

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Report Nos. 50-315/94020(DRP); 50-316/94020(DRP)

Docket Nos. 50-315; 50-316

License Nos. DPR-58; DPR-74

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

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

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

Inspection Conducted: September 24 through October 29, 1994

Inspectors: J. A. Isom  
D. J. Hartland  
J. L. Belanger

Approved By: Wayne J. Kropp  
Wayne J. Kropp, Chief  
Reactor Projects Section 2A

11/17/94  
Date

Inspection Summary:

Inspection from September 24 through October 29, 1994  
(Report Nos. 50-315/94020(DRP); 50-316/94020(DRP))

Areas Inspected: Routine, unannounced safety inspection by the resident and region-based inspectors of action on previous inspection findings; operational safety verification; current material condition; housekeeping and plant cleanliness; radiological controls; security; maintenance and surveillance activities; engineering and technical support; and refueling activities.

Results: Of the nine areas inspected, one non-cited violation was identified regarding the failure to perform adequate reportability reviews (paragraph 2.a). Three inspection follow-up items were identified that pertained to: the review of the licensee's fastener control process (paragraph 4.b); the review of future reactor vessel head penetration inspections (paragraph 5.a); and repair of loose reactor head penetration guide funnels (paragraph 5.b).

The following is a summary of the licensee's performance during this inspection period:

Plant Operations:

Overall performance in this area was good. Operators responded well to several equipment anomalies on Unit 1 and were able to successfully



investigate and address these deficiencies. The operators' use of the new computer system for investigating these anomalies was excellent. Operators needed to improve on the awareness of equipment deficiencies on Unit 2 as various systems were being restored to an operable condition near the end of the Unit 2 refueling outage.

#### Maintenance and Surveillance:

Overall performance in the maintenance and surveillance area was good. The quality of the maintenance work performed by the maintenance personnel was generally excellent.

#### Engineering and Technical Support:

Overall performance in the engineering and technical support area was good. The licensee addressed the damage on the Unit 2 steam generator tubes caused by the pressure pulse cleaning equipment. Also, the licensee conducted a thorough inspection of the Unit 2 reactor head penetrations to determine whether there were indications of weld or material defects. Three indications were found on one penetration, and were resolved satisfactorily with the material engineers from the Office of Nuclear Reactor Regulations. The inspectors had additional questions on how the engineers were addressing loose reactor head penetration guide funnels.

#### Security:

The security organization continued to effectively implement the requirements of the approved security plan. The contract security force performed their duties with a high degree of professionalism. The upgrading of the security computer system and the alarm stations was indicative of excellent management support for the program.



## DETAILS

### 1. Persons Contacted

- # A. A. Blind, Site Vice President/Plant Manager
- \*K. R. Baker, Assistant Plant Manager/Operations Superintendent
- \*L. S. Gibson, Assistant Plant Manager-Technical
- \*J. E. Rutkowski, Assistant Plant Manager, Support
- \*T. P. Beilman, Maintenance Superintendent
- P. F. Cardeaux, Training Superintendent
- D. L. Noble, Radiation Protection Superintendent
- \*T. K. Postlewait, Site Engineering Support Manager
- \*P. G. Schoepf, Materials Management Superintendent
- #\*J. S. Wiebe, Quality Assurance & Control Superintendent
- L. H. Vanginhoven, Project Engineering Superintendent
- \*G. A. Weber, Plant Engineering Superintendent
- A. A. Lotfi, Site Design Superintendent
- # W. M. Hodge, Plant Protection Superintendent
- # S. R. Gane, Administrative Compliance Coordinator
- # L. L. Smead, Security Operations Supervisor

#Denotes those individuals attending the interim security exit interview conducted on September 29, 1994.

\*Denotes those individuals attending the exit interview conducted on November 2, 1994.

The inspectors also had discussions with other licensee employees, including members of the technical and engineering staffs, reactor and auxiliary operators, shift engineers and foremen, and electrical, mechanical and instrument maintenance personnel, and contract security personnel.

