U.S. NUCLEAR REGULATORY COMMISSION

REGION III

REPORT NO. 50-315/95013; 50-316/95013

FACILITY

Donald C. Cook Nuclear Generating Plant

LICENSEE

Indiana Michigan Power Company
Donald C. Cook Nuclear Generating Plant
1 Riverside Plaza
Columbus, OH 43216

DATES

December 5, 1995 through January 16, 1996

INSPECTORS

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2/7/96
Date

AREAS INSPECTED

A routine, unannounced inspection of maintenance, engineering, operations, and plant support was performed. Safety assessment and quality verification activities were routinely evaluated. Follow-up inspection was performed for non-routine events and certain previously identified items.

Executive Summary

MAINTENANCE AND SURVEILLANCE

There were examples of technical specification surveillance activities where safety-related equipment was not tested under suitably controlled conditions. The examples, while not pre-planned, did reflect a failure to ensure that safety-related equipment was tested in accordance with the design and licensing bases. However, there were no examples identified where degraded equipment was not identified as a result of the pre-conditioning.

- The licensee's practice of using the air start system to roll the diesel generators prior to testing was cited as an example of pre-conditioning (Section 1.2.1). INSPECTOR IDENTIFIED

- The licensee performed surveillance tests on the turbine driven auxiliary feedwater pump such that on several occasions the TDAFWP was operated immediately prior to a TS required surveillance. This was cited as an example of pre-conditioning (Section 1.3.1). INSPECTOR IDENTIFIED

- The licensee's practice of venting the residual heat removal (RHR) pumps immediately prior to performing surveillances was identified by the licensee's quality assurance organization as a possible pre-conditioning event (Section 3.4). LICENSEE IDENTIFIED

Several examples of work control problems were identified during this inspection. These examples were not identical to the previous examples discussed in the last inspection report (50-315/316-95012) but did reflect continuing weaknesses in the work control process and post maintenance testing. These examples were:

- The incorrect procedure for the changing of the residual heat removal (RHR) pump oil (Section 1.5). INSPECTOR IDENTIFIED

- Two TDAFWP surveillances were scheduled close together and resulted in initial conditions not being met (Section 1.3.1). INSPECTOR IDENTIFIED

- The issuance of a post maintenance task sheet that was incorrect (Section 1.4). INSPECTOR IDENTIFIED

- Failing to perform the specified PMT on the Unit 2 CD emergency diesel generator (Section 2.1). LICENSEE IDENTIFIED

ENGINEERING

A system engineer did not use the regulatory guide specified in the TSs to determine whether a D/G failure was valid. The subsequent erroneous decision that the failure was not valid, resulted in a failure to test the D/G in accordance with the frequency specified in TSs (Section 2.1). INSPECTOR IDENTIFIED

Following the failure of a D/G to start, the licensee did not check for a common mode failure in a timely manner (Section 2.1). INSPECTOR IDENTIFIED

OPERATIONS

Licensed operators made a non-conservative interpretation of TSs during the followup to a D/G failure to start. The non-conservative interpretation was that testing of the redundent diesel generator was only required when a common mode failure was suspected rather than the TS requirement that D/G failures should be considered potentially common mode failures until demonstrated otherwise was clearly stated in the TS (Section 3.1). INSPECTOR IDENTIFIED

Licensed operators during a planned Unit 1 shutdown received an unexpected high vibrations on the main turbine resulted and conservatively decided to manually trip the reactor (Section 3.3.1). LICENSEE IDENTIFIED

PLANT SUPPORT

The solid radwaste program appeared to be well implemented (Section 4.1.3).

The licensee's pursuit of the resolution of the steam generator blowdown flashtank issue was considered good. The licensee had implemented actions as committed in previous inspections but had identified the need for additional work (Section 4.1.1).

SAFETY ASSESSMENT AND QUALITY VERIFICATION

An excellent Quality Assurance (QA) finding questioned whether the licensee's practice of venting the residual heat removal pumps prior to testing constituted pre-conditioning (Section 3.4). LICENSEE IDENTIFIED

A non-conservative interpretation of a TS occurred across organizational boundaries and vertically through the organization. The TS was one of the longest and more difficult to read however, as stated above the TS's fundamental premise was clear (Sections 2.1, and 3.1). INSPECTOR IDENTIFIED

Summary of Open Items
Violations: identified in Section 1.2.1, 1.3.1, and 2.1
Unresolved Items: closed in Section 2.1.
Inspector Follow-up Items: identified in Section 4.1.1, and closed in Sections 4.2.1, and 4.2.2
Non-cited Violations: identified in Section 2.1

INSPECTION DETAILS

1.0 MAINTENANCE AND SURVEILLANCE

NRC Inspection Procedures 62703 and 61726, and 92902 were used to perform an inspection of maintenance and testing activities. The inspectors identified two examples of a violation for pre-conditioning of safety-related equipment immediately prior to performing surveillance tests. This pre-conditioning, while not pre-planned, had the potential to prevent the identification of equipment failures.

