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March 3, 1997

Mr. D. R. Gipson
Senior Vice President
Nuclear Generation
The Detroit Edison Company
6400 North Dixie Highway
Newport, MI 48166

SUBJECT: NRC INSPECTION REPORT 50-341/96016

Dear Mr. Gipson:

On January 31, 1997, the NRC completed an inspection at your Fermi 2 reactor facility. The enclosed report presents the results of that inspection.

During the 7-week period covered by this inspection, Fermi conducted five startups and shutdowns. Operators showed improved communications and formality while maintaining positive control of work activities, with some exceptions noted in this report. However, we were concerned that operators were unnecessarily challenged by having to perform five plant startups and shutdowns during this inspection period, bringing to seven the number of aborted startups since completing the refueling outage work. At least four of the shutdowns during this inspection were related to inadequate maintenance activities. The specifics of each case were discussed in the body of the attached report.

Additionally, we were concerned that your staff took two days to determine if all safety systems performed as expected following the December 28, 1996, scram. Properly communicating the facts of the event and understanding whether plant response to an event was proper should be among the highest priorities during event analysis.

Based on the results of this inspection, the NRC has determined that three violations of NRC requirements occurred. These violations are cited in the enclosed Notice of Violation (Notice) and the circumstances surrounding them are described in detail in the subject inspection report. The first violation is of concern because an inadequate procedure, coupled with system design weaknesses, resulted in a plant trip while placing the Reactor Instrumentation Reference Leg Backfill System in service. The second violation was of concern because control room operators failed to follow Alarm Response Procedure 2D13, "Fuel Pool Cooling Trouble," while investigating rising water level in the Spent Fuel Pool Cooling System. By not verifying the position of the manual fill valve was shut, as directed in the procedure, the pool overflowed into ventilation ducts and spread contaminated water to two floor of the Reactor Building. The third violation was of concern because the maintenance procedure for installing containment vacuum breaker magnet assemblies was inadequate to properly install and secure the magnet assembly. The magnet eventually worked itself loose and caused a Technical Specification required shutdown when the vacuum breaker would not fully shut.

The NRC has concluded that information regarding the reason for the first violation, the corrective actions taken, plans to correct the violation and prevent recurrence is already adequately addressed on the docket in Licensee Event Report 96-024, dated January 27, 1997. Therefore, you are not required to respond to this letter unless the description therein does not accurately reflect your corrective actions or your position. In that case, or if you choose to provide additional information, you should follow the instructions specified in the enclosed Notice.

You are required to respond to the remaining violations and should follow the instructions specified in the enclosed Notice when preparing your response. The NRC will use your response, in part, to determine whether further enforcement action is necessary to ensure compliance with regulatory requirements.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosures, and your response will be placed in the NRC Public Document Room (PDR).

Sincerely,

Original signed by
John A. Grobe
James L. Caldwell, Director
Division of Reactor Projects

Docket Nos: 50-341
License Nos: NPF-43

Enclosures:
1. Inspection Report 50-341/96016
2. Notice of Violation

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Supervisor of Compliance
P. A. Marquardt, Corporate
Legal Department
James R. Padgett, Michigan Public
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NOTICE OF VIOLATION

Detroit Edison Company
Fermi 2

Docket No. 050-341
License No. NPF-43

During an NRC inspection conducted from December 16, 1996 through January 24, 1997, violations of NRC requirements were identified. In accordance with the "General Statement of Policy and Procedure for NRC Enforcement Actions," NUREG 1600, the violations are listed below:

1. 10 CFR 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," required in part, that activities affecting quality be prescribed by documented instructions, procedures, or drawings, of a type appropriate to the circumstances and be accomplished in accordance with these instructions, procedures, or drawings.

   a. Procedure 46.000.46, "Filling Reactor Instrumentation Sensing Lines and Operation of the Reactor Reference Leg Back Fill System," prescribed steps to fill, vent, and place in service the Reactor Instrumentation Reference Leg Backfill System.

   b. Maintenance procedure 35.425.002, "Drywell/Suppression Pool Vacuum Breaker Valve Repairs," Section 4.12, prescribed work steps to install containment vacuum breaker magnet assemblies.

   Contrary to the above:

   a. On December 28, 1996, Procedure 46.000.46 was inadequate to fill and vent the Division 1 Reactor Instrumentation Reference Leg Backfill System and place it in service. Specifically, performing the procedure as written resulted in a pressure spike which affected the Division 1 Reactor Vessel Water Level Instruments and caused a reactor scram.

   b. On October 14, 1996, maintenance procedure 35.425.002 was inadequate to ensure that the pallet magnet assembly for Containment Vacuum Breaker T23-F400J was properly installed and secured.

This is a Severity Level IV Violation (Supplement I).

2. 10 CFR 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," required in part, that activities affecting quality be prescribed by documented instructions, procedures, or drawings, of a type appropriate to the circumstances and be accomplished in accordance with these instructions, procedures, or drawings.

   Alarm Response Procedure 2D13, "Fuel Pool Cooling Trouble," required that operators, upon determination that the cause of the alarm was Surge Tank High Water Level, verify the Fuel Pool Skimmer Surge Tank Condensate Supply Isolation Valve (G41-F015) was closed.

   Contrary to the above, on October 31, 1996, operators failed to follow Alarm Response Procedure 2D13, "Fuel Pool Cooling Trouble." Specifically, operators failed to check shut G11-F015 for 75 minutes after identifying the high water level condition in the Skimmer Surge Tanks.

This is a Severity Level IV Violation (Supplement I).

Pursuant to the provisions of 10 CFR 2.201, the Detroit Edison Company is hereby required to submit a written statement or explanation to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, D.C. 20555 with a copy to the Regional Administrator, Region III, and a copy to the NRC Resident Inspector at the facility that is subject of this Notice, within 30 days of the date of the letter transmitting this Notice of Violation (Notice). This reply should be clearly marked as a "Reply to a Notice of Violation" and should include for each violation: (1) the reason for the violation, or, if contested, the basis for disputing the violation, (2) the corrective steps that have been taken and the results achieved, (3) the corrective steps that will be taken to avoid further violations, and (4) the date when full compliance will be achieved. Your response may reference or include previous docketed correspondence, if the correspondence adequately addresses the required response. If an adequate reply is not received within the time specified in this Notice, an order or a Demand for Information may be issued as to why the license should not be modified, suspended, or revoked, or why such other action as may be proper should not be taken. Where good cause is shown, consideration will be given to extending the response time.

Because your response will be placed in the NRC Public Document Room (PDR), to the extent possible, it should not include any personal privacy, proprietary, or safeguards information so that it can be placed in the PDR without redaction. If personal privacy or proprietary information is necessary to provide an acceptable response, then please provide a bracketed copy of your response that identifies the information that should be protected and a redacted copy of your response that deletes such information. If you request withholding of such material, you must specifically identify the portions of your response that you seek to have withheld and provide in detail the bases for your claim of

withholding (e.g. explain why the disclosure of information will create an unwarranted invasion of personal privacy or provide the information required by 10 CFR 2.790(b) to support a request for withholding confidential commercial or financial information). If safeguards information is necessary to provide an acceptable response, please provide the level of protection described in 10 CFR 73.21.

