U.S. NUCLEAR REGULATORY COMMISSION

REGION III

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Licensee:	Indiana Michigan Power Company
Facility:	Donald C. Cook Nuclear Generating Plant
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Dates:	July 14 - August 31, 1996
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Executive Summary

D. C. Cook Units 1 and 2
NRC Inspection Report 50-315/96007, 50-316/96007

This inspection included aspects of licensee operations, maintenance, engineering, and plant support. The report covers a 6-week period of resident inspection including the follow-up to issues identified during previous inspection reports.

Operations

- In response to a leaking steam generator power operated relief valve, the licensee closed the manual isolation valve. However, the licensed operators failed to recognize that this made the associated radiation monitor inoperable and required an entry into a technical specification (TS) action statement (Section O4.2).

Maintenance

- Maintenance activities were generally completed thoroughly and professionally with the proper procedures at the work site and in active use. The licensee promptly identified an adverse trend of work control issues and responded appropriately to address the trend. Corrective actions appeared to be appropriate and timely. In addition, the licensee's response to the high oil level on the turbine driven auxiliary feedwater pump was prompt and thorough (Section M1.4).

- The licensee responded promptly to indications of an inoperable station battery. Management personnel and the resident inspectors were notified promptly and were fully apprised of the status of the batteries. The licensee recognized that additional followup would be required. The quarterly surveillance procedure contained a number of errors and improvement opportunities. The errors included misleading directions which could cause the test to be performed in violation of TSs or result in the pre-conditioning of some battery cells (Unresolved Item (50-315/316-96007-02) (Section M3.2).

Engineering

- The timely engineering identification of the entry into the TS action statement for an inoperable PORV radiation monitor resulted in the licensee being able to comply with the action statement requirements and issue a special report within the required time limits (Section O4.2).

- The inspectors and NRC staff raised questions regarding the licensee's first evaluation of cracks found in the seal weld of the TDAFWP governor valve. The inspectors concluded that the licensee did an incomplete job in evaluating and documenting the effect of these cracks in the seal weld (Section E2.1).

- The licensee reassembled the TDAFWP governor valve, tested the pump and turbine, and declared the TDAFWP operable without being able to account for the governor valve plug retaining nut. In addition, an engineering evaluation to document the acceptability of operation of the turbine with the nut missing was not performed. The engineering evaluation was provided to the inspectors after the operability concerns were raised (Section M3.1).

- The licensee's justification for not including the essential service water (ESW) pump discharge strainers in the list of equipment required for operability of the ESW system appeared to be inadequate. Pending additional information from the licensee, this issue will remain an unresolved item (50-315/316-96007-03) (Section E2.2).

Report Details

Summary of Plant Status

Unit 1

Unit 1 began this inspection period at 58 percent power. Power had been reduced to take the east main feed pump off-line to perform condenser leak checks. Power was restored to 100 percent on July 14, 1996. On July 17, 1996, the reactor was taken to 88.5 percent due to main transformer temperature limitations. Power was maintained between 84.6 and 88.5 through the end of the report period. The licensee had observed hydrogen generation taking place inside the main transformer. The temperature limits for the transformer were lowered to reduce the rate of hydrogen generation which resulted in the reduction of the power level.

Unit 2

Unit 2 entered and exited this reporting period in Mode 1 at 100 percent power. There were no unit shutdowns or significant power reductions.

I. Operations

04 Operator Knowledge and Performance

04.1 General Comments

Using Inspection Procedure 71707, the inspectors conducted frequent reviews of ongoing plant operations. In general, the conduct of operations was professional and safety-conscious; specific events and noteworthy observations are detailed below.

04.2 Inoperable Power Operated Relief Valve Radiation Monitor (Unit 1)

a. Inspection Scope

On August 2, 1996, the licensee isolated steam generator (S/G) power operated relief valve (PORV), 1-MRV-213 (Unit 1 Loop 1), due to leak-by. The isolation resulted in the inoperability of an associated discharge radiation monitor 1-MRA-1601. The licensee at first failed to recognize the applicability of the TS for the radiation monitor. The inspectors followed up on the licensee's identification of this failure, root cause analysis, and corrective action determination.

b. Observations and Findings

TS 3.3.3.1, action statement 22B required, in part, that if radiation monitor 1-MRA-1601 was not restored to operable status within 7 days then a special report shall be sent to the NRC within the following 14 days. The operators failed to recognize that the isolation of the PORV resulted in the inoperability of 1-MRA-1601 and the TS action statement

was not entered. The TS action statement required that a report be made by August 23, 1996.

Maintenance to repair the leaking PORV was delayed due to a lack of spare parts. While waiting for the spare parts the licensee decided to isolate the PORV to limit damage to the valve seat due to steam cutting.

Normally, the performance of maintenance activities would not require a safety evaluations (SE) in accordance with 10 CFR 50.59. However, the licensee intended to leave the PORV isolated for several months while waiting for the spare parts. In response to previous inspector concerns with leaving equipment inoperable for long periods of time without performing 50.59 evaluations, the licensee had instituted additional controls on the performance of SEs (reference NRC inspection report 50-315\316-95012 paragraph 3.2). The licensee determined that the lengthy isolation of the S/G PORV met the new guidelines for SEs, and an SE was initiated after the PORV was isolated. The inoperable radiation monitor was identified during the preparation of the draft SE by engineering personnel. The timely identification of the TS action statement by engineering resulted in the licensee being able to comply with the action statement requirements.

