U. S. NUCLEAR REGULATORY COMMISSION

REGION III

Reports No. 50-315/84-17(DRSS); 50-316/84-19(DRSS)

Docket Nos. 50-315; 50-316 Licenses No. DPR-58; DPR-74

Licensee: American Electric Power Service Corporation
Indiana Michigan Electric Company
1 Riverside Plaza
Columbus, OH 43216

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

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

Inspection Conducted: August 15-17 and September 5 and 6, 1984

Inspectors: P Foremdale for
L. J. Hueter — Date: 9/13/84

P Foremdale for
N. A. Nicholson — Date: 9/13/84

Approved By: P Foremdale for
L. R. Greger, Chief
Facilities Radiation Protection Section — Date: 9/13/84

Inspection Summary

Inspection on August 15-17 and September 5 and 6, 1984 (Reports No. 50-315/84-17(DRSS); 50-316/84-19(DRSS))
Areas Inspected: Routine, unannounced inspection of the radiation protection program including internal and external exposure control, organization and staff qualifications, contamination control, ALARA program, ESF air filter housing systems, selected TMI action items, and open items. The inspection involved 60 inspector-hours onsite by two NRC inspectors.
Results: No violations or deviations were identified.

DETAILS

1. Persons Contacted

T. Augustyn, Utility Supervisor
*P. Barrett, AEPSC
*T. Beilman, QA Supervisor
*A. Blind, Technical Engineer
K. Cunningham, Radwaste Handling Supervisor
#S. Dannhardt, Radwaste Handling Supervisor
C. Fliss, Performance Engineer - Senior
*J. Fryer, Environmental Coordinator
D. Gallagher, Chemical/ Radiation Protection Technician - Senior
#M. Glissman, Performance Engineer
J. Gratzle, Chemical/Radiation Protection Technician - Junior
*G. Griffin, QC
*L. Holmes, Administrative Compliance Coordinator
*J. Joseph, ALARA Coordinator
#J. Kambach, Radiation Protection Supervisor
#T. Kriesel, Technical Superintendent - Physical Science
*J. Nelson, Performance Engineer
R. Palmer, Administrative Compliance Coordinator
D. Petroff, Performance Engineer
K. Scherer, Chemical/Radiation Protection Technician
D. Schroeder, Radiation Protection Supervisor (Training)
#*W. Smith, Jr., Plant Manager
H. Springer, Chemical/Radiation Protection Technician - Senior
#J. Stietzel, QC Superintendent
*B. Svensson, Assistant Plant Manager, Operations
*E. Townley, Assistant Plant Manager, Maintenance

*E. Swanson, NRC Senior Resident Inspector
J. Heller, NRC Resident Inspector
R. Leemon, NRC Resident Inspector

*Denotes those present at the August 17, 1984 exit meeting.
#Denotes those present at the September 6, 1984 exit meeting.

2. General

This inspection, which began at 8:00 a.m. on August 15, 1984, was conducted to examine the radiation protection program during routine operations. During plant tours, the inspectors observed work activities, facilities and equipment, and posting, labelling, and access controls. The inspectors verified that posted radiation levels were in agreement with an NRC survey instrument (Xetex 305B, NRC No. 8364, calibrated August 4, 1984).

3. Licensee Action on Previous Inspection Findings

(OPEN) Open Item (315/80-23-06; 316/80-19-06): As noted in previous inspection reports, licensee efforts were made to reduce the background levels of liquid effluent monitor R-18 to increase the sensitivity of the monitor. These efforts, including relocation of the monitor to an area having lower background radiation level and flushing with rinses, including acid, have met with partial success. Plans to replace this monitor were delayed according to licensee personnel because of emphasis placed on completion of many post-TMI modifications. Replacement of this monitor is not included in a design package to replace/update several monitors.

