

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket Nos: 50-315; 50-316
License Nos: DPR-58; DPR-74

Report No: 50-315/99030(DRS); 50-316/99030(DRS)

Licensee: Indiana & Michigan Power Company
(American Electric Power)

Facility: D. C. Cook Nuclear Power Plant

Location: 1 Cook Place
Bridgman, MI 49106

Dates: October 25-28, 1999

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EXECUTIVE SUMMARY

D. C. Cook, Units 1 and 2
NRC Inspection Report 50-315/99030(DRS); 50-316/99030(DRS)

This inspection consisted of evaluating the licensee's performance during an exercise of the Emergency Plan. The inspection was conducted by four regional inspectors, a Senior Resident Inspector, and a Resident Inspector. No violations of NRC requirements were identified.

Plant Support

- Overall licensee performance during the 1999 exercise was adequate. The exercise was considered a successful demonstration of implementation of the Emergency Plan. (Section P4.1.c)
- Performance of shift personnel in the Control Room Simulator was effective. The shift manager and unit supervisor consistently displayed effective command and control of the operators. (Section P4.1.c)
- The Technical Support Center (TSC) staff's overall performance was effective. The TSC personnel demonstrated effective communications and teamwork. (Section P4.1.c)
- Overall performance of Operations Staging Area (OSA) management and staff was competent. Personnel were focused on the emergency and their duties, and teamwork was evident. (Section P4.1.c)
- An Inspection followup item was identified in the OSA concerning the slow dispatch of some inplant repair teams. (Section P4.1.c)
- Performance in the Emergency Operations Facility (EOF) was good. The EOF management successfully overcame several staffing and equipment problems. An inspection followup item was identified in the EOF relative to the proficiency of dose assessment personnel in utilizing the dose assessment program. (Section P4.1.c)
- An Exercise Weakness was identified concerning the failure of OSA staff to effectively communicate the status of inplant repair teams. (Section P4.1.c)
- An Exercise Weakness was identified concerning untimely relief of the Control Room Simulator staff of the responsibility to transmit notification forms to the State of Michigan. (Section P4.1.c)
- The participants and controllers initial facility critiques following termination of the exercise were self-critical and detailed. An excellent consolidated critique meeting with participants provided a detailed discussion of strengths, weaknesses, and concerns. The critiques included inputs from controllers and exercise participants. Overall licensee critique findings were consistent with the NRC evaluation team's findings. (Section P4.1.c)

Report Details

IV. Plant Support

P3 Emergency Preparedness Procedures and Documentation

P3.1 Review of Exercise Objectives and Scenario (82302)

The inspectors reviewed the 1999 exercise's objectives and scenario and determined that the exercise would acceptably test major elements of the licensee's emergency plan. The scenario provided a sufficiently challenging framework to support demonstration of the licensee's capabilities to implement its emergency plan. The scenario included several equipment failures and a large radiological release.

P4 Staff Knowledge and Performance in Emergency Preparedness

P4.1 1999 Evaluated Biennial Emergency Preparedness Exercise

a. Inspection Scope (82301)

Appendix E to 10 Code of Federal Regulations (CFR) Part 50 requires that power reactor licensees conduct biennial exercises that involve participation by offsite authorities. On October 26, 1999, the licensee conducted a biennial exercise involving partial participation by the State of Michigan, and full participation by Berrien County responders. This exercise was conducted to test major portions of the licensee's onsite and offsite emergency response capabilities. Onsite and offsite emergency response organizations and emergency response facilities were activated.

The inspectors evaluated performance in the following emergency response facilities:

- Control Room Simulator (CRS)
- Technical Support Center (TSC)
- Operations Staging Area (OSA)
- Emergency Operations Facility (EOF)

The inspectors assessed the licensee's recognition of abnormal plant conditions, classification of emergency conditions, notification of offsite agencies, development of protective action recommendations, command-and-control, the transfer of emergency responsibilities between facilities, communications, and the overall implementation of the emergency plan. In addition, the inspectors attended the post-exercise critiques in each of the above facilities to evaluate the licensee's initial self-assessment of exercise performance.

b. Emergency Response Facility Observations and Findings

b.1 Control Room Simulator

Exercise staff performance in the Control Room Simulator (CRS) was effective. The shift manager and unit supervisor consistently displayed effective command and control of the operators. Operators consistently used three-way communications. Periodic shift management briefings kept personnel aware of current conditions, priorities and desired goals. Operator statements and actions indicated a detailed understanding of developing plant conditions.

