

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 50-346/88013(DRP)

Docket No. 50-346

License No. NPF-3

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

Facility Name: Davis-Besse Nuclear Power Station, Unit 1

Inspection At: Davis-Besse Site, Oak Harbor, Ohio

Inspection Conducted: April 12-14, 1988

Inspector: M. J. Farber

Approved By: Robert DeFayette, Chief
Reactor Projects, Section 3A

RC Knapp for

4/27/88

Date

Inspection Summary

Inspection on April 12-14, 1988 (Report No. 50-346/88013(DRP))

Areas Inspected: Special, unannounced safety inspection with regard to a series of allegations related to the operation of the Davis-Besse facility.

Results: No violations or deviations were identified.

DETAILS

1. Persons Contacted

Toledo Edison Company

S. Aparicio, System Engineer
*L. Storz, Plant Manager
*N. Bonner, Assistant Plant Manager, Maintenance
*P. Hildebrandt, Engineering General Director
R. Flood, Assistant Plant Manager, Operations
*R. Schrauder, Nuclear Licensing Manager
*T. Myers, Nuclear Licensing Director
*C. Daft, Technical Planning Superintendent
*S. Jain, Director, Nuclear Engineering
*L. Ramsett, Director, Quality Assurance
G. Homma, Compliance Supervisor - Licensing
T. Isely, I&C Lead Engineer
L. Evans, I&C Engineer

NRC

P. M. Byron, Senior Resident Inspector
*D. C. Kosloff, Resident Inspector
R. W. DeFayette, Chief, Section 3A

*Denotes those persons present at exit meeting on April 14, 1988.

2. Background

Since March 1986, NRC Region III has been dealing with a series of allegations regarding the operation and management of Davis-Besse Nuclear Power Station, Unit 1, by the Toledo Edison Company. Each of these allegations consists of a number of technical concerns with some aspect of plant operation, and all are linked by the common concern that employees who identify deficiencies in Toledo Edison programs, voice opinions contrary to the company position, or raise safety concerns are subjected to harassment, intimidation, and adverse job actions. Allegations of this nature are not uncommon in the industry.

The portions of the allegations regarding harassment, intimidation, and adverse job actions were not reviewed during this inspection; the intent of this inspection was to review the circumstances surrounding the technical concerns, determine whether or not the allegations are substantiated, and resolve the technical issues. Some of these technical issues have been inspected by other individuals and their results are documented in inspection reports which will be referenced in this report.

3. Allegation Review (RIII-86-A-0051; RIII-86-A-0184; RIII-87-A-0076)

Technical Concern

Concern: Plant workers are afraid to use new parts during maintenance work so they return used parts to service.

NRC Review: The maintenance program at Davis-Besse is continuously monitored by the resident inspectors and has been the subject of several maintenance oriented inspections, among them an industry peer group maintenance inspection, an Augmented Inspection Team (50-346/87025(AIT)) in September 1987, and a Special NRC Maintenance Inspection Team (50-346/87030) in November 1987. In each case, the availability of spare parts was noted either as a restraint to completion of specific tasks or as a general concern. The licensee, in its Course of Action Plan, developed following the June 9, 1985 event, acknowledged a spare parts problem and has, when necessary, refurbished components and returned them to service. Refurbishment is conducted under maintenance procedures, and the components and systems are subject to the same surveillance and operability requirements as new parts. To date, the use of refurbished parts, where new parts were available, has not been the cause of any of the equipment related occurrences at Davis-Besse since the plant was restarted in December 1986. The licensee is implementing an improvement program for spare parts availability, has committed significant resources to the program, and is expected to continue with the effort under the auspices of its Configuration Management Program.

Conclusions: Region III is aware of the licensee's refurbishment and reuse of components and the reasons that it takes place. This part of the allegation is substantiated; however, since there is no regulatory prohibition against the reuse of parts, the work is done in accordance with procedures, the systems are required to meet technical specification surveillance and operability requirements, and refurbished parts have not been the cause of an event, there is no safety concern in this regard. Beyond the concern expressed by the original allegor, no other individuals have come forward within the past eighteen months and expressed similar concerns. This, coupled with the fact that there was an acknowledged reason (i.e., lack of spare parts availability) for reuse of parts, leads to the conclusion that this part of the allegation is not substantiated.

