U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Report Nos. 50-315/91008(DRSS); 50-316/91008(DRSS)

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

Licensee: Indiana Michigan Power Company
1 Riverside Plaza
Columbus, OH 43216

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

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

Inspection Conducted: March 6-15, 1991

Inspectors: R. A. Paul — 4-4-91 Date

A. G. Januska — 4-4-91 Date

Accompanied By: B. L. Hamrick
M. C. Schumacher (March 14-15, 1991)

Approved By: M. C. Schumacher, Chief
Radiological Controls
and Chemistry Section — 4-4-91 Date

Inspection Summary

Inspection on March 6-15, 1991 (Report Nos. 50-315/91008(DRSS); 50-316/91008(DRSS))

Areas Inspected: Routine, unannounced inspection of the licensee's radiation protection program, including: changes in organization (IP 83750); training and qualifications (IP 83750); audits and appraisals (IP 83750); external exposure (IP 83750); internal exposure (IP 83750); ALARA (IP 83750); plant tours; and licensee actions on previous inspection findings (IP 92701) and an LER concerning controls of extreme high radiation area (EHRA) doors.

Results: The organizational structure, management controls, staffing levels, and management support for radiation protection have improved. The licensee continues to strengthen the ALARA program and has solid audit/problem identification and radiological control programs. Station dose was about average for a PWR for 1990. One weakness noted was concerning EHRA door controls.

DETAILS

1. Persons Contacted

*K. Baker, Assistant Plant Manager
*A. Blind, Plant Manager
*P. Carteaux, Superintendent, Safety and Assessment
*S. Covis, Radiation Support
*J. Fryer, General Supervisor, Radioactive Material Control
*L. Gibson, Assistant Plant Manager
*J. Kauffman, Manager Construction
*D. Loope, Plant Radiation Protection Supervisor
*J. Nadeau, QA Auditor
*D. Noble, Radiation Protection Performance Engineer
*T. Postlewait, Superintendent, Project Engineering
F. Rosser, Supervisor, Radiation Protection
*J. Rutkowski, Assistant Plant Manager
*J. Sampson, Superintendent, Operations
D. Schroeder, Technical Training Coordinator
*D. Williams, Radiation Support Manager
*J. Wojcik, Superintendent, Technical Physical Sciences

*D. Passehl, NRC Resident Inspector

The inspectors also contacted other licensee employees.

*Denotes those present at the onsite exit meeting on March 15, 1991.

2. General

This inspection was conducted to review the licensee's radiation protection program. The inspectors toured the licensee's facility to observe posting, labeling and access control. Independent measurements including direct radiation readings and contamination smear measurements were made. No significant problems were identified.

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

(Closed) Open Item (315/90019-02; 316/90019-02): Licensee to activate new gamma spectrometry system by the end of October 1990. The inspectors visited the chemistry count room and observed that a new spectrometry system is now operational. The licensee stated that the system has been functional since mid October 1990.

(Open) Open Item (315/90012-02; 316/90012-02): Investigate liquid releases from the turbine room sump to the onsite absorption pond. In response to this item and other concerns voiced at an exit interview in August 1990, the licensee has (1) assigned to a Senior Health Physicist the overall coordination responsibility for this matter, (2) determined use of the aquifer for drinking water, (3) sampled wells used for human consumption, (4) drilled a new sampling well 2300 feet south of the absorption pond toward the Livingston Hills beach community, and (5) contracted for a hydrology study to determine the movement of water from

the absorption pond. The investigation determined that eight out of thirty-seven residents to the north (Rosemary Beach Community) had wells providing drinking water. No radioactivity was found in samples of their wells. Residents to the south (Livingston Hills) obtain water from the Lake Township municipal system. Nevertheless, the licensee repaired two of the defunct wells and took duplicate samples from each. Three of the four samples showed tritium below LLD (about 200 pCi/l) and one was near the LLD (350 pCi/l). This item will remain open pending completion of the licensee's hydrology study and the development of an appropriate monitoring program for this pathway.

(Closed) Violation (315/90020-01; 316/90020-01): Failure to perform an adequate evaluation prior to using a new test rig to test a Chemical and Volume Control System (CVCS) safety valve. The inspectors reviewed the revised maintenance procedure associated with the testing of the CVCS safety valve, and visited the rigid wall test enclosure erected by the licensee as part of the corrective action taken to prevent further violations. This new enclosure with its permanently installed HEPA venting system together with the new procedure requirements for health physics review appear sufficient to prevent recurrence.

