U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 50-440/92006(DRSS)

Docket No. 50-440 License No. NPF-58

Licensee: Cleveland Electric Illuminating Company
Post Office Box 500
Cleveland, OH 44101

Facility Name: Perry Nuclear Power Plant

Inspection At: Perry Site, Perry, Ohio

Inspection Conducted: April 13-17, 1992

Inspector: M. Schumacher for
Michael A. Kunowski
Senior Radiation Specialist — Date: 5-13-92

Approved By: M. C. Schumacher, Chief
Radiological Controls and
Chemistry Section — Date: 5-13-92

Inspection Summary

Inspection on April 13-17, 1992 (Report No. 50-440/92006(DRSS))
Areas Inspected: Routine, unannounced inspection of the radiation protection program (Inspection Procedure (IP) 83750) during the station's third refueling outage, including staffing, internal and external exposure control including ALARA considerations, and surveys. In addition, several contamination control issues identified prior to the outage were reviewed.
Results: Radiation protection program activities were adequate. Overall good planning for the outage and the widespread use of remote video monitoring equipment and telemetric personnel dosimeters were apparent (Section 4). However, poor planning associated with shipment of a resin liner (Section 6) and with reactor head removal (Section 5) resulted in contamination control problems. A carbon steel section of reactor water cleanup pipe was replaced during the outage with passivated, electropolished stainless steel pipe. This modification could result in substantial dose savings during future outages (Section 4).

DETAILS

1. Persons Contacted

*P. Barton, Consultant
M. W. Gmyrek, Operations Manager
J. P. Goecker, Tool/Material Control Supervisor
J. Grimm, Chemistry Support Supervisor
*H. Hegrat, Compliance Supervisor
G. W. Kindred, Supervisor, Health Physics Planning Element
C. Reiter, Health Physics Technical Support Supervisor
C. Shelton, Acting Plant Chemist
*R. A. Stratman, General Manager, Perry
*J. J. Traverso, Technical Assistant, Radiation Protection Section
*L. L. VanDerhorst, Plant Health Physicist
*P. Volza, Manager, Radiation Protection Section

The inspector also interviewed other licensee personnel.

P. Hiland, NRC Senior Resident Inspector
*A. Vegel, NRC Resident Inspector

2. General

This inspection was conducted to review radiation protection during the ongoing third refueling outage. The inspection included a tour of onsite facilities, observations of work, review of records and procedures, discussions with personnel, and independent dose rate measurements.

3. Staffing

The inspector reviewed the augmentation of the plant radiation protection (RP) staff for the outage. No problems were identified. In addition to the approximately 1200 permanent plant employees, about 900 temporary personnel were brought onsite for the outage. This total included about 80 senior contract RP technicians and 100 junior technicians. On April 3, 1992, informational pickets were set up by several of the contract RP technicians during the shift change to highlight ongoing unionization efforts of contract RP technicians. According to the licensee, the efforts did not have a serious impact on outage activities.

In addition to the contract technicians, two supervisors from the Davis Besse RP staff and three

persons from the Perry corporate radiological engineering group were added to the Perry plant RP group for the outage. These rotational assignments were intended not only to help the Perry RP group, but also to provide a learning opportunity for the five individuals.

No violations of NRC requirements were identified.

4. External Exposure Control

The licensee's dose total in 1991, which included about 3 days of the second refueling outage and 30 days of forced outage, was 147 person-rem (compared to a projected 156 person-rem). The goal for 1992 is 551 person-rem, which includes 450 person-rem for the ongoing, 62-day third refueling outage. High dose jobs for the outage include in-service inspection (ISI) and mechanical stress improvement process (MSIP) activities of 25 reactor pressure vessel nozzles, chemical decontamination and replacement of reactor water clean-up (RWCU) piping in the drywell, and changeout of nine control rod drives (CRDs). The RWCU pipe job involved the replacement of approximately 140' of highly contaminated carbon steel pipe with electropolished, passivated stainless steel pipe. Substantial dose savings have been achieved through use of this type of pipe at other utilities.