Concern: Admiral Williams had everything painted, "including the sump pump springs and then the pumps wouldn't work."

NRC Review: The inspector reviewed the maintenance history for 1986 and 1987 for the Containment Normal sumps, the Auxiliary Building sumps, and the Emergency Core Cooling System (ECCS) sumps.

There were 41 Maintenance Work Orders (MWOs) written during that time period for the Containment Normal sumps. Five of these were written regarding the pumps or pumping problems. The inspector reviewed the problem description and work summary for these five and found that four were for electrical problems and one was for a clogged sump. None of the MWOs reviewed by the inspector dealt with problems traceable to pump springs.

There were 82 MWOs written during that time period for the Auxiliary Building sumps. Forty-one of these were related to the pumps. Review of the problem description and work summary revealed that all were for routine inspection and lubrication.

There were 37 MWOs written during that time period for the ECCS sumps. Twenty-one of these were related to the pumps and pumping problems. Review of the problem description and work summaries of all 21 MWOs revealed that they dealt with replacement, termination, and testing of new pumps, electrical problems, design of sump pump piping which resulted in inoperability of the sumps during maintenance, a clogged sump, and replacement of the pump with the clogged sump. None were related to problems traceable to the pump springs.

Conclusion: Detailed review of the 66 of the 160 MWOs written for the sumps revealed no problems with the pumps that could be traced to painting of the pump springs. This part of the allegation is not substantiated and considered closed.

Concern: Poorly written procedures, prepared by professional procedure writers who have no idea of plant equipment, have resulted in errors which management has blamed on personnel.

NRC Review: The allegor did not provide instances which would have identified specific procedures for review. At the request of Region III, an Operational Safety Team Inspection (OSTI) was conducted by the Office of Nuclear Reactor Regulation from September 28 through October 9, 1987 (Inspection Report No. 50-346/87024), to obtain an independent assessment of Davis-Besse performance, strengths and weaknesses, and potential problem areas. Part of this inspection involved the direct review of 24 procedures of various types and careful monitoring of the use of many other procedures

by operators and technicians. The team noted that maintenance procedures used were adequate to control the activities, surveillance procedures were well written and provided adequate guidelines for technicians and operators, and that operators had good awareness, understanding, and implementation of plant procedures.

Conclusion: With regard to "poor procedures" in a system which contains thousands of procedures, there will be some number which do not meet the same standard of quality as the rest; the system provides for periodic review and revision of procedures to correct these problems. With regard to errors which occur during the conduct of procedures, it is understood and accepted that errors will occasionally occur during the performance of even the most accurate procedures. The OSTI, as a result of its review of procedures and procedure use, concluded that the licensee had fundamentally sound procedures and practices in place at the plant. This part of the allegation is unsubstantiated and closed.

Concern: Removal of all individual step signoffs and checkoffs had resulted in at least one procedural error.

NRC Review: Absent a specific example, the allogger's claim could not be directly reviewed; however, the Resident Inspectors reviewed the system used by the licensee for procedure signoffs. They determined that although the individual step signoffs and checkoffs had been removed from the body of procedures, they had been retained on a separate attachment which was to be used along with the procedure. The inspector reviewed a sample of I&C, Mechanical, and Electrical maintenance procedures and confirmed the use of the separate signoff sheets. As discussed above, the OSTI found that procedure use and implementation at Davis-Besse were satisfactory.

Conclusion: The removal of signoffs from the body of procedures could not be tied to a personnel error. As noted above, the OSTI found fundamentally sound procedures and practices in place at the plant and that procedure use and implementation were satisfactory. This part of the allegation is unsubstantiated and is closed.

Concern: The Auxiliary Feedwater Pump Turbine steam admission valves were installed in an orientation not recommended by the manufacturer.

