

UNITED STATES NUCLEAR REGULATORY COMMISSION  
OFFICE OF INSPECTION AND ENFORCEMENT

REGION III

Report of Operations Inspection

IE Inspection Report No. 050-346/76-20

Licensee: Toledo Edison Company  
Edison Plaza  
300 Madison Avenue  
Toledo, Ohio 43652

Davis-Besse Nuclear Power Station  
Unit 1  
Oak Harbor, Ohio

License No. CPFR-80  
Category: B

Type of Licensee: PWR (B&W) 906 MWe  
Type of Inspection: Routine, Announced  
Dates of Inspection: October 4-6 and 27-29, 1976  
Principal Inspector: R. Martin *R. Martin*

11/19/76  
(Date)

Accompanying Inspectors: None

Other Accompanying Personnel: None

Reviewed By: R. C. Knop, Chief *RC Knop*  
Reactor Projects  
Section 1

11/19/76  
(Date)

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## SUMMARY OF FINDINGS

### Inspection Summary

Inspection on October 4-6 and 27-29, 1976, (76-20): Witnessing of pre-operational testing of facility diesel generators; review of licensee preparations for Hot Functional Testing; partial review of surveillance testing program; review of test procedures and test procedure results. One item of noncompliance identified relative to failure to follow approved procedures.

### Enforcement Action

The following item of noncompliance was found during the inspection:

#### Infraction

Contrary to Criterion V of Appendix B of 10 CFR 50, work activities were not accomplished in accordance with approved procedures in that:

- A. Insulation was being installed on reactor coolant system piping, on October 9, 1976, without cleaning the pipe to Class D cleanliness as called for in B&W Construction Company Quality Control Procedure 9A-128 (Revision 1, Item 4.4).
- B. Flanges were removed from the suction lines in the emergency sump on October 15, 1976, without appropriate authorization of a Construction Work Permit resulting, due to concurrent preoperational valve testing, in the discharge of approximately 40,000 gallons of water in the the containment.

### Licensee Action on Previously Identified Enforcement Items

Not within scope of this inspection.

### Other Significant Findings

- A. Systems and Components
  1. Diesel generator testing revealed that high control panel temperatures are produced during prolonged diesel runs. Corrective action under review.
  2. The lubrication system for the High Pressure Injection Pump bearings is being reworked to alleviate high bearing temperature problems.

B. Facility Items (Plans and Procedures)

The licensee is preparing to initiate the Hot Functional Testing Sequence for the facility, with the first operations at elevated temperatures expected during the week of November 15, 1976.

C. Managerial Items

None identified during this inspection.

D. Noncompliance Identified and Corrected by Licensee

None identified during this inspection.

E. Deviations

None identified during this inspection.

F. Status of Previously Reported Unresolved Items

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This report indicated that updated versions of certain test procedures (TP 2400.21 and TP 2400.26) were to be provided to the inspector. Review of these procedures was accomplished during this report period.

Management Interview

A. The following persons attended the management interview at the conclusion of the inspection:

L. Roe, Vice President, Facilities Development  
J. Evans, Station Superintendent  
L. Stalter, Technical Engineer  
J. Buck, Operations Quality Assurance Engineer  
C. Daft, Field Quality Assurance Engineer  
W. Green, Assistant to Station Superintendent  
E. Michaud, Test Program Manager (B&W)

B. Matters discussed and comments were as follows:

1. The inspector summarized his findings with respect to the item of noncompliance. (Paragraph 8, Report Details)

2. The inspector summarized his witnessing of the testing of the diesel generators. He reiterated his concern over the high panel temperatures and the apparent reduced cooling air flow through the generator. The licensee indicated his intent to resolve these matters as quickly as possible and, in any event, prior to fuel loading. (Paragraph 1, Report Details)

The inspector requested and obtained a commitment from the licensee that, during a subsequent load test of the diesel, the generator stator and bearing temperatures will be monitored to permit evaluation of their performance.

3. The inspector summarized his review of the preparations of the licensee for Hot Functional Testing. (Paragraph 2, Report Details)

The inspector requested and received a commitment that TECO management will authorize changes in HFT operating plateaus.

The inspector requested and received a commitment that TECO will observe the RCS pressure-temperature limitations as contained in the proposed Technical Specifications for the facility.

