June 1, 2001

Mr. John K. Wood
Vice President - Nuclear
FirstEnergy Nuclear Operating Company
P. O. Box 97, A200
Perry, OH 44081

SUBJECT: PERRY NUCLEAR POWER PLANT
NRC INSPECTION REPORT 50-440/01-08(DRP)

Dear Mr. Wood:

On May 14, 2001, the NRC completed an inspection at your Perry Nuclear Power Plant. The enclosed report documents the inspection findings, which were discussed on May 14, 2001, with you and other members of your staff.

The inspection examined activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your license. The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel.

Based on the results of this inspection, the inspectors identified one issue of very low safety significance (Green).

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at http://www.nrc.gov/NRC/ADAMS/index.html (the Public Electronic Reading Room).

Sincerely,

/RA/

Thomas J. Kozak, Chief
Branch 4
Division of Reactor Projects

Docket No. 50-440
License No. NPF-58

Enclosure: Inspection Report 50-440/01-08

See Attached Distribution

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G. Dunn, Manager, Regulatory Affairs
K. Ostrowski, Director, Nuclear
Services Department
T. Rausch, Director, Nuclear
Engineering Department
R. Schrauder, General Manager,
Nuclear Power Plant Department
A. Schriber, Chairman, Ohio Public
Utilities Commission
Ohio State Liaison Officer
R. Owen, Ohio Department of Health

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U. S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket No:	50-440
License No:	NPF-58
Report No:	50-440/01-08
Licensee:	FirstEnergy Nuclear Operating Company (FENOC)
Facility:	Perry Nuclear Power Plant, Unit 1
Location:	P.O. Box 97 A200 Perry, OH 44081
Dates:	April 1 through May 14, 2001
Inspectors:	C. Lipa, Senior Resident Inspector R. Vogt-Lowell, Resident Inspector D. Simpkins, Resident Inspector, Davis-Besse
Approved by:	Thomas J. Kozak, Chief Branch 4 Division of Reactor Projects

SUMMARY OF FINDINGS

IR 05000440-01-08(DRP); on 04/01-05/14/2001; FirstEnergy Nuclear Operating Company; Perry Nuclear Power Plant. Event Response.

This report covers a 6-week routine inspection. The inspection was conducted by resident inspectors. One Green finding was identified. The significance of the finding is indicated by the color (Green, White, Yellow, Red) using NRC Inspection Manual Chapter 0609 "Significance Determination Process" (SDP). The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described at its Reactor Oversight Process website at **http://www.nrc.gov/NRR/OVERSIGHT/index.html.**

A. Inspector Identified Findings

Cornerstone: Initiating Events

Green. An unplanned manual scram on April 29, 2001 was complicated by a loss of condenser vacuum. The cause of the loss of main condenser vacuum was leaking manway covers on the moisture separator reheater (MSR) drain tanks. The manway covers had been worked on during the recent refueling outage (March 2001) and leaked during the event because incorrect torque values had been used during reassembly (4A03).

This finding was of very low safety significance because the issue affected only the initiating event "transient without power conversion system available" and did not increase the likelihood of any other initiating events or impact any mitigation systems.

Report Details

Summary of Plant Status

At the beginning of the inspection period on April 1, 2001, the reactor was at 100 percent power. At 4:00 p.m. on April 6, the licensee commenced a pre-planned downpower to remove the main turbine for balancing. Power operation was resumed at 7:48 a.m. on April 7, when the main generator was synchronized to the grid. On April 8, at 10:15 p.m, 100 percent power was achieved. On April 28, at 9:21 p.m, a downpower was commenced in response to a leak in the main generator stator water cooling system. During the downpower, operators noted degradation of main condenser vacuum and scrammed the reactor. The reactor was made critical at 7:27 a.m. on May 4, and synchronized to the grid at 5:45 p.m. on May 5, with 100 percent power being reached at 9:56 a.m. on May 7. Later on that same day, another reactor shutdown was commenced at 4:20 p.m. due to high temperature readings on the "B" reactor recirculation pump #2 seal. The reactor was made critical at 5:30 a.m. on May 14, and was subsequently synchronized to the grid at 7:57 a.m. on May 15.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity

Reactor (R)

1R04 Equipment Alignment

a. Inspection Scope (71111.04Q)

- The inspectors walked down the Division 2 emergency diesel generator (EDG) and associated ventilation dampers while the Division 1 EDG was inoperable for emergent work on the ventilation dampers.