### 2. Action on Previous Inspection Findings (92701)

- a. (Closed) Unresolved Item (50-315/94014-05(DRP): Condition Report (CR) 94-1063 documented a concern regarding whether the Unit 1 hatch inspections were performed for a Mode 5 to Mode 4 change on May 25, 1994. At the time, the licensee identified that two hatches which separate upper and lower containment were not inspected as required by Technical Specification (TS) 4.6.5.5.2. Although the licensee took action to ensure that these hatches were inspected prior to making the mode change, CR 94-1063 was initiated to document the concern that potentially, not all the required inspections were completed prior to a previous Mode 5 to Mode 4 change on May 2, 1994.

The inspectors reviewed the licensee's completed investigation of CR 94-1063 and determined that the CR did not address whether the TS surveillance requirement was violated during the mode change made on May 2, 1994. In addition, the inspectors determined that



the CR evaluator failed to obtain the reportability concurrence for the event from the plant Nuclear Safety and Assessment (NS&A) Department, as required by their "Corrective Action" procedure, PMI 7030, Revision 20.

The licensee subsequently determined that not all the required hatch inspections were completed prior to the Mode change on May 2, 1994, and submitted a Licensee Event Report (LER) 315/94010 to document the non-compliance with the TS. The inspectors will review the licensee's root cause evaluation and corrective action to this event, as documented in the LER, at a later date.

As follow-up to the unresolved item, the inspectors reviewed the licensee's completed investigation of CR 94-1369. The inspectors agreed with the licensee's conclusion that the other 10 CRs that were originally closed out without the NS&A department's review were not reportable. In order to prevent future inadequate reportability reviews, the licensee committed to initiate the following actions:

- Revise the implementing documents for the corrective action program to provide clear instructions for the initiators, the condition report assessment group (CAG), the evaluators and the management reviewers.
- Upgrade the training for the condition report investigators to include reportability reviews.
- Review the lessons learned with the investigators and include the lessons learned material in future training.
- Revise the CR form to provide a job aid to ensure that all critical activities are properly completed.
- Revise the maintenance department traveler form used to track CR investigation progress to include a due date and that a reportability determination is required.
- Add a reportability determination field to the CR investigation status summary to assist licensee management in their oversight of the program.

Although this event involved the licensee's failure to perform adequate reportability reviews as required by PMI 7030, the safety significance of the problem met the criteria for a Severity Level V violation. The licensee took immediate action to correct the problem and has committed to comprehensive action to prevent recurrence. Therefore, the violation is not being cited because the criteria specified in Section VII.B.1 of the "General Statement of Policy and Procedure for NRC Enforcement Actions," (Enforcement Policy, 10 CFR Part 2, Appendix C), were satisfied.



- b. (Closed) Unresolved Item 50-315/94002-12(DRP): The inspectors had concerns on whether there was a safety review performed prior to the Operations Department Superintendent's authorization to allow the operation of the component cooling water system to a temperature of 105 degrees Fahrenheit. This unresolved item is closed based on the issuance of violation 50-315/94007-01(DRS).
- c. (Closed) Unresolved Item 50-315/94004-07(DRP): During the Unit 1 reactor coolant system (RCS) drain-down evolution in February 1994, the inspectors were concerned that the licensee's work schedule and planning process either contributed to or exacerbated the operators' inability to adequately control the RCS drain-down evolution.

During the Unit 2 RCS drain-down evolution in September 1994, the inspectors observed that the Operations Department management stressed safety as the operators' number one priority. The inspectors did not observe any scheduling pressure on the operators during the Unit 2 drain-down evolution.

One non-cited violation was identified. No deviations were identified.

### 3. Plant Operations

The licensee operated Unit 1 at full power throughout the inspection period without any significant operational problems.

The licensee began the inspection period with Unit 2 in Mode 6 with all the fuel unloaded from the core. The licensee reloaded the core and installed the reactor head during the inspection period. Unit 1 entered Mode 5 on October 25, 1994. The unit remained in Mode 5 at the end of the inspection period.