Dated at Lisle, Illinois,
this 3rd day of March 1997

U.S. NUCLEAR REGULATORY COMMISSION

REGION 3

Docket No:	50-341
License No:	NPF-43
Report No:	50-341/96016
Licensee:	Detroit Edison Company (DECo)
Facility:	Enrico Fermi, Unit 2
Location:	6400 N. Dixie Hwy. Newport, MI 48166
Dates:	December 17, 1996 through January 31, 1997
Inspectors:	G. Harris, Senior Resident Inspector A. Vegel, Senior Resident Inspector C. O'Keefe, Resident Inspector M. Bielby, Operator Licensing Examiner R. Riemer, Senior Resident Inspector, Duane Arnold S. Stasek, Senior Resident Inspector, Davis-Besse
Approved by:	Mike Jordan, Chief, Branch 5 Division of Reactor Projects

EXECUTIVE SUMMARY

Enrico Fermi, Unit 2
NRC Inspection Report 50-341/96016

This inspection included aspects of licensee operations, engineering, maintenance, and plant support. The report covers a 7-week period of resident inspection supplemented by additional Region III inspectors.

Operations

- Inspectors observed that operator performance during numerous plant startups and shutdowns was focused and controlled. Communications and control room formality showed improvement (O1.1). However, an incorrect control rod was inserted during a Reactor Engineering surveillance because of a data sheet error (O3.1), and a minor reactor water level transient resulted while turbine balancing work was being performed due to weak contingency planning and communications (O1.2). These problems indicated some weaknesses in Operations' control of plant activities.

- Inspectors identified that control room operators failed to take specific corrective actions required in an Alarm Response Procedure in responding to a Fuel Pool Cooling Trouble alarm during the last inspection period. This inaction resulted in overflowing the spent fuel pool. This was cited as a violation (O1.3).

- The main generator was damaged when an output breaker malfunctioned, causing the generator to become motorized. Inappropriate operator response significantly contributed to the severity of the event. Multiple equipment failures were identified by the licensee investigation, although no firm root causes were identified. Lack of procedures and operator knowledge of generator and switchyard failures were contributors to this event (O3.2).

- Inspectors observed that Nuclear Quality Assurance (NQA) assessment activities of Operations resulted in an improvement in the identification and correction of weaknesses. Self-assessment activities were more effective due to NQA lowering the threshold for identifying and reporting weaknesses; Operations was responsive to the issues raised (O7.1).

Maintenance

- Improper maintenance work practices directly caused or contributed to three plant shutdowns and an automatic reactor trip. First, the reactor was shutdown due to a stuck open safety relief valve, which was caused by a bent valve stem (M2.1). Second, a technical specification required shutdown was initiated when a containment vacuum breaker would not close because the magnet assembly had not been installed properly (M2.2). Third, the plant was shutdown to repair an Offgas System draining problem that affected the ability to maintain main condenser vacuum, caused by improper valve/actuator settings when the valves

were rebuilt during the refueling outage (M2.3). A reactor scram occurred while maintenance workers attempted to place the Division 1 Reactor Instrumentation Reference Leg Backfill System in service. A system design weakness and inadequate procedure resulted in a pressure spike which caused an indicated water level transient that tripped the reactor (M3.1). These maintenance issues contributed to the seven startup-shutdown transients the plant experienced following the fifth refueling cycle.

- Inspectors identified that an inadequate review of TS surveillance and mode change restraint requirements for Primary Containment Monitoring System (PCMS) resulted in a late startup scheduling change to avoid exceeding surveillance interval (M1.2).

- The licensee replaced a new Intermediate Range Monitor detector that was damaged by mishandling while attempting to free the detector drive. An investigation revealed that the drive malfunctioned due to undetected material from a previous bearing failure in the gearbox (M2.4).

Engineering

- The licensee experienced a repeat failure of a flow glass in the reactor water sample sink. Interim corrective actions from the last failure were sufficient to prevent a spill outside the sink and spread of contamination. However, permanent corrective actions to prevent recurrence were not yet complete (E2.1).

Plant Support

There were no significant plant support issues discussed in this report.

Report Details

Summary of Plant Status

The plant began the inspection period shutdown to correct an indication problem with Safety Relief Valve (SRV) "A," which was identified during the first and second startup attempts at the end of the fifth refueling outage (RF05). The plant was restarted on December 21, but was shut down the following day when SRV "D" stuck open. Following repairs, the plant was restarted on December 23, but was shut down as required by Technical Specifications (TS) the following day when Containment Vacuum Breaker "J" stuck open while it was being cycled during a surveillance.

Following repairs, the plant was again restarted on December 26. An automatic trip occurred on December 28, due to a pressure transient in an instrument line while attempting to place the Division 1 Reactor Instrumentation Reference Leg Backfill System in service. The plant was restarted on January 1, 1997, and the main generator was synchronized to the grid on January 3, officially ending Refueling Outage 5. The generator was taken off line several times for testing and balancing work. The plant was shutdown on January 10 to correct an offgas problem, and started up on January 13.

On January 17, while attempting to synchronize to the grid, one of the generator output breakers failed to operate properly, causing one phase of the output breaker to remain shut. When operators tripped the turbine, the generator was motorized until actions were taken to deenergize portions of the switchyard. The reactor was subsequently shutdown, where it remained at the end of this inspection period while the licensee conducted generator inspections and repairs.

I. Operations

O1 Conduct of Operations

O1.1 General Comments (71707)

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 in the sections below.

Inspectors spent a considerable amount of time during this inspection observing evolutions which were not routine. These involved a number of plant startups and shutdowns, which included equipment operations, surveillances, briefings, etc. Inspectors noted an improvement in operator communications. This improvement included coaching non-operators in the use of three-way communications. Despite the number of support personnel in the control room, control room demeanor was improved with noise and distractions being effectively minimized.

Pre-job briefings continued to improve, with the exception discussed in Section O1.2 below. Shift supervision repeatedly stressed attention to detail and maintaining questioning attitudes during plant evolutions, given the large number of startups and shutdowns during the last two months. Operator performance during major evolutions continued to be focussed. During this period, operator performance during more routine evolutions was also good, with no significant errors noted.

O1.2 Turbine Balancing Work Results in Minor Reactor Water Level Transient

a. Inspection Scope (71707, 92903)

The inspectors discussed a minor reactor water level transient which resulted from main turbine balancing work with System Engineers and Operations management. Operator training on similar events was also reviewed. Logs and documentation of the event were discussed with operators and turbine group engineers. Procedure improvements were reviewed and discussed with a Nuclear Shift Supervisor (NSS). The subsequent pre-job briefing and balancing work was observed.

b. Observations and Findings

On January 15, the turbine shutdown for balancing with the reactor at low power dumping steam to the main condenser. A small access plate was removed from the north end of Number 2 Low Pressure Turbine (LP-2) to install a balance weight. This allowed air to leak into the main condenser each time the cover was removed.

When a delay was encountered installing the weight due to dirty threads in the designated slot, more air leaked into the condenser than expected. The delay was not adequately communicated to control room operators, so operators were not able to assess the potential impact of the delay immediately. The increased air leakage into the condenser was enough to cause a slight lowering of vacuum in the north half of the condenser that displaced water from the north part of the hotwell to the south part. South hotwell level was raised to the point where the hotwell level controller caused water to be rejected to the Condensate Storage Tank (CST). The condenser reject flow reduced feedwater flow to the reactor, causing a two inch water level decrease. Operators responded to the reactor water level change promptly and increased feedwater flow to restor normal level.

Deviation Event Report (DER) 97-0061 was written to document the event and track corrective actions.

The inspectors determined that applicable operator training had been conducted following the previous refueling outage (RFO4), which assisted prompt operator recognition of the problem and proper response. The inspectors noted that Fermi's condenser design included hotwell level indication at the south end.