Discussions with personnel, review of documents (including the detailed RP pre-outage planning report), and observations of ongoing work indicated that exposure control/ALARA efforts for the outage ranged from adequate to good. Plans to decontaminate the reactor cavity before reactor head removal and to use a strippable coating were cancelled because of outage schedule constraints; however, some exposure reduction was achieved with hydrolazing. Reactor disassembly went generally well although airborne releases via an open flange on the reactor head required temporary evacuation of the refueling floor (Section 5). Mockup training did not go as smoothly as planned for the nozzle ISI/MSIP, but went well for the CRD work.

Also on the positive side, a higher than expected decontamination factor of about 11 was achieved using a single application of the Low Oxidation State Metal Ion (LOMI) method for the decontamination of the RWCU pipe. Extensive use was also made of telemetric dosimeters for nozzle work and for underwater inspection and repair of a feedwater sparger. In lieu of entries by personnel, the licensee will be using a submersible

robot for ISI and foreign object search and retrieval of the suppression pool. Prior to the outage, the licensee used a recently purchased robot to conduct a surveillance in the fuel pool filter/demineralizer room, a high radiation area. Additional use of this robot will be made after the outage for entries into high dose rate or high contamination areas. Also, the passive General Electric Zinc Injection Passivation System (GEZIP) was recently installed and will be made operational near the end of the outage. This system does not use mechanical pumps for adding zinc to the feedwater, unlike the formerly used system. The pumps required frequent maintenance.

No violations of NRC requirements were identified.

Refueling Floor and Fuel Handling Building Evacuations

At about 1:00 a.m. on March 25, 1992, operations, with the cognizance of refueling floor RP personnel, was raising vessel water level when a portable continuous air monitor signaled an alert. Radiation protection personnel conservatively evacuated workers while the cause was investigated. The investigation indicated that the rising water forced fission gases out the recently disconnected flanges joining the reactor head and the head spray piping. The level changes were halted.

Later, at about 2:30 a.m., the refueling floor, as well as the rest of containment and the drywell, were evacuated when the monitor alarm sounded. The alarm, which was spurious, occurred during change of the monitor's particulate filter and iodine cartridge. Still later the same morning (around 5:00 a.m.), after the head spray piping had been removed, the same areas were again evacuated when the portable air monitor and the containment ventilation monitor alarmed. This occurred shortly after onset of reactor head venting via a portable ventilation unit (particulate and charcoal filters) exhausting to the refueling floor. Air samples taken after the evacuation indicated noble gas concentrations in the range of 24 to 44 times Appendix B, Table I concentrations (MPC) and iodine concentrations of approximately 2 to 3 times MPC. None of the personnel from the refueling floor were externally contaminated and confirmatory whole-body counts of three key workers indicated there were no intakes. After the evacuation, the ventilation unit exhaust was connected to the permanent containment ventilation system.

The inspector, while attending the post-job ALARA review for the vessel disassembly, learned that a suggestion to connect the portable ventilation exhaust directly to the containment ventilation system had been made after a previous outage. RP upper management indicated that this had been planned for the current outage because of known fuel leaks, but not implemented because of a misunderstanding by a mid-level RP manager. Although the radiological consequences of the release to workers were minimal, it could have been prevented through adequate follow through of lesson-learned from the previous outage.

On April 15, 1992, an RP technician evacuated the fuel handling building when a radiation monitor on the fuel handling bridge alarmed. A licensed operator and a contract bridge operator were on the bridge at the time and an unirradiated fuel bundle was in the grapple. The bridge operator promptly left the bridge and the building without taking the expected action to place the fuel in a storage condition and de-energize the bridge; the licensed operator delayed to briefly discuss the basis of the evacuation order with the RP technician. Subsequently, the licensee determined the alarm was spurious. Licensee management promptly issued a memorandum to the involved departments reaffirming the stop work authority of radiation protection and the importance of de-energizing the bridge before evacuation. The specifics of the event were still being investigated by the licensee.

