U. S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 50-346/93024(DRP)

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

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

Facility Name: Davis-Besse Nuclear Power Station

Inspection At: Oak Harbor, Ohio

Inspection Conducted: November 22, 1993, through January 14, 1994

Inspectors: S. Stasek
J. M. Shine

Approved By: _____ 2/4/94
R. D. Lanksbury, Chief Date
Reactor Projects Section 3B

Inspection Summary

Inspection on November 22, 1993, through January 14, 1994
(Report No. 50-346/93024(DRP))

Areas Inspected: A routine safety inspection by resident inspectors of operational safety, event followup, surveillances, maintenance, action on previous inspection findings, and licensee event reports.

Results: An executive summary follows:

Plant Operations: Performance of the operating crews was good this inspection period. Operator response to the auxiliary building airborne contamination problem (paragraph 3.a) was, overall, conservative and timely. Adherence to administrative controls was good. However, during response activities to the aforementioned airborne problem, an outdated revision to a procedure was found to be in use in the control room. Also, a change had been made to an operating procedure that isolated the nitrogen makeup line to the reactor coolant drain tank via the closure of two manual valves in that line. However, other procedures were not revised to reflect the change. Because of this, the two valves were left open following a surveillance activity, providing one of the flowpaths of airborne contamination to the auxiliary building air spaces.

Maintenance: Maintenance and surveillance activities observed/reviewed during the inspection period were conducted in accordance with licensee procedures and regulatory requirements. An Unusual Event was declared on one occasion

when maintenance workers, while working on Train 2 of the control room emergency ventilation system, inadvertently broke a refrigerant line on Train 1 (paragraph 3.b).

Engineering: Due to improper implementation of the station modification program, engineering notification to procurement was not made for a changeout of blowout panel bolting. This directly contributed to wrong bolting being installed in a blowout panel during this inspection period (paragraph 2.a).

Plant Support: Overall, good adherence to both the radiation protection and security programs was noted during the inspection period.

DETAILS

1. Persons Contacted

Toledo Edison Company

* L. F. Storz, Vice President, Nuclear
* G. A. Gibbs, Director, Engineering
* S. C. Jain, Director, Nuclear Services
* J. K. Wood, Plant Manager
* T. J. Myers, Director, Nuclear Assurance
* J. W. Rogers, Manager, Maintenance
* J. Dillich, Manager, Radiation Protection
  S. Byrne, Manager, Plant Operations
* T. Bergner, Manager, Training
  B. Donnellon, Manager, Plant Engineering
* J. Holden, Manager, Design Engineering
  T. Haberland, Manager, Planning
* J. Michaelis, Manager, Material Management
  J. E. Moyers, Manager, Quality Assessment
* C. Hawley, Manager, Quality Control
* R. C. Zyduck, Manager, Nuclear Engineering
* S. S. Hawley, Manager, Quality Services
* G. Skeel, Manager, Security
* W. O'Connor, Manager, Regulatory Affairs
  G. J. Melssen, Superintendent, Electrical Maintenance
* R. Greenwood, Supervisor, Radiation Protection
  G. R. McIntyre, Supervisor, E/C Systems
* D. Schreiner, Supervisor, ISE
* A. W. Rabe, Supervisor, Quality Engineering
* P. Smith, Supervisor, Compliance
* J. Barron, Supervisor, Test/Performance Engineering
* D. Eshelman, Superintendent, Operations
* J. Reddington, Shift Manager
* J. McGee, Shift Supervisor
* W. Molpus, Shift Supervisor
* S. Coakley, Supervisor, Planning
* M. K. Leisure, Senior Engineer, Licensing
* N. Peterson, Engineer, Licensing

*Denotes those licensee personnel attending the January 14, 1994, exit meeting.

2. Operational Safety Verification (40500) (71707) (92701)

The inspectors observed control room operations, reviewed applicable logs, and conducted discussions with control room operators during the inspection period. The inspectors verified the operability of selected emergency systems, reviewed tagout records, and verified tracking of limiting conditions for operation (LCO) associated with affected components. Tours of the auxiliary and turbine buildings were conducted to observe plant equipment conditions including potential fire hazards,

fluid leaks, and excessive vibrations, and to verify that maintenance requests had been initiated for certain pieces of equipment in need of maintenance. Walkdowns of the accessible portions of the following systems were conducted to verify operability by comparing system lineups with plant drawings, as-built configuration, or present valve lineup lists; observing equipment conditions that could degrade performance; and verifying that instrumentation was properly valved, functioning, and calibrated.