4. The inspector summarized his preliminary review of the response time testing program, the surveillance testing program, and the inspection program of the licensee's QA Program for Station Operation. (Paragraph 3, Report Details)
5. The inspector summarized his findings with regard to certain facility equipment problems. (Paragraph 4, Report Details)
6. The inspector summarized his review of selected test procedures and approved test procedure results. (Paragraphs 6 and 7, Report Details)

REPORT DETAILS

Persons Contacted

The following persons, in addition to those listed under the Management Interview section of this report, were contacted during this inspection:

Toledo Edison Company (TECO)

J. Lenardson, Manager of Quality Assurance  
J. Blank, Associate Engineer  
R. Flood, Supervising Operator  
S. Batch, Assistant Engineer  
P. Narducci, Quality Control Engineer  
B. Beyer, Maintenance Engineer  
T. Perry, Computer Programmer  
B. Kirk, Assistant Engineer  
J. Orkins, Instrument Engineer  
L. Kurfis, Instrument Foreman  
T. Murray, Operations Engineer  
G. Waugh, Assistant Engineer  
W. Alton, Assistant Engineer  
G. Meyer, Assistant Engineer

Bechtel Construction Management (Bechtel)

J. Hughes, Quality Control Inspector  
J. Heaton, Quality Control Inspector  
R. Sapolich, Quality Control Inspector

Babcock and Wilcox (B&W)

A. Mercado, Test Program Scheduler  
C. Endicott, Test Program Scheduler

Babcock and Wilcox Nuclear Services

C. England, Engineer

Dragon Valves, Inc.

R. Bond, Engineer

1. Inspector Witnessing of Diesel/Generator Preoperational Testing
  - a. The inspector witnessed the load testing of the 1-1 and 1-2 diesel generator units as prescribed in Section 7.10 of TP 410.01 "Diesel Generator Preoperational Test." Testing of the diesel generator units were successful in that identified acceptance criteria were met.
  - b. The inspector reviewed appropriate documentation to verify that:
    - (1) Appropriate pretest meetings were conducted.
    - (2) Appropriate review and resolution of Master Punch Test items for the units had occurred.
    - (3) Test documentation, including the chronological log, was being maintained as required by administrative procedures.
    - (4) Inspection activities of Quality Control personnel were being conducted in accordance with the appropriate Quality Control Instructions.
    - (5) Pretest prerequisites were verified as required by the test procedures.
  - c. During test witnessing, the inspector verified that personnel carried out their test responsibilities in accordance with administrative procedures, and that they appeared to be familiar with their duties and the equipment they operated.
  - d. The inspector noted the following items during this inspection.
    - (1) During the operation of the diesels, it was noted that the exhaust air from the generator was directed at the control panels for the unit. This caused sufficiently high panel temperatures that the operator experienced discomfort in manipulating the controls. At the request of the inspector, temperature measurements were taken and panel surface temperatures of 140<sup>o</sup>-150<sup>o</sup>F were measured. Interior panel temperatures as high as 125<sup>o</sup> were measured.
    - (2) The inspector estimated the temperature rise of the cooling air through the generator to be 60<sup>o</sup>-80<sup>o</sup>F. Later measurements by the licensee showed an air temperature increase of 63<sup>o</sup>F at 2600kw, yet the manufacturer's test of the units showed an air temperature rise of only 40<sup>o</sup>F. This appears to suggest a reduction in cooling air flow.

The inspector indicated that the high panel temperatures and apparent reduced air flow will have to be evaluated and appropriate action taken prior to fuel loading. The licensee indicated his intent to accomplish this.

Before the end of the inspection, the inspector was informed that:

- (1) NCR 150-76 was written (October 7, 1976) to follow corrective action necessary to provide adequate room ventilation in diesel/generator area.
- (2) NCR 160-76 was written (October 8, 1976) to follow evaluation of effect of high panel temperatures on protective relays located in the racks.

The inspector indicated he would follow the licensee's progress in these areas during subsequent inspections.

2. Preparation for Hot Functional Testing (HFT)

The inspector reviewed the status of the preparations for HFT using the prerequisites defined in the controlling procedure for this testing.

This review of preparations included a review of documentation showing the status of prior testing and discussions with licensee and test program personnel. Included also was a review of personnel staffing for HFT. No significant deficiencies were noted during this review, and the inspector indicated to the licensee that he would inform his management that he found nothing to preclude the licensee from beginning HFT.

3. Program Reviews

The inspector reviewed the status of the following programs:

a. Response Time Testing:

The inspector received a briefing on the methods to be used by the licensee in measuring the response time of safety related components and systems in the Reactor Protection System, the Safety Features Actuation System, and the Steam and Feedwater Rupture Control System.

The licensee plans to measure individual component or circuit response times and perform appropriate summations of these values to account for all possible logic combinations.