#### a. Operational Safety Verification (71707)

The inspectors verified that the facility was being operated in conformance with the licenses and regulatory requirements, and that the licensee's management control system was effective in ensuring safe operation of the plant.

On a sampling basis the inspectors verified proper control room staffing and coordination of plant activities; verified operator adherence with procedures and technical specifications; monitored control room indications for abnormalities; verified that electrical power was available; and observed the frequency of plant and control room visits by station management. The inspectors reviewed applicable logs and conducted discussions with control room operators throughout the inspection period. The inspectors observed a number of control room shift turnovers. The turnovers were conducted in a professional manner and included log reviews, panel walkdowns, discussions of maintenance and



surveillance activities in progress or planned, and associated LCO time restraints, as applicable.

The inspectors also accompanied an auxiliary equipment operator on a shiftly tour of the auxiliary building. The inspectors did not identify any concerns.

The inspectors reviewed the following system anomalies during this inspection period:

1) Leaking Pressurizer Power-Operated Relief Valve (PORV)

The inspectors observed the operators' use of the new computer system to graphically trend abnormal parameters. On October 16, 1994, operators received a PORV discharge temperature high alarm on Unit 1. There are three PORVs for the Unit 1 pressurizer. After all three block valves to each of the PORVs were isolated, the operators opened the isolation valves one at a time. By trending several parameters such as the PORV tailpipe discharge temperature and the pressurizer relief tank pressure and level, the operators were able to determine which PORV was leaking. Through the use of the graph the operators determined that NRV-151 was the leaking PORV. NMO-151, which is the associated isolation valve to NRV-151, was shut and Action Request (AR) No. 81702 was written to repair the leaking PORV.

2) Pressurizer Pressure Spikes:

On October 23, 1994, the operators observed pressure spikes on the Unit 1 pressurizer. The operators identified that the pressure spikes were caused by a malfunctioning spray valve, NRV-164. The spray valve was placed in manual control and AR 82493 was written to investigate and repair the cause of the rough operating characteristic associated with NRV-164.

3) 600 Volt Bus Ground:

The inspectors observed that the operators were aggressive in investigating the grounds on the electrical distribution system. When annunciator alarm "600 V Bus 11CMC Ground" was received on Unit 1, the operators, with the assistance from the plant engineers, successfully performed ground isolation. The ground alarm to Bus 11CMC, which is a 600 volt non-vital alternating current bus, was cleared by opening the downstream breaker from Bus 11CMC to the grounded equipment. The ground was eventually found to be coming from the control air dryer motor. AR 81849 was written to repair this grounded condition.

4) EDG Fuel Oil Pump Auto-Start Circuit:

On October 27, 1994, during a routine walkdown of the Unit 2 control room panels, the inspectors reviewed an action request (AR) tag that was attached next to the "AB" emergency diesel generator (EDG) fuel oil transfer pumps. The AR tag, no. A0081620, was dated October 15, 1994, and the tag stated that the pumps would have to be manually started if the level in the day tank was reduced to less than 100 gallons. While trying to gather additional information about this problem from the operators, the inspectors found that the operators were not aware of this deficient condition.

The inspectors were concerned that the operators were not aware of a condition which appeared to require operator action to keep the EDG operating. Although the inspectors verified that the day tank low level alarm was functional and would have alerted the operators, the condition could have added a distraction to the operators during an event that required EDG operation.

Later that day, operations attached a caution tag to the pump switches to provide more visibility of the condition to the operators. Operations also upgraded the priority of the action request to ensure prompt resolution. In addition, a few days later, the operators added the deficiency to the unit turnover sheet.

On October 31, the licensee determined that the cause of the deficiency was an inaccurate local day tank level indication, which was independent of the fuel oil pump auto start and alarm circuit. The local day tank level indication was reading up to 50 gallons low. The Instrument and Controls technicians calibrated the local level detector to indicate properly. Since the pumps were designed to auto start when the day tank was reduced to about 120 gallons, it was postulated that the actual tank level never reached the 120 gallon level to initiate the auto start feature of the EDG fuel oil transfer pumps. The licensee plans to perform a post-maintenance test which will verify the auto-start feature of the transfer pumps.