- The inspectors reviewed equipment alignment on the "C" train of emergency service water (ESW) during maintenance on the reactor core isolation cooling (RCIC) system. The "C" train of ESW is a support system for high pressure core spray (HPCS). The inspectors selected the "C" train of ESW for inspection because of the risk-significance of maintaining HPCS operable when RCIC is not available.

b. Findings

No findings of significance were identified.

1R05 Fire Protection

a. Inspection Scope (71111.05)

The inspectors walked down selected risk significant areas looking for any fire protection issues related to: the control of transient combustibles, ignition sources, fire detection equipment manual suppression capabilities, passive suppression capabilities, automatic suppression capabilities, and barriers to fire propagation. Areas walked down were the emergency service water, service water, and circulating water pump houses.

b. Findings

No findings of significance were identified.

1R12 Maintenance Rule Implementation

a. Inspection Scope (71111.12Q)

The inspectors reviewed equipment issues, surveillance failures, and other performance problems for the system listed below. The inspectors reviewed whether the component was properly scoped in accordance with the Maintenance Rule, whether the failure was properly characterized, and whether the performance criteria were appropriate. In addition, the inspectors reviewed condition reports associated with the maintenance rule to determine if the licensee was identifying problems and entering them in the corrective action program. The problem identification and resolution (PIR) condition reports reviewed are listed in the attached List of Documents Reviewed.

- Diesel Fire Pump. The inspectors reviewed a list of 20 condition reports associated with the diesel fire pump. Condition Report 00-2472 was selected for a detailed review, including associated corrective actions.

b. Findings

No findings of significance were identified.

1R13 Maintenance Risk Assessments and Emergent Work Evaluation

a. Inspection Scope (71111.13)

- The inspectors reviewed the licensee's risk assessment for emergent work on the Division 1, 2, and 3 EDG ventilation dampers following the failure of one Division 3 damper to open during testing.

- The inspectors reviewed the licensee's Probabilistic Safety Assessment for the week of April 22 through April 28, 2001. This included a review of the impact to plant risk associated with a planned reactor core isolation cooling system maintenance outage and work on one train of emergency diesel generator (EDG) ventilation.

- The inspectors reviewed the licensee's risk assessment associated with a forced outage the week of April 29 through May 5, 2001. The inspectors reviewed the licensee's shutdown safety postings and briefings.

- The inspectors reviewed the licensee's Probabilistic Safety Assessment for the week of May 6 through May 12, 2001. This included a review of the impact to plant risk associated with a planned high pressure core spray system maintenance outage. The inspectors also reviewed the licensee's risk assessment associated with a forced outage that began on May 8.

b. Findings

No findings of significance were identified.

1R14 Personnel Performance During Nonroutine Plant Evolutions

a. Inspection Scope (71111.14)

- On April 29, 2001, the inspectors observed operator performance following a scram with degraded condenser vacuum. See Section 4OA3, Event Response, for more details.

- On May 7, 2001, the inspectors observed operator performance during a power reduction associated with increased seal temperature on the "B" reactor recirculation pump.

- On May 9, 2001, the inspectors observed briefings on the implementation of an "Operations Evolution Order" written to drain reactor recirculation loop "B" in support of the "B" reactor recirculation pump seal replacement.

- On May 15, 2001, the inspectors observed synchronization of the main generator to the grid in accordance with Step 4.3 of IOI-3, "Power Changes."

b. Findings

No findings of significance were identified.

1R15 Operability Evaluations

a. Inspection Scope (71111.15)

- The inspectors reviewed an operability evaluation documented in CR 01-1939 concerning the failure to obtain the expected result when stroking RCIC minimum flow return valve 1E51F0019 on April 24, 2001, to determine whether the licensee's conclusion that the valve was operable was technically justified.

- The inspectors reviewed the licensee's conclusion, documented in CR 01-1987, that the heat up and cool down rates for RWCU piping off the reactor vessel bottom head being greater than 100 degrees F per hour noted subsequent to the

manual scram on April 29, 2001 was bounded by previous pressure/temperature cycle calculations and was therefore acceptable.

- The inspectors reviewed the licensee's conclusion, documented in CR 01-1988, that the recirculation loops experiencing a cool down rate of approximately 140 degrees F in a one hour period noted subsequent to the manual scram on April 29, 2001, was bounded by an earlier fatigue evaluation of the recirculation piping performed in connection with a January 7, 1997 scram.

- The inspectors reviewed the licensee's immediate investigation associated with Condition Report 01-1801, dated April 9, 2001, which documented 1) the failure of one Division 3 EDG damper during post-modification testing and 2) that linkages were bent or cracked on other dampers supporting the operation of the Division 1 EDG. See Section 1R19 for more details.

b. Findings

No findings of significance were identified.