1.1 Maintenance and Surveillance Testing Activities

The inspectors observed routine preventive and corrective maintenance and surveillance activities to ascertain that they were conducted in accordance with approved procedures, regulatory guides, industry codes or standards, and in conformance with Technical Specifications. The specific items observed/reviewed are listed in paragraph 1.8.

1.2 Follow-up On Previously Identified Items

A review of the following unresolved item was performed in accordance with Inspection Procedure 92901.

1.2.1 (Closed) Unresolved Item 50-315/316-95010-01 Emergency Diesel Generator (D/G) Pre-Conditioning Prior To Testing - Both Units

The inspectors identified a concern regarding the pre-conditioning of D/G air start system during a D/G auto start. The Updated Safety Analysis Report (USAR) states in Section 8.1.1, that the D/Gs start automatically and accept load within 10 seconds after the loss of normal and preferred offsite power sources to the buses which supply vital loads. Section 8.6, "Tests and Inspection", further states that automatic starting and loading of D/Gs is an essential feature, therefore periodically tested.

The licensee's policy was to roll the D/Gs using the air start system with the cylinder petcocks open prior to the Technical specification (TS) surveillance. This was done to prevent damage to the D/Gs in the event of excessive water or oil accumulation in the cylinders. The licensee monitored the fluid blown from the petcocks in the past and had not observed excessive amounts which would question D/G operability. However, the inspectors were concerned that, since the air start valves were cycled to support the blowdown evolution, the valves were not being tested in an as-found condition. The cycling of the valves prior to a timing test could mask a problem that would prevent the D/G from performing as designed. This issue was first discussed in Inspection Report 50-315/316-95010 and, due to the need to gather additional information, was left as an unresolved item.

On January 5, 1996, the licensee responded to the inspectors concern (licensee letter AEP:NRC:1224D) and stated that the practice of air rolling the diesel generators in this manner would be discontinued. The licensee neither agreed

nor disagreed that the practice constituted pre-conditioning of the diesel generator. While the licensee's letter did not specify a date by which the procedures would be changed, the licensee subsequently verbally committed to a March 1, 1996 completion date.

Upon further review, the inspectors concluded that the rolling of the diesel generators, utilizing the air start system, constituted pre-conditioning of the diesel generators prior to performing a TS surveillance. If the air start system was slow in operating, the 10 second assumption to accept the load would not be met. Some equipment if degraded would operate faster on a second start attempt. By rolling the D/G with the air start system, the licensee was performing the 10 second start surveillance on the second actuation of the starting air system.

The licensee performed Technical Specification surveillance testing (TS 4.8.1.1) on the diesel generators in accordance with procedure OH 4030 STP.027AB/CD. 10 CFR Appendix B, Criterion II, "Quality Assurance", requires in part that activities affecting quality shall be accomplished under suitably controlled conditions. Surveillance testing required by Technical Specifications (TS) to verify operability of equipment is an activity affecting quality. On numerous occasions, including January 16, 1996, the Unit 2 AB D/G the air start system was utilized to roll the D/G prior to verifying the D/G's capability to meet TS fast start surveillance requirements. This is considered a violation of 10 CFR Appendix B, Criterion II , in that, the TS surveillance testing for the Unit 2 AB D/G was not accomplished under suitable conditions (50-315/316-95013-01a(DRP)).

1.3 Auxiliary Feedwater System (AFW) Assessment

The inspectors assessed the material condition, the surveillance program, and the operability readiness of the Unit 1 AFW system. To assess these areas, the inspectors reviewed the last two years of maintenance history and condition reports, previous licensee's QA surveillances, past results of surveillances, and regulatory documents. The inspectors concluded that the material condition and operational readiness of the Unit 1 AFW system was adequate with some concerns identified in the surveillance program.