NRC Review: In response to concerns expressed by Region III personnel over potential operational problems with the Auxiliary Feedwater (AFW) system, a two-day special inspection was

conducted by NRR staff personnel on October 6 and 7, 1987. The results of this inspection, which concluded that the material condition of the AFW system was adequate to allow the system to perform its safety function, were conveyed to Region III in a letter from D. M. Crutchfield to C. E. Norelius, dated January 22, 1988, and documented in Inspection Report No. 50-346/87031(DRP). Prior to the restart of Davis-Besse in December 1986, the type and location of the Auxiliary Feedwater Pump Turbine (AFPT) steam admission valves were modified. The valves are now located near the turbines and are fail open, air-operated control valves where previously they were motor-operated gate valves located approximately a hundred feet from the AFPT. The relocation of the valves was intended to reduce the amount of condensate that would otherwise be produced in a long length of unheated steam line. Both new valves, manufactured by the Masoneilan Company, are identical but are installed in different orientations; one (AFPT 1-1) vertically with the stem horizontal and the other (AFPT 1-2) horizontally with the stem vertical. While both valves have been subject to leakage, the valve associated with AFPT 1-1 has exhibited far greater leakage than AFPT 1-2. Toledo Edison staff personnel reported that a Masoneilan Co. representative stated that leak tightness of the valves installed vertically cannot be guaranteed. The NRR staff was informed by the licensee Design Engineering staff that new valves from a different manufacturer (Valtec) have been ordered to replace the Masoneilan valves. These valves will be installed during the current refueling outage and will be mounted horizontally.

It should be noted that adherence to a manufacturer's installation recommendation is not a requirement, and that installation orientation is often subject to other factors such as interferences or piping configurations. While the plant was operating prior to the current outage, the licensee had implemented a program of increased surveillances and compensatory actions to ensure that the AFPTs would properly respond when required. During 1987, the AFPTs were required to operate during a number of plant transients, and they always did so successfully. Replacement of the leaking steam admission valves with valves of an appropriate design and installation of these valves in the recommended orientation is expected to eliminate the introduction of steam or condensate into the AFPT while the AFW system is not in operation.

Conclusion: The allegation is substantiated, in that one of the two valves (AFPT 1-1) was installed in an orientation such that, according to a vendor representative, leak tightness could not be guaranteed.

Because the licensee had an adequate program of compensatory actions in place during operation and because appropriate modifications are scheduled for the current outage, no hazard to the health and safety of the general public was posed as a result of the orientation of AFPT 1-1 steam admission valve. This part of the allegation is closed.

Concern: Thermocouples welded to the Steam Generator shell had calibration information that indicated that the calibration was accomplished on dates that it would not have been possible for the calibration to have been done.

NRC Review: The Resident Inspectors reviewed the calibration documentation for the Steam Generator thermocouples in question and the Procedure IC 2700.48.01, "Calibration Check and Verification of Thermocouples and RTDs," which was listed in the Maintenance Work Order (MWO) as the procedure used to calibrate the thermocouples. They determined that the procedure was inadequate, in that it did not address in-place calibration of temperature elements. The allegor's concern was raised because the thermocouples were welded to the shell, and the insulation was in place on the steam generator at the time when they were documented as being calibrated. Since the thermocouples could not be calibrated in accordance with the procedure, the allegers did not believe that the thermocouples had been calibrated at all. Further review by the residents revealed that it was possible to calibrate the thermocouples in-place by the method described in the MWO although the procedure did not strictly address this situation.

Conclusion: The inspectors determined that the calibration of the subject thermocouples was performed, but without the benefit of a proper procedure. The licensee was informed, and the procedure has been revised. No violation was issued because this was a non-safety related temperature element. This part of the allegation is unsubstantiated and is closed.

Concern: The low and low-low pressure switches for a makeup isolation valve were reversed and the switches had not been calibrated between 1976 and 1986. A Potential Condition Adverse to Quality Report (PCAQR) was written on the reversed switches, but the lack of calibration was not documented.

NRC Review: This concern related to two pressure switches, PSL-MU33 and PSL-MU33, which are low and low-low air pressure switches on the backup air accumulator for MU-33, the

normal Reactor Coolant System makeup containment isolation valve. The backup accumulator assures an air supply to MU-33 to keep it open in the event of a loss of the instrument air system. PSL-MU33 provides a computer alarm at 90 psig in the accumulator, and PSSL-MU33 closes MU-33 at 75 psig.