1R19 Post-Maintenance Testing

a. Inspection Scope (71111.19)

The inspectors selected the activities listed below for review. Completed work packages were reviewed and/or tests were observed to determine whether test requirements were met. The inspectors also reviewed other documents, such as the USAR, Technical Specifications, and Maintenance Procedures to determine if the testing was sufficient to demonstrate that the systems and components were capable of performing their intended safety functions.

- The inspectors observed portions of post-maintenance testing of the new emergency diesel generator dampers during which one damper associated with the Division 3 EDG failed. The inspectors also reviewed the licensee's investigation and corrective actions.

- The inspectors reviewed the post-maintenance testing activities associated with replacement of the seal on the "B" reactor recirculation pump. Prior to the licensee's decision to replace the "B" seal, control room operators had been receiving high temperature alarms on the reactor recirculation pump B #2 seal (outer seal). The inspectors reviewed CR 01-2096 and CR 01-2100 written in connection with the high temperatures. Work Order 01-8464, "Replace Seal Assembly on Reactor Recirculation Pump 1B33C0001B," provided the work package and post maintenance testing requirements for the seal replacement.

- The inspectors reviewed the post-maintenance testing activities delineated in Work Order 01-7842 and associated with the rework of ball valve 1P53-F591A

for the Upper Containment Airlock Outer Door. Post-maintenance testing was conducted utilizing applicable portions of procedure SVI-P53-T7312, "Upper Containment Airlock Pneumatic System Leak Test."

- The inspectors reviewed the post-maintenance testing activities delineated in Work Order 01-1990 and associated with the Reactor Core Isolation Cooling system. Following the RCIC maintenance outage occurring during this inspection report period, post-maintenance testing and system operability was conducted using procedure SVI-E51-T2001, "RCIC Pump and Valve Operability Test." The inspectors confirmed that discrepancies encountered during the post maintenance testing were entered into the corrective action program. In that regard, the inspectors reviewed CR 01-1939 and CR 01-1940 written to evaluate and disposition operational irregularities encountered with valves 1E51-F011, "RCIC Pump From CST Check Valve" and 1E51-F019, "RCIC Pump Minimum Flow Valve."

b. Findings

On April 9, during post-maintenance testing of the Division 3 EDG outside air damper, damper 1M43F020C failed to open. Only one blade opened and the rest stayed closed because the linkage had broken. The licensee immediately inspected the other Division 3 damper as well as the dampers that support operation of the Division 1 and 2 EDGs. Each EDG has 2 completely redundant sets of dampers. The licensee had recently completed a modification on both dampers for each of the 3 Divisional diesel generators. During the inspections on April 9, the licensee found cracks on some of the linkages for other dampers and initiated Condition Report 01-1801. The control room licensed operators declared the Division 1 EDG inoperable because both of its dampers showed some signs of degradation. The other EDG rooms each had one fully functional damper, which ensured operability of the EDG in Divisions 2 and 3.

This issue had a credible impact to safety because supporting equipment for a mitigation system train had failed and supporting equipment for other mitigating system trains was degraded. The licensee's preliminary investigation determined that the cause of the failure and degradation was likely to be a combination of weaknesses in both the design and installation of the dampers. Criterion III of 10 CFR 50 Appendix B requires that design control measures be met during the modification process. Criterion V requires that instructions and procedures affecting quality be appropriate to the circumstances. Pending review of the licensee's investigation, this is considered an Unresolved Item (URI 50-440/01-08-01).

1R22 Surveillance Testing

a. Inspection Scope (71111.22)

The inspectors witnessed or reviewed the test data for the below listed surveillance tests to determine whether requirements were met, consistent with applicable sections of Technical Specifications, USAR, and Plant Procedures. The inspectors reviewed whether test control was properly coordinated with the control room and performed in the sequence specified in the surveillance instruction and if test equipment was properly

calibrated and installed to support the surveillance tests. In addition, the inspectors reviewed condition reports associated with surveillance testing to determine if the licensee was identifying problems and entering them in the corrective action program. The problem identification and resolution (PIR) condition reports reviewed are listed in the attached List of Documents Reviewed.

- SVI-E22-T1319, "Diesel Generator Start and Load Division 3"
- SVI-C71-T0043A, "Drywell High Pressure Channel A Calibration for 1C71-N050A"
- SVI-B21-T1176, "RCS Heatup and Cooldown Surveillance"

b. Findings

No findings of significance were identified.