(CLOSED) Open Item (315/83-03-07; 316/83-03-07): Source of radioactive gas in the auxiliary building. The licensee was asked to review the auxiliary building floor drain system to determine if design or operational problems with the system caused the airborne problems occasionally experienced during collection of liquid radioactive samples. A dry floor drain loop seal was suspected during an incident in early 1983 involving VCT sampling. The licensee completed the review of the auxiliary building floor drain system and found no evidence of loop seals being provided in the drain system. The licensee stated that in the past, air activity from this source only occurred about twice a year and had never resulted in contamination of personnel. To preclude recurrence, VCT sample collection procedures have been modified to utilize the waste vent header and no longer utilize the floor drain system.

(CLOSED) Open Item (315/84-07-01; 316/84-08-01): Housekeeping and evidence of eating and drinking in the auxiliary building. At the time these problems were identified, the licensee was in a Unit-2 refueling outage with many crafts people onsite. To improve housekeeping, the licensee formed a six-person clean-up crew to perform a general clean-up of the auxiliary building. Regarding the evidence of eating, drinking and smoking in the controlled area, although prohibition of these activities is covered in various training activities including general employee training, supervisory personnel were instructed to reemphasize the requirements to their workers during weekly safety meetings and relate that such violations would be grounds for administrative actions. Further, additional radiation protection personnel were used in-plant to make their presence more obvious in work areas. Also, both radiation protection and radwaste handling personnel were instructed to look for signs of eating, etc. in prohibited areas and to report any evidence of such including, if possible, the individual or group involved. The licensee stated that the increased effort was successful. The inspectors identified no evidence of eating, drinking, or smoking in controlled areas during the plant tours taken during this inspection. However, no extensive outage was in progress during this inspection.

(CLOSED) Open Item (315/84-07-02; 316/84-08-02): Review of auxiliary building tool crib and decon facility operations. The licensee completed a study of the tool crib and related decon facility operation. The inspectors reviewed the licensee's written report of their internal review and discussed tool issuance, decontamination, surveys and storage practices and procedures with a hot tool crib attendant and a supervisor of the activity. The procedure used, as described by the hot tool crib attendant, was compatible with written procedures and should identify low levels of removable contamination to preclude personal contamination of the tool crib attendants and subsequent users of the tools. The hoodless decontamination sink, with a flexible hose and valve arrangement for release to a floor drain, is in the process of being eliminated. It is being replaced with the enclosed decontamination unit which circulates freon (through a filter) as the cleaning agent. This unit is being moved up from a lower level of the auxiliary building to the tool crib area on the 633' elevation.

4. External Exposure Control

The inspectors reviewed the licensee's external exposure control and personal dosimetry programs; planning and preparation for maintenance and refueling tasks including ALARA considerations; and required records, reports, and notifications.

Forms NRC-4's were reviewed for selected individuals who exceeded 1.25 rem/quarter; all documentation was completed in accordance with 10 CFR 20.101. The inspectors selectively verified that prior administrative approval had been obtained for workers exceeding the plant administrative control levels. Termination reports required by 10 CFR 20.409 were distributed within the specified time period.

The inspectors noted that 1984 outage exposures were higher than those of previous outages, apparently because numerous high dose jobs were completed during this outage, including extensive steam generator work. The ALARA effort appeared to be beneficial, as discussed in Section 6. Improved exposure control is anticipated because of two recent organizational actions: (1) approval for fourteen additional inhouse radiation protection technician positions, thirteen of which have been filled; and (2) plans for closer supervision of contractor HP technicians during outages.

No violations were identified.

5. Internal Exposure Control

The inspectors reviewed the licensee's internal exposure control and assessment programs including changes to procedures affecting internal exposure control and personal assessment, determination whether assessment of individual intakes meet regulatory requirements, ALARA considerations, and required records, reports, and notifications.

The following procedures were reviewed for regulatory compliance and technical content:

- 12 THP.6010.RAD.477, Revision 2, Whole Body Counting Procedures
- 12 THP.6010.RAD.409, Revision 2, Assessment of Whole Body Count Results

No problems were identified.