No violations of NRC requirements were identified.

6. Internal Exposure Control and Contamination of Personnel

In 1991, the licensee had a low number of personnel contamination events (PCEs), 135. In 1992, midway through the refueling outage, PCEs were occurring near the expected frequency.

The inspector also reviewed the circumstances of three PCEs associated with the removal of the processing fill-head from a liner of powdered resin on January 22, 1992. Two of the contaminated workers also had low level intakes (less than 40 MPC-hours) of radioactive material. Although the event did not cause significant exposure it could have been prevented by better planning and communication.

No violations of NRC requirements were identified.

7. (Closed) Contamination Control Concern (AMS RIII-92-A-0012): The regional inspector, with assistance from the senior resident inspector, reviewed a concern that pigeons nesting in cable trays of the Radwaste Building (on the 623' elevation near the service elevator) may be spreading contamination from an adjacent area controlled as being "highly contaminated."

Discussion: The nest was located in a radiation area; however, according to the licensee, no radioactive contamination was found during surveys of the nest, feathers, and a large accumulation of pigeon excrement. The area was cleaned of most of the debris and the cable tray penetration (on the outdoor side of the wall) through which the pigeons were entering the building was covered. Although there was some indication that the pigeons had entered the adjacent radwaste evaporator room, which is not controlled as a contaminated area, there is no evidence that they entered the radwaste liner storage area, which is controlled as highly contaminated.

A peripheral issue was that a plant first-line supervisor summarily dismissed the issue of contamination spread by the pigeons when it was raised to him by a worker. In an interview with the regional inspector, the supervisor indicated that upon notification of the pigeons, he believed the issue was already being addressed. During the interview, the supervisor exhibited an appreciation of the potential for animals spreading contamination.

Findings: The concern was not substantiated. No indication of radioactive contamination was found during surveys of the accumulated materials.

No violations of NRC requirements were identified.

8. December 22, 1991, Water Pipe Break

As discussed in Inspection Report No. 50-440/91026 (DRS), a break of an auxiliary circulating water pipe and flooding in several buildings in Unit 1 resulted in the release of low-level radioactive material to Unit 2 and to an unmonitored storm sewer and stream on the west side of the plant. According to the licensee, the contaminated sediment and rocks in the sewer and stream have been removed and disposed of as radwaste, and most of the contamination inside a Unit 2 building was also removed. The remaining contamination, which is confined to relatively inaccessible drain lines, will be decontaminated later this year after the refueling

outage. In addition, a plant underdrain system radiation monitor that was damaged during the break has been repaired.

9. Plant Tours

Confirmatory exposure rate measurements taken with NRC and licensee survey instruments did not identify any problems with postings or control of radiologically controlled areas. Included in the surveys were several vessel nozzles undergoing ISI and MSIP. Observations of ongoing work indicated proper ALARA precautions were being taken and survey instruments in the plant were found to be operational. Remote video monitoring equipment was extensively used by the licensee for observing work. Use of noise abatement measures has resulted in greatly improved conditions at the RP control points at the upper and lower containment hatches where pre-job briefings are held. This was a problem during much of the previous outage. Housekeeping was generally adequate, considering the ongoing refueling outage.

No violations of NRC requirements were identified.

10. Exit Meeting

The inspector met with licensee representatives (denoted in Section 1) at the conclusion of the inspection on April 17, 1992, to discuss the scope and findings of the inspection and the likely informational content of the inspection report with regard to documents or processes reviewed by the inspector during the inspection. The licensee did not identify any such documents or processes as proprietary. The following matters were specifically discussed by the inspector:

a. the use of robotics (Section 4),

b. the airborne radioactivity problem on the refueling floor during venting of the reactor head (Section 5),

c. the concern about pigeons spreading radioactive contamination and the responsiveness of a first-line supervisor to this problem (Section 7), and

d. the improvement in the containment access control points (Section 9).