

September 5, 2000

Mr. Guy G. Campbell
Vice President - Nuclear
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 50-346-00-09(DRP)

Dear Mr. Campbell:

On August 15, 2000, the NRC completed an inspection at your Davis-Besse reactor facility. The results were discussed with you and other members of your staff on August 15. The enclosed report presents the results of that inspection.

The inspection was an examination of 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. Within these areas the inspection consisted of a selective examination of procedures and representative records, observations of activities, and interviews with personnel.

Based on the results of this inspection, the NRC identified three issues which were categorized as being of very low safety significance. These issues have been entered into your corrective action program and are discussed in the summary of findings and in the body of the attached inspection report. One of these issues was determined to involve a violation of NRC requirements, but because of its very low safety significance and the issue has been entered into your corrective action program, the violation is not cited. If you contest this Non-Cited Violation, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001; with a copy to the Regional Administrator, Region III; the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-001; and the NRC Resident Inspector at the Davis-Besse facility.

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*

G. Campbell

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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
Reactor Projects Branch 4

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

Enclosure: Inspection Report 50-346-00-09(DRP)

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U. S. NUCLEAR REGULATORY COMMISSION

REGION III

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

Report No: 50-346-00-09(DRP)

Licensee: FirstEnergy Nuclear Operating Company

Facility: Davis-Besse Nuclear Power Station

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

Dates: July 1 - August 15, 2000

Inspectors: K. Zellers, Senior Resident Inspector
D. Simpkins, Resident Inspector
C. Lipa, Senior Resident Inspector, Perry

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

NRC's REVISED REACTOR OVERSIGHT PROCESS

The federal Nuclear Regulatory Commission (NRC) recently revamped its inspection, assessment, and enforcement programs for commercial nuclear power plants. The new process takes into account improvements in the performance of the nuclear industry over the past 25 years and improved approaches of inspecting and assessing safety performance at NRC licensed plants.

The new process monitors licensee performance in three broad areas (called strategic performance areas): reactor safety (avoiding accidents and reducing the consequences of accidents if they occur), radiation safety (protecting plant employees and the public during routine operations), and safeguards (protecting the plant against sabotage or other security threats). The process focuses on licensee performance within each of seven cornerstones of safety in the three areas:

- | Reactor Safety | Radiation Safety | Safeguards |
|---|---|---|
| <ul style="list-style-type: none">● Initiating Events● Mitigating Systems● Barrier Integrity● Emergency Preparedness | <ul style="list-style-type: none">● Occupational● Public | <ul style="list-style-type: none">● Physical Protection |

To monitor these seven cornerstones of safety, the NRC uses two processes that generate information about the safety significance of plant operations: inspections and performance indicators. Inspection findings will be evaluated according to their potential significance for safety, using the Significance Determination Process, and assigned colors of GREEN, WHITE, YELLOW or RED. GREEN findings are indicative of issues that, while they may not be desirable, represent very low safety significance. WHITE findings indicate issues that are of low to moderate safety significance. YELLOW findings are issues that are of substantial safety significance. RED findings represent issues that are of high safety significance with a significant reduction in safety margin.

Performance indicator data will be compared to established criteria for measuring licensee performance in terms of potential safety. Based on prescribed thresholds, the indicators will be classified by color representing varying levels of performance and incremental degradation in safety: GREEN, WHITE, YELLOW, and RED. GREEN indicators represent performance at a level requiring no additional NRC oversight beyond the baseline inspections. WHITE corresponds to performance that may result in increased NRC oversight. YELLOW represents performance that minimally reduces safety margin and requires even more NRC oversight. And RED indicates performance that represents a significant reduction in safety margin but still provides adequate protection to public health and safety.

The assessment process integrates performance indicators and inspection so the agency can reach objective conclusions regarding overall plant performance. The agency will use an Action Matrix to determine in a systematic, predictable manner which regulatory actions should be taken based on a licensee's performance. The NRC's actions in response to the significance (as represented by the color) of issues will be the same for performance indicators as for inspection findings. As a licensee's safety performance degrades, the NRC will take more and increasingly significant action, which can include shutting down a plant, as described in the Action Matrix.

More information can be found at: <http://www.nrc.gov/NRR/OVERSIGHT/index.html>.

SUMMARY OF FINDINGS

Inspection Report 50-346-00-09(DRP), on 07/01-8/15/2000; FirstEnergy Nuclear Operating Company; Davis-Besse Nuclear Power Station; Maintenance Risk Assessment and Emergent Work Evaluation; Post Maintenance Testing; Event Followup.