The licensee subsequently submitted the special report and restored the PORV to service until the spare parts arrived and the maintenance could be performed. Based upon information identified while researching for the SE, licensee decided an operable radiation monitor was more important than to reduce steam cutting of the valve seat.

Additionally, the licensee instituted corrective actions to ensure that licensed operators and maintenance schedulers understood that isolating the PORVs would make the corresponding radiation monitor inoperable and necessitate an entry into a TS action statement.

c. Conclusions

The licensed operators did not recognize that isolating S/G PORV, 1-MRA-1601, required entry into TS 3.3.3.1, action statement 22B. However, once identified, engineering's recognition of the need to declare the radiation monitor inoperable was pursued in a timely manner.

08 Miscellaneous Operations Issues

08.1 (Closed) Violation 50-315/94004-04: Inability to use a bullseye during a Reactor Coolant System (RCS) draindown. The licensee installed a wide-range mid-loop level transmitter on both units to eliminate the need to use the bullseye to determine RCS level during draining evolutions. In addition, the licensee modified the draindown procedures and trained the operators as part of an overall effort to ensure draindown activities were completed properly. The inspectors had observed licensee performance during subsequent draindown evolutions and have no further concerns. This violation is closed.

08.2 (Closed) Violation 50-315/316-94014-03: Failure of Auxiliary Equipment Operators (AEO) to make room tours. The licensee revised the procedures governing operator tours to explicitly state the expectations for tour performance, including the requirement to carry data sheets on the rounds and add data to the tour sheet as required. The inspectors have accompanied AEOs on tours to verify that the procedural requirements were being followed. In addition, the licensee performed periodic audits of security door records to verify that AEOs were properly completing rounds. In two years of routine audits, no problems of AEOs completing tours have been identified.

The inspectors had reviewed selected audits and verified that AEO tours were being completed properly. As stated in NRC inspection report 50-315/316-96002, while the AEO tours met all licensee and regulatory requirements, the tours were determined by the NRC to meet just the minimum requirements of the tour procedure. There appeared to be insufficient time being spent to perform the recommended inspections defined in the procedures.

Previous information concerning AEO tour completeness and quality were documented in NRC Inspection Reports 50-315/316-93019, 93024, 94002, and 94014. Based upon inspector comments, the licensee performed a review to determine if the tours were being performed in accordance with management expectations. The licensee planned to revise the tour procedures. These plans were still ongoing at the end of this report period. In addition, since the security door audits did not reveal any violations, the licensee planned to discontinue the periodic audits. This violation is closed.

08.3 (Closed) Unresolved Item (URI) 50-315/94004-02: Pre-job briefing for RCS draindown not conducted. The licensee revised applicable procedures to require that a pre-job briefing be performed with plant management in attendance for each shift involved in the draining of the RCS. The inspectors have observed subsequent evolutions and determined that this requirement was being met. In the fall of 1995, the licensee experienced numerous operator performance problems (documented in 50-315/315-95010). In response to those problems, the licensee instituted a number of corrective actions including increased use of pre-job briefings prior to important evolutions. The licensee's performance of pre-job briefings has increased significantly following the implementation of these corrective action programs.

08.4 (Closed) URI 50-315/94004-03: Training of operators for infrequent evolutions. The licensee conducted training for all operators on the RCS draining evolution . The training plan incorporated equipment and procedure changes, as well as lessons learned from the issues discussed in 50-315/316-94004. The inspectors had observed subsequent draining evolutions and had not identified any concerns regarding operator performance.

08.5 (Closed) URI 50-315/94004-06: Use of an inaccurate pressurizer relief tank (PRT) level instrument during a draindown evolution. The inspectors developed concerns that operators monitoring level in the PRT during an RCS draindown evolution were using an instrument that was known to have an accuracy outside of necessary limits. As corrective action, the licensee issued a written policy requiring the use of only functional instrumentation for decision making during operation of the plant. In addition, instruments that have operability concerns were required to be clearly labeled. The inspectors had observed that inoperable instruments were clearly labeled and the inspectors had not observed any recurrence of using degraded instruments for important evolutions.

08.6 (Closed) IFI 50-315/316-94014-08: Review of revision to DC ground procedures. The licensee revised the DC ground isolation procedure to provide instruction to the operators with regards to reporting intermittent grounds and when electrical maintenance should be notified for assistance. The inspectors had observed satisfactory implementation of the revised procedure.

08.7 (Closed) IFI 50-315/316-96006-13: Despite procedure changes, there were performance problems with inadequate control of reactor coolant system draining. The inspectors noted that the operators inadvertently commenced draining despite a difference of more than 4 inches between level instruments, in contrast to the procedure requirements. An NCV was documented in IR 94022 for this finding. As corrective action, the licensee enhanced the procedure to clarify what instruments were applicable for a given RCS level. In addition, the licensee standardized the scale on the required level instruments, as necessary, so all read in feet and tenths of feet. The inspectors have observed that subsequent evolutions were performed without incident.