In general, significant changes in plant status were immediately reported to shift management. The inspectors noted one occasion when a reactor operator delayed informing the shift management of a problem involving the operation of the hydrogen recombiners. Following the receipt of a recombiner high temperature alarm, the inspectors observed the indicated recombiner temperature exceeding the 1400°F maximum operating temperature specified in Annunciator Response Procedure (ARP) 02 Operations Head Procedure (OHP) 4024.203, "Annunciator #203 Response: Ventilation," Revision 5. Despite repeated recombiner power reductions by the reactor operator, the indicated recombiner temperature continued to exceed 1400°F. The operator did not promptly report the high temperature condition or the difficulty in controlling recombiner temperature to the unit supervisor or shift manager.

During discussions with the simulator controllers, the inspectors learned that the simulator did not accurately model the expected behavior of the hydrogen recombiners. The licensee critique additionally indicated that some of the recombiner switches in the simulator have malfunctioned, and replacements were on order. The licensee had previously documented the need to upgrade the simulator hydrogen recombiner temperature indication in simulator change request number 98091, dated September 21, 1998.

Operators proficiently utilized their procedures, including emergency operating procedures and emergency plan implementing procedures. CRS personnel properly diagnosed reactor events at the Alert and Site Area Emergency levels, and correct emergency classifications were made in a timely manner. Event notification message forms and verbal communications to State of Michigan and the NRC personnel were completed in a detailed and timely manner.

Transfer of command and control of emergency responsibilities from the Acting Site Emergency Coordinator (Shift Manager) to the TSC's Site Emergency Coordinator (as the TSC was ready for assumption of command and control of response efforts) was orderly and timely. Communications between the CRS and TSC staffs were maintained throughout the exercise, but information and status reports were sometimes delayed. The inspectors noted that information concerning reactor plant and repair team status was not consistently communicated between the CRS and other emergency response facilities in a timely manner. Examples of communications problems included the following:

- The TSC staff continued to prioritize a repair team activity involving the opening of a failed reactor trip breaker after the activity was no longer required to support plant operation. CRS management requested a repair team to open the failed trip breaker to support reset of a safety injection signal and subsequent switchover to cold leg recirculation. At 9:15 a.m., per the scenario, the exercise controllers opened the trip breaker, which then allowed the reactor operators to successfully reset the safety injection signal. The TSC staff continued to track the dispatch of the trip breaker repair team for an additional twenty minutes after the trip breaker was opened.
- Because of delays in obtaining repair team reports from the OSA, the control room staff was unsure if the accumulators would be isolated in a timely manner. The CRS Assistant Shift Manager requested a repair team to energize the accumulator discharge motor operated valves in order to isolate the safety injection accumulators in accordance with procedure 02-OHP 4023.E-1, "Loss of Reactor or Secondary Coolant," Revision 8, Change 1, step 16. In order to prevent entry of nitrogen from the accumulators into the reactor coolant system, the operators vented nitrogen to the containment atmosphere in accordance with the emergency operating procedure. The unnecessary venting of additional non-condensable gases to the containment could have exacerbated control of elevated containment pressure during an event. However, at the time of the venting, containment pressure was less than 5 psig. The licensee initiated Condition Report (CR) P-99-26485 to address the failure of the OSA staff to communicate the status of assigned actions to the TSC and CRS. The inspectors identified the failure of OSA staff to effectively communicate the status of repair teams as an Exercise Weakness. This item was tracked as an Inspection Followup Item (IFI 50-315/99030-01; 50-316/99030-01).

Initial dose projections were made in the CRS utilizing the Dose Assessment Program. However, due to significant delays in the transfer of state facsimile communications from the CRS to the EOF, the non-licensed Auxiliary Equipment Operators (AEOs), who were providing communications, were prevented from being reassigned to other response activities. This is discussed further in the EOF observations and findings section (b.4).

b.2 Technical Support Center

The Technical Support Center (TSC) staff's overall performance was effective. Activation of the facility was rapid and efficient. Minimum staffing was achieved within ten minutes of the Site Area Emergency declaration. The TSC's Site Emergency Coordinator (SEC) accepted command and control of accident response within twenty-six minutes of the Site Area Emergency declaration.