1.3.1 Surveillances

The inspectors' review of past surveillances for the Unit 1 AFW identified several concerns with the performance of quarterly surveillances OHP 4030 STP.017T (017T), "Turbine Driven Auxiliary Feedwater (TDAFW) System Test" and OHP 4030 STP.017TV (017TV), "TDAFP Trip and Throttle Valve Operability Test." Surveillance 017T was performed to satisfy Technical Specification (TS) surveillance requirement 4.7.1.2.b. Due to previous reliability concerns, surveillance 017TV was performed quarterly and as needed to verify operability of the trip and throttle valve (T&TV). The following concerns were identified by the inspectors during the review of the surveillance activities:

- Surveillance procedure 017TV stipulated to verify operation of the mechanical overspeed trip lever by depressing the trip lever and

verifying mechanical overspeed plunger upward movement. After this verification of the trip lever operation, the TDAFWP would then be started and subsequently tripped from the control room.

The TDAFWP vendor recommended conducting mechanical overspeed trip mechanism freedom of movement testing after each scheduled turbine/pump surveillance at a maximum interval of quarterly. The licensee incorporated the recommendation into TDAFWP surveillances. However, the inspectors identified that the step was inserted prior to operating the TDAFWP. Therefore, the surveillance program for the TDAFWP did not verify the capability of the mechanical overspeed to trip the turbine while running.

- The Updated Safety Analysis Report (USAR) states in Section 14.2.8.2 (17), that a major assumption in a rupture of a main feedwater pipe was that automatic initiation of AFW would occur and supply the intact steam generator (SG) within 60 seconds of a low-low SG level.

  In April and September 1994, surveillance 017TV was performed within 3 hours and 1 hour respectively prior to performing surveillance 017T on the Unit 2 TDAFW pump. Performance of 017TV had the effect of preconditioning the TDAFWP by running and warming up the pump and exercising the mechanical overspeed trip lever prior to the TS required surveillance (017T). Therefore, the pump was not tested under standby conditions. 10 CFR Appendix B, Criterion II, "Quality Assurance", requires in part that activities affecting quality shall be accomplished under suitably controlled conditions. Surveillance testing required by Technical Specifications (TS) to verify operability of equipment is an activity affecting quality. Therefore, running the TDAFW pump just prior to the required TS surveillance is considered a violation of 10 CFR Appendix B, Criterion II, in that, the TS surveillance testing for the Unit 2 TDAFW pump was not accomplished under suitable conditions (50-315/316-95013-01b(DRP)).

- Recent procedure revisions of 017T and 017TV in August 1995 added a precaution to require that routine testing be performed under "cold quick start" conditions. A "cold quick start" was defined as a start which occurred when a turbine has not been operated for at least 72 hours. This would have eliminated the pre-conditioning of the pump, as discussed above. However, there were no scheduling or procedural controls to ensure that the 017T procedure was performed before 017TV in order to avoid pre-conditioning the TDAFWP during TS required surveillances.

  Following the revision, the surveillances were performed on the Unit 2 TDAFWP on November 8, 1995. Procedure 017TV was performed within one hour following 017T. Therefore the "cold quick start" criteria was not met for surveillance 017TV. However, since 017T, the TS required surveillance, was performed first, the failure to meet requirements in

the 017TV procedure was less significant. This failure constituted a violation of minor significance and is being treated as a Non-Cited Violation, consistent with Section IV of the NRC Enforcement Policy.

1.4 Post Maintenance Test (PMT) Task Sheet Error

During the observation of JO# R0034969 the inspectors observed that the operators were performing a different PMT than was specified in the Job Order (JO). Fortuitously, the PMT that the operators performed was more conservative than that specified in the JO.

Activity number 2 in the original JO specified, "Cycle valve at least partially if the reachrod was disconnected to verify the reachrod will still operate the valve." The reachrod was not disconnected by mechanical maintenance and thus the valve was not required to be stroked. However, the operators insisted that the valve was required to be fully stroked in accordance with the operations PMT.

The inspectors determined that the operators' PMT standard was different than that specified in the JO. The PMT standard stated, "Cycle the valve one complete cycle, full open-full closed." In addition, the operation's PMT standard did not contain any of the other notes contained within the original JO for the specified PMT.

Interviews with the operations department schedulers identified that an old operations standard was inadvertently allowed to remain in the computer data base. When the JO activity was printed by the schedulers, the standard over rode all other PMT contained within the activity. Fortunately the standard, in this case, was more conservative then the PMT identified in the JO.

The operator standards were no longer being utilized in the performance of JOs and were to be deleted when identified in the data base. This standard was apparently missed by the scheduler who printed the PMT for the control room. Following the inadvertent overwrite identified by the inspector, management altered the deletion process and had personnel delete all remaining standards codes in the data base.

This failure to have the correct PMT constituted a violation of minor significance and is being treated as a Non-Cited Violation, consistent with Section IV of the NRC Enforcement Policy.