Following the event, the licensee stopped all turbine balancing work and conducted a thorough review of the event. The balancing procedure was changed to include precautions and controls to prevent recurrence, as well as discussions of the effects on the plant of balancing work. Tools used for installation of balance weights were modified to include an integral clear coverplate to minimize air introduction into the condenser.

The inspectors monitored the completion of the balancing evolution following the improvements to the procedure on January 16. The inspectors noted improved work preparation and communications. Balancing was completed without further problems.

c. Conclusions

The inspectors considered that a minor reactor water level transient was caused by excessive air inleakage due to the unexpected difficulties installing a balance weight. The event was aggravated by inadequate communications between the turbine deck and the control room when a problem was encountered. Operators responded properly and minimized the impact of the transient. The inspectors concluded that lack of discussion of possible undesirable consequences of the planned work, in the form of pre-job briefing and procedural notes, indicated a weakness in the control of work. The inspectors considered that the licensee promptly identified the problem, thoroughly investigated its causes, and implemented adequate corrective action.

O1.3 Inadequate Operator Response During Spent Fuel Pool (SFP) Overfilling Event

a. Inspection Scope (92901)

The inspectors performed additional inspections into the overflowing of the spent fuel pool event of October 31, 1996. This issue was discussed in Inspection Report 341/96013. Inspectors reviewed operator response to available alarms and indications during this event. Training and Operations expectations for alarm response procedure usage were discussed with senior licensee management.

b. Observations and Findings

At 6:02 pm, the Fuel Pool Cooling Trouble alarm was received in the control room. An operator was dispatched to the reactor building to check local indications to determine the source of the alarm. The operator identified that the SFP skimmer surge tank level was high and rising. Alarm Response Procedure (ARP) 2D13, "Fuel Pool Cooling Trouble," required checking that the manual fill valve was closed; this valve was actually open. Control room operators, including the NASS, determined that the fill valve should not be open because it was not ordered open. Instead, control room operators verified that there was no other fill source, then increased the SFP drain rate.

During the 75 minutes between receiving the alarm and overflowing the SFP, the Refuel Floor Coordinator called the control room four times to report that the water level in the SFP continued to rise. Control room operators did not take action to check the manual fill valve was shut until after the SFP overflowed. This event resulted in contaminating portions of two floors of the Reactor Building when the SFP overflowed into ventilation ducting.

Partially in response to inspector concerns about ARP usage, the licensee planned to focus on this topic during upcoming operator training.

c. Conclusions

Operators in the control room did not adequately respond to the abnormal condition causing the Fuel Pool Cooling Trouble alarm. ARP 2D13, if followed in a reasonably timely manner, would have identified the problem and corrected it. Failure to follow procedures was a violation (VIO) (50-341/96016-02).

O2 Operational Status of Facilities and Equipment

O2.1 Safety System Walkdowns (71707)

The inspectors used Inspection Procedure 71707 to walk down accessible portions of the following safety related systems:

- High Pressure Coolant Injection System (HPCI)
- Reactor Core Isolation Cooling System (RCIC)
- Core Spray System
- Division 1 and 2 130/260V Batteries
- Emergency Diesel Generators (EDG) 11, 12, 13, 14
- Ultimate Heat Sink Structure and Support Systems
- Condensate Storage Tank and Support Systems

Equipment operability and material condition were acceptable in all observed cases. Since completing the bulk of the refueling outage work, Housekeeping was very good. A considerable effort to clean and paint the plant was evident. However, both Reactor Recirculation Motor-Generator Sets and all four EDGs continued to have a number of small oil leaks. Several minor discrepancies were brought to the licensee's attention and were corrected. The inspectors identified no substantive concerns as a result of these walkdowns.

Inspectors found a broken lock on Core Spray System Valve E21-F001C used to lock the valve shut. Security investigated and had a metallurgical examination performed which determined the lock material was excessively brittle. The investigation concluded the lock failed due to inservice use, not due to tampering. Operations replaced the lock and planned to check a sample of safety related valve locks for brittleness to determine if further lock replacements were necessary.

Inspectors identified several worn hanger brackets on high pressure turbine inlet piping. The U-bolts were wearing into the angle iron supporting the 20-inch steam lines, and one had broken off at the angle iron. A cracked weld on one of these hangers had been identified by the inspectors at the start of the refueling outage, and had been repaired. Following the first issue, Plant Support Engineering determined that the supports in question were not necessary but had not initiated any changes to have them removed or to eliminate the source of wear until after the issue was again raised by the inspectors. Engineering again assessed the condition as acceptable, but stated that a change to remove the bolts would be pursued by a technical service request. Deviation Event Report 97-0030 was written to document the issue.

During startups, inspectors identified several small valve packing leaks releasing small amounts of steam on the HPCI and RCIC systems. These leaks were identified to the licensee and were repaired.

O3 Operations Procedures and Documentation

O3.2 Switchyard Breaker Failure Results in Motorizing Main Generator, Plant Shutdown to Inspect for Damage

a. Inspection Scope (93702, 92903)

The inspectors conducted an investigation following a breaker failure that resulted in motorizing the main generator. The circumstances surrounding the event and operator responses were investigated, and members of the operating shift were interviewed. Plant response to the failure was verified to have been as expected, with some exceptions noted below. The licensee investigation was independently reviewed. The maintenance history and preventive maintenance practices for 345KV switchyard equipment were reviewed with a supervisor from the offsite group responsible for switchyard maintenance.

b. Observations and Findings

On the midnight shift, January 17, operators were attempting to synchronize the main generator to the grid following turbine balancing work. When the operator attempted to shut the first output breaker (CM breaker), anomalous indications were received. The synchroscope stopped at 12 o'clock, with 20 MVARs and 5-13 MW were indicated. Also, control room indicators showed a small current on the Y phase. Control room and local indications for the breaker showed the breaker was open. Additionally, an attempt to trip the CM breaker from the control room resulted in no change in indications.

Following discussions with a Turbine Group engineer, the NSS and NASS decided to trip the generator field breaker to trip the turbine. However, opening the generator field breaker motorized the turbine generator, which continued to turn at synchronous speed. Protective relaying failed to sense the reverse power condition because a transistor failed. Control room operators recognized high current due to

motorizing and deenergizing the generator with the assistance of the Central System Supervisor, allowing the turbine to coast down. Following discussions with turbine generator experts, the licensee decided to shutdown the reactor and inspect the generator for damage.

Subsequent inspection by the licensee identified a blown fuse in a heater circuit in the cubicle for the CM breaker. Weather conditions were near zero fahrenheit. With the reduced heater capacity, the lubricant for the Y phase auxiliary contact arm may have stiffened, slowing its operation. The associated operating linkage was also determined to be out of adjustment, although the breaker had operated properly four days prior to the event. The licensee determined that the combined effect was that the CM breaker closed, then tripped open only on two of the three phases. The licensee was unable to determine the root cause of the equipment malfunctions, partially because the investigation was begun over several days after the event, by which time some of the evidence had been disturbed.

The licensee investigation team determined that operator training on generator and switchyard equipment was identified as weak. Also, no procedures existed to cover the failures observed. Heater fuses were not periodically checked. The operators involved made an inappropriate decision to open the field breaker, partially because of a false sense of urgency to take corrective action to avoid generator damage, and took action without clear concurrence from the turbine engineer present.