Command and control of the facility by the SEC was good. The initial briefing defined plant status and provided guidance to the TSC staff. Subsequent, periodic briefings were concise and informed the staff of current status, priorities, and issues. Significant changes in plant conditions were promptly announced as they occurred, instead of waiting for the next briefing.

Status boards were effectively maintained and updated, with one exception of the Emergency Status Board. Conversely, the Tasks and Priorities status board continuously tracked the OSA repair teams' priorities and status.

Transfers of emergency responsibility from the CRS to the TSC and to the EOF were crisp and occurred in a seamless manner. The SEC ensured the staff was aware of the current status of communications and which facility was responsible for the next notifications.

TSC personnel demonstrated effective communications and teamwork. The SEC maintained headset communications with CRS and EOF staffs, to provide and receive current emergency conditions. Noise levels were maintained appropriately low. When necessary, the SEC emphasized the need for reduced noise levels.

Relative priorities assigned by TSC management did not seem to have any impact on the OSA's emergency response teams dispatch times. The SEC did not emphasize to the OSA manager the need to dispatch teams more expeditiously.

The Radiation Assessment Coordinator (RAC) maintained appropriate awareness of plant and offsite radiological conditions. For example, security officers were told early in the exercise to put on electronic dosimeters which aided in determining onsite radiation levels. The RAC also requested the TSC managers to expedite evacuation of non-essential personnel before radiation levels affected the primary evacuation route.

The Emergency Response Data System was rapidly activated. The system experienced some technical difficulties that caused the system to disconnect twice. The system responded as designed, and automatically reconnected to the NRC system.

Plant personnel accountability was not accomplished within the goal specified in procedure PMP 2081 EPP.103, revision 3, dated May 11, 1999, "Assembly, Accountability, and Evacuation of Plant Personnel." Section 5.6.2 specified that accountability be accomplished within thirty (30) minutes of the start of an emergency. A simulated accountability was reported as being completed approximately 57 minutes after declaration of the Site Area Emergency.

b.3 Operational Staging Area (OSA) and Emergency Response Teams

The overall staff performance in the OSA was competent. Personnel were focused on the emergency and their duties. Teamwork among the staff in the facility was evident.

Setup and activation of the facility was rapid, with personnel arriving within six minutes of the Site Area Emergency declaration. Facility staff appropriately signed in on the facility sign in status board as they arrived at the OSA. The facility was staffed and effectively activated within 31 minutes of the emergency declaration, well within the one hour requirement.

Upon arrival, the Radiation Protection Director (RPD) proactively coordinated staff activation activities, verified that radiation protection technicians, chemistry technicians, and maintenance personnel were prepared for response, and then initiated access control at both ends of the facility.

Offsite Monitoring Teams efficiently prepared their equipment, obtained briefings from the RPD, and were dispatched within 39 minutes of the Site Area Emergency declaration. Control of the offsite teams was accomplished by a radio operator, who performed his responsibilities well. The RPD and Skills Supervisor provided detailed briefings to all monitoring teams dispatched from the OSA.

Facility command and control by the OSA Manager (OSAM) was generally good. Periodic briefings were concise; however, not all staff were attentive, as they continued their phone communications and discussions. The OSAM and Assistant OSAM effectively communicated with the TSC regarding response team requests and team priorities. Facility status boards were well maintained and continuously updated. This became important when TSC management directed the OSA management to change numerous response teams priorities prior to the teams' dispatch. Frequent habitability surveys were conducted in the OSA.

Dispatch of some response teams was untimely. Examples included response team number three, assigned to open a reactor trip breaker, which was initially identified as a priority three team, was later changed to a priority two team, and changed again to a priority one team. Response team number three was then placed on standby due to high radiation levels and was never dispatched from the OSA. Response teams took between 26-58 minutes to dispatch from the time they were requested by the TSC. The licensee's evaluation and corrective actions for the untimely dispatch of OSA teams will be tracked as an Inspection Followup Item (IFI 50-315/99030-02; 50-316/99030-02).