The inspectors have no further concerns regarding this issue as overall operator awareness of plant conditions during the Unit 2 refueling outage was good, and this appears to be an isolated event.

b. Current Material Condition (71707)

The inspectors performed plant and selected system and component walkdowns to assess the general and specific material condition of



the plant, to verify that work requests had been initiated for identified equipment problems. Walkdowns included an assessment of the buildings, components, and systems for proper identification and tagging, accessibility, fire and security door integrity, scaffolding, radiological controls, and any unusual conditions. Unusual conditions included but were not limited to water, oil, or other liquids on the floor or equipment; indications of leakage through ceiling, walls or floors; loose insulation; corrosion; excessive noise; unusual temperatures; and abnormal ventilation and lighting.

On October 25, 1994, during a routine tour of the Unit 2 "AB" EDG fuel oil transfer pump room, the inspector observed that a herculite cover was draped over the transfer pumps. Although a painting contractor was painting the walls in the room, painting was not being performed near the transfer pumps. Even though the herculite cover did not appear to impose an immediate equipment hazard at the time, the inspectors were concerned that, in the event that the pumps were required to start, the herculite could potentially get caught in the rotating shaft or prevent the pump motor from receiving the adequate airflow for cooling.

The inspectors notified an auxiliary equipment operator (AEO) who was in an adjacent area. As immediate action, the AEO verified that the cover was removed. In addition, operations shift management notified the painter's supervisor, who counseled the individual on the importance of minimizing impact on operational equipment during painting and cleaning activities in the plant. The licensee also documented the discrepancy in a CR 94-2205 for a follow-up investigation. The inspectors do not have any further concerns regarding this issue, as it appears to be an isolated incident.

c. Housekeeping and Plant Cleanliness

The inspectors monitored the status of housekeeping and plant cleanliness for fire protection and protection of the safety-related equipment from intrusion of foreign matter. The inspectors observed that, overall, plant housekeeping was good during the inspection period. However, the inspectors noted that some Unit 2 areas, such as the start-up flash tank area, contained excessive amounts of clutter and stray tools. The inspectors notified plant management of the observations. The plant management agreed with the inspectors that the present condition of the Unit 2 startup flashtank room was inconsistent with the plant's housekeeping standards. The licensee informed the inspectors that the area will be cleaned up after several on-going work activities were completed in this area.



d. Radiological Controls (71707)

The inspectors verified that personnel were following health physics procedures for dosimetry, protective clothing, frisking, posting, etc., and randomly examined radiation protection instrumentation for use, operability, and calibration. The inspectors did not identify any concerns in this area during the inspection period.

e. Security (71707 & 81070)

Each week during routine activities or tours, the inspectors monitored the licensee's security program to ensure that observed actions were being implemented according to the approved security plan. The inspectors noted that persons within the protected area displayed proper photo-identification badges and those individuals requiring escorts were properly escorted. The inspectors also verified that checked vital areas were locked and alarmed. Additionally, the inspectors also observed that personnel and packages entering the protected area were searched by appropriate equipment or by hand.

A routine physical security inspection was conducted September 26 through 29, 1994, by a Region III security inspector. Inspection activities included a review and evaluation of protected area detection equipment; vital area control of personnel and equipment, alarm stations and communications; testing and maintenance of security equipment; and follow-up on a concern relating to the falsification of an employment application which was submitted to obtain unescorted access privileges to the protected areas. The following are the results of this inspection:

1) Program and Equipment

The security program was found to be effectively implemented and appropriately directed toward public health and safety. Management actions and support for the program were effective with day-to-day implementation of security activities and maintenance support for these activities being excellent. The audit and self-assessment activities were adequate in scope and in depth. The security organization continued efforts to enhance the security program by identifying security concerns and by taking corrective actions through the use of a tracking and trending program. The experience level of the licensee management organization and contract security staff was viewed as a strength. Turnover rate of the contract security force was low. There were no major program weaknesses identified.