Whole body count results were reviewed for 1,166 personnel counted between April 2 and June 30, 1984, during outage activities. No uptakes greater than the regulatory limits were noted. One elevated Co-60 count result was identified. On April 26, 1984, the termination count of a contractor indicated approximately 88 MPC-hours of Co-60. However, calculations based on immediate subsequent counts onsite after the individual showered estimated a residual of 38 MPC-hours. A follow-up count at the Callaway County Nuclear Station on May 10, 1984, indicated the actual exposure was less than five MPC-hours. The inspectors determined that the licensee followed applicable procedures. The licensee had initiated an inhouse evaluation and follow-up which were delayed because the affected individual had left the site. At the inspectors request, the licensee obtained the Callaway whole body count data; the licensee is completing and documenting this evaluation.

Whole body counts indicated uptakes levels from an iodine-131 airborne occurrence on April 10, 1984; all nine uptakes reported were less than a maximum of 20 MPC-hours. Follow-up whole body counts were conducted; no problems were noted.

No violations were identified.

6. Maintaining Occupational Exposures ALARA

The inspectors reviewed the licensee's program for maintaining occupational exposures ALARA, including: ALARA considerations for maintenance and refueling outage; worker involvement in the ALARA program; establishment of goals and objectives, and effectiveness in meeting them.

The ALARA program remains as described in Inspection Reports No. 50-315/84-07; 50-316/84-08. This program was fully implemented during the recent Unit-2 outage (mid-March to mid-July); the ALARA coordinator reported good management support and worker involvement for this program. The ALARA coordinator documented an external dose savings of approximately 33% for steam generator work over the 1983 outage as a result of better planning.

The ALARA staff includes the coordinator, a former construction supervisor, and an engineering technologist who has a masters degree in health physics. The coordinator reports directly to the Technical Superintendent, Physical Science.

The inspectors reviewed a licensee QA audit of the ALARA program (Report No. NSDRC-107). No significant findings were identified; the auditors acknowledged the program was well conceived and well administered.

No violations were identified.

7. Control of Radioactive Materials and Contamination

The inspectors reviewed the licensee's program for control of radioactive materials and contamination, including: adequacy of supply, maintenance, and calibration of contamination survey and monitoring equipment; effectiveness of survey methods, practices, equipment, and procedures; adequacy of review and dissemination of survey data; and effectiveness of methods of control for radioactive and contaminated materials.

The inspectors made several tours in radiological controlled areas. Posting and labelling appeared to be in agreement with survey data. The inspectors observed no evidence of eating and/or drinking in the controlled areas of the auxiliary building; such evidence was noted during the previous health physics inspection (50-315/84-07; 50-316/84-08).

The inspectors noted that persons exiting selected contaminated areas with narrow exits or sliding doors would have difficulty removing and disposing of anti-contamination clothing without contaminating the step-off pad. At certain exits, laundry carts to collect used clothing were several feet from the step-off pad, maximizing the potential for contamination spread. All of these areas were identified to an accompanying licensee representative. This matter was discussed at the exit meeting; the licensee agreed to evaluate the situation (Open Item 315/84-17-01; 316/84-19-01).

During a tour on the August 16, 1984, the inspectors noted that two workers on the 633' level were looking for parts in a bin containing highly contaminated bagged reactor coolant pump (RCP) seal components. At the inspectors' request, the bin and RCP components were smear surveyed; removable beta/gamma contamination levels ranged from 478 to 35,000 dpm/100 cm^2. Workers wore a full set of anti-C's and appropriate dosimetry as specified by RWP 1613 for this job. However, no respiratory protection equipment was used nor required by the RWP; the RWP indicated up to 20,000 dpm/100 cm^2 based on a survey conducted for a search of the same bin several days earlier. Also, no step-off pad was established for the roped-off area around the bin. This matter was brought to the attention of HP management personnel. The following day, a step-off pad and a laundry cart were set up next to the bin; however, the workers inside the bin still were not wearing respiratory equipment. At the inspectors' request, these workers were whole body counted after exiting the bin. No significant internal or external contamination was identified. The inspectors reviewed the applicable respiratory protection procedures; no specific guidance relating levels of removable contamination to use of respiratory equipment was

available. This was discussed with HP management and at the exit meeting; licensee representatives agreed to evaluate this matter (Open Item 315/84-17-02; 316/84-19-02).

