

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Reports No. 50-315/82-13(DETP); 50-316/82-13(DETP)

Docket Nos. 50-315; 50-316

Licenses No. DPR-58; DPR-74

Licensee: American Electric Power Service Corporation
Indiana and Michigan Electric Company
2 Broadway
New York, NY 10004

Facility Name: D. C. Cook Nuclear Plant, Units 1 and 2

Inspection At: D. C. Cook Site, Bridgman, MI

Inspection Conducted: June 21-25, and July 12-13, 1982

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

8/12/82

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

8/12/82

Inspection Summary

Inspection on June 21-25, and July 12-13, 1982 (Reports No. 50-315/82-13(DETP); 50-316/82-13(DETP))

Areas Inspected: Routine, unannounced inspection of licensee's actions in response to Health Physics Appraisal significant findings and an item of noncompliance identified during the appraisal. It also included inspection of operational and refueling radiation protection activities including: reactor coolant water quality; waste systems and waste processing; radwaste transportation; licensee audits; radiation protection procedures; organization and management; radiological qualification and training; exposure control; in-plant radiation protection program; advance planning and preparation; instruments and equipment; and followup of selected licensee event reports (LERs). The inspection involved 63 inspector-hours onsite by one NRC inspector.

Results: No items of noncompliance or deviations were identified.

DETAILS

1. Persons Contacted

E. Abshagen, Outage and Design Change Coordinator
+T. Beilman, Senior QA Auditor
S. Dannhardt, Engineering Technologist
+*J. Fryer, Radiation Protection Supervisor
D. Gallagher, Senior Health Physics Technician
P. Holland, Senior Health Physics Technician
+W. Ketchum, Senior Radiation Protection Engineer
*T. Kriesel, Environmental Coordinator
+D. Palmer, Plant Radiation Protection Supervisor
D. Schroeder, Radiation Protection Supervisor - Training
+*E. Smarrella, Technical Superintendent
+W. Smith Jr., Plant Manager
*J. Stietzel, QA Supervisor
*B. Svensson, Assistant Plant Manager, Operations
+*E. Townley, Assistant Plant Manager, Maintenance
*J. Wojcik, Plant Chemical Supervisor

*N. DuBry, NRC Resident Inspector
E. Swanson, NRC Senior Resident Inspector

The inspector also contacted other licensee employees, including members of the technical staff.

*Denotes those present at the June 25 exit meeting.

+Denotes those present at the July 13 exit meeting.

2. General

This inspection, which began about 10:30 a.m. on June 21, 1982, included tours of the reactor control rooms, radwaste processing and cask loading area, turbine building, various levels of the auxiliary building and lower containment of Unit 1. In the auxiliary building, attention was directed toward postings, instructions, instrumentation, and control measures provided at entrance/exit points for containments, high and extreme high radiation areas and the three exits from the controlled area to be used during the refueling outage which began on July 3, 1982. Location of CAMs for airborne activity monitoring and locations of friskers for contamination monitoring and control were also observed.

Observations made during the inspector's tours suggest the need for greater attention to details by radiation protection personnel. These observations included: disposable cloth gloves (liners) and respirators lying on the floor in several locations in the auxiliary building; rope barriers and signs used to delineate the boundary of contaminated areas lying on the floor in several locations in the auxiliary building; the frisker for use by personnel exiting Unit 1 upper containment was in a

location not visible during a normal exit; and a continuous air monitor (CAM) was found with a recording chart which had not been advancing for several days.

This matter was discussed at the July 13 exit meeting.

3. Licensee Action on Previous Findings

(Closed) Noncompliance Item (50-315/80-23-05; 50-316/80-19-05): Regarding personal contamination control. During a previous inspection conducted in November 1981, the licensee's corrective actions were reviewed and appeared complete at that time except for installation of shielded frisker stations at some locations. Due to unforeseen delays in delivery by the vendor of the shielded frisker stations, the installation was not completed until early February 1982. Installation of the shielded frisker stations was verified during this inspection.

