

January 16, 2002

Mr. Howard Bergendahl  
Vice President - Nuclear, Davis-Besse  
FirstEnergy Nuclear Operating Company  
Davis-Besse Nuclear Power Station  
5501 North State Route 2  
Oak Harbor, OH 43449-9760

SUBJECT: DAVIS-BESSE NUCLEAR POWER STATION  
NRC INSPECTION REPORT 50-346/01-14

Dear Mr. Bergendahl:

On December 20, 2001 the NRC completed an inspection at your Davis-Besse Nuclear Power Station. The enclosed report documents the inspection findings which were discussed on December 20, 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. Specifically, the inspection focused on permanent plant modifications and changes, tests and experiments done in accordance with 10 CFR 50.59.

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/**

John M. Jacobson, Chief  
Mechanical Engineering Branch  
Division of Reactor Safety

Docket No. 50-346  
License No. NPF-3

Enclosure: Inspection Report 50-346/01-14

See Attached Distribution

H. Bergendahl

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cc w/encl: B. Saunders, President - FENOC  
Plant Manager  
Manager - Regulatory Affairs  
M. O'Reilly, FirstEnergy  
Ohio State Liaison Officer  
R. Owen, Ohio Department of Health  
A. Schriber, Chairman, Ohio Public  
Utilities Commission

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U. S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket No: 50-346  
License No: NPF-3

Report No: 50-346/01-14(DRS)

Licensee: FirstEnergy Nuclear Operating Company

Facility: Davis-Besse Nuclear Power Station

Location: 5501 North State Route 2  
Oak Harbor, OH 43449-9760

Dates: December 17 through 20, 2001

Inspectors: V. P. Lougheed, Senior Engineering Specialist  
R. C. Daley, Engineering Specialist  
D. J. Jones, Engineering Specialist  
S. N. Sheldon, Engineering Specialist

Approved by: John M. Jacobson, Chief  
Mechanical Engineering Branch  
Division of Reactor Safety

## SUMMARY OF FINDINGS

IR 05000346-01-14, on 12/17-20/2001, FirstEnergy Nuclear Operating Company, Davis-Besse Nuclear Power Station. Permanent plant modification and changes, tests and experiments.

This report covers a four day announced inspection conducted by four regional engineering specialist inspectors. One Green finding was identified. The significance of the finding is indicated by its color (Green, White, Yellow, Red) using IMC 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: Mitigating Systems**

Green. The inspectors identified a finding involving loss of the licensee's makeup pumps during a loss of offsite power under cold weather conditions.

The issue was of very low safety significance due to other mitigating systems (auxiliary feedwater) being available, and because of the likelihood that operator would take action to restore the makeup pump lube oil circulation path (Section 1R17).

## Report Details

### 1. REACTOR SAFETY

#### **Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity**

#### 1R02 Evaluations of Changes, Tests, or Experiments (71111.02)

##### .1 Review of Evaluations and Screenings for Changes, Tests, or Experiments

###### a. Inspection Scope

The inspectors reviewed ten 10 CFR 50.59 evaluations, six screenings performed under the revised 10 CFR 50.59 process, six 10 CFR 50.59 applicability checks, and five screenings performed under the original 10 CFR 50.59 process. These documents were reviewed to ensure consistency with the requirements of 10 CFR 50.59. For completed evaluations, screenings, and 10 CFR 50.59 applicability checks performed since the revised 10 CFR 50.59 went into effect in March 2001, the inspectors used Nuclear Energy Institute (NEI) 96-07 "Guidelines of 50.59 Evaluations", Revision 1, to determine acceptability of the documents. The NEI document was endorsed by the NRC in Regulatory Guide 1.187 "Guidance for Implementation of 10 CFR 50.59, "Changes, Tests, and Experiments," November 2000. The inspectors also consulted Inspection Manual, Part 9900 "10 CFR GUIDANCE: 50.59." For those evaluations and screenings performed under the old process, the inspectors used the previous revision of the inspection manual guidance. Documents reviewed during the inspection are listed at the end of the report.

###### b. Findings

No findings of significance were identified.