The inspection was conducted by resident inspectors. This inspection identified three green issues, of which one was a Non-Cited Violation. The significance of issues is indicated by their color (green, white, yellow, red) and was determined by the Significance Determination Process.

Cornerstone: Initiating Events

- GREEN. The inspectors identified that licensee personnel did not appropriately evaluate the risk associated with conducting maintenance on electrical circuit breaker HAAC, which is a supply breaker to a 13.8kV - 4.16 kV step-down transformer.

This issue is of very low safety significance because it did not significantly increase the likelihood of an initiating event.

Cornerstone: Mitigation Systems

- GREEN. The licensee identified that check valves MS 145 and 146, which are installed in a 1½ inch auxiliary feedwater system minimum flow line, had failed reverse flow testing. As a result, these valves were unable to perform their design function which is to prevent feeding a steam line break from an intact auxiliary feedwater pump turbine (AFPT) steam supply line following a steam line break in the opposite train. This rendered the auxiliary feedwater system inlet steam pressure interlocks inoperable for a period of greater than 7 days which was a Non-Cited Violation of Technical Specifications.

This issue was determined to have very low safety significance because the failure of check valves MS 145 and 146 has no adverse affects on the operation of the AFPTs and the ability to provide auxiliary feedwater to the steam generators.

- GREEN. The licensee did not conduct post-maintenance testing following motor bearing removal and installation, a shaft alignment, and other adjustments on the Startup Feedwater Pump (SUFP).

This issue was determined to have very low safety significance because, even if the SUFP failed post-maintenance testing, there are other secondary heat removal systems available to perform this safety function.

Report Details

Summary of Plant Status: The plant was operated at about 100 percent power throughout the inspection period, except for brief power reductions to about 90 percent for testing activities or low system demand.

1. **REACTOR SAFETY**

1R04 Equipment Alignments (Inspection Procedure 71111.04)

a. Inspection Scope

The inspectors conducted partial walk-down inspections by comparing station configuration control documentation with actual system/train lineups on the #1 auxiliary feedwater system train and the motor driven feedwater pump to verify train/pump operability when the #2 auxiliary feedwater system train was out-of-service (documents reviewed were DB-OP-06233, DB-OP-06225, OS-12A, OS-17A, OS17B).

b. Findings

There were no findings identified.

1R05 Fire Protection (Inspection Procedure 71111.05)

a. Inspection Scope

The inspectors verified fire protection program implementation by reviewing equipment status and lineup, control of transient combustibles and ignition sources, condition of fire detection systems, fire suppression systems, manual fire fighting equipment, passive fire protection features and compensatory measures. The inspectors walked down the following areas: auxiliary building levels 545', 555', 565', and 585'. Documents reviewed were the Pre-Fire Plan, the Fire Hazards Analysis Report, and Fire Protection Drawings A221F-A223F.

b. Findings

There were no findings identified.

1R12 Maintenance Rule Implementation (Inspection Procedure 71111.12)

a. Inspection Scope

The inspectors reviewed the licensee's implementation of the maintenance rule requirements, including a review of scope, goal setting, and performance monitoring, short-term and long-term corrective actions, and current equipment performance status, for the following components and systems that have had performance problems:

- Service water system (documents reviewed were the Davis-Besse Material Condition Report, the Maintenance Rule Program Manual, and Operations Schematic OS-020)
- Steam and Feedwater Rupture Control System (documents reviewed were the Davis-Besse Material Condition Report, the Maintenance Rule Program Manual, the Probabilistic Safety Assessment for the Davis-Besse Nuclear Power Station, and TS 4.3.2.2)
- Motor Driven Feedwater Pump (documents reviewed were the Davis-Besse Material Condition Report, the Maintenance Rule Program Manual, OS 12A, M-006D)

b. Findings

There were no findings identified.

1R13 Maintenance Risk Assessment and Emergent Work Evaluation (Inspection Procedure 71111.13)

a. Inspection Scope

The inspectors evaluated the effectiveness of the risk assessments conducted prior to maintenance on structures, systems, and components (SSCs), verified how risk was managed, and evaluated the effectiveness of the licensee's identification and resolution of problems associated with the following activities.