4. Reactor Coolant Water Quality

The inspector reviewed selected licensee records to determine compliance with technical specification requirements for reactor coolant periodic tests, chemical control, and radioactivity control. The only problem noted has been the Unit 2 reactor coolant system dose equivalent iodine-131 concentration exceeding the 1.0 $\mu\text{Ci/gm}$ action level of Technical Specification 3.4.8 (apparently due to fuel cladding problems) following several transients occurring since the last refueling outage. The peak concentration reached was about 2.3 $\mu\text{Ci/gm}$ dose equivalent iodine-131. Continued operation of the reactor has been permitted since the concentration has returned below the action level within the applicable time interval provided for in the technical specifications. Occurrence reports have been prepared on three occasions. The licensee has instituted controls for planned power level changes in an effort to minimize iodine increases.

No items of noncompliance or deviations were identified.

5. Waste Systems and Waste Processing

The inspector reviewed licensee documents regarding three modifications to the radioactive waste systems completed (or nearing completion) since January 1, 1981, to determine compliance with 10 CFR 50.59. The additions were:

- (1) A waste evaporator concentrate tank on the 587' elevation of the auxiliary building.
- (2) Two gas decay tanks (in original design but just installed in 1981).
- (3) A 15 gpm waste evaporator (currently being installed).

All three additions were covered by the licensee's Request For Change (RFC) system. The RFC packages reviewed were RFC-12-DC-800, RFC-12-DC-2196, and RFC-12-DC-2074, respectively. For all three changes the matter of unreviewed safety questions had been addressed.

The licensee processes nearly all radioactively contaminated liquids using either evaporators or resins. Liquids not processed are those from some laundry and laboratory drains in which the concentration is initially as low or lower than waste evaporator condensate concentrations. In an effort to minimize the volume of radwaste generated, normally non-radioactive systems such as the service water system or demineralized water system, are drained to the turbine building sump (which pumps to the absorption pond) or to yard drainage after sampling to verify the absence of radioactivity.

Fission and activation products (excluding tritium and dissolved gases) in liquid waste effluents from January 1, 1981 through March 31, 1982, have averaged about 0.5 curies per quarter.

No items of noncompliance or deviations were identified.

6. Licensee Audits

The inspector reviewed licensee QA/QC audits of the radiation protection and radwaste programs and corrective measures for identified problems. The audits reviewed included: an audit in January 1981 of in/out card usage; an audit in August 1981 of a waste resin transfer; and an audit in early 1982 regarding licensee followup of items identified during the Health Physics appraisal inspection.

Followup and corrective actions for the audit findings appeared appropriate.

7. Radiation Protection Procedures

The inspector reviewed selected radiation protection procedures added or revised in 1981 and 1982 to date. A number of the new or revised procedures were written to correct problems identified in the Health Physics Appraisal.

In the area of exposure control, procedures for documentation of exposure investigations (12 THP 6010 RAD 712, "Dose Assessment For Lost or Off-Scale Personnel Dosimetry") and personal contamination occurrences (12 THP 6010 RAD 600, "Personnel Decontamination Incident Reporting") were implemented on December 18, 1981. No problems were identified in the review of these two procedures. Also in the area of exposure control, as noted in a previous inspection report,¹ the licensee had issued a revision to procedure 12 THP 6010 RAD 409, "Assessment of Whole

¹ IE Inspection Reports No. 50-315/81-26; 50-316/81-29

Body Count Results," which formalized the documentation of investigations and changed the method of assessment. However, the inspector noted in the referenced inspection report that the procedure specified whole body count action levels which do not adequately demonstrate compliance with the 40 MPC-hour control criteria specified in 10 CFR 20.103(b)(2). The matter was discussed at the exit meeting for the referenced inspection and the licensee agreed to review the procedure. During this inspection it was noted that the licensee had made a further revision to the procedure which resolved part of the identified problem. During the exit meeting for the current inspection the licensee committed to further revise the procedure by September 1, 1982, to demonstrate compliance with the 40 MPC-hour control criteria specified in 10 CFR 20.103(b)(2). (315/80-23-03; 316/80-19-03)

In the area of access and contamination control, procedures were implemented by January 1, 1982, for high radiation area key control (12 PMP 2060 SEC.001) and for changes in the RWP system to help ensure proper notification of the RP Section before entry or start of work (12 THP 6010 RAD 406). Other licensee actions taken in the area of access and contamination control were documented in a previous inspection report.² (Closed 315/80-23-04; 316/80-19-04)