The inspector was informed that for two types of identical components (approx. 240 relays and 40 analog amplifiers), the licensee plans to determine a "representative" response time by a 10% sample of these populations. The inspector informed the licensee that he would pursue the acceptability of this test method with NRC-OIE Management, and inform the licensee of their decision.

b. Surveillance Testing Program:

The inspector received a briefing on the computer program to be used in scheduling surveillance testing activities. The inspector informed the licensee that the usage of T.S. 4.0.2 relative to inspection frequency tolerances was not applicable to items whose surveillance was governed by Section XI of the ASME Code. The inspector referred the licensee to T.S. 4.0.5. Except for the program changes required by the above, no other significant deficiencies were noted during this program review.

The inspector also informed the licensee that instrument calibrations performed under the preventive maintenance program would be reviewed by the inspector for those instruments used to determine Technical Specification limits but for which specific surveillance requirements were not established in the Technical Specifications. An example of such instrumentation would be the Core Flood Tank Level instrumentation.

The inspector indicated, after discussions with licensee representatives that a formal audit of this program will be conducted during the latter part of December.

c. QA Program for Operations (Inspections):

The inspector received a status report on the development of the Inspection Program for the licensee's QA Program for Station Operation. Redevelopment of the Program was required because of the licensee's decision to eliminate the Inspection Engineer position and reassign several of his duties to the Quality Control Engineer. After discussions with the licensee representatives, the inspector indicated he would audit this area during late November.

4. Equipment Problems

The inspector reviewed information and received briefings regarding the following equipment problems:



a. Dragon Valves

The improper operation of 2 and 5 valve instrument manifolds manufactured by Dragon Valves Incorporated was reported by the licensee and summarized in his report dated October 13, 1976, pursuant to 10 CFR 50.55(e). This inspector reviewed the actions being taken and determined the following:

- (1) The valve malfunctions (failure of the spring loaded plunger to open against system pressure and/or to remain open) has been analytically and experimentally determined to be caused solely by inadequate spring forces. The manufacturer has determined that a spring force of 180 lbs. is required instead of the original 60 lbs force.
- (2) Such forces, for the space available, is not achievable using helical springs so the design was changed to make use of commercially available stainless steel belleville spring washers. The manufacturer has retested this design and has qualified it for service applications up to 4000 psig.
- (3) The manufacturer is providing the licensee with sufficient (approximately 7,150) stainless steel and nickel (manufacturer has determined this material also suitable) spring washers to repair each valve.
- (4) The licensee has developed suitable controls for the rework of each manifold including:
  - (a) 100% QC surveillance of each manifold rework.
  - (b) A check list (maintenance and QC) for each manifold.
  - (c) Individual shift foreman approval of each manifold removed from service and its return after being reworked.
  - (d) A maintenance instruction for the rework activity.
- (5) The valve manufacturer representative indicated that the modes of failure were not detected during the prototype testing of the valve design because the process fluid was not introduced into the prototype unit in the same manner as occurs in the actual design. After testing actual valve models (following the licensee's report of difficulties), the same failure modes were observed.

The inspector indicated he had no further questions on this matter, but that he would follow the completion of the rework activity as part of his regular inspection activities.

b. High Pressure Injection Pump Bearings

The inspector received a briefing on the proposed corrective action being taken to relieve the high bearing temperatures being experienced in the High Pressure Injection Pumps. The corrective action presently being followed involves the use of a gravity fed lubrication system for the bearings and AC and DC oil pumps used to maintain level in the "head tank" which will provide the driving force for the lubricant. The licensee indicates that this revised system should be ready for testing in mid November, and that submittal of design details for NRR review is expected in January, 1977.

5. Facility Tour

The inspector conducted tours of the facility during both inspection periods to review the status of work in progress in support of preparations for Hot Functional Testing.

Except for the item of noncompliance relative to installation of the RCS mirror insulation, which is described in detail in Section 8 of this report, no unsatisfactory conditions were observed during these reviews.

6. Test Procedure Reviews

The inspector reviewed, several test procedures as identified below against licensee commitments and regulatory requirements.

- a. The inspector indicated that the following approved test procedures appeared to adequately address appropriate commitments and requirements. He provided some comments to the licensee for their consideration:

TP 161.02 - Containment Hydrogen Dilution and Hydrogen Purge System.

TP 190.03 - Contact data Logger Input Verification - Fire Inputs.

TP 240.01 - Component Cooling Water Preoperational Test.

TP 256.01 - Station Response to Loss of Instrument Air Test.

TP 271.09 - Main Steam Isolation Valve Preoperational Test.