Priorities assigned to response teams had no apparent impact on the timeliness of team dispatch. Independent of the team's priority, team selection, donning of protective clothing, obtaining a detailed briefing, and obtaining appropriate tools or equipment took a certain amount of time. This amount of time was not affected by the priorities assigned to the OSA response team as indicated by the above dispatch times. As an example, response team number five, identified as the "highest priority" took 40 minutes to dispatch after being requested by TSC management.

The inspector accompanied response team number five from selection to briefing, dispatch, completion of task, return to the OSA, and debriefing. The briefing was comprehensive, including task specifics, location and route to the equipment involved, requested communications frequency, turnback dose/dose rates, wind direction, dose rates expected, plant conditions, and protective clothing. Good radiological practices were used as the approach to the area was continuously monitored by a radiation protection technician (RPT). When the team concluded their observations and communicated back to the OSA, they were advised that a radiological release had been reported.

The area dose rates were checked and the team discovered they were in a radiation field of 84 rem per hour. They immediately proceeded to a low dose area where they reestablished communications with the OSA for additional directions.

Upon the team's request to return to the facility, the RPT reported that they had been downwind of the release and may have been contaminated. An OSA manager indicated an appropriate return route through the plant, where they were to remove their protective clothing and respirators and obtain contamination surveys.

Good decontamination discussions by the RPD and the response team were noted by the inspector when the team was found to be contaminated. A thorough debriefing was conducted for the returning team, which included the team's observations, doses received, dose rates observed in the field, and status of team members' contamination.

b.4 Emergency Operations Facility (EOF)

The EOF had been relocated to the licensee's offices in Buchanan, Michigan since the last (1997) NRC-evaluated exercise. The EOF's layout facilitated information sharing among response team members, and included work space for more private telecommunications with senior State officials and discussions between senior EOF responders.

During the first two hours of the exercise, EOF management successfully overcame several EOF staffing and equipment problems. For example, the Recovery and Control Manager (RCM), EOF Manager, and Communications Director monitored ongoing EOF staffing by pre-selected personnel and determined that the senior of three key protective measures staff would not be reporting for duty due to (actual) illness. Faced with a decision of whether to delay declaring the EOF fully operational and allowing EOF staff to reduce the burdens on onsite responders, the RCM correctly conferred with available protective measures staff and decisively appointed one of them to lead the group until another qualified, senior staff member could report to the EOF.

The RCM became concerned with the operability problems of two desk top computers used to perform offsite dose projections. Associated software provided the capability of printing offsite dose projection data directly on the form used to transmit updated event-related information to State officials at 15 minute intervals. The RCM had to encourage a computer specialist and protective measures staff to increase their efforts to restore at least one of these computers to more than intermittent service. Dose assessment personnel initially did not appear to be proficient in the use of the Dose Assessment Program (DAP). The proficiency of dose assessment personnel in use of the dose assessment program will be tracked as an Inspection Followup Item (IFI 50-315/99030-03; 50-316/99030-03).

A negative impact resulting from the delay in EOF staff restoring a dose projection computer to continuous service was that Auxiliary Equipment Operators (AEOs) in the CRS were told to continue generating and transmitting the 15 minute message forms to offsite officials for about 40 minutes after the EOF's RCM assumed overall command of the licensee's event response. Apparently, TSC staff were unable to relieve the AEOs

of this notification task so that the AEOs could be assigned to other duties. The inspectors identified the failure to relieve the CRS shift staff, in a timely fashion, of the responsibility to transmit notification forms to the State of Michigan as an Exercise Weakness. This item is tracked as an Inspection Followup Item (IFI 50-315/99030-04; 50-316/99030-04).

Coordination of the shift of notification form transmission was ineffective. As a result, between 9:50 a.m. and 10:30 a.m., offsite officials received three update message forms from CRS staff and three update message forms from EOF staff. The transmittal of update message forms from two response facilities resulted in offsite officials being given conflicting wind speed and direction information. The CRS staff's three message forms included incorrect wind directions from 282 to 286 degrees and incorrect wind speeds of 7.6 to 8.1 miles per hour, while EOF's staff's corresponding message forms included the correct 315 degrees wind direction and correct wind speed of 9 miles per hour. This was an "exercise artifact," as the meteorological information transmitted by CRS staff represented actual conditions, while the information transmitted by EOF staff represented conditions postulated in the exercise's scenario.