During a previous radwaste program inspection,³ the licensee agreed to strengthen alarm response procedures for the vent gas monitor (R26) and the vent radioiodine monitor (R32). Procedure 12 PMP 6010 URE.001, Revision 1, Section 8.2.3, requires use of the monitor response/release rate curves for the vent gas monitor (R26) to assess compliance with gaseous release limits. The licensee now uses silver zeolite as the iodine collection medium to minimize noble gas adsorption and the potential for erroneous high iodine release rate indications for the vent radioiodine monitor (R32). (Closed 315/78-28-02; 316/78-26-02)

During the same referenced radwaste program inspection, the licensee agreed to review and amend, as needed, Procedures THP 6010 RAD 304 and THP 6010 RAD 332 dealing with solid waste and liquid releases, respectively. The problem previously identified with the solid waste procedure, involving clarification of curie estimation methods for dewatered resins and solidified evaporator bottoms, is resolved in current procedures. The current procedures provide methods of curie estimation for different forms of radwaste including compacted waste, dewatered resins, and solidified wastes. The problem previously identified with the liquid waste release procedure, involving the listing of insoluble instead of soluble MPC values for certain nuclides has been rectified in current procedures. (Closed 315/78-28-03; 316/78-26-03)

During the same referenced radwaste program inspection the licensee agreed to formalize a procedure for quantifying noble gas releases from containment pressure ventings. During this inspection it was found that the procedure had not been written due to licensee oversight. However, the licensee made a commitment in the exit meeting to formalize the

² IE Inspection Reports No. 50-315/81-26; 50-316/81-29

³ IE Inspection Reports No. 50-315/78-28; 50-316/78-26

procedure by September 1, 1982. The inspector's review indicated that the unquantified releases resulting from the pressure ventings amounted to no more than three per cent of quantified releases. (315/78-28-01; 316/78-26-01)

8. Organization and Management

A significant finding from the Health Physics Appraisal concerned staffing shortages in the Radiation Protection (RP) Section. Additional RP Section weaknesses involved poor communications, in-plant supervisory presence and oversight of the contract health physics group. During a subsequent inspection,⁴ some progress in staffing, particularly at the technician level, was noted. Although the technician staffing remains at 17 (six senior technicians, three technicians, and eight junior technicians) plus 5 semi-permanent contract technicians, concentrated training has been provided in recent months to the junior technicians to qualify them as technicians eligible for shift rotation. Three of the eight are in the final stages of testing. Two technician positions remain unfilled.

A pilot program, initiated in June 1981, involving financial assistance for ten high school students in obtaining formal training and cooperative experience in the plant's RP Section is continuing. Eight of the initial ten trainees are starting in their second year and an additional ten have commenced the first year of the two year program which leads to an Associate Degree in Nuclear Power.

Progress has also been made at the professional level. The two health physicist positions which remained unfilled at the time of the November 1981 inspection were both recently filled with spring graduates in health physics, one with a bachelors degree and the other with a masters degree. Another engineer in the Health Physics area is on "loan" from the corporate office for about a 6-8 month period which began in May. Licensee staffing plans now appear acceptable and should provide the means to strengthen the weaknesses in communications, in-plant supervisory presence and oversight of the contract health physics group. (Closed 315/80-23-01; 316/80-19-01)

No items of noncompliance or deviations were identified.

9. Radiological Qualification/Training

A significant finding from the Health Physics Appraisal concerned the inadequacy of training and development of radiation protection technicians and foremen. During a subsequent inspection,⁵ it was reported that the Radiation Protection Supervisor - Training was working on structuring, coordinating and administering a formalized technical training program in two phases. The first phase, involving training file/record retention, training program responsibility, and training topics, was completed on December 15, 1981, meeting the January 1, 1982, commitment date. The second phase involving training details and individual lesson plans