4. Changes (IP 83750)

There have been no significant changes to the overall administration of the radiation protection (RP) program from that described in Inspection Report Nos. 50-315/90014; 50-316/90014. The most significant change was the promotion of the lead health physicist to corporate health physicist. This change should significantly benefit the station RP program because of his plant experience, familiarity with station programmatic weaknesses, and the good working relationship he has with the plant staff. Another significant change has been the increase of experienced permanent radiation protection technicians (RPTs) and less dependence on contract workers. Overall, the staff is comprised of a sufficient number of professionals and technicians, and remains generally stable with good support from upper management. Communications and support from other departments has improved.

No violations or deviations were identified.

5. Training and Qualifications (IP 83750)

The inspectors observed members of the RP staff performing their duties and spoke to some members of the staff regarding their RP training at the licensee's facilities. In general, good radiological protection and control practices were observed; the RPTs interviewed indicated the training received was thorough and that the training program continues to improve.

The licensee has a flexible continuing training program in place for RPTs. Minor changes to procedures are disseminated to the technicians on a "read and sign" basis. Major procedural changes, NRC regulatory changes, training on infrequently performed but difficult tasks and a

selection of other topics for continuing training are reviewed at least quarterly by the Senior Instructor, Plant Radiation Protection Supervisor (RPS) and the Training Specialist to determine which topics need to be addressed in a formal continuing training session.

The inspectors reviewed the RPT training plan, and specifically the lesson outlines and objectives for training the licensee's permanent and long-term contract RPTs on plant systems. RPTs are expected to complete a one week indoctrination course, a five to seven week fundamentals course, a six week RPT basics course, and a two to five week specialty basics course within the first eighteen months of employment. The systems portion of the RP training occurs during the six week technician basics course, and is also included on an "as needed" basis in the continuing training program. For those technicians assigned to the "production" specialty, additional systems training is given during their specialty basics course. Lesson plans for systems training concentrated on system construction, function, maintenance and radiological impact. The lesson plans were thorough and adequately addressed those aspects of the systems most significant to RP. Based on this inspection, it appears that the licensee's RPT training program, and specifically the training on plant operating systems is adequate.

No violations or deviations were identified.

6. External Exposure Control (IP 83750)

The inspectors examined the licensee's program for the control of external exposure including review of records, observation of operations being performed, and discussions with personnel.

The licensee uses thermoluminescent dosimeters (TLDs) as the primary and self reading dosimeters (SRDs) as the secondary means of measuring external exposure. The inspectors saw records of ratios of monthly TLD and SRD results that are compared against a criterion which must be satisfied for every exposure in excess of 100 mrem. Failure to satisfy the appropriate criterion results in an investigation and a one-on-one meeting with the wearer when possible; failures ranged from five to 10 per month during nonoutage times to as high as 170 per month during outages. The licensee has determined that the SRD overestimates the TLD dose by an average of 28%. The records indicated low total body exposures and that special dosimetry results are added to the employee exposure records.

The licensee's TLD program is certified by the National Voluntary Laboratory Accreditation Program through July 1, 1991, for test categories I through VII. Neutron exposures and extremity badges are processed by ICN Dosimetry Service, Irvine, California. The inspectors examined portions of the licensee's procedures covering significant beta radiation exposures, personnel overexposures, lost or damaged personnel dosimetry, and correlation of TLDs and SRDs, and selected records of the use of extremity badges and noted no problems. The licensee has had only one potential exposure greater than the administrative limit of 1000 mrem/qtr; it was investigated and found to be invalid.

A quality assurance program conducted by the University of Michigan for the licensee, in accordance with ANSI N13.11-1983, indicated acceptable licensee performance in all accredited categories. The licensee maintains an up-to-date equivalent of the NRC Form 5 on file (Exposure Monitor Record) for all badged employees. The inspectors also saw examples of monthly dosimeter reports which summarize, among other parameters, TLD dose for the current month and year and whole-body counts.

No violations or deviations were identified.

7. Internal Exposure Control (IP 83750)

The inspectors selective review of whole-body count results from August 1990 to date indicated no results exceeding the 40 MPC-hour control measure. The licensee continues to use two whole-body counters, one for routine counting located in the Training Building and the other for special counting located in the APAC near the exit from the RCA. The inspectors selectively reviewed relevant whole-body count procedures, the whole-body count facilities and equipment, and the most recent calibration results. The inspectors also discussed the current and recently developed whole-body count program with cognizant personnel. The licensee was presented with two examples of radioactive intakes (ingestion and inhalation) for MPC-hour and dose assessment. Although some adjustments had to be performed in the use of the procedure to ensure correct assessments were made, no significant problems were noted.

No jobs requiring use of respirators or special air sampling equipment were observed during inspector tours of the plant. It is licensee practice to try to collect air samples that are representative of work zones, and where practical, use breathing zone samplers. A sufficient number of constant air monitors (CAMs) were observed at various locations in the auxiliary building; however, there did not appear to be nearby instructions to remind personnel of actions when they alarm. This matter was discussed with the licensee.

