" detector (plastic scintillator with an area of 100 cm²) is used to survey equipment before release from the controlled area. Smears for contamination are counted on an automatic gas proportional planchet counter, a Scintillation Alpha Counter (Eberline), a Stabilized Assay Meter (Eberline) with a 2" x 2" NaI crystal detector, or RM-20 ratemeters with various detectors.

The inspectors reviewed selected calibration and source check records and tracking logs for the licensee's survey and counting equipment. No major problems were noted. The number and type of equipment appears to be adequate. In addition, the inspectors noted that equipment at the access control point and in the controlled area was not being used past calibration due-dates and was being used in a manner consist with good health physics practices.

The inspectors observed two technicians calibrate the monitoring system of the licensee's dry-active waste sorting table. The table has four sorting stations, each equipped with a 7" x 11" gas proportional detector. A fifth detector, for monitoring background, is mounted on the frame above the table. The calibration requires two persons for approximately three hours, and is performed semiannually. Source checks of the detectors are performed shiftly. For the calibration, the technicians were following procedure, HPI-J22, "Calibration of the Sorting Monitor System." No problems were identified

No deviations or violations of NRC requirements were identified.

6. Internal Exposure Control and Assessment (IP 83725)

The inspector reviewed the licensee's internal exposure control and assessment programs, including: changes in facilities, equipment, personnel, and procedures affecting internal exposure control and personal assessment.

The inspectors toured the licensee's recently-operational mask cleaning facility, the respirator dispensing area, and the self-contained breathing apparatus (SCBA) air-tank storage area. No problems were noted. Storage cases containing SCBAs are mounted on walls throughout the plant. The SCBAs are intended for emergency use. For air-filtering respirators, the licensee tests each filter with dioctyl phthalate (DOP) after each use, according to procedure HPI-G8, "Requalification of Respirator Filter and Facepiece Integrity." The inspectors also noted that the licensee possesses several portable HEPA-filter-equipped air movers and air samplers of various capacities.

No deviations or violations of NRC requirements were identified.

7. Control of Radioactive Materials and Contamination (IP 83726)

The inspectors reviewed the licensee's program for control of radioactive materials and contamination, including: changes in instrumentation, equipment, and procedures; effectiveness of survey methods, practices, equipment and procedures; adequacy of review and dissemination of survey data; effectiveness of methods of control of radioactive and contaminated materials; and management techniques used to implement the program and experience concerning self-identification and correction of program implementation weaknesses.

The licensee recently installed four PCM-1B whole-body friskers at the main controlled area exit, and one at the radwaste control room entrance; the PCM-1Bs at the controlled area exit replace less sensitive Gamma-10 portal monitors. Gamma-10 monitors remain in use at the protected area exit. The licensee found that the radiation background at a second controlled area exit facility (trailers) was too high during plant operations to effectively use portal monitors; the licensee plans to relocate the facility and then install PCM-1B friskers in place of the installed Gamma-10 menitors. In addition to whole-body friskers and portal monitors, the licensee places hand-held friskers at or near step-off-pads within the controlled area and requires their use after exiting a contaminated area.

During a previous inspection, the inspector noted that the licensee's Personnel Contamination Survey Form needed improvement. Since then, the licensee revised the form so that additional information concerning the contamination incident is recorded, and that supervisory followup of the event is required and recorded. The form/program now can be used as a management tool for radiation protection program implementation oversight/review.

During tours of the controlled area, posting and labeling of radioactive materials appeared proper. The inspectors noted that the method of zoning contaminated materials storage areas had been improved.

No violations or deviations were identified.

8. Facilities and Equipment (IP 83727)

Newly constructed facilities and needs for additional facilities are discussed in Inspection Reports No. 50-440/86031, No. 50-440/87006, and No. 50-440/87018. The inspectors reviewed progress made in construction of selected new facilities during this inspection. Construction progress for these selected facilities is described below:

- Construction of radwaste compaction facilities has begun. In addition, a door is being installed in the cubicle housing the sorting table. The door is intended to set off activities in the radwaste truckbay from those in the sorting monitor cubicle.
- Construction of the tool decontamination facility in the Intermediate Building is continuing. No firm completion date has been set.
- A new building, the Service Building Annex, is now complete. Personnel dosimetry offices are now located in this building.

No deviations or violations of NRC requirements were identified.

9. Startup Test STI-D21-002, Radiation Measurements (IF 83521)

FSAR Section 14.2.12.2.2 states that radiation measurements will be made throughout the plant prior to fuel load, subsequent to fuel load during reactor heatup, and at nominal power levels of 20-25, 60, and 100% of rated power. Also, surveys are to be performed before and after Reactor Water Cleanup (RWCU) system resin transfer and during traversing of the startup neutron sources through the inclined fuel transfer system.

Radiation measurements performed through 29% power, and RWCU spent resin transfer and inclined fuel transfer system testing are discussed in Inspection Report No. 50-440/87006. Measurements performed at 63% power are discussed in Inspection Report No. 50-440/87018.