⁴ IE Inspection Reports No. 50-315/81-26; 50-316/81-29

⁵ IE Inspection Reports No. 50-315/81-26; 50-316/81-29

committed for completion by July 1, 1982, was essentially complete when reviewed on June 25, 1982. The formal program, scheduled to be implemented in mid-July, will involve lectures, video presentations, practical demonstrations, and written examinations with a goal of about 100 hours training per year. The program is also designed to provide training for job progression and for biennial requalification. Although increased training has been provided in the past year, before initiation of the formal program, it has concentrated primarily on training junior technicians to qualify them as technicians. The Radiation Protection Supervisor - Training plans to utilize the professional health physicists in some of the training effort. The lesson outlines reviewed appeared to be comprehensive. With completion of preparation of the formal technician training program and the recent additions to the professional staff to assist in training and to relieve the training supervisor of some duties, the licensee appears to be able to implement the formal training program in mid-July as scheduled, which should strengthen the technician training program. (Closed 315/80-23-02; 316/80-19-02)

No items of noncompliance or deviations were identified.

10. External Exposure Control

The licensee's personal monitoring program remains as previously described. The Radiation Exposure and Maintenance Management (REM) System described in a previous inspection report⁶ is now in partial use. The total exposure at the plant in 1981 was about 650 person-rems. Refueling outages for both units plus an additional outage of about six weeks duration occurred during the year. Records show that no individual at the plant exceeded 3 rems exposure during 1981.

The licensee currently has no formalized program for spiking TLDs but has done some on occasion as manpower permitted. With the aid of the new full-time professional health physicists, the licensee stated plans to formalize a program for systematic evaluation of the vendor's TLD program.

No items of noncompliance or deviations were identified.

11. Internal Exposure Control

For control of internal exposures the licensee utilizes engineering controls, protective clothing and equipment, decontamination of surfaces, survey information and stay-time calculations. Whole body counting is used to evaluate the effectiveness of the other measures taken.

During the period from June 30, 1981, through June 25, 1982, over 1700 individual whole body count data, as well as selected air activity surveys, contamination surveys, and Radiation Work Permits (RWPs) were reviewed. No exposures greater than the 40 MPC-hour control were indicated.

No items of noncompliance or deviations were identified.

⁶ IE Inspection Reports No. 50-315/80-23; 50-316/80-19

12. In-plant Radiation Protection Program

a. Surveys

The inspector selectively reviewed radiation, contamination, and airborne radioactivity surveys conducted for routine surveillance and for radiation work permit requirements. No problems were noted.

b. Posting and Access Control

The inspector reviewed radiation, high radiation and extreme high radiation area postings and selectively checked the locks controlling access to the latter two type of areas. All locked entrances checked were found secure and all postings appeared to meet the requirements of 10 CFR 20.203.

c. Release of Materials for Unrestricted Use

The licensee's procedures and practices for release of materials for unrestricted use were reviewed. No problems were identified.

No items of noncompliance or deviations were identified.

d. Personal Contamination Control

During a plant tour on July 13, 1982, about a dozen persons were observed exiting Unit 1 lower containment. Only about one-half of them used the frisker instrument provided at the location to check for personal contamination following removal of anti-c clothing. This matter was discussed at the July 13 exit meeting.

13. Advanced Planning and Preparation

In the area of advance planning/preparation and ALARA, the new professional health physicists have been assigned specific major tasks associated with the Unit 1 refueling. The assignment, in addition to planning and preparation, involves analysis of current controls with the goal of looking for ways of further reduction of exposure.

The specific tasks assigned to the professional health physicists for special analysis are refueling, steam generator work, ISI (weld inspection), and reactor coolant pump seal inspections. Nonroutine jobs planned for this outage include replacing some of the nonessential service water system and work on the containment purge isolation valves. Some of the work on the latter will be in containment but not in the higher radiation areas of containment. More reliable exposure assignment to specific tasks should be provided by data from the REM system. This system, when completely operational, will control access to high radiation areas but keys will still control access to extreme high radiation areas.

A bid has been let to a vendor, with an estimated completion time of about one year, to develop a formal ALARA program and a formal radiation protection plan.

No items of noncompliance or deviations were identified.

14. Instruments and Equipment

As noted in Section 3, installation of shielded frisker stations was completed in February 1982.