- Control Room Emergency Ventilation System - Trains 1 and 2
- Auxiliary Feedwater System - Trains 1 and 2
- Emergency Diesel Generators - Trains 1 and 2

The inspectors, by observation and direct interview, verified that the physical security plan was being implemented in accordance with the station security plan, including badging of personnel, access control, security walkdowns, security response (compensatory actions), visitor control, security staff attentiveness, and operation of security equipment.

Additionally, the inspectors observed plant housekeeping, general plant cleanliness conditions, and verified implementation of radiation protection controls.

Specific observations and reviews included the following:

a. On January 1, 1994, an inadvertent trip of a containment purge exhaust fan occurred. Because the associated supply fan continued to run for a short period of time afterwards, air pressure in mechanical penetration room #4 increased sufficiently to cause one of the blowout panels to open. Several blowout panels were incorporated into the design of the room to address potential high energy line break (HELB) accidents. Maintenance personnel were called in to prepare the maintenance work order (MWO), to obtain replacement parts from stores, and to reclose and refasten the subject blowout panel.

   It was subsequently determined that incorrect bolting was used to refasten the blowout panel. The bolting, designated as explosive release assemblies, break or shear at specified pressures. The original installation used Group 3 bolting and the replacement bolting was Group 5. This meant that with the group 5 bolts installed a higher room pressure would have to be obtained before the subject blowout panel would respond.

   An engineering evaluation determined that with other blowout panels correctly incorporating the required Group 3 bolting, no degradation in response to any HELB event would occur with the Group 5 bolts installed in the one panel.

The root cause for the incorrect bolting being installed was that the approved procurement package did not accurately reflect the as-built requirements. A modification had been implemented in the past to changeout many of the Group 5 bolts in the mechanical penetration rooms to Group 3 bolts. When this was done, by procedure, notification was to have been made to the procurement group to revise the approved procurement package and to begin stocking the required spare parts for the Group 3 bolts. This was not done, and therefore the new spares were not stocked nor was the procurement package revised. Additional contributions to the installation error resulted from the unclear nature of the subject procurement package. This package contained vague information and inadequate references to related documents and drawings.

These configuration control and procedural compliance weaknesses appear to be similar in nature to those documented in inspection reports 50-346/93016(DRS) and 50-346/93019(DRP). Followup actions in response to the related matters discussed in those reports are still ongoing at this time. Therefore, pending final resolution of the issues described in those reports and review of the similarities to the current weaknesses, this will be considered part of unresolved item (346/93024-01a(DRP)).

b. On December 30, 1993, in response to a regional request, the inspectors performed a review to determine if any plant equipment was currently operating in an "Alert" range or degraded condition.

It was found that two valves included in the Inservice Testing (IST) program exhibited stroke times in the "Alert" range. All pumps in the IST program were found to be operating within normal ranges. Further, the Vibration Monitoring and Assessment Program (VMAP) at Davis-Besse addressed a broader scope of components and established monitoring thresholds lower than the IST program. Under the VMAP program, the licensee had noted five pumps that were operating within the VMAP "Alert" range criteria. These included:

- Reactor Coolant Makeup Pump #1
- Decay Heat Pumps #1 and #2
- High Pressure Injection Pumps #1 and #2

The inspectors will continue to monitor licensee implementation of the IST and VMAP programs.

No violations or deviations were identified in this area.

3. Followup of Events (93702)

During the inspection period, the licensee had two events which required prompt notification of the NRC pursuant to 10 CFR 50.72. The inspectors pursued the events onsite with the licensee and/or other NRC officials. In each case, the inspectors verified that the notification was correct

and timely, that the licensee was taking prompt and appropriate actions, that activities were conducted within regulatory requirements, and that corrective actions would prevent recurrence. The specific events were as follows.

a. On December 21, 1993, during sampling of the makeup tank air volume, the radwaste ventilation system tripped due to sensing of abnormal radiation levels via the process monitors installed in the ductwork. Upon receipt of the ventilation system trip, the auxiliary building was evacuated and operators manually started the emergency ventilation system (EVS). Because the EVS was started in response to a real concern with radiation levels, the licensee subsequently determined that notifications were required per 10 CFR 50.72 and 50.73.