The RCM demonstrated effective command and control of the EOF staff and was decisive when correctly making major decisions. He clearly communicated his expectations to EOF staff and promptly informed them of significant changes in plant status, major decisions, and higher response priorities. The RCM closely monitored emergency classification criteria related to the status of the three fission product barriers. The RCM correctly declared a General Emergency within 15 minutes of the existence of the related degradations in plant conditions and quickly selected a procedurally correct offsite Protective Action Recommendation (PAR).

Telephone communications with State officials following major changes in plant status and major decisions were timely and accurate. The RCM personally informed his State counterpart of the General Emergency declaration, its bases, the related PAR, and the correct wind direction. The RCM also communicated changes to the release's status and top priorities to his State counterpart and correctly responded to questions. When a county official requested guidance on a radiological exposure control concern, several EOF staff promptly interfaced and correctly forwarded this concern to State Emergency Operations Center counterparts for resolution.

The use of status boards within the EOF varied in quality. Status board writers were relatively slow to post information on the Emergency Action Level associated with the Shift Manager's Site Area Emergency declaration. Several status boards were effectively used to depict the licensee's PAR versus protective actions chosen for implementation by State officials. In contrast, chronological event information posted on an electronic copy board was less valuable. Relevant times were not always posted with information printed on this copy board. Although information about inplant damage control teams was occasionally posted on this status board, the information did not always indicate whether an inplant team's mission was successful or whether a listed team had yet been dispatched. Although a meteorological forecast was obtained, it was not posted on an EOF status board.

After the simulated release was terminated, the RCM assigned select EOF staff to an initial onsite recovery planning team. The relevant procedure was reviewed. The recovery planning staff and the senior State official were correctly advised that the situation should remain classified as a General Emergency and that no relaxation to the current offsite PAR was prudent. The recovery planning staff acceptably discussed higher priority action items, including assessing the extent of fuel damage and options for reducing radiation levels within the containment building. It was correctly concluded that any decision to initiate a controlled release of radioactive gas from containment must first be discussed with State, local, and Federal officials.

b.6 Scenario and Exercise Control

The exercise scenario was challenging and exercised the majority of the licensee's emergency response capabilities. The scenario included several equipment failures, and a major radiological release. No instances of controller prompting were observed.

b.7 Licensee Critiques

The inspectors attended the licensee's self-critiques in the CRS, TSC, OSA, and EOF which occurred immediately after the exercise. Exercise controllers solicited verbal and written inputs from the participants in addition to providing the participants with the controllers' initial assessments of personnel performance. The inspectors concluded that these initial critiques were self-critical, thorough and in close agreement with the majority of the inspectors' observations. A common theme among the critiques was that some of the pagers did not work during emergency response organization activation and the pager codes were unfamiliar.

c. Summary of Conclusions

Evaluation of the license's exercise performance was as follows:

- Overall licensee performance during the 1999 exercise was adequate. The exercise was considered a successful demonstration of implementation of the Emergency Plan.
- Performance of shift personnel in the Control Room Simulator was effective. The shift manager and unit supervisor consistently displayed effective command and control of the operators.
- The Technical Support Center staff's overall performance was effective. TSC personnel demonstrated effective communications and teamwork.
- Overall performance of OSA management and staff was competent. Personnel were focused on the emergency and their duties. Teamwork was evident. An Inspection followup item was identified relative to the slow dispatch of some inplant repair teams.
- Performance in the Emergency Operations Facility was good. EOF management successfully overcame several EOF staffing and equipment

problems. An inspection followup item was identified relative to the proficiency of dose assessment personnel in utilizing the dose assessment program.

- Two Exercise Weaknesses were identified relating to (1) communicating to the CRS shift staff the status of completion of inplant repair team assigned tasks, and (2) untimely relief of the Simulator Control Room shift staff of the responsibility to transmit notification forms to the State of Michigan.
- The participants' and controllers' initial facility critiques following termination of the exercise were self-critical and detailed. An excellent consolidated critique meeting with participants provided a detailed discussion of strengths, weaknesses, and concerns. The critiques included inputs from controllers and exercise participants. Overall licensee critique findings were consistent with the NRC evaluation team's findings.