The final set of radiation measurements was performed during September 1987 with the core power at 98% and electrical power at 1210 MWe. Gamma radiation measurements were made in general areas and at pre-established survey points; general area neutron measurements were made. No unanticipated radiation levels were observed.

The radiation measurements commitments of FSAR Section 14.2.12.2.2 have been satisfactorily completed.

No violations or deviations were identified.

10. Startup Tests STI-P35-001, Chemical and Radiochemical (IP 845?1)

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FSAR Section 14.2.12.2.1 states that various chemical and radiochemical tests will be performed prior to fuel load, prior to heatup, during heatup, and during power ascension; data is to be collected from the reactor water, condensate, feedwater, control rod drive water, condensate demineralizer, reactor water cleanup, main steam, and liquid and gaseous radwaste systems.

The purpose of testing the chemical and radiochemical parameters is to verify that chemical parameters of various fluid-filled systems meet acceptable limits and to determine adequacy of plant sampling procedures and equipment, analytical procedures and equipment, and sampling and handling techniques. Additional objectives for these tests are to evaluate fuel performance and condenser integrity, demonstrate proper steam separator-dryer operation, and to check calibration of certain process instrumentation.

Tests performed through 30% core power are discussed in Inspection Report No. 50-440/87006. Tests performed at 77% core power are discussed in Inspection Report No. 50-440/87018.

During September 1987, the final required tests were performed at 98% of core power. All results were within specification; no abnormalities were identified during testing.

All commitments for startup chemical and radiochemical testing have been satisfied.

No violations or deviations were identified.

11. <u>Radiological Controls for Drywell Access during Spent Fuel Movement</u> (TI 2500/23)

The licensee will be using a fuel-chute to limit rate levels in the drywell during core alterations, including spent fuel transfer. According to the licensee's Final Safety Analysis Report, a postulated fuel bundle drop in the upper pool would cause gamma radiation levels at the upper drywell level (elevation 655') to reach approximately 1 R/hr. Because of these potential radiation levels, the licensee will evacuate the upper drywell level before altering the core and will post the two ladders leading to the grating at this level as a possible High Radiation Area. In addition, radiation levels at this elevation will be monitored with a portable area monitor. The monitor's alarm signal will activate the licensee's drywell evacuation alarm. According to the licensee, drywell hazards and the proper responses to alarms are explained at the annual radiation protection training, which plant personnel and contractors involved with refuel outages are required to attend. After a discussion with the inspectors, the licensee agreed to modify procedure IOI-9, "Refueling (Unit 1)," to include the requirements that the two ladders leading to the upper drywell grating will be barricaded with ladder locks, in addition to being posted, and that communications between the fuel handlers, control room, and rad protection drywell control point will be established and periodically tested. These procedure modifications will be reviewed during a future inspection (Open Item No. 50-440/87026-02).

12. NRC Information Notices (IP 92700)

The inspectors reviewed the licensee's internal responses to related NRC Information Notices. The licensee's evaluations, conclusions, and actions appear appropriate and adequate. The following Notices were reviewed:

No. 86-103: Respirator Coupling Nut Assembly Failures. The licensee uses both types of respirator facepieces mentioned in the Notice. According to the licensee's evaluation in response to this Notice, no coupling nut failures have been experience because Freon is not used to clean the facepieces and because the licensee's respiratory device user training program stresses proper methods of removing the devices after use.

No. 87-32: Deficiencies in the Testing of Nuclear - Grade Activated Charcoal. In the response to this Notice, the licensee stated that because charcoal is currently being tested by one of the four laboratories that met the NRC acceptance criteria, no further action is required.

13. Plant Tours

Several tours of the RCA and outdoor controlled areas were made to review postings, access controls, contamination controls, and housekeeping. Tours were made during the licensee's three regular shifts. Postings; access control at the main access point, the containment, and several contaminated and high radiation areas; contamination controls; and housekeeping appeared adequate. The inspectors noted a large volume of low-level waste stored in three buildings adjacent to the radwaste building. The waste is being stored temporarily awaiting completion of the compactor facility and processing for shipment to burial sites.

No deviations or violations of NRC requirements were identified.

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14. Exit Meeting

The inspectors met with licensee representatives (denoted in Section 1) at the conclusion of the inspection on December 11, 1987, to discuss the findings. The inspectors also discussed the likely informational content of the inspection report with regard to documents or processes reviewed by the inspectors during the inspection. The licensee did not identify any such documents/processes as proprietary. In response to certain matters discussed by the inspectors, the licensee:

- a. Acknowledged the inspectors positive comments regarding the radiation protection program.
- Agreed to modify the refuel procedure to incorporate additional radiological control requirements for drywell access during spent fuel movement (Section 11).
- c. Stated that the IFTS will not be used to transport irradiate fuel until necessary switch labeling, key control, and procedural changes have been implemented (Section 3).