   Licensee review thereafter determined that, although the radiation levels were found to be very low, certain weaknesses in personnel performance, equipment design, and associated procedural problems needed to be addressed. These weaknesses were as follows.

   - The associated purge rate utilized during the sampling evolution was significantly higher than intended. This was due to establishing the flowrate via a rotometer installed in the sample line that was found to be calibrated for liquid flow and not for gaseous flow.

   - A revision to the operating procedure had been previously made to maintain the nitrogen makeup to the reactor coolant drain tank (RCDT) isolated via two manual valves. This was done to eliminate bleedoff flow through a pressure regulating valve located in the makeup line. However, a surveillance procedure used to check the RCDT leakrate included restoration steps for these two manual valves. The surveillance procedure should have been, but was not, revised at the same time that the operating procedure was changed. This resulted in the two manual valves being left in the open position after completion of the surveillance. Flow from the RCDT through the regulating valve, and through its associated bleedoff line to the radwaste ventilation system ductwork was subsequently determined to be one pathway contributing to the airborne condition.

   - The setpoints for the process radiation monitors in the radwaste ventilation system had recently been changed to a very conservative value of approximately three times background (a reduction from the previous setting by approximately a factor of 40). It was not recognized that the sampling of the makeup tank using the installed equipment and current sampling techniques would result in the monitors reaching their trip setpoints and initiating a trip of the radwaste ventilation system.

- Procedure HS-HP-02861, High Airborne Activity or Airborne Levels, was utilized by the operators during their initial response to the event. However, it was subsequently determined that the revision to the procedure used was not the current revision. Although an outdated revision to the procedure was used, no inappropriate actions were directed.

The above concerns appear to include examples of inadequate configuration control and procedure adherence weaknesses as discussed in paragraph 4.a of this report and as such are considered as part of unresolved item (346/93024-01b(DRP)).

b. At 12:46 p.m. on December 22, 1993, with the unit at 100 percent power, the licensee declared an Unusual Event due to the commencement of a Technical Specifications (TS) required shutdown. The shutdown was required by plant TS 3.0.3, which was entered at 11:46 a.m. due to both trains of the control room emergency ventilation system (CREVS) being simultaneously inoperable. Technical Specification 3.0.3 required that actions be initiated within 1 hour to place the unit in Hot Standby within the next 6 hours when the limiting condition for operation for the CREVS was not met. Reduction of reactor power proceeded at 1 percent-per-hour, and was terminated at 1:57 p.m. at approximately 98 percent reactor power, after one train of the CREVS was declared operable. The Unusual Event was terminated at 2:03 p.m. and the unit was returned to full power.

The previous day, during surveillance testing, Train 2 of the CREVS had exhibited excessive shaft vibration, indicating probable fan shaft/motor bearing failure with continued operation. The train was declared inoperable and taken out of service to perform repairs. While Train 2 maintenance was in progress, personnel inadvertently sheared a CREVS train 1 compressor refrigerant pressure sensing line and caused a freon leak. This necessitated declaring Train 1 CREVS inoperable and entry into the Unusual Event. Maintenance personnel heard the freon leaking and proceeded to crimp the line. The repair to the line was completed and the compressor verified operable in a timely manner, thereby enabling the licensee to terminate the unit power reduction in roughly 1 hour.

The apparent cause of the sheared sensing line was a combination of material fatigue and incidental personnel contact with the line while supporting maintenance on the other train. The sensing line was 1/4-inch diameter copper tubing, which traversed the CREVS Train 2 workspace. The workspace available to personnel was limited, and contributed to the personnel contact. Corrective actions included placement of a temporary cover over the lines

while maintenance was in progress, "tailgate" discussions of the event with mechanical maintenance personnel, and initiation of a request to reroute and protect the lines in the future.

No violations or deviations were identified in this area.

4. Surveillance (61726)

The inspectors observed safety-related surveillance testing and verified that the testing was performed in accordance with adequate procedures, that test instrumentation was calibrated, that limiting condition for operation (LCOs) were met, that removal and restoration of the affected components were accomplished, that test results conformed with Technical Specification and procedure requirements and were reviewed by personnel other than the individual directing the test, and that any deficiencies identified during the testing were properly reviewed and resolved by appropriate management personnel.