P8 Miscellaneous EP Issues

- P8.1 (Closed) Inspection Followup Item No. 50-315/97013-02; 50-316/97013-02: During the 1997 exercise, the licensee identified that a controller had to intervene during PAR development when containment radiation levels exceeded 25,000 Rem/hour in the containment building. Exercise participants were aware that a revised PAR was required, but an attachment to the procedure proved confusing. During this exercise, procedurally correct PARs were determined in a timely manner. This item is closed.
- P8.2 (Closed) Inspection Followup Item No. 50-315/97013-03; 50-316/97013-03: During the 1997 exercise, there were several instances where the licensee's exercise controllers simulated the response teams to fix needed equipment to keep the exercise timeline on track. Controllers injected this information without informing other participants. During this exercise, controllers properly controlled the progression of the scenario. This item is closed.

V. Management Meetings

X1 Exit Meeting Summary

The inspectors presented the inspection results to members of licensee management at the conclusion of the inspection on October 28, 1999. The inspection team leader stated that overall exercise performance was good, two Exercise Weaknesses (Inspection Followup Items) had been identified, and the licensee critiques were effective. The licensee acknowledged the preliminary findings presented. The inspectors asked the licensee whether any materials examined during the inspection should be considered proprietary. No proprietary information was identified.

PARTIAL LIST OF PERSONS CONTACTED

Licensee

C. Bakken, Site Vice President
S. Chambers, Radiation Protection
R. Cook, Regulatory Affairs Compliance Engineer
R. Gaston, Compliance Manager
R. Krieger, SPS
W. Kropp, Performance Assurance
D. Kunsemiller, Technical Assistant to Senior Vice President
D. Loope, SPS
M. Marano, Director Business Affairs
W. McRae, RA
T. Noonan, Plant Manager
J. Pollock, Director, Performance Assurance
M. Rencheck, Vice President, Engineering
J. Smith, SPS
C. Vanderniet, Performance Assurance
G. Vaughn, Vice-President, Central and Southwest Utilities
L. Weber, Operations Manager
L. Wolf, Radiochemist
D. Wood, Radiation Protection Superintendent

Those listed were present at the October 28, 1999, exit meeting.

NRC

J. Grobe, Director, Division of Reactor Safety, Region III

INSPECTION PROCEDURES USED

IP 82301: Evaluation of Exercises for Power Reactors
IP 82302: Review of Exercise Objectives and Scenarios for Power Reactors

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

50-315/316/99030-01	IFI	Exercise Weakness, the failure of the OSA staff to effectively communicate the status of repair teams.
50-315/316/99030-02	IFI	The untimely dispatch of OSA teams.
50-315/316/99030-03	IFI	The proficiency of dose assessment personnel in use of the DAP.
50-315/316/99030-04	IFI	Exercise Weakness, the failure to relieve the CRS shift staff, in a timely fashion, of the responsibility to transmit notification forms to the State of Michigan.

Closed

50-315/316/97013-02	IFI	During the 1997 exercise, a controller had to intervene during PAR development; a revised PAR was required, but an attachment to the procedure proved confusing.
50-315/316/97013-03	IFI	During the 1997 exercise, there were several instances where exercise controllers injected information without informing other participants.

Discussed

None.

LIST OF ACRONYMS USED

AEO	Auxiliary Equipment Operator
ARP	Annunciator Response Procedure
CFR	Code of Federal Regulations
CR	Condition Report
CRS	Control Room Simulator
DAP	Dose Assessment Program.
DPR	Demonstration Power Reactor
DRS	Division of Reactor Safety
EOF	Emergency Operations Facility
FEMA	Federal Emergency Management Agency
IFI	Inspection Follow up Item
NRC	Nuclear Regulatory Commission
NRR	Office of Nuclear Reactor Regulation
OHP	Operations Head Procedure
OSA	Operations Staging Area
OSAM	Operations Staging Area Manager
PAR	Protective Action Recommendation
PDR	NRC Public Document Room
PRR	Public Reading Room
PSIG	Pounds per square inch, gage
RAC	Radiation Assessment Coordinator
RCM	Recovery and Control Manager
RPD	Radiation Protection Director
RPT	Radiation Protection Technician
SEC	Site Emergency Coordinator
SRI	Senior Resident Inspector
TSC	Technical Support Center