Three National Nuclear high sensitivity portal monitors utilizing three plastic scintillators (one foot panel and one on each side) have recently been received and installed at the three exits from the controlled area. The length of count time can be preselected at 0.4, 0.8, or 1.2 seconds. Sensitivity can also be altered by selecting the multiple (1 to 8) of the standard deviation of the background count rate, which, when added to the background count rate will result in an alarm. Discriminating against lower energy radiation, which seemed necessary in order to use the monitor in one area with elevated background radiation, appeared to significantly reduce the sensitivity. Using an NRC source set, the inspector performed an independent check of the sensitivity of the portal monitors.

For the two monitors located in the low background radiation areas, the monitors were found to alarm about 80-90% of the time with a nominal 0.11 μCi cesium-137 source waved along the center line between the two side detectors. The sensitivity of the third monitor was less consistent but would detect a nominal 1 μCi of cesium-137 (placed at the center line) at least 50% of the time. Some shielding has been used for the latter monitor and use of additional shielding is being evaluated by the licensee.

The sensitivity of the new monitors is much improved over that of the G-M tube type in use at the guardhouse. Two of the three guardhouse monitors were checked with cesium-137 sources. With a nominal 0.32 μCi source, one monitor gave no alarm at contact with the surfaces of the portal monitor while the other gave alarms about 50 percent of the time. With a nominal 0.59 μCi source at contact, the alarm rate was approximately 75 percent for one unit and 100 percent for the other. For source placement along the centerline, the alarm rate was about 25 percent with a nominal 0.92 μCi source for one unit while it took about 2.4 μCi at the centerline to obtain a 10-20 percent alarm rate with the other unit. The licensee has budgeted for replacement of the guardhouse monitors with the more sensitive monitors.

The licensee has had a continuing problem with the source drive mechanism for internal check sources of PING CAMs. Some of the source drive mechanisms, currently removed for maintenance, had been removed for several weeks. Others, still on the CAMs, were routinely being noted on daily checks as being "out of commission" (OOC).

The licensee just received two new Eberline gas flow proportional hand and foot monitors which are being tested out and are reported to have high sensitivity.

Because delivery of a new upgraded liquid waste discharge monitor has been delayed, the current monitor location was changed to a lower background area. However, this did not appear to increase sensitivity appreciably. The main source of background radiation is apparently due to "fixed" contamination in the liquid chamber inside the monitor since flushing with liquids, including acid solutions, have not significantly lowered the background count rate of the instrument. The licensee's plans to upgrade the Radiation Monitoring System (RMS) in two phases remains as described in a previous inspection report.⁷ (315/80-23-06; 316/80-19-06)

15. Transportation

Selective licensee radwaste procedures were reviewed (Section 7) and appeared to be current with respect to burial site criteria and NRC/DOT regulations. The licensee has had no deficiencies/violations involving transportation activities in the past 16 months. The licensee's followup of previous problems appeared adequate.

The licensee has had no spent fuel shipments nor Type B shipments, although Type B casks are used on occasion for shielding purposes. Certificate of compliance maintenance requirements for casks are being performed by the cask vendor. Inspection of gaskets and contamination levels of cask and trailer are being performed by the licensee.

Waste forms consist of boxed, compacted, and a portable in-container solidification system operated by vendor personnel for spent resins and evaporator bottoms. A process control program involves a sample test solidification using the same ratios of waste material and cement as planned for the waste liner. Twenty-four hours after filling, the liners are observed for absence of free standing water and physically tested for solidification. On June 22, the licensee had 1271 cubic feet of radwaste ready for shipment, consisting of 87 barrels and four boxes.

The inspector reviewed records of shipments of solidified evaporator bottoms from August through December 1981 and for solidified resins and other solid waste from January through May 1982. No problems were noted.

The licensee's volume of solid radwaste increased each year through 1980. Special effort by the licensee resulted in a one-third reduction in 1981 over 1980, even with two refueling outages in 1981. Further reduction was experienced in the first quarter of 1982.

No items of noncompliance or deviations were identified.