The inspectors investigated recent problems with the CM breaker compressor. The inspectors noted that the CM breaker air supply was cross-tied to another breaker several times in December 1996. This condition had been repaired by the time of the event. Another problem on December 28 when the CM breaker closed and tripped back open during testing was not able to be reproduced. The licensee was unable to determine if either problem was related to this breaker event.

Protective relaying logic was checked by the licensee following the event and found to be functioning properly, with the exception of the failed transistor. Breaker lubricants were used in accordance with breaker manufacturer recommendations. The transistor was replaced and the logic tested satisfactorily. Main generator inspections and heater fuse failure analysis were in progress at the conclusion of this inspection period.

Procedures were planned to include generator and switchyard problems, and the control room simulator was to be modified to model generator faults. Operator training on switchyard operations and failures was planned for the next two training cycles. Site participation in switchyard maintenance scheduling and work practices was planned to be increased.

The inspectors noted that offsite power from all five offsite lines was continuously supplied to the unit during the event, and onsite emergency power was also available.

c. Conclusions

This event was initiated by a breaker failure, but escalated by inappropriate operator action due to knowledge weaknesses and a false sense of urgency. An additional equipment failure in the protective logic was a contributed to the significance of the event. The licensee investigation was detailed, and identified human performance and knowledge problems. However, the licensee failed to identify any specific root causes for the equipment failures. The inspectors concluded that operators maintained the reactor in a safe condition during and following the event, and that no regulatory requirements were violated. The event was of no safety significance.

O3.3 Reporting ESF Actuations

Early in RFO5, the licensee reported several ESF actuations to the NRC. Using the available guidance in MLS05, "Notification/General Regulatory Reporting Requirements," control room personnel had difficulty determining whether the events were actually ESF actuations during the allowed during the 4 hours allowed to make the report.

Subsequently, the inspectors noted frequent detailed NSS Log entries describing control room briefs conducted on various surveillance tests which might result in ESF actuations. Should they occur, the entries stated that no ENS notification would be made because the ESF actuations would be part of a planned evolution.

The inspectors reviewed a sampling of these procedures, and most did involve a planned ESF actuation.

However, on December 7, 1996, a log entry was made to indicate a briefing had been conducted prior to purging the drywell, and this evolution might cause drywell-torus vacuum breaker actuation, which would not be reported. A note in the procedure for this evolution indicated that such an actuation had occurred (at the beginning of RFO5), and that operators should closely monitor drywell and torus pressures.

The inspectors discussed this log entry with licensee management, who agreed that an ESF actuation due to operator error does not constitute an expected ESF actuation. Further, because vacuum breakers have no logic for operation and should not actuate during normal operations, a vacuum breaker actuation during drywell purging would have been reportable. No regulatory requirements were violated because no vacuum breaker actuation occurred.

As a result of inspector inquiries into the log entries the licensee began a review of their reportability instructions against regulatory requirements and guidance in order to clarify reportability decisions. The inspectors will review the results of the licensee's clarifications as an inspection followup item (IFI) (50-341/96016-01).

O7 Quality Assurance in Operations

O7.1 NQA Operations Assessments

a. Inspection Scope (40500)

The inspectors reviewed to licensee's Operations Excellence Plan and discussed it with senior licensee management. Inspectors and supervisors in Nuclear Quality Assurance (NQA) were observed assessing Operations, and the results of the licensee's findings were discussed. The plan was discussed with a variety of site personnel to determine the impact and the level of support. The results of internal assessments of progress made were compared with inspectors observations.

b. Observations and Findings

The inspectors observed NQA Surveillance Group personnel performing observations in the control room and the plant. Deviation event reports and surveillance reports written as a result of these efforts were reviewed and discussed with members of the Surveillance Group, as well as senior management for the plant, Operations, and NQA. Corrective actions taken were discussed with NQA personnel.

The inspectors noted a significant increase in NQA presence during Operations' activities. NQA personnel observed control room activities as well as field operations. Prompt feedback of observations was given to shift supervision, and the feedback was received well and disseminated appropriately. Feedback was also given directly to Operations management and received well.

Inspectors observed that individuals in NQA have become more aggressive in identifying and correcting minor weaknesses that did not violate well-defined requirements. The NRC had previously identified that NQA was not identifying such problems in Inspection Report 50-341/96-201. Operations personnel were observed to be receptive to NQA observations and comments. As discussed in O1.1 above, some improvements in operator performance were noted by the inspectors during this inspection period.

NQA utilized two operations specialists from offsite to assist in the assessment of Operations. Nuclear Quality Assurance management planned to continue to obtain expert assistance as the focus of assessment shifts to training and work control in the near future. The NQA assessments were planned to follow the focus of the Operations Excellence Plan, currently in progress to address problems identified by regulatory and industry inspections and self-assessments. The plan included specific action items, completion dates, and performance measures, which NQA was to use to assess performance.

The inspectors assessed commitment to the planned improvements by discussing the plan with a broad spectrum of personnel on the licensee's staff. Individual and organizational commitment appeared good. Cooperation among organizations on

the plan appeared strong, and changes agreed to were made promptly. Corporate support also appeared good, with senior corporate members spending more time onsite observing progress and receiving updates on milestone completion.

c. Conclusions

The inspectors concluded that NQA was providing effective, timely feedback of the implementation of the Operations Excellence Plan. The inspectors noted some improvements in Operations performance in response to NQA comments.

O8 Miscellaneous Operations Issues (92700)

O8.1 (Closed) Licensee Event Report 96024, Rev. 0: Automatic Reactor Scram Due to Perturbations in the Reactor Water Level Indicating System. Corrective actions included a modification to the system to improve venting air from the lines and procedural enhancements for both improved venting and minimizing pressure differential, when placing the system in service. Corrective actions were completed and the system was successfully placed in service following corrective actions. Plant response during the event was verified in detail, and functions which did not initiate were verified to have performed as expected due to the brief time the pressure spike was present. Corrective actions appeared adequate. This item is closed.

II. Maintenance

M1 Conduct of Maintenance

M1.1 General Comments

a. Inspection Scope (62703)

The inspectors observed all or portions of the following work and surveillance activities:

- Rod Block Monitor Operability Surveillance
- Drywell-Torus Bypass Leakage Test
- Intermediate Range Monitor Calibration
- Reactor Protection Surveillance, Scram Discharge Volume Level Div 2, Channel B
- Hydrogen Recombiner Operability Surveillance
- Sequence of Events Test 96-16, Safety Relief Valve Testing
- Sequence of Events Test 96-10, Turbine Testing
- Turbine Overspeed Testing and Setpoint Adjustment
- EDG 12 Fuel Rack Troubleshooting Activities
- Offgas System Troubleshooting Activities
- Primary Containment Personnel Airlock Local Leakrate Testing
- Turbine Balancing Activities
- Fill and Vent of Reactor Reference Leg Backfill System, Division 1

- Hydraulic Control Unit Pressure and Level Switch Calibrations
- Local Leakrate Testing of Division 2 EECW/EESW Cross-tie Check Valves
- Main Generator Ground Detection Circuit Modification and Calibration

b. Observations and Findings

The inspectors observed that housekeeping at the conclusion of the refueling outage was returned to an excellent condition. Cleanliness and preservation efforts in the power block were clearly evident. Scaffolding and temporary services were removed from the plant promptly. However, the actual material condition of some plant equipment had yet to be fully determined due to the number of problems that resulted in shutdowns, and because the plant had not yet been operated at high power. Post maintenance testing requiring higher power levels remained to be completed at the conclusion of this inspection period.