II. Maintenance

M1 Conduct of Maintenance

M1.1 General Comments

a. Inspection Scope (62703)

The following maintenance and surveillance activities were observed and/or reviewed:

- 02 OHP-4021.017.04 — Flushing Residual Heat Removal System to the Refueling Water Storage Tank

• 02 IHP-4030.SMP.221	Steam Generator 1 and 3 Steam/feed flow mismatch and steam pressure protection set II functional test and calibration
• 02 OHP-4030.STP.050W	West Residual Heat Removal Train Operability Test
• C0003958	Investigate and Correct Oil Level in Unit 1 TDAFWP
• 02 OHP-4030.STP.027.CD	CD Diesel Generator Operability Test (Train A)
• 12 IHP-4030.STP.097	Seismic Monitoring Instrumentation Surveillance Test - Monthly
• 01 OHP-4030.STP.031	Operations Weekly Surveillance Checks
• C0034613	Measure Component Cooling Water Flows on Pegged Flowmeters
• C0028177	2 West RHR Pump - Correct Leak on Seal Water Heat Exchanger Line
• C0037456	Flush of 1 West Essential Service Water Instrumentation Tubing
• 12 OHP-SP.136	Temporary Removal of Both Trains of Reserve Feed to Isolate Transformers #5 and #6 for Planned Maintenance
• A0117248	2-HV-SHK-96 (Auxiliary building Elevation 650' space heater) ruptured steam coils
• 12 IHP-4030.STP.601	AB, CD, and N-Train Battery Quarterly Surveillance and Maintenance
• A0088143	Replace the 2 CD Station Battery
• C0036292	Clean and remove sediment from the CD diesel generator fuel oil storage tank
• C0036293	Clean and remove sediment from the AB diesel generator fuel oil storage tank

b. Observations and Findings

The inspectors found the work performed under the activities listed above to be generally professional and thorough. During the review of licensee condition reports and reviews of licensee work activities, the inspectors identified a concern with the adequacy of the licensee's work control. The licensee identified similar concerns simultaneously and promptly began root cause analysis and corrective actions. The examples of inadequate work control resulted in the licensee stopping work on elective preventive and corrective maintenance activities from August 23, 1996 until September 5, 1996. The partial work stoppage was initiated to allow the identification and implementation of short term corrective actions. The licensee established task teams to perform the root cause analysis and to recommend the necessary changes. The issues are discussed in additional detail in the following section (M1.2).

M1.2 Licensee Identified Work Control Issues (Both Units)

a. Inspection Scope (62703)

During this inspection period, the licensee experienced a number of events which revealed problems with the work control system. The licensee identified an adverse pattern simultaneously with the NRC inspectors. The inspectors observed the licensee's response and corrective actions to the work control weaknesses.

b. Observations and Findings

Plant management recognized a pattern of work control problems and immediately instituted a "safe stop directive". The directive stopped all elective safety related corrective and preventive maintenance work activities. The stop work directive continued through the licensee's root cause evaluation phase until the immediate corrective actions were instituted.

The licensee formed three independently task teams to review the following three events in an effort to fully understand the problems and the root causes:

- One team reviewed the problems encountered during the local rate testing of 2-VCR-106 and 2-VCR-206 (Upper containment purge exhaust inside and outside containment isolation valves) (CR 96-1250). Valve 2-VCR-206 was originally thought to be leaking excessively. However, the licensee later determined that valve 2-VCR-106 was leaking. While the licensee maintained containment boundaries in accordance with TS, the team noted that there were numerous missed opportunities for improvement. The team had the following recommendations:

1. Establish appropriate means to control blank flanges installed in plant systems. During leak rate testing of valves 2-VCR-106 and 206 the task team determined that there were minimal controls over blank flanges.

2. Establish the appropriate controls to ensure that the modified work scope receives the same level of process review that new work receives. During the work on the two containment valves, the work scope had expanded and changed and not all the additional work planning had been reviewed to the same level as the original job scope. The lower level of review resulted in inefficiencies and a less rigorous approach to maintaining the containment pressure boundary.

3. Consider the applicability of management reviews to all work originally planned for outages, but performed with the plant at power. The leak rate testing of valves 2-VCR-106 and 206 had originally been planned to be performed during a refueling outage. Due to efforts to reduce the length of refueling outages, some work was rescheduled to be performed at power. While the work had been reviewed and approved in accordance with licensee procedures, the team determined that some reviews had been performed under the assumption that the work would be done during a refueling outage.

- Another team reviewed the planned but undesired draining of the 2 West residual heat removal (RHR) pump casing (CR 96-1321). The system engineer had determined that draining the pump casing was undesirable because not all sections of the piping could be vented prior to restoring the pump to service. Due to an error to convey this information forward, the pump was drained for routine maintenance. The planned modification to correct the venting problem had been deleted from the last refueling outage and the information had not been included with the maintenance package. The team had the following recommendations:

  1. Modify the standard clearances for the emergency core cooling systems to add a caution about draining at power. This would enable the information about not draining the RHR pump casing to be properly identified to plant personnel.

  2. Review planned work packages for the validity of planning codes and the plant conditions. When it was determined that the work shouldn't have been performed while at power, the planning codes should have been changed to reflect outage conditions only.