1R23 Temporary Modifications

a. Inspection Scope (71111.23)

The inspectors reviewed Temporary Modification 1-01-002, which was installed on one of the Division 1 EDG ventilation dampers and authorized the installation of clamps to block open the louvers on damper 1M43F0220A. The inspectors reviewed the documentation associated with the modification, the installation in the field, and the post-installation testing to assess conformance to the modification documents.

b. Findings

No findings of significance were identified.

4. OTHER ACTIVITIES (OA)

4OA3 Event Follow-up

a. Inspection Scope

The inspectors responded to the site to observe operator actions and plant conditions following a reactor manual scram with a Loss of Normal Heat Removal on April 29, 2001. The inspectors followed up on the event by interviewing operators and reviewing plant logs, chart recorders, procedures, and other documents.

b. Findings

The licensee failed to use the correct torque value when installing moisture separator reheater (MSR) drain tank manway covers which resulted in the loss of the normal heat sink following a manual reactor scram. This issue was of very low risk significance (Green) and did not involve a violation of NRC requirements.

At approximately 9:00 p.m. on April 28, 2001, the licensee received an alarm that was initiated by a stator cooling water leak in the main generator rectifier banks that caused a generator exciter ground. The operators performed a fast power reduction to approximately 20 percent reactor power and took the turbine/generator off line. A short while later, the vacuum in the condenser began to degrade and at approximately 00:50 a.m. on April 29, 2001, the operators decided to manually scram the reactor while the main condenser was still available for decay heat removal. As vacuum continued to degrade, an automatic isolation of the main steam isolation valves occurred at 2:15 a.m. and the normal heat removal method was lost. The operators used reactor core isolation cooling (RCIC) and the safety relief valves (SRV), one at a time, to control reactor pressure. RCIC and the motor feed pump were operated to control level throughout the event. Cool down was controlled with SRVs and shutdown cooling was later put into service with RHR A. Mode 4 (Cold Shutdown) was reached at 7:30 p.m. on April 29, 2001. Also during this event, there were actuations of safety-related equipment, which the licensee has investigated under Condition Reports 01-1979, 01-1980, 01-1985, and 01-2010.

The scram was complicated by the loss of condenser vacuum which was caused by leaking manway covers on the MSR drain tanks. The manway covers were installed during the recent refueling outage (March 2001) using incorrect torque values. The work orders specified a torque value of 125 ft-lbs, which was contrary to the correct torque value of 180 ft-lbs, specified in General Maintenance Instruction, GMI-155, "Removal and Reinstallation of Boiler Style Manways." Since the MSR drain tanks and manways are nonsafety-related equipment, there was no violation of NRC requirements due to this inadequate procedure. However, there was a credible impact to safety because the leaking manway covers caused a loss of condenser vacuum, which increased the frequency of initiating event "transient without power conversion system available." The inspectors assessed the risk significance of this performance deficiency using Manual Chapter 0609, "Significance Determination Process," Appendix A. This issue did not increase the likelihood of a primary or secondary system LOCA, did not impact mitigation equipment, and did not increase the likelihood of fire or external event. Based on the guidance in Manual Chapter 0609, this issue was determined to be of very low safety significance (Green). This issue is in the licensee's Corrective Action Program as CR 01-1982, 01-2008, and 01-2170.

4OA6 Meeting

Exit Meeting

The inspector presented the inspection results to Mr. John Wood, Site Vice President, and other members of licensee management at the conclusion of the inspection on May 14, 2001. The licensee acknowledged the findings presented. No proprietary information was identified.

KEY POINTS OF CONTACT

Licensee

J. Wood, Vice President-Nuclear
B. Boles, Operations Manager
R. Strohl, Superintendent, Plant Operations
G. Dunn, Manager, Regulatory Affairs
D. Gudger, Supervisor, Compliance
T. Lentz, Manager, Design Engineering
K. Ostrowski, Director, Nuclear Services Department
D. Phillips, Manager, Plant Engineering
T. Rausch, Director, Nuclear Engineering Department
R. Schrauder, General Manager, Nuclear Power Plant Department