The inspectors toured the auxiliary building tool crib decontamination area. Delineation was not clear between contaminated and uncontaminated items near the tool crib where clean-up of an area was in progress in preparation for installing a freon type decontamination unit in an area where items, later identified as having been decontaminated, had just been relocated. These problems were corrected during this inspection and no further problems were noted.

No violations were identified.

8. Laundry Activities

The laundry process was reviewed including collection, sorting, cleaning, and frisking contaminated clothing. An inspector accompanied two maintenance contractors collecting laundry; procedures used minimized contamination spread and the contractors appeared to be knowledgeable of good health physics practices. Frisking operations were also observed; no problems were noted.

No violations were identified.

9. ESF HVAC Filter System

One ESF HVAC filter system was inspected for provisions to preclude iodine desorption, to ascertain that all unplugged drains are directed to the radwaste system, and to assure that the filter housing drain lines are provided with means to prevent bypassing of contaminated air around filters or adsorbers by way of the drain system.

The Unit-1 HV-AE5-1 filter system was inspected. It is one of two Unit-1 ESF auxiliary building filter systems, one of which serves as a backup system to the other. These systems are located on the 633' elevation of the auxiliary building and draw air from a plenum room which in turn collects air from the following seven cubicles or enclosures: (1) contaminant spray heat exchanger; (2) RHR residual heat exchanger; (3) SI Pump; (4) centrifugal charging pump; (5) reciprocating charging pump; (6) RHR pump; and (7) containment spray pump.

The filter train is a negative pressure system with a rollamatic prefilter, a single bank of 24 HEPA filters, a metal damper system, three vertical water deluge pipes, a single bank of 72 charcoal adsorbers, and a blower fan followed by a back damper which automatically closes when the fan is not operating (to prevent back flow from the other system since the two have a common header). There are no demisters or heaters in the system nor are there any final HEPA filters following the charcoal adsorbers.

Temperature sensors at the downstream side of the charcoal adsorbers are set to provide an alarm at 150°F and to sound an alert, trip the fan off, and initiate the water deluge system at 250°F (which is conservative with respect to the 300°F limit considered necessary to prevent significant iodine desorption). The use of a water spray on the adsorber section, to limit temperature and minimize iodine desorption, appears to be an acceptable cooling mechanism per Regulatory Guide 1.52, Revision 2, March 1978 (Regulatory Position 3.k).

The filter housing has two 3" diameter floor drains, both of which are hard piped to individual floor drains with no observable regular valves, check valves, or loop seals. The first filter housing floor drain is located between the HEPA filter bank and the charcoal adsorber bank. This filter housing floor drain was mechanically plugged closed. The second filter housing floor drain is located on the downstream side of the charcoal adsorber bank and was not plugged. According to licensee representatives, the drains are not modified when in-place HEPA filter and charcoal adsorber efficiency tests are conducted.

With only a single operation drain, bypassing of contaminated air around one filter or adsorber to another through the drain system is not a problem. However, if indeed no valves or seals exist in the operating drain line, the licensee should evaluate the potential for dilution air from this drain pathway which could provide a nonconservative efficiency determination during in-place HEPA filter and charcoal adsorber tests. Further, the licensee should evaluate the potential for release of unfiltered contaminated air during both normal and accident conditions. Also, the licensee should evaluate the adequacy of number of drains in the filter housing in light of the recommendation of Section 4.5.8 of ERDA 76-21 (which is referenced by Regulatory Guide 1.52, Revision 2, March 1978, Section 3.h) which states that a separate drain is needed for each chamber of the filter house where the spaces between two banks of components in service and between a bank and the housing are considered separate chambers. The licensee should also verify that the drain leads to the radwaste system. These matters were discussed at the exit and will be reviewed during a future inspection (Open Item 315/84-17-03; 316/84-19-03).