#### 1R17 Permanent Plant Modifications (71111.17)

##### Review of Recent Permanent Plant Modifications

###### a. Inspection Scope

The inspectors reviewed fifteen permanent plant modifications that were performed by the licensee's engineering staff during the last two years. The modifications were chosen based upon the effect on systems that had high probabilistic risk analysis significance in the licensee's Individual Plant Evaluation or high maintenance rule safety significance. The modifications were reviewed to verify that the completed design changes were in accordance with specified design requirements and the licensing bases and to confirm that the changes did not affect the modified system or other systems' safety function. Four calculations, which were performed or revised to support modifications, were also reviewed. As applicable to the status of the modification, post-modification testing were reviewed to verify that the system, and associated support

systems functioned properly and that the modification accomplished its intended function. The inspectors also verified that the completed modifications did not place the plant in an increased risk configuration. The inspectors evaluated the modifications against the licensee's design basis documents and the updated safety analysis report. The inspectors also used applicable industry standards, such as the American Society of Mechanical Engineers Code, to evaluate acceptability of the modifications.

b. Findings

Green. The inspectors identified a finding involving loss of the licensee's makeup pumps during a loss of offsite power under cold weather conditions.

During review of modification 00-0040-00, the inspectors identified that the licensee had not entirely corrected a problem with low lube oil temperatures affecting the makeup pumps. The inspectors determined that these non-safety-related pumps were credited in the licensee's internal plant evaluation (IPE) as a source of high pressure injection during mitigation of most transients.

The makeup pumps are supplied with both an alternating current (AC) and a direct current (DC) lube oil pump. Operation of one lube oil pump is necessary in order for the makeup pump to operate. The licensee performed the modification to correct a problem where the ½-horsepower AC pump motor was undersized under certain conditions. Specifically, during cold weather, the lube oil viscosity substantially increased, requiring the pump motor to produce more torque to overcome the increased power demand. The licensee determined that it was necessary to install a larger 1-horsepower motor.

The inspectors determined that the DC lube oil pump also had a ½-horse-power motor, which was not replaced. The inspectors ascertained that the same condition with low viscosity oil would affect the DC pump. During a loss of offsite power, lube oil was supplied to the makeup pump via the DC lube oil pump. If the DC lube oil pump failed, the operators would have to manually start the AC pump.

The inspectors considered the issue to have a recognizable impact on the mitigating system cornerstone objective of ensuring the availability, reliability, and capability of systems that mitigate initiating events to prevent reactor accidents. Under the specific scenario of a loss of offsite power during cold weather, both makeup pumps could fail. During loss of offsite power events, the plant's IPE credits the makeup system as the only source of high pressure injection. However, the auxiliary feedwater system provided an alternate path to ensure core cooling, and makeup pump operability would be ensured by operator action to start the AC lube oil pump, which would restore the lube oil circulation path. Therefore, the risk associated with this issue was determined to be of very low safety significance. This issue was entered into the licensee's corrective action program as condition report 01-3438.



#### 4. **OTHER ACTIVITIES (OA)**

##### 4OA2 Identification and Resolution of Problems

###### a. Inspection Scope

The inspectors reviewed a selected sample of condition reports associated with Davis Besse's permanent plant modifications and 10 CFR 50.59 program to verify that the licensee had an appropriate threshold for identifying issues and to verify the effectiveness of corrective actions for the identified issues.

###### b. Findings

No findings of significance were identified.

##### 4OA6 Meetings

###### Exit Meeting

The inspectors presented the inspection results to Mr. Bergendahl and other members of licensee management at the conclusion of the inspections on December 20, 2001. The licensee acknowledged the findings presented. The inspectors discussed the extent of review and expected documentation of proprietary information and confirmed that all proprietary information was returned to the licensee.

## KEY POINTS OF CONTACT

### Licensee

G. Campbell, Site Vice President  
H. Bergendahl, Plant Manager  
S. Coakley, Outage Manager  
D. Eschelman, Manager, Plant Engineering  
D. Lockwood, Manager, Regulatory Affairs

## LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

### Opened and Closed During this Inspection

50-346-01-014-01    FIN    Failure to Recognize Susceptibility of the Makeup Pump DC  
Lube Oil Pump Motor to High Torque Situations

## LIST OF ACRONYMS USED

AC	Alternating Current
ADAMS	Agency-wide Document Access and Management System
DC	Direct Current
DRS	Division of Reactor Safety
IPE	Individual Plant Evaluation
NEI	Nuclear Energy Institute
PARS	Publicly Available Records System
SDP	Significance Determination Process

## LIST OF DOCUMENTS REVIEWED

### Calculations

33-5014198-00	Stress Report for Control Rod Drive Mechanism Hydraulically Closure	Revision 0
33-1155599-00	Control Rod Drive Mechanism Hydraulically Tensioned Closure Parts	September 13, 1985
33-1155599-01	Control Rod Drive Mechanism Hydraulically Tensioned Closure Parts	January 10, 1992
C-ICE-048.01-004	Safety Feature Actuation System Borated Water Storage Tank Low Level Setpoint	Revision 6