The licensee had a goal to reduce Control Room Information System deficiencies (CRIS dots) to 10 by the end of the outage. The inspectors noted that the number of CRIS dots at the end of this inspection period was 36 compared to the pre-outage level of about 30. During the outage, 144 CRIS dots were cleared, indicating that CRIS dots continued to have appropriate priority in work scheduling. However, after 4 months of outage work, no improvement in control room indications was made.

Work practices observed were mostly good. However, while installing a balance shot on the high pressure turbine, workers dropped a bolt they were removing. The bolt was found in an inaccessible lube oil drain void below the front standard. Deviation Event Report (DER) 97-0027 was written to document the event and track corrective actions. Engineering considered a modification to cut a handhole, but management decided to leave it in place based on an engineering evaluation that it was unlikely to move and could not cause any damage if it did. The inspectors reviewed the analysis and concluded that its conclusions were reasonable. The failure to properly control work material, resulted in a lengthy delay in scheduled work.

M1.2 Primary Containment Monitoring System (PCMS) Calibration Impacted Scheduled Mode Changes

a. Inspection Scope (61726)

The inspectors reviewed a System Engineering memorandum to Operations discussing PCMS calibration scheduling and operational considerations as they related to plant startup and containment inerting plans. Technical Specification requirements and surveillance scheduling were also reviewed. An inspector concern was discussed with senior licensee management.

b. Observations and Findings

Primary Containment Monitoring System hydrogen and oxygen instrument calibrations were required to be performed every 92 days, with a 25 percent extension allowed by TS 4.0.2. With the allowed extensions, Division 1 was due December 27.

System Engineering sent a memorandum to Operations on November 21 and December 18 reported that the calibration for Division 1 PCMS was approaching the critical completion date. The system engineer stated that two courses of action were possible: Inert the drywell and perform the calibration before the surveillance expired, or perform the calibration with containment deinerted. If the latter option were necessary due to startup delays, it would result in an excessive error in indicated oxygen concentration following inerting and would require declaring the equipment inoperable and recalibrating following inerting.

On December 26, with the plant shutdown, the inspectors reviewed the system engineering memorandum and concluded that operational mode changes associated with a reactor startup with an inoperable PCMS channel were not allowed by TS 4.0.3. The inspector questioned whether the calibration could be completed before it expired, given operational requirements. The inspector discussed these issues with licensee management. As a result of that discussion, the licensee reevaluated their startup schedule and decided to inert containment in parallel with startup in order to ensure the calibration would be completed before it expired. The calibration was successfully completed prior to expiration on December 27.

Following discussions with the inspectors, the licensee wrote DER 96-1885 to document the issues and to investigate past mode changes which may have been made with one or both containment oxygen channels inoperable.

c. Conclusions

The inspectors concluded that the licensee did not adequately review the TS surveillance and mode change requirements for PCMS. The system engineer previously identified and communicated the possible schedule impact of performing the PCMS calibration during startup, but no action was taken until additional issues were raised by the inspectors. Licensee understanding of TS requirements was previously identified as a weakness in Inspection Report 341/96017.

The licensee's investigation of past operability of PCMS during mode changes will be reviewed as an Unresolved Item (URI) (50-341/96016-03).

M1.3 Conclusions on Conduct of Maintenance

The majority of significant issues in this inspection report resulted from improper maintenance practices. Most of the events included opportunities to identify the

problems earlier. As discussed in other sections of this report, attention to detail, maintenance work practices, and procedural adequacy continued to be problems in Maintenance. Additional licensee attention to these weaknesses was warranted.

M2 Maintenance and Material Condition of Facilities and Equipment

M2.1 Stuck Open Safety Relief Valve Results in Plant Shutdown

a. Inspection Scope (92903, 61726)

While inspectors were observing SRV functional testing, SRV "D" initially failed to shut. Operator response to the event was observed and compared to procedural requirements. The licensee shutdown and investigation was observed, and the results independently reviewed.

b. Observations and Findings

On December 22, while testing five selected SRVs to ensure proper position indication at 200 psig plant pressure, SRV "D" stuck open. The inspectors noted that this possible failure had been discussed during the pre-evolution brief. Operators responded promptly and in accordance with plant procedures. The valve failed to close on three consecutive attempts by control room operators, but then shut by itself. The plant was shutdown to investigate the failure. DER 96-1872 was written to document this event and track corrective actions.

The SRVs were actuated manually by opening a solenoid operated valve to supply nitrogen to the SRV pilot valve. The licensee determined that the cause for the SRV failing to close was the solenoid operated valve associated with SRV "D" had a bent shaft. The licensee concluded to have been damaged during outage work activities.

The licensee inspected and tested the remaining solenoid operated valves. No deficiencies were identified. The affected valve was replaced and retested satisfactorily prior to startup.

As followup to the valve failure, the licensee reviewed the SRV maintenance history and identified that the environmentally-qualified components in the SRV solenoid operated valves were not replaced as scheduled during RFO5. The work package, which executed several different SRV preventive maintenance requirements, included a note that stated the environmentally-qualified components were not to be replaced during RFO5. The note was subsequently determined to have been incorrectly added by the work planner because of incomplete research on the requirement. Additionally, the central component data base was not sufficiently detailed to track subcomponents. This finding was documented in DER 96-1882.

An engineering analysis was promptly conducted by the licensee, which determined that sufficient service life remained for the components to allow deferring replacement to the next refueling outage. The inspectors reviewed the analysis and concluded it was reasonable.

The licensee concluded the failure to perform the EQ portion of the PM was an isolated error. However, the licensee reviewed all other RFO5 work packages planned by the same individual and noted no other additional problems. The licensee also determined that combining PM activities was a contributor to this event, and was reviewing that practice as part of corrective actions.

c. Conclusions

The inspectors concluded that control room operators' briefing had adequately prepared them to responded immediately and appropriately. The plant was shutdown in an orderly manner to investigate the failure. The inspectors concluded that although no NRC requirements were violated, outage maintenance work practices resulted in damage to a safety related valve. Additionally, maintenance documentation and planning were considered weak because the EQ components were not replaced as scheduled; continued SRV operability required an engineering evaluation. An Inspection Followup Item will be issued pending NRC review of licensee practices for protecting equipment inside containment from inadvertent damage during outage work (IFI) (341/96016-04).

M2.2 Containment Vacuum Breaker Problem Necessitated Plant Shutdown

a. Inspection Scope (93702, 61726, 92903)

While the inspectors observed performance of vacuum breaker operability surveillance, T23-F400J did not close. Operator response to the event was observed and compared to procedural requirements. The inspectors reviewed applicable work packages and maintenance instructions for work performed on the vacuum breaker during the refueling outage. The performance history for the vacuum breakers was discussed with the system engineer. The results of the licensee's investigation were independently reviewed.

b. Observations and Findings

Following SRV testing on December 24, Surveillance 24.402.01, "Drywell-Suppression Chamber Vacuum Breaker Operability Test," was performed in accordance with TS 4.6.4.1.b.1. Vacuum Breaker T23-F400J failed to properly reclosed after manual cycling. After additional attempts with identical indications, and consultation with System Engineering, the licensee determined that a plant shutdown was required by TS 3.6.4.1, Action b. This was reported per 10 CFR 50.72(b)(1)(i)(A).