1.5 Poorly Planned JO

JO# C0033590 involved the replacement of a leaking upper bearing reservoir sight glass on the 1 West RHR pump motor. During that replacement a number of errors were identified in the JO by the electricians. The electricians worked around these errors.

The JO instructed the electricians to adjust the oil level in the lower bearing reservoir to reach a certain height. During this evolution, the

electricians measured 3.25 quarts of oil in the lower reservoir. The work instructions also directed the electricians to add 8.5 gallons of oil to the upper reservoir.

The workers, who had read the motor nameplate data, correctly determined that the reference to gallons was in error. The maximum amount of oil the motor could hold in the upper and lower reservoirs together was 10.5 quarts. The workers decided to add 8.5 quarts to the upper reservoir and then make a scribe mark to show the correct level.

When 7 quarts of oil had been added to the upper reservoir, the workers realized that if the full 8.5 quarts were added, the upper reservoir would overfill. Instead the workers added just enough oil to bring the total amount of oil in the motor to 10.5 quarts.

The workers properly questioned the work instructions and compared the instructions to the motor nameplate data. However, the instructions did not assist the workers in the correct performance of the job.

1.6 Perform Check Valve Examination - JO# R0041238

This activity included inspection and repair/replacement of the west emergency service water (ESW) pump discharge strainer outlet check valve (2-ESW-102W). The entire valve was replaced due to a damaged insert. The inspectors identified that although the activity was performed satisfactorily, the workers did not exhibit a questioning attitude.

The design of this check valve incorporated springs to assist each disc half in closing. During the inspection, both the mechanics and quality control personnel noted that one spring was weak. The mechanics also commented on the significantly stronger closing force present in the replacement valve. The inspector noted an obvious difference in the size and gauge of the springs. This raised a question as to which of the springs was appropriate.

The inspector discussed this issue with the component engineer who was previously unaware of the difference in springs. While the engineer was researching the parts, the valve was installed and returned to service. The engineer determined that during the previous installation of 2-ESW-102W in 1989, smaller springs were substituted, and that the larger springs being installed were the correct parts.

The inspectors concluded that the mechanics did not exhibit a questioning attitude in that a difference in valve performance was noted, but no effort was made to identify the reasons or verify the proper valve parts were being installed.

1.7 Incorrect Work Mode Scheduling Aids

Several of the JOs were worked in different modes than specified in the JOs. This was apparently due to work being removed from the refueling outage without the JOs cover sheets being appropriately updated.

Several of the JOs had work mode scheduling aids on the cover sheet stating modes 5 and 6. This meant that the work was to only be performed during modes 5 or 6. In the last year the licensee had been making an effort to perform more work while on line and move as much work as possible out of the refueling outage timeframe. When the work was evaluated and rescheduled for on line, not all cover sheets were updated.

The licensee documented this discrepancy in a condition report (CR 95-1957) which was still open at the end of this inspection period.

1.8 The following activities were observed and/or reviewed:

- JO# R0022045, Visual leak examination of portions of Unit 1 West Residual Heat Removal (RHR) train.
- JO# R0035347, Calibration of 1 West RHR pump discharge pressure and temperature alarm/indication and heat exchanger outlet flow control calibration.
- JO# C0033590, 1 West RHR pump motor, replace upper bearing sight glass and correct oil level.
- JO# R0033207, Perform motor operator testing on valve 1-IMO-225, refueling water storage tank supply to west containment spray pump.
- JO# R0034373, Perform motor operator testing on valve 1-IMO-324, west RHR pump discharge crosstie shutoff valve.
- JO# R0051720, Perform 01-OHP 4030.STP.050W, West RHR train operability test for Modes 1 - 4.
- JO# R0028959, Inspect and lubricate reach rod to valve 1-RH-106W, West RHR pump casing drain.
- JO# R0034969, Inspect and lubricate reach rod to valve 1-RH-104W, Recirculation sump to west RHR pump suction shutoff valve.
- JO# C0034161, Calibrate safety-related overcurrent relay 2-51-TA1, Unit 2 South Safety Injection Pump.
- JO# C0028289, Mechanical Modification 526, Install new motor on 2-IMO-911-ACT, Refueling water storage tank to centrifugal charging pump motor operated valve.
- JO# R0042029, Lube & clean 2-pp-7w-mtr, Unit 2 West Essential Service Water (ESW) pump motor.
- JO# R0019241, Inspect and clean breaker 2-T21A5, Unit 2 West ESW pump supply breaker.