The following test activities were observed and/or reviewed:

- DB-SP-03159, Auxiliary Feedwater (AFW) Pump #2 Monthly Jog Test
- DB-SP-03151, AFW Pump #1 Quarterly Test
- DB-MI-03001, Reactor Protection System Channel #4 Monthly Functional Test
- DB-SC-03070, Emergency Diesel Generator (EDG) #1 Monthly Test
- DB-CH-06002, Non-Nuclear Areas Sampling, Makeup Tank Gas Sampling
- DB-PF-03272, ASME Section XI And Containment Isolation Valves Post Maintenance Test (CF1341)

No violations or deviations were identified in this area.

5. Maintenance (62703)

Station maintenance activities of safety-related systems and components were observed and/or reviewed during the inspection period to ensure that they were conducted in accordance with approved procedures, regulatory guides, and industry codes or standards, and in conformance with technical specifications.

The following items were considered during this review: the limiting conditions for operation (LCOs) were met while components or systems were removed from service; approvals were obtained prior to initiating the work; activities were accomplished using approved procedures and were inspected as applicable; functional testing and/or calibrations were performed prior to returning components or systems to service; quality control records were maintained; activities were accomplished by qualified personnel; parts and materials used were properly certified; radiological controls were implemented; and fire prevention controls were implemented.

Maintenance work orders (MWOs) were reviewed to determine status of outstanding jobs and to assure that priority was assigned to safety-related equipment maintenance which may affect system performance.

The following maintenance activities were observed and/or reviewed:

- DB-MI-3409, Process Radiation Monitor HRN Calibration
- DB-MI-3413, Channel Calibration of Station Vent Normal Range Radiation Monitor RE-4598-BA
- MWO 7-93-0375-01, CREVS Train #2 Bearing and Shaft Replacement
- MWO 7-94-001501, Containment Hydrogen Analyzer Circuit Board Replacement
- MWO 3-94-1222-01, EDG Room Supply Fan
- MWO 3-94-2484-01, EDG Room 318 Air Supply Damper Operator
- AF 3869 (AFP 1-1 to Steam Generator 1-2 Stop Valve) Static Testing

No violations or deviations were identified in this area.

6. Followup of Previous Inspection Findings (92701)

(Open) Inspection Followup Item (346/93017-02(DRP)): Component Cooling Water Nonessentials Inlet Valve (CC1495) Failure to Fully Close. This item pertained to the incomplete valve stroke and lack of engagement of the detent device which occurred on September 13, 1993. The failure resulted due to the valve's air pressure regulator setpoint being set too low to affect full valve closure with the bypass valve around CC1495 closed. Previous valve surveillances were performed with the bypass valve open. This reduced the differential pressure across CC1495, thereby reducing the closing force necessary to fully stroke the valve. Because of the configuration under which previous testing had been performed, the inadequate pressure regulator setpoint was not identified.

The safety function of CC1495 was to isolate nonessential component cooling water loads from essential loads necessary to mitigate certain design basis accidents. The differential pressure that CC1495 would be required to close against per the accident analysis was higher than the differential pressure the valve was tested against. Therefore, the surveillance testing program for CC1495 was inadequate to ensure that the valve could perform its safety function. However, as a result of the September 13, 1993, failure to fully close event, operability evaluations were performed (reference Inspection Report 50-346/93016) which concluded that even with the valve partially open and the detent device not engaged, CC1495 could adequately perform its safety function.

Continued review of this matter by the inspectors and the licensee concluded that although all American Society of Mechanical Engineers (ASME) Inservice Testing (IST) requirements for the valve appeared to have been met, the testing program failed to identify potential operability concerns. The licensee initiated a Potential Condition Adverse to Quality Report to further evaluate, on a broader scope, the

adequacy of air operated valve (AOV) testing at the station. The intent was to evaluate the generic potential of the CC1495 testing problem. The inspectors will continue to monitor and assess the licensee actions to address this matter. This item remains open.