The licensee inspected the vacuum breaker and determined that the magnet assembly used to pull the pallet against the seating surface was not exerting the necessary force to fully close the valve. Disassembly of the magnet assembly indicated that it had been installed improperly. Specifically, the licensee determined that the assembly was overtightened such that the non-metallic spacer was extruded and hung up on the mounting bolt threads. When it was subsequently loosened, the mounting bolt was no longer secured in place because a gap was created by the deformed non-metallic spacer.

The licensee investigation determined that the magnet installation procedure (35.425.02, Section 4.12.2) was inadequate because it did not ensure the magnet assembly remained secured. The procedure specified a locking compound that was a non-curing type, which did not ensure the assembly remained secured. Also, by locating the non-metallic spacer along the assembly bolt threads, it could extrude and result in relieving bolt tension. Corrective actions were to move the non-metallic spacer so it could not be caught in the mounting bolt threads, to change the locking compound to a curing type, and to perform a check to ensure the non-metallic spacer was not excessively extruded during installation. The remaining vacuum breakers were inspected to ensure the magnet assemblies were tight, and that the non-metallic spacers were not extruded. The other vacuum breakers had been successfully tested during the surveillance which identified the F400J failure.

DER 96-1875 and LER 96-023 was written to document the event causes and corrective actions.

c. Conclusions

The inspectors concluded that Operations' and Engineering's response to the vacuum breaker problem was appropriate, and TS requirements were met. The licensee performed a thorough investigation of the maintenance and recent operating history of containment vacuum breakers. Coordination during the investigation and inspection activities among maintenance, operations and engineering groups was good.

The inspectors concluded that the vacuum breaker failure to close was caused by an inadequate procedure in that the magnet assembly was not properly secured, such that the valve was rendered inoperable. This was considered a violation (VIO) (50-41/96016-05). The inspectors concluded that worker self-checking could have identified that the magnet assembly was not tight as part of the installation process.

M2.3 Offgas Drain Problem Results in Plant Shutdown

a. Inspection Scope (92903, 71707)

The inspectors investigated problems with water collecting in the Offgas suction path, which was affecting Offgas flow. The effects on plant operations were assessed. Following plant shutdown to conduct repairs, inspectors reviewed the

results of the licensee's troubleshooting and root cause investigation. Valve deficiencies identified by the licensee were discussed with the maintenance engineer.

b. Observations and Findings

On the evening of January 9, operators identified a problem with the automatic draining cycle for the 20-inch offgas manifold. This manifold was in the steam jet air ejector (SJAE) suction path from the main condenser, and was thus important to maintaining the condenser as a heat sink. The 20-inch manifold collected moisture and routed it to the drain collecting tank. Level switches were used to isolate the tank and blow it down when it was full. Operators recognized that water was accumulating in the 20-inch manifold because the automatic draining cycle was functioning very slow. At times, this was determined to reduce or stopped offgas flow from the condenser to the SJAEs. Deviation Event Report (DER) 97-0043 was written to document the event and track corrective actions.

In order to minimize the effects of a possible loss of vacuum, the licensee conservatively decided to reduce power while initial troubleshooting was conducted. The plant was later shutdown on January 10 to facilitate repairs.

The licensee identified that the air operated valves (N62-F422A/B) used to isolate the drain tank from the 20 inch manifold leaked past their seat. While the drain tank was being blown down, water was also being blown back into the manifold through the leaking valves. The licensee determined that the actuators maintenance was improperly performed during the refueling outage; specifically, actuator stroke length and spring pressure had been improperly set. Deviation Event Report (DER) 97-0052 was written to document the event and track corrective actions.

c. Conclusions

The inspectors concluded that improper maintenance on offgas valves unnecessarily challenged operators and impacted operation of the condenser as a heat sink for the reactor. This was considered to be a minor violation because of the low safety significance, and because the licensee identified the problem and took prompt corrective actions. Therefore, in accordance with the requirements of Section IV of NUREG-1600, "General Statement of Policy and Procedures for NRC Enforcement Actions" this will not be cited.

M2.4 Intermediate Range Monitor (IRM) Detector Failure Caused by Maintenance

On December 19, IRM "D" would not withdraw properly during testing. The licensee attempted to free the drive without success. An inspection of the drive internals identified that a ball bearing was lodged in a drive gear. The licensee concluded that the ball bearing was introduced when a bearing came apart in the drive box in April 1996, and was not detected in the gearbox grease at that time. The licensee then removed all the grease, and another ball bearing was found.

Following attempts to free the detector drive, the IRM "D" detector showed degradation and was declared inoperable. The detector was subsequently replaced. The licensee attributed the failure to rough handling while attempting to free the detector drive.

The inspectors concluded that the maintenance work practices used to free the detector were poor. The drive problem was caused by incomplete inspection during previous maintenance activities.

M2.5 Freeze Protection Inspection

a. Inspection Scope (71714)

The inspectors reviewed the licensee's completed checklists and preventive maintenance events which comprised the freeze protection program. The corrective actions for Violation 96002-03, which included a plant modification, were reviewed. The inspectors reviewed all DERs generated for potential freeze protection issues, and verified corrective actions for significant issues. The inspectors walked down selected areas of the power block and outbuildings to observe cold weather protection performance.

b. Observations and Findings:

The inspectors walked down the valve pits for the CST and Condensate Return Tank (CRT). Space heaters functioned properly, but the metal enclosures that formed the entrances were uninsulated and each had an six-inch square opening. This configuration resulted in condensation of ambient moisture on the inside of the enclosure dripping into the pits, which both had standing water on the floor.

The CST and CRT instrument cabinets were insulated and heated. However, as noted in Inspection Report 96-201, UFSAR Section 7.4.1.1.3.8, required that the CST instrument cabinet remain locked when not attended. However, the inspectors identified that the padlock was not locked even though a placard attached to the cabinet door stated it was to remain locked. Inspection Report 96-201 identified that the cabinet was not locked as required in the UFSAR. This issue was still being considered for enforcement at the time of this report. This will be considered an Unresolved Item pending NRC disposition of the original issue. (URI)(50-341/96016-06)

Procedure 27.000.04, "Freeze Protection Lineup Verification," and associated inspection results for the last year were reviewed. In general, the inspectors noted that the recorded time spent in performing the inspections were well below the manpower estimates, and few problems were identified during these inspections.

The inspectors reviewed documentation related to Violation 96002-03, Licensee Event Report (LER) 96-001, DER 96-0110, Engineering Design Package (EDP) 28180, "RHR Complex Pumps Freeze Protection," and Technical Service Request (TSR) 28893, "Freeze Protection Walkdowns for RACTs Commitment 96127."

These documents all related to escalated enforcement action for a common mode failure of Diesel Service Water Pumps due to freezing. Licensee corrective actions included a thorough walkdown of the site to identify potential cold weather problems with equipment, per TSR 28893. This series of 32 walkdowns resulted in 18 DERs identifying minor problems. The inspectors reviewed the DERs and identified no regulatory concerns or impact on safety equipment.

EDP 28180 included installing a wall of blowout panels around the safety related service water pumps in each reservoir of the Ultimate Heat Sink, extending the Mechanical Draft Cooling Tower Bypass Line below the surface of the reservoirs, and adding electronic thermometers to monitor the air space near the pump casings. The blowout panels were designed to meet the tornado requirements used for the Refueling Floor blowout panels. The panels were tethered to the support structure to prevent them from becoming missiles during a 200 mph tornado event. The inspectors identified no concerns during the review and inspection of the modification. However, the inspectors identified that no preventive maintenance events were created for the new components. The thermometers were initially calibrated, but no preventive maintenance event was created to channel check or calibrate them periodically, even though they were used to determine whether the pumps should be run to prevent freezing. Similarly, no preventive maintenance events were created to be periodically inspected the blowout panels for function and fit.