### Condition Reports Reviewed During the Inspection

00-0128	Reactor Trip Module Failure	January 20, 2000
00-0342	Work for Modification 97-003 (Work Order 99-1119-12) Not Completed on Schedule	February 22, 2000
00-0395	Implementation of Emergency Core Cooling System Room Cooler Piping Modification Does Not Meet Expectations	February 28, 2000
00-0568	Reactor Trip Module Failure	March 19, 2000
00-0950	Mod 97-0074 - Section of Pipe Found Damaged	April 13, 2000
00-1485	Reactor Trip Module Failure	May 20, 2000
00-1852	Lack of Functional Testing of Component Cooling Water Interlock	July 26, 2000
00-1994	Reactor Trip Module Failure	August 16, 2000
01-0075	Potential Inadequate Safety Review for Temporary Modification 00-0018	January 10, 2001
01-0093	Inadequate Safety Review	January 12, 2001
01-1158	Generic Letter 91-18 Implementation Weaknesses	April 30, 2001
01-1330	10 CFR Part 21 Notification by Thomas & Betts Corporation Against Agastat E7000 Series Timing Relays	May 17, 2001
01-1352	Inadequate Capture of Modifications Concerning Switchyard Components	May 22, 2001
01-2089	Seismic Qualification Report	August 15, 2001
01-2357	Containment Purge Valve Modification Documentation Concerns	September 12, 2001
01-2536	Foreign Material Exclusion Concerns at the Spent Fuel Pool	September 27, 2001

01-2677	10 CFR 50.59 Evaluation Not Performed Due to Incorrect 10 CFR 50.59 Screen Results	October 10, 2001
01-2853	Inadequate Post-modification Test for Modification 00-0040 Discovered During Nuclear Quality Assurance Surveillance SR-01-ENGRG-12, Modification Review and 10 CFR 50.59 Process.	October 25, 2001
01-3145	Thirteen Procedures Were Not Updated to Reflect Recent Changes to Technical Specifications	November 26, 2001

Condition Reports Written as a Result of the Inspection

01-3425	Temporary Procedure Change Canceled but Regulatory Applicability Determination and Screen Data Base Was Not Revised	December 18, 2001
01-3416	New Motor Information Not Incorporated into Vendor Manual M-516-73 for Main Lube Oil Pump on the Make-up Pumps	December 18, 2001
01-3418	Overload Heater Rating for Main Lube Oil Pumps MP371B and MP372B Are Incorrect in Design Documents	December 18, 2001
01-3438	Makeup Pump DC Lube Oil Pump Was Not Properly Sized for Cold Weather Lube Oil Viscosities	December 19, 2001
01-3439	Resolution of Differences Between Vendor Supplied Motor and Design Specifications Was Not Documented	December 19, 2001
01-3443	Increased Load on Load Center L57D1 Was Updated on Design Drawings and in the Updated Safety Analysis Report, but not Included in the Plant's Electrical Load Monitoring System Calculation	December 20, 2001
01-3444	Insufficient Justification for Change in Code Allowable Value Used in Framatone Stress Calculation	December 20, 2001
01-3452	The Documentation/Justification for Two Safety Reviews Did Not Provide Enough Detail to Sufficiently Answer the Question on Change to the Facility	December 20, 2001

### Field or Design Change Alterations

DCR 99-0046	Multiple Changes to Design Documents Including Revisions to E-1043, Sheets 1 and 2, to Reflect Maximum Possible Loading of Lighting Panel L57D1	March 14, 2000
FCR 01-0582	Framatone Control Rod Drive Mechanism Hydraulically Tensioned Closure	August 30, 2001

### Maintenance Work Orders

99-006410-001	Install Modification 98-0056	February 25, 2000
00-003320-002	Install Modification 97-0063-00	August 29, 2000
00-003561-003	Change Undersized Pump Motor for Oil Viscosity Match-up	September 27, 2000

### Miscellaneous Documents

SD-016	System Description for Component Cooling Water System	Revision 14
11-5001569-03	FTI Reactor Trip Module Qualification Specification	Revision 3
51-5006947-00	FTI Reactor Trip Module Qualification Test Report	Revision 0