The licensee was replacing the security uninterruptible power supply during the inspection period. The process was expected to take fourteen days and required the licensee to submit a temporary change to their approved security plan under 10 CFR 50.54(p), describing the compensatory measures. This requirement was discussed at the interim exit meeting conducted by the security inspector on September 29, 1994.

The licensee was also pursuing a major security computer system replacement program. The factory acceptance test was performed and witnessed by the licensee at the vendor location in August 1994. Eighty-five tests were completed to ensure that the system operated as specified in the design specification. The central alarm station (CAS) and the main computer equipment were installed in new locations. Completion of the project was slated for July 1995. The licensee was expected to submit a security plan change under 10 CFR 50.54(p) describing the measures to be taken during the transition process from the existing CAS to the new one. The timely submission of this plan change was also discussed at the interim exit meeting.

The inspector reviewed a weapon related incident in which a carbine (a contingency weapon) was left unattended in a restroom by a security officer for approximately twenty minutes. The significance of the event was lessened by the fact that the weapon was not loaded. However, because the licensee was concerned that the event would have a negative effect on the credibility of the security force, the officer involved received an appropriate discipline and the event was communicated to the security force.

2) Falsification of Employment Application

On or about February 4, 1994, an application submitted by a contract employee to obtain an unescorted access indicated that the individual had no military service. Finger print cards were taken and submitted by the licensee to the Federal Bureau of Investigations (FBI). The individual was badged for protected and vital area access on February 10, 1994, and employment was terminated on March 28, 1994. The individual was a laborer, specifically, a member of the ice crew working on the ice baskets during the Unit 1 outage. This was the first time that the individual had worked at the Cook plant.

The finger prints were returned by the FBI to the licensee on April 19, 1994, and reviewed that day by licensee security personnel. The FBI records showed an arrest for desertion. The licensee's contract investigation agency was able to verify that the individual was discharged under other than honorable conditions from the military. The

reason given was conduct: commission of a serious offense. By letter dated June 23, 1994, the licensee advised the individual of the denial of future unescorted access authorization on the basis that the individual provided falsified documentation. This letter also advised the individual of the right to appeal the decision. The individual did not appeal the decision.

The licensee advised Region III of this matter on June 23, 1994, and conservatively made a one hour report to the NRC Operations Center. The one hour report was subsequently retracted because of the NRC guidance (Generic Letter 91-03), and the licensee logged the incident. The licensee indicated that they would not have denied access to the individual if the individual had been truthful about the military service, including the desertion conviction. However, the licensee felt that based on the falsified employment application, the individual's present integrity and trustworthiness was questionable. Consequently, the licensee denied unescorted access privileges to the protected areas for this individual.

The licensee conducted a review of the individual's work history. The individual's onsite supervisors confirmed that the individual's behavior and work record while onsite were normal with no problems indicated.

The inspector concluded that the licensee's access authorization program was effective in identifying that the individual had provided the falsified documentation. After learning of this problem through the review of military records, the licensee conducted a proper evaluation of the information relevant to the access determination that resulted in the individual being denied future unescorted access authorization.

No violations or deviations were identified.

4. Maintenance/Surveillance (62703 & 61726)

a. Maintenance Activities (62703)

Routinely, station maintenance activities were observed and/or reviewed to determine that they were conducted in accordance with approved procedures, regulatory guides and industry codes or standards, and in conformance with technical specifications (TS).

The following items were also considered during this review: limiting conditions for operation were met while components or systems were removed from service; approvals were obtained prior to initiating the work; functional testing and/or calibrations were performed prior to returning components or systems to



service; quality control records were maintained; and activities were accomplished by qualified personnel.