The inspector reviewed the following documents:

- PCAQR No. 86-0564
- MWO No. 1-86-3349-00
- MWO No. 7-86-4045-00
- DB-MI-05152, "Calibration of Static O-Ring Pressure Switches" (formerly IC 2701.42)
- Davis-Besse Technical Specifications, Sections 3/4.3 (Instrumentation) and 3/4.6 (Containment)
- Updated Safety Analysis Report, Section 9.3.4, Makeup and Purification Systems

The inspector also reviewed the calibration requirements and calibration history of PSL-MU33 and PSSL-MU33. The switches are considered safety-related; however, there is no required technical specification surveillance. The instrument records showed no evidence of any maintenance since original installation in 1976. The records showed that when the switches were checked in November 1986, prior to plant restart following the June 9, 1985 event, they were both out-of-tolerance low and required recalibration. There was no evidence that any periodic calibration requirement for these switches existed. In discussions with I&C personnel the inspector found that PSL-MU33 and PSSL-MU33 had no established calibration requirement in place until March 18, 1988.

A review of the PCAQR revealed that there was no mention in the description of the possibility that these pressure switches had not been calibrated between 1976 and 1986. On November 13, 1986, the day before the allegations made their complaint, an I&C supervisor identified that neither the instrument record nor Davis-Besse Maintenance Modification System equipment history had any record of maintenance on those switches since the original installation. The root cause and resolution sections of the PCAQR failed to address this condition nor did they address the possible safety significance of the ten-year lack of calibration.

Conclusion: The PCAQR did not address the ten-year lack of calibration or its potential safety significance, and the allegation is substantiated. Because the pressure switches, which provide warning and protection for an engineered safety function, were found out-of-tolerance, there is some question as to whether or not MU-33 would have closed as required when PSSL-MU33 did actuate. This is an unresolved item (50-346/88013-01) pending an engineering evaluation addressing the ability of the backup accumulator to close MU-33 at the reduced air pressure setpoint found during the November 1986 calibration.

Concern: The allexer was refused access to a "Procedure Writer's Guide" when he requested it in order to determine how comments he had made on a procedure had been resolved. The allexer stated that he was told he could not see it because he was not on the list of people who were authorized.

NRC Review: The allexer did not identify the individual who denied his access to the Procedure Writer's Manual. To determine whether or not access restrictions had been, or were presently, in place on the Procedure Writer's Guide, the inspector reviewed the following related to the development and control of Davis-Besse procedures:

- ° NG-IM-00100, Rev. 0, "Preparation and Control of Nuclear Group Procedures"
- ° NG-IM-00114, Rev. 0, "Preparation and Control of Administrative Guidelines"
- ° NG-IM-00115, Rev. 1, "Preparation and Control of Nuclear Division and Department Procedures"
- ° NP-DP-00001, Rev. 0, "Development, Review, Approval, and Control of NPD Procedures"
- ° DB-DP-00003, Rev. 0, "Procedure Preparation and Maintenance"
- ° Davis-Besse Nuclear Power Station Procedure Writer's Manual, Volumes I through IV

The inspector also spoke with the Systems and Procedures Manager, the former Technical Support Superintendent, and the Lead I&C Engineer.

These reviews and interviews revealed that the "Procedure Writer's Manual" was controlled by the Technical Support group under the Plant Manager, and that use of the

procedure was mandated by DB-DP-00003 and its predecessor documents, the AD-1805.00 series. When the document was first issued, it was under a controlled distribution with a limited number of copies given to specific departments. According to the former Technical Support Superintendent, there were no other access controls placed on the document, and the intent was to provide availability through the department. The Lead I&C Engineer stated that at no time in the past, nor were there presently, any restrictions on access to the "Procedure Writer's Manual," that it was stored in an open bookshelf, and that its use was encouraged by the I&C Superintendent.

Conclusion: Absent the identity of the individual allegedly denying information and having determined that there were no procedural restrictions to the guide, the inspector must conclude that this part of the allegation can not be substantiated and is considered closed.