### Permanent Plant Modifications

EWR 01-0071	Replace Station Air Header to Containment Check Valve	March 14, 2001
EWR 01-0108	Replace Control Rod Drive Mechanism Closure Nuts with Different Design	May 24, 2001
EWR 01-0170	Replace Actuator on Valve DH2733	June 25, 2001
97-0029-00	Fail Valves CC1471 and CC1474 in the Open Position	July 7, 1997
97-0063-00	Change Setpoint for LSLL-1525A, B, C, and D and LSL-1525A1 and B1	August 8, 2000
98-0056-00	Change Delay Time on Component Cooling Water Relays	December 21, 1998
99-0051	Install High Density Fuel Storage Racks in the Spent Fuel Pool	June 5, 2000
99-0068-00	Replace Station Blackout Diesel Generator Battery	December 16, 1999
99-0071	Modification of the 1 and 2 Instrument Air Dryer Prefilter Arrangement	September 6, 2000
00-0033	Intake Crib Modifications for Frazil Ice Protection	June 15, 2000

00-0048	Stop Water Leak in the Annulus	June 5, 2001
00-0024-00	Alternate Biocide Modification - Service Water and Circulating Water	February 9, 2001
00-0024-01	Alternate Biocide Modification - Service Water and Circulating Water	April 18, 2001
00-0031-00	Reactor Protection System Reactor Trip Module Upgrade	June 13, 2001
00-0040-00	Increase Size of the Makeup Pump Main Oil Pump Motor	September 15, 2000

Procedure Alterations

DB-CH-06000	Post Accident Sampling System Operation and Analysis	March 6, 2001
DB-OP-02531	Steam Generator Tube Leak	December 13, 2000
DB-PF-04704	Component Cooling Water System Heat Exchanger 1	February 24, 2000
DB-PF-06704	Separated Curve for Auxiliary Feedwater and Generated New Curves	June 1, 2001
DB-SP-03218	High Pressure Injection Pump 1 Quarterly Pump and Valve Test	December 12, 2000

Regulatory Applicability Determinations

01-00055	Revise Technical Specification Bases to Remove Anticipatory Reactor Trip System Turbine Trip Arming Setpoint Discussion	July 2, 2001
01-00059	Revise Technical Specification Bases for Steam Generator Level Requirements	August 8, 2001
01-00247	Pressurizer Code Relief Valve Removal and Installation	August 29, 2001
01-00339	Equivalent Change for MS145 and MS146 Auxiliary Feedwater Pressure Transmitter Main Steam Minimum Flow Line Check Valves	September 26, 2001
01-00821	Anticipatory Reactor Trip Setpoint Arming Power Level	October 25, 2001
01-00840	Containment Leakage Rate Testing	November 5, 2001

### 10 CFR 50.59 Evaluations

00-0026	Intake Crib Modifications for Frazil Ice Protection	August 27, 2000
00-0028	Corrects Wording in Operating Specifications Related to Starting of Diesel Fire Pump	August 7, 2000
00-0035	Changes to Updated Safety Analysis Report Technical Requirements Manual Section 3.3.3.2	September 27, 2000
00-0038	Main Steam Safety Valve Setpoint Tolerances	October 23, 2000
01-021	Modification 99-0034, Control Room Emergency Ventilation System Reliability Improvement, UCN 01-029	June 11, 2001
01-0002	Replacement of the Emergency Diesel Generator Engine Soak Back Pump Motor	March 24, 2001
01-0003	UCN 00-071 Replacement of Anticipatory Reactor Trip System Test Trip Bypass Switches	April 18, 2001
01-0005	Install High Density Fuel Storage Racks in the Spent Fuel Pool (Both Revisions)	May 21, 2000
01-0010	Restoring Slopes on Intake Canal Dike	April 18, 2001
01-0055	Revise References to Technical Specification Bases 3/4.3.1 and 3/4.3.2 to Correctly Reference 7.4.1.4.1.2 for Anticipatory Reactor Trip System Turbine Trip Arming Setpoint	July 24, 2001

### 10 CFR 50.59 Screenings

01-00060	Replace Station Air Header to Containment Check Valve	September 29, 2001
01-00338	Loss of Decay Heat Removal	August 01, 2001
01-00487	Auxiliary Feedwater Train 1 Level Control, Interlock and Flow Transmitter Test, PAT #TA01-2181	August 28, 2001
01-00516	Equivalent Change of the Instrument Air Containment Isolation Check Valve	October 9, 2001
01-00953	Steam Generator Leak Determination	November 26, 2001
01-00978	Replace Relay K5 in Cabinet C4606	December 3, 2001