3. Establish a schedule freeze date to allow adequate time for planning and analysis of items for work schedules. A schedule freeze date helps eliminate last minute work changes that do not allow for efficient planning.

4. Develop additional guidance to engineering for the issuance of technical direction. The subject of guidance for engineering technical direction issuance was previously addressed in NRC inspection reports (reports 50-315/316-95010 and 96003). As a result the licensee had made changes to the manner in which technical directions was given to the operators, but the changes to the guidance did not capture all old recommendations that had already been incorporated into work documents.

5. Clarify for all senior reactor operators the role of the various management approvals for work activities. The operators had realized that certain work activities had required special management approvals. However, a number of operators had misinterpreted management approvals for some aspects of the planned jobs to apply to the PRA aspects.

- The last team reviewed the scheduling and removal from service of various components without the necessary specific probabilistic risk assessment (PRA) analysis (CRs 96-1320 and 1324). The licensee had guidelines which stated various pieces of plant equipment should not be removed from service at the same time without a PRA analysis. For example, one train of RHR and one train of component cooling water out of service at the same time would need a PRA analysis. The team had the following recommendations:

  1. Implement an independent review for the need of a PRA analysis of each days work schedule.

  2. Communicate the basis and results for the PRA decisions through the work control process.

  3. Clarify for all senior reactor operators the role of the various management approvals for work activities. (same as recommendation number 5 above)

The inspectors will followup and track the licensee's performance in this area (IFI 50-315/316-96007-01).

M1.3 High Oil Level in Unit 1 Turbine Driven Auxiliary Feedwater Pump (TDAFWP)

a. Inspection Scope (62703)

On July 16, 1996, at 0457, an AEO reported to the control room that the TDAFWP inboard bearing oil level was 2-inches above the maximum oil level mark on the sightglass and had increased from the previous readings. Oil could leak out the pump seal at the increased level. The inspectors evaluated the licensee's response and corrective actions to the occurrence.

b. Observations and Findings

Subsequent to the notification by the AEO of the increasing oil sump level, the Shift Supervisor declared the TDAFWP inoperable, notified the system engineer, and initiated an action request to troubleshoot and repair the TDAFWP. A leak was found in the cooling water tubes of the oil cooler which had allowed water to leak into the oil sump.

The inspector observed the pressure test on the replacement oil cooler and initially had a concern with the testing activities. Following a review of the licensee's design basis for the cooler, the inspectors determined that the test was acceptable. The cooler was installed in the Unit 1 TDAFWP, and the pump was tested and returned to service.

The licensee was unable to determine the length of time that the pump turbine had been inoperable due to the water/oil mixture. The TDAFWP turbine oil level received only a check mark as an indication of level status on the turbine building tour log data sheet. Therefore, the log sheet did not provide trend data to determine the rate of level rise. However, on July 12, 1996, the lube oil cooler had been replaced as part of a routine preventative maintenance program. This meant that the replacement oil cooler leaked within a week of operation. Discussions with quality assurance personnel revealed that the cooler was tested during receipt inspection to 200 PSIG and did not exhibit leakage. The inspectors reviewed the test procedure and verified that the 200 # test was adequate to verify proper operation of the cooler.

M1.4 Conclusions on Conduct of Maintenance

Maintenance activities were generally completed thoroughly and professionally with the proper procedures at the work site and in active use. The licensee promptly identified an adverse trend of work control issues and responded appropriately to address the adverse trend. Corrective actions appeared to be appropriate and timely. The licensee's response to the high oil level on the TDAFW was determined to be prompt and thorough.

M3 Maintenance Procedures and Documentation

M3.1 Missing Valve Stem Retaining Nut in Governor Valve to TDAFWP (Unit 2)

a. Inspection Scope (62702)

During the teardown and inspection of the governor valve to the TDAFWP on July 16, 1996, the licensee identified that a retaining nut was missing. The inspectors performed routine followup activities to assess the licensee's root cause evaluations and corrective actions.

b. Observations and Findings

On disassembly of the TDAFWP governor valve, the retaining nut that secured the valve plug to the valve stem was found to be missing. The licensee evaluated the operability of the governor valve and the TDAFWP with the nut missing. Licensee discussions with the vendor determined that due to the governor stem nut having an interference fit and low separation stresses, the valve would properly operate even with the stem nut missing. Additional licensee evaluations discussed the operability of the TDAFWP while a stem nut passed through the turbine. The licensee concluded that the nut would not harm the turbine and that the TDAFWP was fully operable.

The inspectors reviewed the licensee's copy of the TDAFWP vendor manual and determined that there was a failure to ensure that an important recommendation was included in the maintenance instructions. The manufacturer's disassembly and reassembly instructions stated, "The valve stem is secured in the valve plug with a stainless steel nut and the threaded end of the stem is peened over to secure the nut to prevent accidental disengagement during operation." The inspector reviewed the licensee's maintenance order from the previous valve reassembly and observed there were no instructions on the peening of the nut. After finding the nut missing, the licensee staked the nut during the reassembly. The licensee records did not indicate that the stem threads had been peened on the Unit 1 TDAFWP during the last maintenance activity.

Interviews determined that the licensee personnel were unaware of the peening recommendations of the vendor manual. The licensee indicated that the probable cause was due to the insertion of the recommendation in a general section of the vendor manual and not in the specific section on valve disassembly/assembly.