TP 600.04 - Makeup System Operational Test.

TP 600.23 - RPS Logic Test Procedure.

TP 2400.26 - Containment Radiation Level Inputs to SFAS - Preoperational Calibration.

TP 2400.28 - Containment Pressures to RPS Preoperational Calibration.

- b. The inspector provided the following comments to the licensee which will have to be resolved either prior to conduct of the test or fuel loading, as appropriate.

- (1) TP 310.02 - Integrated Safety Features Actuation System Test.

The licensee will have to determine if there is an appreciable difference in diesel generator starting times when using one air motor starting system compared to the dual system installed on the unit. If there is such a difference, it will have to be factored into the response time evaluations being performed during this test to assure appropriately conservative values.

- (2) TP 600.01 - Hot Functional Testing Controlling Procedure

(a) The licensee agreed during the Management Interview to commit to observing the pressure-temperature limits for the reactor coolant system as contained in the present revision of the draft Technical Specification.

(b) The inspector informed the licensee that this procedure should reflect the approval of a member of the management of the licensee prior to major HFT plateau changes. The licensee indicated that appropriate steps would be taken to document this approval.

- (3) TP 2400.21 - Reactor Temperature Instrumentation Preoperational Calibration - Instrument Strings RC3A and 3B.

The licensee was informed that the surveillance test procedure (ST 5030.06) utilized in this test procedure does not comply with the Technical Specification requirements for Channel Calibration in that it does not include calibration of the primary sensor. The use of this surveillance procedure during later calibrations would result in a noncompliance with

Technical Specification requirements. At the present time, with respect to fuel loading, this is not a problem because the licensee has a valid set of manufacturer calibrations which are still current regarding calibration interval.

7. Review of Approved Test Procedure Results

The inspector reviewed the following test procedure packages for completeness with regard to:

- a. Meeting acceptance criteria.
- b. Appropriate management review and approval.
- c. Conformance to the requirements of administrative procedures.

TP 120.04 - Stud Tensioning and Handling Equipment Operational Test.

TP 330.06 - CRD System M-G Set Acceptance Test.

TP 350-01 - 855 System Field Verification.

TP 370.01 - Environmental Monitoring System Preoperational Test.

TP 401.08 - 250/125 DC System Preoperational Test.

TP 401.09 - Instrument AC System Preoperational Test.

No deficiencies were observed during the review of these packages. The licensee was complimented on their completeness and organization, permitting an efficient review.

8. Details of Item of Noncompliance

- a. Criterion V of Appendix B to 10 CFR 50 requires, in part, ". . . Activities affecting quality shall be prescribed by documented instructions, procedures, . . . and shall be accomplished in accordance with these instructions, procedures, . . .". During these inspection periods, two examples of failure to conform to these requirements came to the attention of the inspector.
- b. During the facility tour conducted during the October 4-6, 1976 period, the inspector noted that RCS mirror insulation was being installed without cleaning the pipe to Class D cleanliness as called for in B&W Construction Company Quality Control Procedure 9A-128 (Revision 1, Page 2, Item 4.4). This matter was brought to the attention of the licensee. The inspector determined that the following actions have been taken.

- (1) On October 11, 1976, BCM confirmed by memo to TECO the October 6, 1976, decision to clean pipe prior to insulation placement, and to verify cleaning by Bechtel QC personnel.
- (2) Bechtel QC Surveillance has verified cleaning and has defined the boundaries of insulation placed over uncleaned pipe (this area of rework has not been yet undertaken).
- (3) The subcontractor installing the insulation did not have instructions in his original contract to clean the pipe, and, since the insulation is not Q-listed, that contract did not receive review by QA personnel.

The licensee, as of this date, has still not decided on a course of action regarding the insulation placed over uncleaned pipe.

- c. On October 15, 1976, the licensee informed the inspector by telephone that a quantity of water had been discharged into the containment as a result of a procedural violation. Contractor personnel working in the building emergency sump had removed flanges from the sump suction lines without proper authorization of a Construction Work Permit (CWP) as called for Procedure 10A of the Start-up Procedures Manual. Because of preoperational testing of valves in these lines, clean water from the BWST back-flowed open lines into the sump, flooding some equipment. During this inspection, the inspector verified that:

- (1) The flooded safety related valve operator motors were removed, cleaned, and dried and appropriate resistance checks were conducted prior to their reinstallation (documented by MWO 1853) on October 18, 1976.
- (2) As of the date of the end of this inspection, the licensee was still considering the actions to be taken to prevent recurrence.