Operators identified that the CST level instrument line froze on January 17, declared the instrument inoperable and an LCO was entered. This was documented in DER 97-0092. Operators inspected the cabinet containing the level transmitter and found the heater working, but the cabinet lock was frozen and the door was slightly open. The lock had frozen in the past, but non-licensed operators were able to open the door open enough to record log data. The licensee concluded that this had occurred again, and the door was not properly shut during very cold weather, causing the instrument line to freeze. The instrument line was thawed and returned to operable status within the allowed LCO time period.

c. Conclusions

The inspectors will continue to inspect freeze protection implementation, based on concerns as a result of the CM breaker failure and CST level instrument freezing. The detailed walkdowns performed as a corrective action for a previous violation did not identify any design deficiencies, but did find some minor freeze protection problems. The freezing of the CST level instrument was of concern because it potentially rendered the safety function of HPCI and RCIC suction swap inoperable. Therefore, this will be treated as an Unresolved Item pending inspector review of the CST instrument cabinet design, cold weather problem history, and operability (URI) (50-341/96016-07).

The inspectors remained concerned that the engineering modification process did not require identifying preventive maintenance for new equipment as part of the modification implementation. This issue was previously identified in IR 95009. For

EDP 28180, there was no safety significance to this finding, but it was considered a weakness in the modification process.

M3 Maintenance Procedures and Documentation

M3.1 Instrument Reference Leg Backfill System Procedure Causes Scram

a. Inspection Scope (93702)

The inspectors were present in the control room when an automatic reactor trip occurred while placing the Reactor Instrumentation Reference Leg Backfill System in service. Operator response to the scram was evaluated. The licensee investigation was monitored and results reviewed with the investigators. The I&C technicians were interviewed. Portions of the fill and vent procedure were also observed.

b. Observations and Findings

This Reactor Instrumentation Reference Leg Backfill System supplied air-free water from the Control Rod Drive Hydraulics System to the reactor instrument reference leg. On December 28 while at 18 percent power, the licensee completed venting and filling the backfill system and attempted to place it in service per 46.000.46, "Filling Reactor Instrumentation Sensing Lines and Operation of the Reactor Instrumentation Reference Leg Backfill System." A pressure pulse in the instrument line resulted when the final valve was opened, causing a false indicated high water level, followed by a false indicated low level on all channels of Division 1 instrumentation; this tripped the running feed pump and both reactor recirculation pumps, as well as causing a reactor scram.

The inspectors observed that operator response to the transient was in accordance with plant procedures. The plant was placed in a stable condition promptly. HPCI, RCIC, Low Pressure Coolant Injection Loop Select, and isolation of the Nitrogen Inerting Isolation Valve all did not initiate on the low-low level (Level 2). The licensee later determined that the Level 2 signal was present for only 56 milliseconds, which was slightly faster than the time required to initiate the functions in question. All other systems responded normally.

The licensee investigation determined that the system design did not optimize complete venting of the backfill system. This was the first time the system had been drained for maintenance and returned to operation. Also, the procedure for placing the system in service caused an excessive differential pressure across the final valve because the system was depressurized just before being connected to the reference leg. Because the system was placed in service at normal operating pressure in the reactor, the reactor instrument reference leg momentarily depressurized, causing the false high level signal, then rapidly repressurized, causing the false low level.

This event was reported as a four hour notification per 10 CFR 50.72, as an ESF Actuation. The Resident Inspector staff conducted prompt onsite followup. A conference call between the licensee and NRC Region III management was conducted on December 30, to investigate NRC concerns about safety system response to the transient. However, the licensee was able to respond to NRC concerns and verified that plant response was as expected. As a result of this discussion, Region III decided that an Augmented Inspection Team inspection to followup on the event was not necessary because the licensee was able to determine that the plant had responded as expected. Following NRC questioning, the licensee provided an update to their original 50.72 report on December 30, to include all applicable information. Licensee Event Report (LER) 96-024 was issued on the event.

Corrective actions included an engineering design review and procedure review to identify and correct problems. For example, the four drain valves were rotated to facilitate efficient venting, and one was moved to better location to support better venting of the system. Procedures were modified to enhance venting by performing a high velocity flush. Also, the procedure was changed to minimize pressure differential across the final valve while placing the system in service.

The licensee performed applicable surveillance procedures to verify that safety system logic and equipment functioned properly following the event. Following plant startup, the backfill system was successfully placed in service.

c. Conclusions

The inspectors concluded that this event was caused by an inadequate procedure with a contributing design deficiency. The inspectors, therefore, considered that procedure 46.000.46 as inadequate to prevent a plant transient while placing the backfill system in service. This was a violation (VIO)(50-341/96016-08).

The inspectors concluded that licensee's initial event report was not clear, and investigation was not focussed. The inspectors were also concerned by the considerable delay in determining whether safety systems performed properly during the event.

M8 Miscellaneous Maintenance Issues (92902)

M8.1 (Closed) Licensee Event Report 96010, Rev. 0: HPCI Suction Swap Due to Radio Usage. The inspectors determined that corrective actions taken for previous events where radios interfered with plant operations should have prevented this event. At the inspectors' request, the licensee reviewed previous corrective actions and determined that the CST instrument cabinet was the only radio-sensitive safety related instrumentation which was not located in a building. Previous corrective actions were implemented by grouping equipment by building.

Corrective actions for this event included repairing the telephone line to the cabinet so radios would not be required near this instrument. This event was added to initial and continuing training for radio users, including contractors. In addition, the CST instrument cabinet was posted with radio use warnings similar to those previously installed near radio sensitive equipment. Licensee corrective actions appeared adequate for this event. The safety significance was considered minor because the effect of the radio caused an action which was in the conservative direction. As a result, the inadequate corrective actions were considered a minor violation and will not be cited because the requirements of NUREG 1600, "General Statement of Policy and Procedures for NRC Enforcement Actions," Section IV, were met (NCV) (50-341/96016-09). This item is closed.

III. Engineering

E2 Engineering Support of Facilities and Equipment

E2.1 Reactor Chemistry Sample Panel Flow Glass Repeat Failure

a. Inspection Scope (92902)

The inspectors continued to follow licensee progress resolving Reactor Water Chemistry Sample Panel problems. During this inspection, inspectors investigated a third failure of a flow glass. The on-shift chemistry technician (CT) and chemistry supervisor were interviewed. The status of the engineering study and corrective actions were discussed with the system engineer and system engineering management.

b. Observations and Findings

At the start of dayshift on January 17, a CT went to check the Reactor Chemistry Sample Panel and found Sample Point 50 (which samples the Reactor Water Cleanup System inlet) total flow indicating low. While attempting to increase flow, a high pitched noise was heard. Recognizing the noise as an indication of flow resonance, the CT attempted to quickly adjust flow out of resonance conditions. However, the total flow indicator glass ruptured almost immediately, spilling reactor coolant. The CT promptly isolated the sample point.

This event was the third such failure in the sample sink. As discussed in Inspection Report 341/95009, the total flow indicator glass from sample Point 37 ruptured on August 1, 1995. The licensee determined the failure to be caused by a manufacturing defect. The manufacturer stated that none of the glasses had ever failed in service. The sample point relief valve and backpressure control valves were verified to function properly. As documented in Inspection Report 341/96004, on April 18, 1996, the same flow indicator glass failed during a reactor pressure increase, spilling water on the floor and resulting in the only personnel contamination of a CT for the year. The licensee attributed the failure to a pre-existing flaw in the glass identified during failure analysis, which failed when resonant flow started while adjusting flow.