The TDAFWP was returned to service without the licensee knowing the location of the missing retaining nut nor documenting an evaluation of the impact of the missing nut on the TDAFWP. The licensee subsequently performed an engineering evaluation pertaining to the missing nut. Inspection of the valve stem threads indicated that the valve and turbine had been in operation for some time after the nut had fallen off. The licensee concluded that the loss of the valve plug retaining nut from the governor valve would not be expected to diminish the

capability of the TDAFWP below what was assumed in the accident analyses, nor result in significant damage to the turbine.

The failure to perform and document prompt operability determinations was the subject of a recently issued violation in the last inspection report (315/316-96006-01). Since the licensee performed a satisfactory operability determination for the missing nut prior to the conclusion of this inspection, this example for failing to perform and document an operability assessment is not being cited. Long term corrective action for ensuring prompt and documented operability assessments will be assessed by the inspectors during the review of the licensee's response to violation 315/316-96006-01.

c. Conclusions

The licensee's work document followed the vendor manual recommended procedure to perform work on the governor valve but failed to ensure that all appropriate comments were included the maintenance instructions. This resulted in the retaining nut separating from the stem and passing through the turbine. The licensee reassembled the valve, tested the pump and turbine, and declared TDAFWP operable without knowing the whereabouts of the nut, and without at first documenting an engineering evaluation concluding that the operation of the turbine with the missing nut was acceptable. The engineering evaluation was provided to the inspectors after the operability concerns were raised with no problems being noted by the inspectors.

M3.2 CD Battery Cell #57 Voltage Less Than TS Requirement (Unit 2)

a. Inspection Scope (61726 and 93702)

On August 29, 1996, during the performance of the Unit 2 CD Battery quarterly TS surveillance, 12 IHP-4030.STP.601, "AB, CD, and N-Train Battery Quarterly Surveillance and Maintenance", the licensee identified that Cell #57 voltage was less than the TS minimum. The inspectors assessed the licensee's identification and corrective action.

b. Observations and Findings

Upon notification to the SS that cell #57 read 2.08 volts, the licensee entered a two hour action statement as required by TS 3.8.2.3.b. One hour and 59 minutes later the licensee exited the action statement after restoring cell #57 to greater than the TS minimum of 2.13 volts. The licensee instituted a category C condition report (CR) with a corrective action team. The licensee determined that:

- The trend data of the pilot cell voltage and quarterly surveillance test results did not indicate that the battery would have a cell drop below the TS minimum.

- The 2 CD Battery was scheduled to be changed out in the last refueling outage (Spring 1996), but the battery changeout was delayed due to budgetary constraints. Prior to the schedule change, the licensee had performed an evaluation which concluded that the battery change out could be delayed to the Fall of 1997.

- The quarterly surveillance procedure contained a number of errors and improvement opportunities. The errors included misleading directions which could cause the test to be performed in violation of TSs or result in the pre-conditioning of some battery cells. The pre-conditioning could result if the electricians placed the battery on equalizing charge prior to completing the TS surveillance.

- The licensee concluded that cell #57 would be added to the list of pilot cells and be monitored periodically as required by TSs.

c. Conclusions

The licensee responded promptly to indications of an inoperable station battery. Management personnel and the resident inspectors were notified promptly and were fully appraised of the status of the batteries. The additional followup requirements were recognized by the licensee. The licensee's review of the possible pre-conditioning of the station batteries along with the licensee's review for TS violations will remain an Unresolved Item (50-315/316-96007-02).

M8 Miscellaneous maintenance Issues

M8.1 (Closed) Unresolved Item (50-316/93013-01): Condition report not issued for a valve repack. The item was being tracked to evaluate the licensee's practice of initiating condition reports as required by their corrective action program. NRC Inspection Report 50-315/316-96003 identified further examples where the licensee failed to issue condition reports as required, and a notice of violation was issued in report 50-315/316-96006. The item is closed, and the issue will be tracked by the resolution of violation 50-315/316-96006-02.

M8.2 (Closed) Unresolved Item (50-315/316-94018-03): Review of planned maintenance of ESW expansion joints. The inspector reviewed the job orders associated with the subject expansion joints, 1-XJ-56AB and 1-XJ-56CD, and verified that the replacements were completed on July 6, 1996 and April 25, 1995, respectively. The inspectors also verified that the expansion joints had been added to the preventive maintenance program and were on a reasonable replacement schedule. The item is closed.

M8.3 (Closed) IFI (50-316/94014-04): Evaluation to determine if a calibration procedure was required. Miscalibration of the main turbine exhaust hood high temperature switches resulted in a reactor trip in August 1993. The licensee concluded that a procedure for calibration of the switches was not required. However, the licensee modified the

calibration method to use a hot water bath instead of a heat gun to provide a more uniform heat source. The trip feature associated with the exhaust hood switches was also removed via a plant modification. The inspectors have no further concerns regarding this issue.