Portions of the following Job Orders (JO) activities were observed and reviewed:

C0026657 "Clean blockage near valve, QMO-420 (emergency boration valve for Unit 2) and inspect"  
R0026005 "Set 2-DCR-330 Stroke and Limit Switches"  
C0024223 "Replace 2-WMO-738"  
C0026848 "Troubleshoot/Repair 2-QT-106-AB1 Auto Start Circuit"  
R0026554 "MOV PM On Valve 2-QMO-452"  
R0026717 "Set Stroke on Valve 2-RRV-312"

b. Overtorquing of Pressurizer Studs:

Quality Control (QC) inspectors, who were performing a visual and surface examination of the studs used on the Unit 2 pressurizer safety valves, found that there were two different types of studs ("B8" and "SA453 GR660") used on the valves. Further investigation by an engineer in the Plant Engineering department found that the concurrent use of the "B8" and "SA453 GR660" studs resulted in the overtorquing of these "B8" studs. The "B8" studs were overtorqued because the mechanics applied the same amount of torque to both the "B8" and the "SA453 GR660" studs, although the "B8" studs have a lower torque specification. The primary cause for the overtorquing of the "B8" studs appears to be attributable to procedure \*\*12MHP5021.001.092, Revision 4, "Pressurizer Safety Valves Removal and Installation," which only specified the torque values for the "SA453 GR660" studs. The inspectors learned that the "B8" and the "SA453 GR660" studs were a type of stainless steel fastener with different strength characteristics. The inspectors determined that identification of this problem by the QC inspectors was a strength.

The "B8" studs used on the suction side of the pressurizer safety valves were overtorqued by 160 percent of the yield stress of the material. Similarly, the "B8" studs used on the discharge side of the pressurizer safety valves were overtorqued by 150 percent of the yield stress. Although 12 of the 36 studs for the three safety valves were effected, none of these overtorqued studs were found to exhibit the "necking down" effect, cracking or other damage that would be indicative of an imminent stud failure. The licensee could not determine what the as-found mixture of "B8" and "SA453 GR660" studs were on the three safety valves. The 12 "B8" studs were replaced with "SA453 GR660" studs.

To address the concern that a similar condition may exist for the Unit 1 pressurizer safety valves, the licensee reviewed the ASME Code Section XI report, Form NIS-2, used to document the repairs and replacements accomplished on these valves. The review of these NIS-2 forms indicated that the licensee had used "SA453 GR660" studs and nuts for all the Unit 1 pressurizer safety valves.

The reasons for not replacing all of the Unit 2 studs and nuts with those made of "SA453 GR660" material was not yet understood. At the end of the inspection period, the inspectors were reviewing the licensee's fastener control process and how the licensee's program controlled proper torquing of fasteners if fasteners of different material were used on the same valve. This will be an inspection follow-up item (DRP);50-316/94020-01(DRP). The licensee wrote CR 94-1951 to review this event.

c. Surveillance Activities (61726)

During the inspection period, the inspectors observed TS required surveillance testing and verified that testing was performed in accordance with adequate procedures, that test instrumentation was calibrated, that results conformed with TS and procedure requirements and the results were properly reviewed, and that any deficiencies identified during the testing were properly resolved.

The inspectors also witnessed portions of the following surveillances:

12 EHP 4030 STP 205A, "ESF Time Response-Train A," Revision 1

12 EHP 4030 STP 217A, "CD EDG Load Shedding and Performance," Revision 1

One inspection follow-up item was identified. No violations or deviations were identified.

5. Engineering & Technical Support (37700)

The inspector monitored engineering and technical support activities at the site including any support from the corporate office. The purpose was to assess the adequacy of these functions in contributing properly to other functions such as operations, maintenance, testing, training, fire protection, and configuration management.

a. Reactor Vessel Head Penetration Inspection:

In response to an industry concern, the licensee performed an eddy current inspection of the Unit 2 reactor head penetrations used for control rod drive mechanism (CRDM) and in-core thermocouple (TC) insertion. Of the 71 penetrations inspected, the licensee identified several small cracks in in-core thermocouple

penetration number 75. During subsequent review, the licensee determined that the as-found condition was not a safety concern, because the location of the indications was such that if the flaws would propagate, the reactor coolant pressure boundary would not be breached and no reactor coolant system (RCS) leakage would result. The licensee committed to reinspect the penetration during the next refueling outage.