- Electrical circuit breaker HAAC maintenance (reviewed the weekly risk summary for July 10-16, 2000)
- Main Feed Pump 1 turbine overspeed test (reviewed DB-SS-04054, the weekly risk summary for August 7-13, 2000, Key Work Activities and Surveillances for Week of August 7, 2000, and the Administrative Work Process Guideline Manual)

b. Findings

The licensee's risk summary for the week of July 10-16 stated that maintenance on electrical circuit breaker HAAC, which is a supply breaker to 13.8kV - 4.16 kV step-down transformer AC, was a low risk Level 3 Activity according to the licensee's risk assessment program. Level 3 Activities do not require any compensatory measures. However, the inspectors identified that the licensee did not consider that the circuit breaker cubicle door has a protective device which can be inadvertently actuated during breaker installation or removal. Given this possibility, this activity should have been characterized as a higher risk Level 1 Activity according to the licensee's program. Level 1 Activity expectations are that additional risk assessments be performed and pre-job briefs be conducted to discuss the risk sensitivity of the activity and any contingency actions that should be performed if an adverse condition would occur. The licensee generated CR 2000-1985.

The licensee's power supply has numerous redundancies and no other competing electrical distribution system work was accomplished during the circuit breaker maintenance activity. In addition, the failure to appropriately categorize this activity did not significantly increase the likelihood of an initiating event. For these reasons, this issue was determined to be of very low safety significance and was characterized as Green by the SDP.

1R15 Operability Evaluations

a. Inspection Scope

The inspectors reviewed the following operability evaluations affecting mitigating systems and barrier integrity. The reviews considered whether the evaluations were technically justified, the adequacy and functionality of any compensatory measures, and any degradations that might cause a loss of function as described in the USAR or TSs.

- #2 Auxiliary Feedwater System Pump turbine higher than normal bearing temperature, as reported in Condition Report (CR) 2000-1892 (other documents reviewed: OS- 17A and OS-17B)

b. Findings

There were no findings identified.

1R19 Post Maintenance Testing

a. Inspection Scope

The inspectors evaluated whether or not the post-maintenance test procedures and test activities were adequate to verify system operability and functional capability for the following maintenance activities performed on risk significant systems.

- #2 EDG air start maintenance (documents reviewed were Maintenance Work Order (MWO)-99-4127-0, MWO-00-1908-0, and CR 2000-1753)
- SUFP maintenance, (document reviewed was MWO-00-002216-000)

b. Findings

Maintenance was conducted on the SUFP to address higher than expected vibration readings. The maintenance activities included disassembling the outboard motor bearing for inspections, correcting any soft foot conditions, and aligning the shaft. However, the inspectors noted that no post-maintenance testing was conducted upon completion of the maintenance activities. If the SUFP bearing was not reinstalled correctly, the licensee would not know that it could not perform its mitigation function until it was called upon. After a subsequent conversation with the system engineer, a work request was generated to conduct a post-maintenance test and a condition report was generated to document the issue (CR 2000-1986).

The SUFP is not required to be addressed by 10 CFR Appendix B, Quality Assurance Criteria, but is considered a risk significant system for its accident mitigating function for a loss of feedwater accident. This issue was determined to have very low safety significance because, even if the SUFP failed post-maintenance testing, there are other secondary heat removal systems available to perform this safety function (Green).

1R22 Surveillance Testing (Inspection Procedure 71111.22)

a. Inspection Scope

The inspectors verified by witnessing the following surveillance tests and/or reviewing the test data that the subject risk-significant SSCs met TS, updated safety analysis report, and licensee procedure requirements and demonstrated that the SSCs were capable of performing their intended safety functions. The inspectors evaluated the following tests for preconditioning, effect of the test on plant risk, clear and adequate acceptance criteria, operator procedural adherence, test data completeness, test frequency, test equipment range and accuracy, and post-test equipment restoration:

- Emergency Diesel Generator 2 Monthly Test, DB-SC-03071, (other document reviewed: CR 2000-1754)
- C1 Bus Undervoltage Units Monthly Functional Test, DB-ME-03045
- Quarterly Makeup Pump 1 Inservice Test and Inspection, DB-SP-03371 (other documents reviewed: Pump Performance Curves, DB-PF-06704; the ASME Section XI, Inservice Testing; and CR 2000-1827)

b. Findings

There were no findings identified.

1R23 Temporary Plant Modifications (Inspection Procedure 71111.23)

a. Inspection Scope

The inspectors reviewed Temporary Modification 00-0026, which injected leak sealant material into pressurizer spray bypass valve RC-262, to verify that it did not affect the safety functions of important safety systems. The inspectors reviewed the temporary modification and the associated 10 CFR 50.59 screening against the system design basis documentation, including the Updated Safety Analysis Report and Technical Specifications to verify that the modification did not affect system operability/availability (other documents reviewed: DB-OP-02513, DB-MM-09067). The inspectors also verified that the temporary modification was consistent with plant documentation and procedures.

b. Findings

There were no findings identified.