M8.4 (Closed) Violation (50-316/94013-02): Failure to correct the root cause of repeated packing failures of 2-MMO-240. The licensee revised applicable procedures to redefine rework to include any corrective maintenance which required entry into an LCO if similar work has been performed on that equipment during the current operating cycle, including the previous refueling outage. The licensee retained the "90-day" standard for equipment which did not require an LCO entry. The licensee's procedures required that a CR be initiated for rework. However, NRC inspectors identified further concerns regarding the licensee's process for identifying rework, as documented in Inspection Report (IR) 50-315/316-96003. The issues from report 50-315/316-96003 were discussed further and tracking numbers issued in report 50-315/316-96006. Therefore, this specific item is closed and the general issue will be tracked by IFI 50-315/316-96006-18.

M8.5 (Closed) IFI 50-316/94022-01: Maintenance effectiveness during refueling outage. This item was opened pending inspector review of emergent work identified during plant heat-up following the 1994 Unit 2 refueling outage. Review of rework on the steam generator manway cover gaskets was discussed in IR 50-315/316-94024. The licensee could not determine a definitive cause for the rework associated with the body to bonnet leak on 2-IMO-316, but incorrect installation of the retaining ring was suspected. As corrective action, the licensee enhanced the applicable maintenance procedure to provide the means of assuring that the retaining ring was properly installed. The inspectors observed that, overall, the quality of maintenance during the last refueling outage for both units was good and no significant examples of rework identified. This item is closed.

M8.6 (Closed) Violation (50-315/316-94018-01): Failure to remove action request tags. The licensee revised applicable plant procedures to make the maintenance supervisors accountable for removal of tags upon completion of work. In addition, clerical personnel performing closeout review of work packages are required to return the package to the supervisor if removal of the tags is not addressed in the package. Audits performed by the plant material condition group have determined that the requirements are being met except in isolated cases. The inspectors have specifically observed for the removal of AR tags and have not identified any discrepancies with the implementation of the program enhancements.

M8.7 (Closed) Licensee Event Report 50-316/95008: Inadequate procedural guidance resulted in the auto-start of an ESW pump on an unexpected ESF signal. This event was discussed previously in NRC Inspection Report 50-315/316-95010. The inspectors reviewed and verified that the corrective actions discussed by the licensee in the LER had been implemented. The inspectors had no further concerns.

III. Engineering

E1 Conduct of Engineering

E1.1 Operability Evaluation of the TDAFWP Governor Valve With Cracks in a Seal Weld (Unit 2)

a. Inspection Scope (37551)

During routine preventive maintenance activities, the licensee identified cracks in the seal weld of the TDAFWP governor valve seat. The inspectors observed the licensee's operability evaluation process and performed an assessment of the licensee's root cause analysis and corrective actions. The inspectors also examined the spare TDAFWP governor valve and reviewed vendor documents and industry experience related to the governor valves.

b. Observations and Findings

During the week of July 14, 1996, the licensee took the governor valve for the TDAFWP out of service for inspection. Industry experience had discovered that the valve seat retaining seal welds on the governor valves were subject to radial cracks. The licensee performed an inspection of the TDAFWP using dye-penetrant testing and identified cracks. The licensee then performed dye-penetrant testing on the spare TDAFWP governor, where cracks were also identified. The licensee reassembled the TDAFWP with the original governor valve and did not repair the cracks in the seal weld. The TDAFWP was tested and then declared operable.

The NRC staff reviewed the licensee's operability evaluation dated July 16, 1996 and concluded that the evaluation was not based on metallurgical evidence, but was based solely on engineering judgement. The inspectors notified the licensee on July 17, 1996, of the NRC's conclusions. In addition, the NRC staff had requested more information on the cracking observed on the valve seat retaining seal welds that was not addressed in the licensee's original operability assessment. The licensee declared the TDAFWP inoperable.

Some of the information requested by the NRC staff included: 1) the number of cracks; 2) the depth of the cracks; 3) what would prevent the cracks from growing; 4) what size pieces could break off; 5) what would be the effect on the turbine if pieces of the weld broke off and passed through the turbine; and 6) was the data for the cracks recorded so that the cracks could be evaluated for growth in future inspections

The licensee furnished the NRC staff with the required information and after performing another engineering evaluation on July 18, 1996, the licensee declared the TDAFWP operable.

On July 19, 1996, the NRC reviewed the new engineering evaluation "Operability of Unit 2 Turbine Driven Auxiliary Feedpump Governor Valve" and found the new evaluation to have significantly more engineering analysis. The analysis showed that the information supplied to the NRC earlier concerning the metallurgy of the weld was in error. The metal was in fact much softer than the NRC had been lead to believe. The softer metal was much less likely to break off in pieces. The inspectors found the second operability assessment to be acceptable. The licensee also stated that the data on the cracks had not been recorded, therefore crack growth would be much harder to determined during the next inspection.

The failure to perform and document prompt operability determinations was the subject of a recently issued violation in the last inspection report (315/316-96006-01). Since the licensee performed a satisfactory operability determination for the crack seal welds prior to the conclusion of this inspection, this example for failing to perform and document an operability assessment is not being cited. Long term corrective action for ensuring prompt and documented operability assessments will be assessed by the inspectors during the review of the licensee's response to violation 315/316-96006-01.

c. Conclusion

The inspectors and other NRC staff raised questions not answered in the licensee's first evaluation. At the conclusion of the inspection, the licensee had answered the questions. The inspectors concluded that the licensee's original assessment, based solely on engineering judgement, did not adequately document the effect of the cracks in the seal weld. The revised operability assessment was found to be acceptable.