- JO# R0053519, Inspect expansion joint 2-XJ-54W, West ESW header to emergency diesel generator heat exchanger.
- JO# R0038174, Calibrate protective relays for 2-OME-34W, West ESW pump discharge strainer.
- JO# R0041238, Perform check valve examination of 2-ESW-102W, West ESW pump discharge strainer outlet.
- 01-OHP.4030.STP.18, "SG Stop Valve Dump Valve Surveillance Test"
- 02-IHP.4030.SMP.115, "SG Level Protection Set I Functional Test And Calibration
- 01-OHP 4030.STP.01TV, " Turbine Driven Auxiliary Feed Pump Trip and Throttle Valve Operability Test "
- 01-OHP 4030.STP.017T (017T), "Turbine Driven Auxiliary Feedwater (TDAFW) System Test"

2.0 ENGINEERING

NRC Inspection Procedures 37550 and 37551 were used to perform an onsite inspection of the engineering functions. Troubleshooting efforts to determine the root cause of the Unit 2 CD diesel generator failure to start were comprehensive. The inspectors identified a concern with engineering's ability to ensure that equipment was tested and evaluated in accordance with the correct regulatory requirements. Two TS violations were identified.

2.1 Failure to Implement Diesel Generator Surveillance Requirements Properly

The inspectors reviewed licensee actions following a failure of the Unit 2 CD emergency diesel generator (D/G). The root cause investigation and troubleshooting were thorough, but concerns were identified with the use of a different Regulatory Guide than required by Technical Specifications (TS).

On December 5, 1995, the Unit 2 turbocharger jet assist check valve in the CD-1 starting air train (2-DG-130C) was replaced. The planned post-maintenance testing (PMT) included two fast starts of the D/G, each using only one bank of starting air. The two starts were necessary to ensure the check valve operated in both the open and close directions. This PMT was not performed following valve replacement on December 5, 1995, due to a scheduling error. Only one fast start was performed using the CD-2 starting air train, which resulted in testing the valve in the closed direction.

The remaining fast start, using the CD-1 starting air train; was attempted at 5:02 p.m. on December 29, 1995. The D/G failed to accelerate to design speed within the required time, the incomplete start relay actuated, and the D/G was declared inoperable. The D/G was successfully started using both starting air trains and was declared operable at 12:30 a.m. on December 30, 1995.

The root cause of the incomplete start was not obvious and the licensee began trouble-shooting efforts on the afternoon of December 30, 1995. These efforts included several air rolls using only the CD-1 air bank with temporary instrumentation installed. The system engineer suspected a slow acting pilot-operated valve (POV) as the root cause due to the history of similar failures. This valve was required to reposition on a start signal to admit control air to the starting air valve's actuator. Several starts were attempted with varying idle times, with inconclusive results. On January 5, 1996, the licensee decided to replace the solenoid valve and quick exhaust valves (QEVs) and refurbish the POV, as a precautionary measure.

The refurbishment of the POV did not reveal any indications of failure. On January 15, 1996, the QEVs that were removed were disassembled and one was noted to have the diaphragm stretched and depressed against the seat. The QEVs were designed to admit and exhaust control air to opposite sides of the actuator for the starting air valves. If the QEV had become stuck in this position while still installed, the result could have led to the slow starting of the engine. The licensee was continuing the investigation to attempt to verify the QEV was the root cause. The licensee's trouble-shooting efforts were comprehensive, and reflected a conservative philosophy. However, the inspectors' review of this event raised the following concerns:

- The failure to perform the required PMT was identified by the licensee on December 28, 1995. The licensee determined that a fast start using the CD-1 air bank was required to complete the PMT. The root cause for the inappropriate PMT was identified as a scheduling error. Specifically, the PMT was correctly specified in a job order activity, but was not included in the scheduled work for December 5, 1995.

  Previous concerns with performance of PMT have been identified by the inspectors, including a violation issued in NRC Inspection Report 50-315;316/95009. However, those concerns regarded inappropriate PMT being specified for certain components or evolutions, and that issue did not contribute to this missed test.

  The licensee performed the required PMT and provided additional guidance to the planning department to prevent recurrence. This licensee-identified and corrected violation is being treated as a Non-Cited Violation, consistent with Section VII.B.1 of the NRC Enforcement Policy.

- T.S. 4.8.1.1.2 required that the number of valid starts and failures (of a D/G) be determined in accordance with RG 1.108, Revision 1, 1977. In accordance with RG 1.108 the failure to start on December 29, 1995 would have been considered a valid failure. However, the licensee used guidance in RG 1.9 to reach the erroneous conclusion that the incomplete start of the CD D/G should not be categorized as a valid failure. This was based on an exception to valid failures if portions of the starting air system were isolated for testing.