NRC headquarters personnel reviewed the licensee's evaluation and did not have any further concerns. NRC review of future reactor vessel head penetration inspections is an inspection follow-up item (50-315/94020-02(DRP); 50-316/94020-02(DRP)).

b. Reactor Vessel Head Penetration Guide Funnels:

In conjunction with the penetration inspection, the licensee also performed an inspection of 53 control rod drive mechanisms (CRDM) and 5 thermocouple (TC) guide funnels. The function of the funnels was to ease the entry of CRDM/TCs into the pressure housings when the reactor vessel head was lowered onto the vessel. The original installation of the funnel guides included threading the funnels onto the thermal sleeves and torquing to 200-250 Ft-Lbs and then inserting a locking pin into the funnel which was then plug welded. During the initial inspection, the licensee discovered that one of the TC funnels did not have a locking pin installed and 12 funnels for the CRDMs were found loose. The licensee determined through physical measurements that the locking pin was never originally installed. The twelve loose funnels were found when a physical inspection was performed due to inaccessibility of these funnels by the robotics equipment. The robotics did not identify loose funnels on forty one of the CRDM funnels.

During a follow-up teleconference on October 21, 1994, with NRC management, the licensee stated that only the TC funnel with the missing pin would be repaired. The licensee's decision to postpone CRDM funnel repair appeared to be inconsistent with recent industry experiences with loose funnel guides. Recent industry documentation pertaining to loose and/or falling off funnel guides included:

- May 1994 NRC Inspection Report 50-456/94013; 50-457/94013 which documents the investigation of a stuck control rod caused by a failed locking pin.
- May 1994 NRC Information Notice (IN) 94-40, which alerted the licensees that failure of the welds on the pins could result in loose parts in the RCS. Potentially, this could result in the failure of the control rod assemblies to fully



insert into the core or a impact wear on the fuel. The welds on the pins are believed to undergo fatigue failure from the loose funnels.

- September 12, 1994 Westinghouse "Infogram" which described the actions to repair loose funnels.

During the October 21, 1994, telecon, the NRC requested that the licensee provide technical justification for the decision to delay the repair to the 12 CRDM thermal sleeve funnel guides. After the telecon, the licensee performed a physical inspection of the funnels that were previously inspected by the robotics. This physical inspection identified an additional 30 loose funnels. At this time, the loose funnels were repaired because the licensee stated that a safety evaluation would have taken longer to complete than the repairs. The repair consisted of stitch welding the guides to the thermal sleeves. The licensee also committed to performing weld repairs to the remaining funnels during the next refueling outage. The weld repairs to the remaining funnels is considered an inspection follow-up item pending further NRC review (50-315/94020-03; 50-316/94020-03(DRP)).

c. Steam Generator (SG) Tube Damage:

On October 2, 1994, contractors for the licensee had just completed water lancing and pressure pulse cleaning (PPC) operation on the Unit 2 steam generators (SGs) 22 and 23. During a review of a video tape taken for a foreign object search and retrieval on SGs 22 and 23, an engineer in the Plant Engineering department found that there was evidence of abrasion and denting of some of the tubes in the SGs. There was evidence of damage to tubes in row 1, columns 5, 6, 7, and 8 in SG 22; and row 1, columns 4, 5, 6, 7, 8, 90, 91, 92, 93, and 94 in SG 23. The licensee's investigation of this event found that the SG tubes were damaged by the contractor's PPC equipment. The licensee's corrective actions taken to resolve the damaged tubes were considered a strength. The licensee wrote a CR 94-1980 to document this issue and to address any corrective actions resulting from this problem.

The PPC equipment used for this operation consisted of a rigid horizontal stainless steel pipe that was welded to the middle of a circular flange at one end and terminated in a short piece of pipe oriented in a 45 degrees downward direction at the other end. Also, there was a braided stainless steel flexible hose on either side of this rigid horizontal pipe. The free end of the hose was terminated by a solid stainless steel ring. The flange was mounted to a SG inspection opening that was located in the middle of the SG tube lane. The rigid pipe supplied the high pressure nitrogen during the PPC operation, and the stainless steel hoses provided the suction return path to the other sections of the PPC

system. During the PPC operation, these flexible hoses behaved like a whip in the SG tube lane, and the impact on the SG tubes from the solid stainless steel rings caused the tubes to become damaged. The damage went unnoticed by the PPC crew.