E1.2 Operability of ESW With Inoperable Pump Discharge Strainers (Both Units)

a. Inspection Scope

During routine control room observations the inspectors observed that an ESW pump discharge strainer had been removed from service without the ESW system being declared inoperable. The inspectors evaluated the licensee's basis for the strainers not being a support system required for ESW system operability.

b. Observations and Findings

Each of the licensee's two Units has two ESW pumps. Each pump has a discharge strainer containing two filters. Normally the strainer operates automatically and based on a set differential pressure, the strainer swaps filters and initiates a backwash of the filter that was in service. The licensee's work involved removing the instruments and relays from service which initiated the automatic swapover and backwash in order to perform routine calibrations.

In response to inspector requests for information, the system engineer stated that the strainers were a support component not required for system operability. The system engineer also stated that the question had first been raised in the NRC Safety System Functional Inspection (SSFI) on the ESW system performed in 1990. Based upon the inspectors review of licensee documentation, the specific concern of the SSFI inspectors appeared to be the non-safety related solenoids which controlled the ESW pump strainer backwash capability.

The licensee's response (question MECH 5) stated that in the event that the strainers became plugged, a 10 psid differential pressure across the strainer, would cause the strain basket to fail. The licensee had calculations which showed that there was adequate flow to safety related components at a 10 psid differential pressure across the strainer basket. Above 10 psid the strainer basket failure would open up the flow path allowing enough flow through the system to perform the intended function.

The inspectors were concerned that since the strainer basket was not designed to fail at a pressure of precisely 10 psid that the basket in fact could remain intact at a substantially higher differential pressure. The licensee's calculation (HXP 900629PDC) did not appear to support operability of the ESW system at substantially higher differential pressures (and resultant lower ESW system flows). The licensee's response to SSFI question MECH 5 did show that an 80% clogged strainer would only have a 2.5 psid differential pressure. In addition, the 1990 response stated that there was no history of clogged discharge strainers.

There has been recent history on the ESW pertaining to potential blocking of the strainers. On August 15, 1996, the licensee experienced strainer difficulties on the Unit 2 East ESW pump (CR 96-1270). During a planned evolution to briefly raise the ESW system flow from approximately 4,500 gpm to approximately 7,500 gpm, strainer differential pressure suddenly increased. The strainer automatically initiated a swap over and backwash, but the high strainer differential pressure persisted. ESW header pressure dropped to approximately 40 psi and initiated an automatic start of the Unit 1 West ESW pump (as designed). During the system transient the operators measured an ESW pump flow of just greater than the TS requirement. Following the transient the licensee declared 2 East ESW inoperable and performed an inspection of the strainer. The inspection verified that the strainer was not damaged and no longer blocked.

The licensee theorized that a "slug" of sand had passed through the strainer and its backwash system. This was determined when no blockage could be identified in the strainer basket but some sand and debris was identified in the sensing lines of the strainer basket. A similar but less severe transient occurred on the 1 West ESW strainer three days later on August 18, 1996. This time the header pressure dropped to around 60 psi.

These two transients resulted in differential pressures of 40 psid and 20 psid with no damage to or failure of the strainer baskets.

c. Conclusions

The licensee's justification for not including the ESW pump discharge strainers in the list of equipment required for operability of the ESW system appeared to be inadequate. Pending additional information from the licensee the issue will remain an Unresolved Item (50-315/316-96007-03).

E8 Miscellaneous Engineering Issues (92902)

E8.1 (Closed) Licensee Event Report 50-315/96001: Emergency diesel generator declared inoperable due to a missed surveillance due to personnel error. The event was the result of a violation of technical specifications. The LER was issued due to NRC inspectors identifying that the licensee used the wrong regulatory guide to determine whether a failure of the diesel generator to start was valid or invalid. A Notice of Violation was issued by the inspectors in inspection report 50-315/316-95013; therefore, the licensee's corrective actions will be tracked under violation no. 50-316/95013-02. The LER is closed.

E8.2 (Closed) Violation 50-315/316-94008-01: Failure of procedure to document ESW flow to AFW pump. The licensee's test procedure did not demonstrate that the ESW system would provide the required flow to the AFW pumps and prevent the lines from becoming blocked. As a corrective action, the licensee installed full flow flush connections on the ESW supply lines to each AFW pump, and flushes were performed annually. The inspectors have observed selected flushing evolutions and have no further concerns regarding this issue.

E8.3 (Closed) Inspection Followup Item 50-315/94002-13: Reactor Coolant Pump (RCP) motor lower radial bearing failure. The licensee determined that the cause of the failure was oil leakage from a level pot labyrinth seal. The licensee has not experienced any bearing failures since then, and oil levels were checked and topped off as necessary during forced outages. In addition, the licensee determined that the risk to reactor safety was minimal from a lower bearing failure because the bearing had only minimal loading during normal operation. The inspectors have no further concerns regarding this issue.