7. Followup of Licensee Event Reports (92700)

Through direct observations, discussions with licensee personnel, and review of records, the following licensee event reports (LERs) were reviewed to determine that reportability requirements were fulfilled, immediate corrective action was accomplished, and corrective action to prevent recurrence had been accomplished in accordance with technical specifications.

a. (Closed) LER 93-005-00, Reactor Trip Due to Momentary CRD Trip Confirm Signal. On October 8, 1993, at 8:43 a.m., a reactor trip was experienced from 97 percent power when a momentary control rod drive (CRD) trip confirm signal was generated which caused the Integrated Control System (ICS) to initiate a Rapid Feedwater Reduction (RFR) and main feedwater block valve closure. This resulted in feedwater flow being significantly reduced with the reactor at full power. This upset caused the Reactor Coolant System (RCS) pressure to rapidly increase to the reactor trip setpoint. Post trip response of the plant was normal with no major problems occurring.

   Subsequent troubleshooting into the root cause of the event determined that the CRD trip confirm signal was generated due to a degraded power supply in CRD system logic cabinet #1. The degraded power supply circuit card was replaced prior to restart of the unit.

   The inspector reviewed the licensee's troubleshooting methodology, and based upon the information provided by System Engineering and review of the applicable drawings, it was determined that the licensee's follow-up troubleshooting and corrective actions were appropriate. This LER is considered closed.

b. (Closed) LER 93-007-00, Plant Operated Outside Design Basis Due to Isolation of Steam Generator 1-1. On October 20, 1993, during a planned outage for Auxiliary Feedwater (AFW) System Train 1, the inspector questioned the appropriateness of the system lineup at the time. Specifically, AFW Train 1 had been removed from service for the planned maintenance activities concurrent with the cross-connect line from Train 2 also being inoperable. This was subsequently determined to be outside of the design basis for the AFW system per the Updated Safety Analysis Report (USAR) Chapter 15 Accident Analysis. Further followup of this event and subsequent corrective actions are discussed in Inspection Report 50-346/93019, and associated correspondence.

The licensee's corrective actions included issuance of a Standing Order to the operating crews to better specify allowed AFW system configurations. The AFW system operating procedure was to be revised to add precautions alerting operators to the technical specification impact of closing certain auxiliary feedwater valves. In addition, the technical specifications (TS), associated bases, and USAR descriptions for the AFW system were to be reviewed and evaluated for possible changes.

During inspector review of the technical specifications related to this issue, two areas of concern arose. The first involved the fact that in TS Section 3.6.3.1, required followup actions to an inoperable containment isolation valve allowed isolation of the affected penetration. One means specified would be to isolate the penetration by use of at least one closed manual valve or blind flange. No limitations were placed on the timeframe for which this compensatory action could remain in existence. The inspectors also noted that the manual valve or blind flange relied upon to meet the technical specifications could itself be non-seismic, non-Q, and may not be required to be leakrate tested as the containment isolation valve pairs are. Additionally, the associated piping up to the new containment boundary valve could be non-seismic, non-Q, etc.

The second issue involved TS Section 3.3.2.2 which requires, as part of the surveillance requirements, time response testing of the Steam and Feedwater Rupture Control System (SFRCS) and includes all active components other than the cross-connect valves. The inspectors noted that for SFRCS to properly function, the cross-connect valves are required to operate as well as the other components in that system.

During discussions with licensee personnel concerning these two matters, it was determined that the aforementioned review of the technical specification would include evaluation of both issues. The inspectors also initiated discussions with the NRC Office of Nuclear Reactor Regulation (NRR) to discuss, in particular, the concern with the containment isolation valve compensatory measures. Pending completion of licensee review of the technical specifications, and feedback from NRR concerning the acceptability of the current containment isolation valve compensatory actions, both issues are considered an inspection followup item (346/93024-02(DRP)). This LER is closed.

No violations or deviations were identified in this area.

8. Inspection followup items are matters that have been discussed with the licensee, which will be reviewed further by the inspectors, and which involve some action on the part of NRC or licensee or both. An inspection followup item disclosed during the inspection is discussed in paragraph 7.b.

9. Unresolved Items

An unresolved item is a matter requiring more information in order to ascertain whether it is an acceptable item, a violation, or a deviation. Two examples of an unresolved item were identified in paragraphs 2.a and 3.a.

10. Exit Interview

The inspectors met with licensee representatives (denoted in paragraph 1) throughout the inspection period and at the conclusion of the inspection on January 14, 1994, and summarized the scope and findings of the inspection activities. The licensee acknowledged the findings. After discussions with the licensee, the inspectors determined there was no proprietary information contained in this inspection report.