Air samples are taken, counted, and evaluated in accordance with procedural requirements. The procedures appear adequate for use in determining air sample results, placement, and type. A review of the respirator fit testing, usage, issuance, accountability, storage and maintenance program was performed and it appeared satisfactory.

No violations or deviations were identified.

8. Maintaining Occupational Exposure ALARA (IP 83750)

The station ALARA programs are guided by the the Station ALARA Committee which includes upper management personnel and is responsible for developing ALARA goals for the station, making recommendations for reducing personnel exposure, and providing guidance and recommendations on aspects of radiological operations. Several of the ALARA Committee meeting minutes were reviewed for some of the major dose producing jobs during the Unit 1, 1990 refueling outage. The review indicated that the

Committee's input appeared appropriate. The station RPS coordinates the ALARA effort at the plant with the ALARA coordinator responsible for program implementation. The ALARA coordinator supervises five ALARA RPTs drawn from the pool of experienced RPTs. The current group of RPTs joined the ALARA group only about one year ago but their RP experience ranges from about 6 to 8 years. Their performance appears satisfactory.

ALARA corporate support has improved and is more involved in assisting the station in implementing ALARA initiatives. The corporate ALARA group has recently developed an ALARA Action Plan which discusses already initiated and proposed efforts in source term reduction, improvements in shielding, and training.

The station has implemented a radiation exposure goals program to estimate yearly dose. The goals are predicated on work scope, historical data, and manpower requirements. Several of the work packages associated with the five highest dose producing jobs during the Unit 1, 1990 refueling outage were reviewed by the inspectors; the dose estimates used by the licensee appeared sound and reasonably accurate. Good quality pre- and post-job ALARA reviews were performed and historical data and lessons-learned were incorporated and used. Station workers understood and were aware of their responsibility to ALARA.

Work planning is accomplished at outage planning meetings and has improved since the appointment of an outage coordinator about one year ago. The outage coordinator is responsible for overall outage planning and implementation and has increased the involvement of ALARA personnel in work planning and performance. With the support of station management, he has increased control over emergent work. Recently ALARA input into the design change process has improved but it appears that more effort is warranted.

The inspectors discussed ALARA inplant station dose initiatives with licensee representatives. ALARA measures currently in use include use of new reactor head shields, remote handling equipment, chemistry controls, limiting material allowed into the RCA, improved pre-job briefings, and controlling the number of workers involved in dose producing jobs. The licensee also plans to install permanent scaffolding structures in the containment, and is strongly considering the removal of the Resistance Temperature Detector (RTD) Bypass Loop Line which is a significant outage dose contributor. Additional ALARA measures such as cobalt reduction, chemical decontamination, and improved mockup training facilities are also under consideration.

The dose per reactor in 1989 and 1990 was 267 and 290 person-rem respectively compared with the PWR average (1989) of 296 person-rem. The increased dose for 1990 over 1989 was caused in part by increased refueling outage work scope and unexpected increased radiation fields in Unit 1 lower containment. The station goal for 1991 is about 80 person-rem based on no planned refueling outages.

No violations or deviations were identified.

9. Licensee Event Report (LER-90-14-03)-Extreme High Radiation Area (EHRA) Door Control

On October 25, 1990, the licensee discovered that the door leading to the Unit 1 Seal Water Injection Filter cubicle, an extreme high radiation area (EHRA), was unlocked. Dose rates inside ranged from 4 R/hr at 18 inches to 22 R/hr at contact with the filter housing. This is a condition contrary to Technical Specification 6.12.2. which requires locked access doors to areas where any individual could receive a radiation exposure of greater than 1000 mrem in one hour. The licensee's investigation of this event identified no unexpected personnel exposures or unauthorized entries into the area during the approximately 1.5 hours the door was unlocked. It also revealed that the door closed but did not lock because the closure mechanism failed, and that the contractor RPT who was assigned the key did not ensure it was locked upon leaving the area; the RPT was terminated for failure to do so.

Licensee corrective action also included repair of the door closure device, further training of all RPTs on EHRA door control requirements, and issuance of a standing order requiring independent (by RPTs) verification of door locking.

This event was similar to one identified by the licensee on August 21, 1990 (NCV 315/90020-02; 316/90020-02). Corrective actions taken then appeared appropriate to significantly reduce the probability of an unlocked EHRA door. However, it was recognized that the possibility of failure of a door closure device combined with personnel failure to confirm that the door had locked upon closure could not entirely be eliminated. To further address this, the licensee planned to install automated control access device readers (ACADs) on all EHRA doors. This had not been completed when the second event occurred. The licensee reaffirmed its intention to complete the ACAD installation and further committed to install better designed closure devices on the EHRA doors by September 1991.