E8.4 (Closed) IFI 50-315/316-95005-01: Operation with neither boric acid transfer (BAT) pump running. The licensee determined that the basis for running one of the pumps continuously in slow speed was for mixing purposes to eliminate thermal gradients in the BAT system. Heat trace was used to prevent precipitation of the boric acid which could block the boration flow path. The inspectors reviewed the system's design basis and verified that operator action to manually start a pump for emergency boration was acceptable.

E8.5 (Closed) URI 50-315/316-95005-03: Qualifications for alternate members of the Plant Nuclear Safety Review Committee (PNSRC). The licensee revised TS 6.5.1.2 to clarify the requirements for PNSRC composition. The inspectors reviewed the committee's current membership and have no further questions in this area.

E8.6 (Closed) IFI 50-315/316-94008-02: Actions to prevent further sand intrusion into the Control Room Air Conditioners (CRAC). The licensee was considering options for an improved method of removing sand that accumulates on the ESW isolation valves to the chillers and the inspectors issued an IFI to follow this consideration. The licensee determined that no changes to the method of removing sand were warranted. The licensee continues to find only a minimal accumulation during inspections/flushing evolutions. In addition, the licensee has not experienced any operational problems with the chilled water system or the ESW valves. The inspectors do not have any further concerns regarding this matter.

PARTIAL LIST OF PERSONS CONTACTED

Licensee

*A. Blind, Site Vice President
*J. Sampson, Plant Manager
*K. Baker, Assistant Plant Manager
*D. Noble, Radiation Protection Superintendent
*T. Postlewait, Site Engineering Support Manager
*L. VanGinhoven, Material Management Department
*J. Allard, Maintenance Superintendent
*B. Gillespie, Operations Superintendent
*P. Schoepf, Supervisor, Safety Related Systems
*D. Morey, Chemistry Superintendent
*J. Kobyra, Manager Nuclear Engineering
*T. Beilman, Scheduling
*D. Hafer, Nuclear Engineering
*T. Quaka, Project Management & Inst. Services
*A. Barker, Plant Performance Assurance
*M. Horvath, Plant Performance Assurance
*P. Barrett, Plant Performance Assurance
*P. Russell, Plant Protection
*R. Ptacek, Licensing
*M. Ackerman, Licensing
*G. Martin, Licensing

INSPECTION PROCEDURES USED

IP 37551	On-site Engineering
IP 61726	Surveillance Observations
IP 62703	Maintenance Observation
IP 71707	Plant Operations

ITEMS OPENED and CLOSED

Opened

50-315/316-96007-01	IFI	Work Control Process
50-315/316-96007-02	URI	Pre-Condition of station batteries
50-315/316-96007-03	URI	Operability of ESW System

Closed

50-315/94004-04:	VIO	Inability to use bullseye during a Reactor Coolant System (RCS) draindown.
50-315/316-94014-03:	VIO	Failure of Auxiliary Equipment Operators (AEO) to make room tours.

50-315/94004-02:	URI	Pre-job briefing for RCS draindown not conducted.
50-315/94004-03:	URI	Training of operators for infrequent evolutions.
50-315/94004-04:	VIO	Inability to Use Bullseye During RCS Draindown.
50-315/94004-06:	URI	Use of an inaccurate Pressurizer Relief Tank (PRT) level instrument during a draindown evolution.
50-315/316-94014-08:	IFI	Review of revision to DC ground procedures.
50-315/316-94006-13:	IFI	Despite procedure changes, there were performance problems with inadequate control of reactor coolant system draining.
50-316/93013-01	URI	Condition report not issued for a valve repack.
50-315/316-94018-03	URI	Review of planned maintenance of ESW expansion joints.
50-316/94014-04	IFI	Evaluation to determine if a calibration procedure was required.
50-316/94013-02	VIO	Failure to correct the root cause of repeated packing failures of 2-MMO-240.
50-316/94022-01	IFI	Maintenance effectiveness during refueling outage.
50-315/316-94018-01	VIO	Failure to remove action request tags.
50-315/96001	LER	Emergency diesel generator declared inoperable due to a missed surveillance due to personnel error.
50-315/316-94008-01	VIO	Failure of procedure to document ESW flow to AFW pump.
50-315/94002-13	IFI	Reactor Coolant Pump (RCP) motor lower radial bearing failure.
50-315/316-95005-01	IFI	Operation with neither boric acid transfer (BAT) pump running.
50-315/316-95005-03	IFI	Qualifications for alternate members of the Plant Nuclear Safety Review Committee (PNSRC).
50-315/316-94008-02	IFI	Actions to prevent further sand intrusion into the Control Room Air Conditioners (CRAC).

LIST OF ACRONYMS USED

AEO	-	Auxiliary Equipment Operators
BAT	-	Boric Acid Transfer
CR	-	Condition Report
CRAC	-	Control Room Air Conditioners
IR	-	Inspection Report
PNSRC	-	Plant Nuclear Safety Review Committee
PORV	-	Power Operated Relief Valve
PRA	-	Probabilistic Risk Assessment
PRT	-	Pressurizer Relief Tank
RCP	-	Reactor Coolant Pump
RCS	-	Reactor Coolant System
RPH	-	Residual Heat Removal
S/G	-	Steam Generator
SE	-	Safety Evaluations
SSFI	-	Safety Stem Functional Inspection
TDAFWP	-	Turbine Drive Auxiliary Feedwater Pump
URI	-	Unresolved Item