10. High Range Iodine and Particulate Effluent Sampling and Analysis

The licensee has an essentially identical system for both Unit-1 and Unit-2 auxiliary building vents for sampling/monitoring both normal and accident range iodine and particulate effluents. The major component is an Eberline SPING-4 unit. This system has been modified so that when high activity levels are reached, all filtering and monitoring portions of the SPING-4 are bypassed except the high range noble gas monitor (SA-9). A new system is valved in to replace the bypassed sections. The new system provides a means for collecting a grab sample of particulate and iodine activity at a reduced sample flow rate and also provides for sending a reduced gas flow rate through a lead shielded HEPA filter before the gas is directed to the SA-9 detector.

The inspector walked down the Unit-1 system except for a portion above the roof. Licensee representatives stated that an isokenetic probe draws a sample from the auxiliary building vent about 30 feet above roof level. Both the sample and return lines are 1 inch diameter stainless steel. (The only smaller diameter line upstream of sample collectors is an approximate four foot length of 3/8 inch stainless steel tubing immediately upstream of the high range iodine and particulate grab sample location.) The section of sample line above the roof and external to the auxiliary building vent is heat traced (spiral type) and insulated. Heat is supplied only during the winter months. An estimated additional 130 feet of sample piping with numerous bends (no sharp bends) leads from the roof to the SPING-4 unit.

Following the cursory review of the Unit-1 high range iodine and particulate effluent sampling system, the inspector has concerns regarding the adequacy of the system as currently designed and operated to satisfy several positions and clarifications of NUREG-0737, Item II.F.1, Attachment 2. Heavy moisture loading of the effluent air stream could reasonably be expected during accident conditions. Long lengths of unheated sample lines under such conditions may cause condensation and water traps which may result in large sample line losses of both iodine and particulates and may even cause weakening or breaking of particulate filter media, destroying its usefulness. This potential problem raises concern regarding the system's ability to collect NUREG-0737 specified representative samples.

At the plant, documentation was not immediately available showing the source term used by the licensee for the design basis shielding envelope for the accident range iodine and particulate samplers. (NUREG-0737 specifies 100 microcuries per cubic centimeter each of radioiodine and particulates deposited in the sampling media for 30 minutes and an average energy of 0.5 MeV.) Nor was documentation immediately available showing that plant personnel could remove samples, replace sampling media, and transport the samples to the onsite facility with radiation exposures that are not in excess of 5 rem whole-body exposure and 75 rem to the extremities as required by clarification (2) of NUREG-0737, Item II.F.1, Attachment 2. The inspector has concerns regarding the ability to meet this criteria based on current equipment and procedures.

The provisions for collecting and transporting iodine and particulate filter samples under high range conditions and reduced flow rates include collecting the filter samples using an unshielded "clam shell" filter holder and a 3 inch by 4 inch transport shielded box constructed of 1/4" steel with 3/8" lead added to all six sides and a one foot long handle. Apparently the "clam shell" device will have to be opened by hand to release the filter media into the shielded box as the "clam shell" will not fit into the box.

Also, documentation was not immediately available to show how continuous samples are collected whenever exhaust flow occurs as required by Table II.F.1-2 of NUREG-0737, Item II.F.1, Attachment 2. Under the high range portion of the system described above, iodine and particulate filter sampling appears to be established only on a grab sample basis.

Also of concern is the design of the high range portion of the system which bypasses all of the SPING-4 unit except the high range noble gas detector (SA-9). Although there is a HEPA filter upstream of the SA-9 monitor to remove particulate activity, there appears to be no provision for removal of iodine activity to preclude contamination of the SA-9 detector with iodine activity which could also result in an erroneous noble gas activity indication by the monitor. These matters were discussed at the exit and will be reviewed during a future inspection (Open Item 315/84-17-04; 316/84-19-04).