On January 12, 1996, the inspectors informed the licensee that the TS required valid failures were to be determined in accordance with RG 1.108. In response, the licensee determined on January 15, 1996 that the failure should have been considered a valid failure. Because this was the second valid failure in the last 20 starts, the CD D/G should have been on an increased testing frequency (every 7 days) since December 30, 1995.

Subsequent to December 30, 1995, the CD D/G was successfully tested for troubleshooting on January 5, 1996. The surveillance was then required to be performed on January 14, 1996. Testing was not completed on the CD D/G until January 15, 1996. This exceeded the required interval (7 day plus 25% maximum extension) by 23 hours. The licensee's failure to test the Unit 2 CD D/G within the required surveillance interval is considered a violation of TS 4.0.2 (50-316/95013-02(DRP)).

- Inspection of the QEVs was not performed in a timely manner. The QEVs were removed from service on January 5, 1995, but were not inspected until one week later. The information gathered from the inspection indicated that a potential existed for a common mode failure of both EDGs. The licensee successfully tested each EDG for both units using a single air bank on January 16 and 17, 1995.

- Interviews with Engineering and Operations personnel revealed a non-conservative approach to the implementation of action b. of TS 3.8.1.1. Further discussion of this topic is discussed in Section 3.1 of this report.

3.0 OPERATIONS

NRC Inspection Procedure 71707 was used in ongoing inspection of plant operations. Performance during this inspection period was mixed. A conservative philosophy was demonstrated when operators manually tripped the Unit 1 turbine generator when high vibrations were encountered, but a non-conservative philosophy towards emergency diesel generator testing was identified by the inspectors. The improvement noted by the inspectors regarding human performance in the previous inspection report was observed to remain steady.

3.1 Non-conservative Interpretation of Technical Specifications (TS)

While reviewing the D/G failure described Section 2.1 of this report, the inspectors identified that the Operations department's philosophy towards implementing Action b. of TS 3.8.1.1 was non-conservative. While this interpretation was not implemented during this report period, the inspectors were concerned with future implementation.

Action b. of T.S. 3.8.1.1 stated that if a diesel generator became inoperable due to any cause other than an inoperable support system, an independently testable component, or preplanned preventive maintenance or testing, demonstrate the OPERABILITY of the remaining OPERABLE diesel generator by

starting it within 8 hours, unless the absence of any potential common mode failure for the remaining diesel generator is demonstrated.

Discussions with operations personnel from different shifts ranging from Unit Supervisors to the Operations Superintendent revealed that the action statement was being interpreted in a non-conservative manner. The "Operations" and "engineering" interpretation was that testing of the redundant D/G was only required when a common failure mode was suspected. The TS stated that testing of the redundant D/G was required whenever a common mode failure could not be positively ruled out.

The licensee has evaluated this concern and was planning to develop and issue guidance to the operation crews on the proper implementation of TS 3.8.1.1.

3.2 Main Transformer Induced Current Heating - Unit 1

At the beginning of the inspection period, the licensee was operating Unit 1 at 75 percent power due to elevated temperatures on the main transformer center phase bus duct transition box bolting flange. The licensee had determined that the excessive heating was caused by induced current on the transition box.

The licensee removed the unit from service twice during the inspection period to perform repairs on the transition box flange. During the latest shutdown on December 14, 1995, the licensee replaced the flange gaskets with high temperature silicon-rubber and installed flux plates on all three phases. The licensee also installed thermocouples for continuous monitoring capability.

On December 19, 1995, the licensee returned the unit to 100 percent power, with flange temperatures approximately 30°F below licensee administrative limits. The licensee is currently developing an action plan to address a potential challenge to the limits due to the eventual increase in ambient temperature.

3.3 Followup on Previously Identified Items

A review of a licensee written reports of nonroutine events was performed per NRC Inspection Procedure 92700.

3.3.1 (Closed) LER 50-315/95012: Manual Reactor Trip Conservatively Initiated Due To Increasing Main turbine Vibration

On December 7, 1995, licensee operators manually tripped the Unit 1 reactor from about 32 percent power due to increasing vibrations on the main turbine. The licensee was reducing power on the unit at the time to remove the turbine-generator from service for repairs.

The licensee attributed the cause of the excessive vibrations to increased sensitivity of the main turbine to steam temperature changes while removing the MSRs during the power reduction. The increased sensitivity was due to tighter clearances of the new monoblock rotor within the turbine assembly which was installed during the previous refueling outage.