Failure to control EHRA doors has not been a recurrent problem at the station. The only prior event was in 1988. This matter was discussed at the exit interview and remains open pending completion of all licensee corrective actions for this matter. (Open Item 315/91008-01; 316/91008-01).

No violations or deviations were identified.

10. Audits and Appraisals (IP 83750)

The inspectors reviewed the Quality Assurance Audit (QA 90-29) conducted October 15, 1990 to December 17, 1990, several Quality Assurance surveillances from 1990, four corporate technical reviews, as well as the results of an outside agency audit and a sampling of "Condition Reports" generated during 1990.

The audits and surveillances all identified several minor problems with the RP staff not strictly adhering to and/or fully understanding the licensee's RP policies. The RPS had previously identified this as a problem mainly attributable to the large percentage of contract RPTs working at the plant and their inconsistent application of radiological controls. Similar problems were also noted during the inspectors' review of Condition Reports. To correct this problem the licensee circulated memoranda addressing procedural adherence for all RPTs to read and sign, discussed job performance with contractor management and, in 1990, set about to increase substantially the number of "in-house" technicians (from 32 to 68) and correspondingly reduce the number of routine contract technicians by the end of 1993. As evidenced by the current "in-house" staff of 50 technicians (nine junior technicians, twenty-one technicians, and twenty senior technicians), considerable progress has already been made in this area.

In addition to audits performed by QA, the inspectors examined Internal Surveillance/Evaluation Checklists conducted by RP for various performance auditable RP functions. These surveillance/evaluations were broad based. Approximately 40-45 such surveillances are assigned to various staff or supervisors of RP each year.

Overall, the licensee audits appeared to have adequately appraised the RP program, and the licensee's responses to audit recommendations appeared timely and appropriate.

The inspectors reviewed several Condition Reports (CRs) generated in 1990. In general, the investigations were thorough, adequately addressed the root causes of the incidents, and with one exception appeared to be well documented.

The exception involved the discovery of a 15 R/hr hot spot, found on the pressurizer surge line after several carpenters, who were erecting scaffolding, received higher than expected exposures. The CRs written for the event focused on the fact that two SRDs were offscale and concluded this occurred because the carpenters failed to read their SRDs in accordance with their instructions.

There appeared to be no documentation addressing the quality of job coverage and the reason why the pre-job surveys failed to find the hot spot. This matter was discussed with the RPS who acknowledged that better documentation was warranted but stated that the event had been evaluated and, as a result, the RPT covering this job was suspended for three days for failing to provide adequate radiological controls. Although the involvement of health physics is evident from the disciplinary action taken against the RPT, there is no documentation of the RP department's investigation, root cause analysis, or the actions taken to prevent recurrence. Given the level of sensitivity at which the licensee initiates a CR, it appears this situation would have merited such attention.

No violations or deviations were identified.

11. Tours

The inspectors made several facility tours throughout the inspection period to observe posting and labeling, radiological controls and to observe personnel performing various jobs.

After one tour, the whole-body frisker at the exit from the auxiliary building to the turbine building alarmed audibly indicating contamination on the shoe of an inspector and contamination on the hard hat of another. The shoe contamination was verified by resurveys on different whole-body friskers and a portable instrument. The contamination was on a small piece of duct tape that had adhered to the inspector's shoe. Subsequent evaluation by the licensee indicated no hot particle was involved. The hard hat contamination could not be isolated. Coincidentally, a station employee received audible alarms on two successive attempts due to faulty monitoring technique on the same whole-body friskers. None of the alarms were acknowledged by nearby RP personnel. Subsequent discussions with licensee representatives indicated that alarm response is a duty of an RPT working in the area but he is not always in a position to hear the alarm. The inspectors also noted that a telephone number for obtaining assistance was not posted. The inspectors also discussed this matter at the exit interview and stressed the need to strengthen access control in this area. The licensee acknowledged the inspector's comments.

The inspectors observed jobs conducted under various Radiation Work Permits during the inspection. Personnel questioned understood their RWP requirements and limitations, and used good health physics practices.

No violations or deviations were identified.

12. Open Items

Open items are matters which have been discussed with the licensee, which will be reviewed further by the inspector, and which involve some action on the part of the NRC or licensee or both. An open item disclosed during the inspection is discussed in Section 9.

13. Exit Interview

The scope and findings of the inspection were discussed with licensee representatives (Section 1) at the conclusion of the inspection on March 15, 1991. The inspectors specifically discussed the problems of EHRA door controls, the status of the ALARA program, and weaknesses noted in access controls at the turbine building egress point and in radiological controls of a job where workers had unexpectedly high SRD readings. The licensee acknowledged the inspectors' comments. Licensee representatives did not identify any documents or processes reviewed during the inspection as proprietary.