In response to the second event, CT training was held on the flow resonance phenomenon and the new procedure for system operation to avoid resonance conditions. A spray shield was added to the back of the sample sink to avoid personnel contamination during any subsequent ruptures. Two CTs were used to place a sample point in service to allow quicker response to resonance conditions. The spray shield was adequate to retain water inside the sink during this event. No contamination outside the sink was identified. The sample point was repaired and returned to service.

System engineering had contracted with an outside engineering firm to review the existing design, compare it with those in use at other facilities, perform flow modeling, and recommend improvements. This investigation identified four other industry failures and recommended modifications to avoid recurrence. The engineering firm's report was scheduled to be finalized in February, 1997, with any plant modifications to be prepared and recommended to licensee management the following month.

c. Conclusions

The inspectors determined that the latest flow glass failure event was of minor significance. Interim corrective actions prevented personnel contamination or a spill outside the sample sink. TS requirements for sampling were not impacted by the failure.

Corrective actions from previous failures were not yet completed, but appeared appropriate and progressing reasonably. The methodical approach to this complex engineering problem delayed earlier implementation of plant modifications. However, this issue will continue to be tracked under inspection followup item 341/96004-08 pending inspectors' review of modification implementation and system performance.

E2.3 UFSAR Requirement Review

A recent discovery of a licensee operating their facility in a manner contrary to the Updated Final Safety Analysis Report (UFSAR) description highlighted the need for a special focused review that compares plant practices, procedures, and parameters to the UFSAR descriptions. While performing the inspections discussed in this report, the inspectors reviewed the applicable portions of the UFSAR that related to the areas inspected. The inspectors verified that the UFSAR wording was consistent with the observed plant practices, procedures, and parameters.

E8 Miscellaneous Engineering Issues (92902)

E8.1 (Closed) Inspection Followup Item 50-341/96013-03: SRV "A" Position Indication Instrumentation Modification. During this inspection period, post modification testing of the modification to move the instrument line further away from the low pressure area created by the sonic wave was successfully completed. The licensee determined that the SRV position indications had not been tested at the lowest

design pressure. The licensee decided to test five representative SRVs at 200 psig to verify system performance. At the request of Region III, NRR reviewed the use of a sample to confirm system operation conformed to the design; NRR agreed that the sampling method was adequate. This item is closed.

E8.2 (Closed) Violation 50-341/96002-03: Diesel Service Water Pump Common Mode Failure. The inspectors reviewed licensee corrective actions, including site-wide walkdown for potential cold weather impacts on the plant as discussed in section M2.5. The walkdowns appeared thorough, and resulted in 18 DERs being written for problems identified. Inspectors reviewed the DERs and found that no issues impacted operability of safety related equipment or plant reliability. Training on conservative decision-making and common mode failures appeared effective, as indicated by the licensee response during recent plant problems which included EDG voltage regulator failures and SRV problems discussed in Inspection Report 341/96013. Also, as discussed in M2.5 above, the plant modifications to prevent future freezing in safety service water pumps was reviewed, and appeared to prevent recurrence adequate when coupled with existing administrative controls. This item is closed.

E8.3 (Closed) Licensee Event Report 96001, Rev 0: Diesel Service Water Pump Common Mode Failure. As discussed in E8.2 above, corrective actions for this event appeared adequate. This item is closed.

E8.4 (Open) Inspection Followup Item 50-341/96004-08: Reactor Water Sample Point Flow Glass Failures. As discussed in Section E2.2 above, another failure occurred, this time in Sample Point 50. Interim corrective actions mitigated the consequences of the failure. System Engineering was reviewing recommendations for procedural and system changes at the conclusion of this inspection period. This item remains open pending inspectors' review of the results of the licensee's study and any changes planned.

IV. Plant Support

There were no significant plant support issues during this inspection report. A security inspection was conducted during this inspection period, which will be reported under Inspection Report 341/96015.

V. Management Meetings

X1 Exit Meeting Summary

The inspectors presented the inspection results to members of licensee management at the conclusion of the inspection on January 31, 1997. The licensee acknowledged the findings presented.

The inspectors asked the licensee whether any materials examined during the inspection should be considered proprietary. No proprietary information was identified.

PARTIAL LIST OF PERSONS CONTACTED

Licensee

S. Booker, General Supervisor, Electrical Maintenance
C. Cassise, General Supervisor, Mechanical Maintenance
D. Cobb, Superintendent, Operations
W. Colonnello, Director, Safety Engineering
R. Delong, Superintendent, System Engineering
P. Fessler, Plant Manager, Operations
T. Haberland, Superintendent, Work Control
R. Johnson, Supervisor, NQA Audits
E. Kokosky, Superintendent, RP and Chemistry
J. Korte, Director, Nuclear Security
R. McKeon, Assistant Vice President/Manager, Operations
J. Moyers, Director, NQA
J. Nolloth, Superintendent, Maintenance
J. Plona, Technical Director
J. Sweeney, Audits Group Leader, NQA
W. Romberg, Assistant Vice President and Manager, Technical
J. Rotundo, Surveillance Group Leader, NQA
T. Schehr, Operations Engineer

INSPECTION PROCEDURES USED

IP 40500:	Effectiveness of Licensee Controls in Identifying, Resolving, and Preventing Problems
IP 61726:	Surveillance Observations
IP 62703:	Maintenance Observation
IP 71707:	Plant Operations
IP 71714:	Cold Weather Preparations
IP 92902:	Followup - Engineering
IP 92903:	Followup - Maintenance
IP 92700:	Onsite Followup of Written Reports of Nonroutine Events at Power Reactor Facilities
IP 93702:	Prompt Onsite Response to Events at Operating Power Reactors

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

50-341/96016-01	IFI	Improper Log Entries For Planned Evolutions Which Might Result in ESF Actuations
50-341/96016-02	VIO	Operators' Failure to Follow Alarm Response Procedure
50-341/96016-03	URI	Past Operability of PCMS Due to Calibration Practices
50-341/96016-04	IFI	Protection of Equipment During Maintenance Inside Containment
50-341/96016-05	VIO	Failure of Maintenance to Properly Assemble and Secure Magnet Assembly as Required by Procedures
50-341/96016-06	URI	CST Not Locked per UFSAR
50-341/96016-07	URI	Review of CST Design and Operability for Cold Weather
50-341/96016-08	VIO	Procedure Inadequate to Prevent a Plant Transient While Placing Backfill System in Service
50-341/96016-09	NCV	HPCI Suction Swap Due to Radio Usage

Closed

50-341/94008-00	LER	Unrecognized Entry into Technical specification Action Statement
50-341/94016-01	VIO	Failure to Verify Alternate Decay Heat Pathway
50-341/96001-00	LER	Diesel Service Water Pump Common Mode Failure
50-341/96002-03	VIO	Diesel Service Water Pump Common Mode Failure
20-341/96010-00	LER	HPCI Suction Swap due to Radio Use
50-341/96013-03	IFI	SRV "A" Position Indication Instrumentation Modification
50-341/96024-00	LER	Automatic Reactor Scram Due to Perturbations in the Reactor Water Level Indicating System

Discussed

50-341/96004-08	IFI	Reactor Water Sample Point Flow Glass Failure