As corrective action, the licensee revised the applicable procedure to minimize temperature transients when removing the MSRs from service. The licensee demonstrated successful use of the procedure during a subsequent MSR removal evolution. The inspectors concluded that the operators made the appropriate decision to manually trip the reactor to prevent from challenging the automatic trip circuitry.

3.4 Potential Pre-Conditioning Issue Identified By Quality Assurance

During a review of licensee condition reports the inspectors observed a QA question as to whether the practice of venting the residual heat removal (RHR) pumps prior to TS required surveillance tests constituted pre-condition. The inspectors felt that this QA finding/question was excellent and reflective of a good questioning attitude. The licensee indicated the CR would be included in any followup to the inspectors' concerns regarding pre-conditioning.

4.0 PLANT SUPPORT

NRC Inspection Procedure 84750 was used to perform an inspection of plant support activities. The licensee's gaseous, liquid, and solid radwaste programs were well conducted. There was a gradual decrease in released effluent (gaseous and liquid) activity released during the latter part of 1994 through 1995. The solid radwaste program appeared well implemented, but the licensee had identified several concerns regarding the radioactive material shipping program. All effluent radioactive releases and offsite doses remained within technical specification limits. One Inspection Followup Item (IFI) concerning corrective actions to prevent liquid radioactive blowdown effluent was identified. Also, the inspectors reviewed concerns regarding the bypass of charcoal absorbers on the spent fuel pool and engineered safeguard feature ventilation systems.

4.1 Radiological Controls

4.1.1 Radiological Liquid Releases From Unit 1 Blowdown

Minute amounts of radiological liquid releases from condensed airborne releases occurred via the Unit 1 blowdown startup flash tank which discharges through the storm sewer system to Lake Michigan. During the plant modification which was performed to prevent radioactive material releases from this pathway, damaged baffle plates in the north moisture separator vent tank were identified. These baffle plates were intended to remove the moisture from the blowdown effluent. To correct this problem the licensee stated that the plates would be replaced by May 30, 1996. This matter is considered an inspector followup item. (315/95013-01; 316/95013-03).

4.1.2 Liquid and Gaseous Radioactive Waste

Overall, the liquid and gaseous radwaste programs appeared to be effectively implemented. Although several departments were involved in the organization and management controls, the programs were operating efficiently. A general description of the monitoring, gaseous and liquid release program and release paths was discussed in Inspection Report No. 50-315/316-90021.

Effluent activity released was declining, since leaking fuel was identified in 1993 (see inspection report 50-315/316-94011). The decline was partially attributed to improvements to the liquid radwaste processing system including the conversion from a mixed bed radwaste demineralization system to a higher capacity advanced liquid processing system and electropolishing of liquid effluent sample liners. Changes required by the revised 10 CFR Part 20 were made to the Offsite Dose Calculation Manual (ODCM). The inspectors verified that offsite doses and effluent release monitor setpoints were calculated using ODCM methodology.

The inspectors selectively reviewed initial and subsequent calibration records of the effluent release monitors and also channel functional test and setpoint records. No significant problems were identified in review of functional test and calibration data for the systems, and they were performed in accordance with an approved procedures which appeared to be technically sound. During tours, the inspectors verified that effluent monitors were in good operating condition.

4.1.3 Solid Radioactive Waste and Transportation

The solid radwaste and transportation program appeared well implemented. A review of the process control program identified no problems with the licensee's program or associated vendor activities. Radwaste storage facilities, including the Interim Radwaste Storage Facility (IRSF), appeared well maintained. The licensee continued to ship waste to offsite vendors for processing, but had no immediate plans for burial. A review of these shipment records identified no problems.

However, a review of recent audits and condition reports (CRs) identified weaknesses with waste water management and exempt quantity radioactive material shipments. A station auditor noted that the amount of flush water used during resin sluicing operations was not effectively controlled. This resulted in 2,000 to 13,000 gallons of waste water generated per resin bed. Waste water management was also a weakness identified in a recent Electric Power Research Institute (EPRI) audit. Effective waste water management results in reduced radwaste generation and potentially lower associated personnel exposure. The licensee had revised resin sluicing procedures to minimize generated waste water and was developing other actions.

A review of CRs identified two occasions where exempt quantities of radioactive material were apparently shipped to unlicensed persons. This material was below Department of Transportation (DOT) (ie < 0.002 microcuries/gram) and 10 CFR Part 30 licensing requirements. The licensee later determined that the individuals were licensed, but that shipping procedures did not contain appropriate controls for shipments of exempt material. The licensee revised the procedures and provided guidance to appropriate station personnel.