Concern: A maintenance worker was directed to hammer on a Core Flood system check valve with a sledge hammer.

NRC Review: This concern related to the methods used by the Mechanical Maintenance Department to seat a back-leaking Core Flood system check valve (CF-30). The function of CF-30 is to prevent backflow from the reactor coolant system to the core flood tanks and the decay heat removal system and allow forward flow under accident conditions or when decay heat removal flow is needed. At the time of the allegation, CF-30 was leaking in excess of Technical Specification requirement and the mechanics were attempting to seat the valve.

The inspector reviewed the following documents:

- ° MWO 1-86-4196-00, dated 12/3/86
- ° MWO 1-86-4196-04, dated 12/5/86
- ° MWO 1-86-4196-06, dated 12/19/86
- ° MWO 1-86-4196-07, dated 3/13/87
- ° MWO 1-86-4196-09, dated 5/7/87
- ° Facility Change Request 86-403, Install Anti-Rotation Devices in CF-30 and 31
- ° PCAQR No. 86-0639, dated 12/5/86
- ° PCAQR No. 87-0260, dated 5/23/87

- Company Nuclear Review Board (CNRB) Meeting Minutes - Meeting No. 185, Rev. 0
- CNRB Meeting Minutes - Meeting No. 186, Rev. 1
- CNRB Meeting Minutes - Meeting No. 190, Rev. 1
- Technical Specification 3/4.6.2

CF-30 had been experiencing back-leakage problems in early December 1986. During this time frame, the CNRB, Engineering, Maintenance, and Operations devoted extensive resources to the evaluation of the methods used to seat CF-30. These methods and the evaluations were carefully documented in the MWOs and the CNRB Minutes listed above. There were three primary methods termed "mechanical agitation," used either individually or in combination in the attempts to seat the valve. They were:

- A "dead-blow" hammer, filled with lead shot such that there is little or no recoil or bounce of the type which would cause damage to the valve body.
- An air-operated tamp with 4"x4"x4" oak blocks, such that there was no metal-to-metal contact.
- Air-operated pipe shakers (vibrators) were strapped to the piping above and below the valve.

The problem was believed to be off center seating of the valve disk as a result of wear of the anti-rotation pins, and the intent of these mechanical agitation techniques was to center the disk.

A combination of these techniques was successful in December 1986 and again in March 1987. At the time of the allegation, the plant had been shutdown, and surveillance testing required prior to a mode change had shown that CF-30 had again failed to properly seat and was leaking. Combinations of mechanical agitation techniques were used without success, and the plant returned to cold shutdown. The valve was dismantled and the modifications described in FCR 86-403 implemented. The plant subsequently returned to power with no problems with CF-30. Following the September 1986 shutdown, the plant again returned to power with no evidence of problems with CF-30. The MWOs and PCAQR related to CF-30 have been closed. However, the FCR will remain open until the modification is completed for CF-31 during the current refueling outage.

Conclusion: The allegation that a sledge hammer was used on CF-30 emerged from Occupational Health and Safety Administration (OSHA) communications with the Resident Inspector. The allexer had filed a complaint with OSHA regarding what he felt were unsafe work practices at Davis-Besse: use of hammers and air-operated tamps on CF-30 at temperature and pressure.

The problem of leaking check valves is not unique to Davis-Besse, nor are the techniques used by the licensee in its attempts to seat CF-30. The records show that the use of mechanical agitation was carefully reviewed and that its applications to CF-30 were fully documented. The use of a hammer and air-operated tamps is acknowledged; the practice is not considered unsafe, and the issue has no safety significance. The allegation is not substantiated, and this matter regarding use of a sledge hammer is considered closed.

4. Unresolved Items

Unresolved items are matters about which more information is required in order to ascertain whether they are acceptable, violations, or deviations. An unresolved item disclosed during this inspection is discussed in Paragraph 3.

5. Exit Interview

The inspector met with licensee representatives (denoted in Paragraph 1) at the conclusion of the inspection on April 14, 1988, and summarized the scope and findings of the inspection. The inspector also discussed the likely informational content of the inspection report. The licensee acknowledged the information and did not identify any of the information disclosed during the inspection as proprietary.