⁷ IE Inspection Reports No. 50-315/81-26; 50-316/81-29

16. Licensee Event Followup

The inspector reviewed for health physics considerations the following Licensee Event Reports (LERs) and some related condition reports, QA Surveillance Reports, and effluent records, all involving unplanned gaseous releases except two which involved unmonitored releases:

Unit 1

RO 81-053/04T-0
RO 81-058/04T-0
RO 82-003/04T-0
RO 82-010/04T-0

Unit 2

RO 81-034/04X-1
RO 81-055/04T-0
RO 81-066/04L-0
RO 82-020/04T-0

The release rates of gaseous radioactivity were all small percentages of the technical specification release rate limits, and no significant personal exposures to airborne activity apparently resulted.
(Closed 316/81-34-03)

Since the development of a small primary to secondary leak in a Unit 2 steam generator (S/G), the occasional loss of side stream flow (apparently due to crud blockage) to radiation monitor R-19, results in an unmonitored release if the startup blowdown flash tank is in service. This has occurred four times since early 1981. As noted in previous inspection reports,⁸ the licensee initiated a change request (RFC No. DC-12-1825) to replace flow meters on the S/G blowdown sample lines with a type that will provide an alarm in the control room upon loss of flow. The status of this RFC was discussed in the July 13 exit meeting. (316/81-01-02)

17. Exit Meeting

The inspector met with licensee representatives (denoted in Section 1) on June 25 and July 13, 1982. The following items were discussed:

- a. The purpose and scope of the inspection.
- b. The inspector noted that during the exit meeting of a previous inspection,⁹ the licensee had agreed to review Procedure 12 THP 6010 RAD 409, Revision 1, because the action levels at which whole body counting is required in the procedure will not adequately demonstrate compliance with the 40 MPC-hour control criteria specified in 10 CFR 20.103(b)(2). The inspector further noted that since that time, a change has been made to the procedure which resolves part of the identified problem. However, the inspector discussed further changes needed in the procedure to fully resolve the problem. The licensee committed to make further changes to the procedure by September 1, 1982. (Section 7)

⁸ IE Inspection Reports No. 50-315/81-01; 50-316/81-15

⁹ IE Inspection Reports No. 50-315/81-26; 50-316/81-29

- c. The licensee made a commitment to formalize by September 1, 1982, a procedure for quantifying noble gas releases through containment pressure ventings. (Section 7)
- d. The inspector noted the licensee's successful effort in significantly reducing solid radwaste sent to commercial licensed burial facilities. (Section 15)
- e. The inspector asked about the status of facility change RFC No. DC-12-1825, initiated by the licensee in early 1981, to replace flow meters on S/G blowdown sample lines with a type that will provide an alarm in the control room upon loss of flow to monitor R-19 to preclude occasional unmonitored releases. The inspector was informed that three purchase orders were made for this project. Two of the orders recently arrived onsite but the third, which involves the flow meter itself, can not be shipped by the vendor before September 1982. Drawings for the project, both mechanical and electrical, are being prepared by the corporate office in New York. Mechanical drawings are said to be completed while electrical drawings are now in the preparation phase and should be onsite by the end of August 1982. It was further stated that if the final tie in will take longer than one day (not determinable at this time), it will require that the unit be in an outage (after September). The licensee agreed to provide to the resident inspectors a proposed installation date as soon as possible after receipt of the electrical diagrams in August. (Section 16)
- f. The inspector discussed observations made during the inspection tours regarding cloth glove liners and respirators lying on the floor, inappropriate location of a frisker station, and an inoperable CAM chart, which appear to suggest a need for greater attention to details by radiation protection technicians during routine assignments and/or daily rounds. (Section 2)
- g. The inspector discussed the apparent ineffectiveness of the licensee's efforts to have individuals check for personal contamination by using "frisker" instruments upon exiting areas having significant potential for personal contamination. The licensee agreed to review the problem. (Section 12)
- h. The inspector emphasized at the June 25th exit meeting that while the licensee apparently now has the staffing and/or the availability of future staffing to remedy the various weaknesses identified by the Health Physics Appraisal performed in December 1980, much remains to be accomplished to attain the goals. (Sections 8 and 9)
- i. The inspector discussed the licensee's continuing problem with CAMs involving the source drive mechanism for the internal check sources used in checking CAM response. The licensee agreed to review the problem. (Section 14)