11. SPING Monitors

SPING-4 monitors were installed in response to NUREG-0737 criteria to monitor iodine, particulate, and noble gas concentrations in the containments and in effluents from the plant vents, the steam reliefs, and the main condensers.

During a recent routine calibration of a SPING-4 monitor, the licensee identified an erroneous calibration factor that had been entered into SPING-4 channels during previous calibrations. All calibrations were conducted in accordance with Procedure 12 THP.6010.RAD.584, Eberline Radiation Monitoring System Secondary Source Calibration, approved June 8, 1982. The procedure contained an incorrect (inverted) factor in a formula used to convert the initial monitor calibrations, which utilized gases and spiked filter media, to subsequent solid source calibrations. The errors ranged from very slightly conservative to almost a factor of two non-conservative. The errors were corrected and revised factors were entered into all channels by September 7, 1984, after verification by corporate specialists. The corporate specialists are continuing to evaluate the steam relief monitors calibrations. The calibration procedure is being revised to incorporate these calculational corrections; the procedure and corrections were reviewed by the inspector.

Most plant airborne releases during this period were not affected by the error because they were based on grab samples and other continuous monitors. Quantification of releases to maintain containment pressure within normal operating limits were affected by the SPING-4 errors but since the higher of the SPING-4 and a second monitor was used to quantify these releases, any errors introduced would have been conservative. An inspector reviewed selected airborne releases calculated in accordance with Procedure 10 THP.6010.PER.405, Preparation of Semi-Annual Radioactive Effluent Release Report; no problems were noted.

Selected alarm set points, set a twice the normal channel readings in accordance with Technical Specifications Table 3.3-6, are based on the SPING-4 monitor readings. The SPING-4 monitors would also have been relied upon in an emergency as a basis for onsite and offsite actions. For this usage, a factor of two error would have been marginally acceptable. The licensee is evaluating the impact of the erroneous factors on the technical specification required set points; this matter, the adequacy of the steam relief monitors calibrations, techniques will be reviewed during a future inspection (Open Item 315/84-17-05; 316/84-19-05).

Corrective actions for this licensee identified problem appear acceptable.

12. Exit Meeting

The inspectors met with licensee representatives (denoted in Section 1) at the conclusion of the inspection. The subjects of ESF HVAC filter systems and the shielding, sampling, and analysis provisions for iodine and particulate effluents via the auxiliary building vent stacks during accident conditions pursuant to NUREG-0737 Task Item II.F.1.2 were discussed in a telephone conversation with Mr. W. Smith, Jr., and other plant staff personnel on August 29, 1984. In response to certain items discussed by the inspectors, the licensee:

a. Committed to review exits, step-off pads and the potential for migration of contaminants at these posted contaminated areas (Section 7).

b. Committed to evaluate the need for formal guidance relating removable contamination levels to respiratory protection equipment use (Section 7).

c. Committed to review and evaluate all ESF filter housings, within 60 days from the date of this report (cover letter date), for (1) the destination of drains, (2) adequacy of the number of drains provided for each ESF filter house, and (3) verification of type of valves, traps, seals, etc., if any, in each individual drain line and in the absence of valves or seals evaluate the effects on in-place HEPA filter/charcoal adsorber efficiency tests and the potential for release of unfiltered contaminated air from the drain line(s) (Section 9).

d. Committed to have documentation available 60 days from the date of this report (cover letter date) for inspector review regarding the high range iodine and particulate effluent sampling system to demonstrate that NUREG-0737, Item II.F.1, Attachment 2, positions and clarifications have been met regarding representative sampling, proper shielding for sample removal and transport, continuous sampling, and provisions for precluding contamination of the high range noble gas monitor with iodine (Section 10).