The inspector also reviewed a recent industry event concerning a dropped radwaste cask liner caused by a failure of the lifting device. The licensee indicated that they were aware of the event and had determined that their lifting device was not affected. However, as a precaution they had

temporarily suspended lifting activities pending a review of the failure mechanism. This was indicative of a good industry awareness and conservative decision making process by the station radwaste group.

4.1.4 Recurrent Problems With Ventilation Systems

The inspectors reviewed several condition reports concerning bypass of the charcoal absorbers on the spent fuel pool (SFP) and Engineered Safeguards Feature (ESF) ventilation systems. Two licensee event reports (LER Nos. 92-008 and 94-008) also documented these events (see inspection report 50-315/316-93007(DRSS)). The bypass resulted from aging and loss of pliability of the seal material on the charcoal absorber bypass damper blade edge. The licensee identified the problem after several failures of the charcoal absorbers to meet the TS leak rate criteria. However, both systems did pass in-place filter DiOctyl Phthalate (DOP) penetrant and charcoal absorber methyl iodide removal tests.

The licensee planned to replace the SFP dampers with new "gas bubbler" dampers during the next refueling outage. A similar replacement for the ESF dampers was not yet scheduled. The new dampers were similar to those currently used on the control room ventilation system, which have not had bypass problems. In the interim, the SFP dampers were permanently disabled and air flow was routed continuously through the charcoal. Per TS requirements, the SFP charcoal was tested following every 720 hours of continuous operation. The ESF dampers were checked quarterly and replaced every 5 years to verify proper sealing.

An analysis of the consequences of a fuel handling accident or significant release, assuming complete bypass of the charcoal absorbers, was performed by the licensee and reviewed by the inspectors. The analysis concluded that 10 CFR 100 limits (ie $\leq$ 75 rem for the thyroid) would be met under accident conditions. This issue will continue to be reviewed during routine inspections.

4.1.5 Problem with Tool Decontamination Accountability Log

The inspectors reviewed a licensee identified problem regarding the accountability log used in the tool decontamination program. In some cases, RP technicians incorrectly signed the log rather than the worker who actually performed the decontamination. This problem occurred because the instructions were not clear that only the person performing the job should sign the log. To correct this problem the licensee changed the program such that each person performing the decontamination function would be in possession of and responsible for his/her own accountability log, and that the only other person signing that log would be a supervisor responsible for that work.

4.2 Follow-up on Previously Opened Items

A review of the following previously opened inspection follow-up was performed using Inspection Procedure 92901.

4.2.1 (Closed) IFI 50-315/316-94011-01(DRSS): Review effectiveness of licensee corrective actions for recurrent shipping events.

The licensee revised station procedures and included a radiation protection (RP) sign off on the shipping list. These actions appear to be effective, as there was no recurrence of these events. This item is closed.

4.2.2 (Closed) IFI 50-315/316-94011-02(DRSS): Review licensee actions addressing inspector concerns about filter testing criteria.

The inspectors verified that those actions listed in inspection report (IR) 94011 were taken. The effectiveness of these actions will be reviewed in subsequent routine inspections. This item is closed.

5.0 Exit Meeting

The inspectors contacted various licensee operations, maintenance, engineering, and plant support personnel throughout the inspection period. Senior personnel are listed below.

At the conclusion of the inspection on January 16, 1996, the inspectors met with licensee representatives (denoted by *) and summarized the scope and findings of the inspection activities. The licensee did not identify any of the documents or processes reviewed by the inspectors as proprietary.

*A. A. Blind, Site Vice President
*J. R. Sampson, Plant Manager
*K. R. Baker, Assistant Plant Manager
*D. L. Noble, Radiation Protection Superintendent
T. K. Postlewait, Site Engineering Support Manager
J. S. Wiebe, Superintendent, Plant Performance Assurance
R. Rickman, Operations Production Supervisor
*M. E. Barfelz, Superintendent, Nuclear Safety & Analysis
*J. D. Allard, Maintenance Superintendent
*D. O. Morey, Chemistry Superintendent
S. D. Delong, Supervisor Tech/Support Administration.
J. A. Kobyra, Chief Nuclear Engineer
*P. G. Schoepf, Plant Engineering Superintendent
*B. Nichols, Acting Operations Superintendent
*B. Burgess, Information Communications Services
*E. Morse, General Supervisor QC-NDE
*M. Depuydt, Licensing Coordinator