The inspectors were concerned that similar damage may have occurred with the Unit 1 SGs which were also cleaned using the PPC process. The licensee's discussion with the contractor indicated that the damage to the Unit 1 SG tubes was less likely than to the Unit 2 SG tubes based on a narrower tube lane design on the Unit 1 type "51" SG design. The type "51" SG design has a 3.5 inch tube lane opening and therefore, it was thought to be better in restraining the flexible hoses from motion. Unit 2 has a type "51F" SG design. Because the Unit 2 SG is of a more recent design and because the licensee had removed one row of tubes from the hot and cold leg sides on the SGs, the Unit 2 SGs have a 5.5 inch tube lane opening. Additionally, the shorter flexible hoses used on the PPC equipment for the Unit 2 SGs allowed the hoses to behave more like whips because the end of the hoses were closer to the end of the rigid pipe which provided the source of high pressure. The licensee reviewed the video tape which was taken on the Unit 1 SGs and found no damage. This was the first time that this contractor had used the PPC equipment on the type "51F" SGs and therefore, the possibility that this type of damage may have occurred at other facilities was determined to be unlikely.

The licensee performed eddy-current inspection of all but one of the SGs tubes that could be reached by the flexible hoses to determine the severity and extent of the damage. Based on this inspection, 3 tubes in SG no. 22 and 6 tubes in SG no. 23 were plugged. The safety significance of this event was minimal since Unit 2 was defueled for a refueling outage. The inspectors consulted with the material engineers from the Office of Nuclear Reactor Regulations and the engineers were satisfied with the results of the eddy-current inspections and the actions taken by the licensee to plug the tubes which were found damaged.

d. Main Turbine Cracks:

During non-destructive examination of the Unit 2 low pressure (LP) "B" turbine last stage blades and steeples, which are used to attach the blades to the LP turbine rotor, the licensee discovered several small cracks. The licensee had removed the blades for reshimming because the looseness of their fit to the rotor was approaching the specified tolerance value. The licensee believed that this was the first time that the blades were removed from the rotor since initial plant start-up.

The licensee attributed the cracks to sharp edges on the rotor steeples. The licensee replaced 6 of the blades with spares and removed the remainder of the cracks by grinding. The licensee also rounded off the corners of the steeples to prevent recurrence

of cracks in these areas. The licensee also inspected the last stage blading on the other Unit 2 low pressure turbines and did not observe any excessive looseness. The inspectors observed portions of the turbine inspection and repair activities and reviewed the licensee's technical evaluation and did not identify any further concerns.

Two inspection follow-up items were identified. No violations or deviations were identified.

6. Refueling Activities (60710)

During the refueling outage, the inspectors observed the licensee's fuel handling operations and discussed the refueling operations with the plant operators and the fuel handling personnel. The licensee used approved procedures for fuel accountability and movements. Communications between the control room and fuel handlers were established and effective. The inspectors witnessed fuel handling operations during several shifts from the control room, in the fuel building, and in containment.

During this Unit 2 outage, all of the fuel was loaded into the reactor and the reactor head was reinstalled. The refueling activity was completed essentially on schedule and proceeded in accordance with the plan.

No violations or deviations were identified.

7. Inspection Follow-up Items

Inspection follow-up items are matters which have been discussed with the licensee, which will be reviewed by the inspector and, which involve some action on the part of the NRC or licensee or both. Inspection follow-up items disclosed during the inspection are discussed in paragraphs 4.b, 5.a and 5.b.

8. Exit Interview (30703)

The inspectors met with the licensee representatives denoted in paragraph 1 during the inspection period, on September 29, 1994, and at the conclusion of the inspection on November 2, 1994.

The inspectors summarized the scope and results of the inspection and discussed the likely content of this inspection report. The licensee acknowledged the information and did not indicate that any of the information disclosed during the inspection could be considered proprietary in nature.