NRC

T. Kozak, Branch Chief, Reactor Projects, Branch 4

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

50-440/01-08-01	URI	EDG Damper Linkages Fail/Crack Following Modification

LIST OF ACRONYMS USED

ADAMS	Agencywide Documents Access and Management System
ARI	Annunciator Response Instruction
CFR	Code of Federal Regulations
CR	Condition Report
EDG	Emergency Diesel Generator
ESW	Emergency Service Water
FENOC	FirstEnergy Nuclear Operating Company
FME	Foreign Material Exclusion
GMI	General Maintenance Instruction
GPM	Gallons per Minute
HPCS	High Pressure Core Spray
IOI	Integrated Operating Instruction
LOCA	Loss of Coolant Accident
MSR	Moisture Separator Reheater
NRC	Nuclear Regulatory Commission
NRR	Office of Nuclear Reactor Regulation
PARS	Publicly Available Records
PIR	Problem Identification and Resolution
RCIC	Reactor Core Isolation Cooling
RCS	Reactor Coolant System
RHR	Residual Heat Removal System
RWCU	Reactor Water Cleanup
SDP	Significance Determination Process
SOI	System Operating Instruction
SRV	Safety Relief Valve
SVI	Surveillance Instruction
TS	Technical Specification
URI	Unresolved Item
USAR	Updated Safety Analysis Report
VLI	Valve Lineup Instruction

LIST OF DOCUMENTS REVIEWED

1R04 Equipment Alignment

SOI-R43	Division 1 and 2 Diesel Generator System	
SOI-P45/49	Emergency Service Water and Screen Wash Systems	
VLI-P45	Valve Line-up, Emergency Service Water System	

1R12 Maintenance Rule

CR 01-1729	Maintenance rule evaluation required for control rod drive indication	April 3, 2001
CR 01-1731	Maintenance rule evaluation required for breaker trip	April 3, 2001
CR 01-1711	Broken fuse block for gas mixing compressor	April 1, 2001
CR 01-1978	Stator water cooling leak	April 28, 2001
CR 01-1982	Loss of condenser vacuum	April 28, 2001
CR 01-1983	Motor feed pump min flow valve	April 29, 2001
CR 01-1984	Turbine bypass valve #4 failed to close	April 29, 2001
CR 01-1989	Overall CR for forced outage	April 29, 2001
CR 01-1993	RCIC test return to CST will not stroke	April 29, 2001

1R14 Nonroutine Evolutions

IOI-3	Power Changes	

1R15 Operability Evaluations

CR 01-1801	Diesel Generator ventilation system dampers	April 9, 2001
SVI-E51-T2001	RCIC System Pump and Valve Operability	
SVI-B21-T1126	RCS Heatup and Cooldown	
CR 01-1987	Reactor vessel bottom head drain temperature	April 29, 2001
CR 01-1988	Cool down of reactor recirc loops	April 29, 2001
CR 01-2032	Compliance with annunciator response instruction	May 1, 2001

1R22 Surveillance Testing

CR 01-2092	Leak detection transmitter out of calibration	May 5, 2001
CR 01-1728	Surveillance requirement not met for ESW valve	April 3, 2001
CR 01-1720	Technical Specification rounds surveillance	April 2, 2001
CR 01-1939	RCIC valve stroke time unsat	April 24, 2001
CR 01-1940	RCIC valve failed leakage test	April 24, 2001
CR 01-1899	Surveillance TS references incorrect	April 22, 2001
SOI-E22B	Division 3 Diesel Generator (Unit 1)	
WO#99-019710	Diesel Generator Start and Load Division 3	

1R23 Temporary Modifications

Safety Evaluation 01-0025	Temporary Mod to EDG Damper	April 11, 2001

4OA3 Event Response

CR 01-1978	Stator water cooling leak	April 28, 2001
CR 01-2008	Leaking Manways results in degraded condenser vacuum	April 29, 2001
CR 01-1983	Motor feed pump minimum flow valve fail to open	April 29, 2001
CR 01-1979	ECCS initiation signal	April 29, 2001
CR 01-1982	Loss of condenser vacuum	April 28, 2001
CR 01-1985	ECCS initiation signal	April 29, 2001
PDB-I0005	Plant Data Book	
CR 01-2010	ECCS initiation signal	April 29, 2001
ARI-H13-P680-4	Reactor pressure high and drain temperature low	
IOI-6	Cool down - main condenser not available	
CR 01-2033	Div. 2 and Div. 3 Diesels simultaneously connected to the grid	April 29, 2001
CR 01-1980	Div. 3 ECCS initiation	April 29, 2001
CR 01-2022	FME identified during inspection of MSR gaskets	April 30, 2001
CR 01-1982	Degraded condenser vacuum following turbine trip	April 28, 2001

CR 01-2017	Reactor feed pump trip on low vacuum	April 29, 2001
ONI-N62	Off-Normal Instruction: loss of main condenser vacuum	
ONI-C71-1	Reactor Scram	
ARI-H13-P680-2	LP condenser vacuum low	
Scram 1-01-02	Post-Scram Report	
CR 01-2010	Lo-Lo set logic initiated during scram events	April 29, 2001
CR 01-1986	Manual Reactor Scram	April 29, 2001