1EP6 Drill Evaluation (Inspection Procedure 71114.06)

a. Inspection Scope

The inspectors evaluated the conduct of the July 28, 2000, Emergency Preparedness Drill (documents reviewed were the Davis-Besse Nuclear Power Station Emergency Preparedness Integrated Drill Manual for July 26, August 30, and September 27, 2000, NEI 99-02 Rev 0, "Regulatory Performance Indicator Guideline," and DBNPS Emergency Preparedness Integrated Drill Report) which the licensee had determined as contributing to the drill/exercise and emergency response organization drill participation performance indicators. The inspectors observed the drills to: identify weaknesses and deficiencies in classification, notification and protective action requirement development activities, to compare identified weaknesses and deficiencies against licensee identified findings to determine whether the licensee properly identified failures, and to determine whether licensee assessment of performance was in accordance with the applicable criteria.

b. Findings

There were no findings identified.

OTHER ACTIVITIES (OA)

4OA3 Event Followup (Inspection Procedure 71153)

(Closed) LER 2000-003: Loss of auxiliary feedwater pump turbine main steam supply train separation due to check valve failure. The licensee identified that check valves MS 145 and 146, which are installed in a 1½ inch auxiliary feedwater system minimum flow line, had failed reverse flow testing. As a result, these valves were unable to perform their design function which is to prevent feeding a steam line break from an intact auxiliary feedwater pump turbine (AFPT) steam supply line following a steam line break in the opposite train and to ensure that inlet steam pressure interlocks are not affected by the intact train. The valve failures were due to an inadequate design modification that was implemented in 1998 during the 11th refueling outage. The modification did not ensure that the check valves would remain open during all expected operational flow conditions, which caused abnormal wear and eventual failure. The corrective action was to install new valves with different strength opening springs that would maintain the check valves open.

TS 3.7.1.2 requires that with any AFPT inlet steam pressure interlock inoperable, restore the inoperable interlocks to operable status within 7 days or be in Hot Shutdown within the next 12 hours. Due to the as found condition of the valves, it was determined that this requirement was not met. The failures of check valves MS 145 and 146 have no adverse affects on the operation of the AFPTs and the ability to provide auxiliary feedwater to the steam generators. Therefore, this issue was determined to have very low safety significance and was characterized as Green by the SDP. This TS violation is being treated as a Non-Cited Violation, consistent with Section VI.A.I of the NRC Enforcement Policy (**NCV 50-346/2000009-001**). This violation is in the licensee's corrective action program as LER 2000-003.

4OA6 Management Meeting

The inspectors presented the inspection results to Mr. G. Campbell and other members of licensee management on August 15, 2000. The licensee acknowledged the findings presented. No proprietary information was identified.

PARTIAL LIST OF PERSONS CONTACTED

Licensee

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W. J. Bentley, Manager, Work Control
K. W. Byrd, Senior Engineer, Nuclear Engineering
G. G. Campbell, Vice President - Nuclear
R. B. Coad, Jr., Manager, Plant Operations
C. A. Gale, Senior Engineer, Plant Engineering
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P. J. Mainhardt, Senior Engineer, Plant Engineering
J. W. Marley, Senior Engineer, Plant Engineering
V. J. Patton, Fire Protection Engineer
R. I. Rishel, Maintenance Rule Coordinator
T. A. Thompson, Engineering Advisor, Performance Engineering
M. R. Widner, Work Week Manager
G. M. Wolf, Engineer, Regulatory Affairs

NRC

T. J. Kozak, Chief, Reactor Projects Branch 4
K. S. Zellers, Senior Resident Inspector, Davis-Besse
D. S. Simpkins, Resident Inspector, Davis-Besse

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened and Closed

50-346/2000009-001	NCV	Loss of auxiliary feedwater pump turbine main steam supply train separation due to check valve failure
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Closed

50-346/2000-003	LER	Loss of auxiliary feedwater pump turbine main steam supply train separation due to check valve failure
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LIST OF ACRONYMS USED

AC	Alternating Current
ARTS	Anticipatory Reactor Trip System
CFR	Code of Federal Regulations
CR	Condition Report
DBNPS	Davis-Besse Nuclear Power Station
EDG	Emergency Diesel Generator
IFI	Inspection Follow-up Item
LER	Licensee Event Report
MWO	Maintenance Work Order
NCV	Non-Cited Violation
NRC	Nuclear Regulatory Commission
OS	Operations Schematic
SSC	Structures, Systems, and Components
SUFP	Startup Feedwater Pump
TS	Technical Specification
URI	Unresolved Item
USAR	Updated Safety Analysis Report