U. S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 50-346/92003(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: February 18, 1992, through April 6,1992

Inspectors: W. Levis
K. Walton

Approved By: I. N. Jackiw, Chief — Date: 4-16-92
Reactor Projects Section 3A

Inspection Summary:
Inspection on February 18, 1992, through April 6, 1992
(Report No. 50-346/92003(DRP))

Areas Inspected: A routine safety inspection by resident inspectors of licensee actions on previous inspection findings, licensee event reports followup, plant operations, followup of events, radiological controls, maintenance/surveillance, emergency preparedness, security, engineering and technical support, and safety assessment/quality verification was performed.

Executive Summary:

Plant Operations: Power was decreased on March 1, 1992, to perform maintenance in containment and look for the source of unidentified leakage. Upon subsequent escalation of power a maintenance activity resulted in a turbine trip and reactor trip from 40% power.

A turbine bypass valve failed open after the trip complicating the post-trip plant response. Two turbine bypass valves were repaired and isolated and plant startup commenced March 2, 1992. Full power was achieved on March 3, 1992. The plant has operated at essentially full power since this startup.

The operators response to the event was good. Weaknesses were noted in the decision making process which allowed work to occur and in logkeeping practices.

The licensee submitted a Temporary Waiver of Compliance and a License Amendment request to allow operating with a reactor coolant system high point

vent isolated. The valve was reopened on March 25, 1992, and the vent path was re-established.

An operations strength was noted during a loss of service water pump casualty. Operators quickly diagnosed and responded to the problem. (See paragraph 4)

Radiological Controls: The inspectors noted strengths in the licensee's radiological controls program this inspection period.

ALARA meetings held prior to containment entry to clean the containment air coolers and locate the source of an unidentified reactor coolant system leak were well planned and conducted.

Alert radiological controls technicians on tour discovered a potential for an unplanned release path when hoses from the auxiliary steam system were directed to the wrong turbine building drain system. (See paragraph 5)

Maintenance/Surveillance: Weaknesses in the maintenance area were noted by the inspectors during this inspection period.

A maintenance activity on March 1, 1992, resulted in a turbine trip and a reactor trip. Weaknesses were noted in job planning and job performance. A violation was issued for work being performed outside the scope of the work authorization.

The licensee must clean boron deposits off the containment air coolers monthly until the source of a reactor coolant system leak is located and repaired. (See paragraph 6)

Emergency Preparedness: Strengths were noted by the inspectors in the Emergency Preparedness program. The licensee performed an integrated emergency preparedness and casualty control drill on March 11, 1992. (See paragraph 7)

Engineering/Technical Support: Engineering detected increased fouling in the containment air coolers from deposition of boron crystals and made recommendations to operations to remove the CACs from service. An engineering evaluation was performed to ensure that the CACs were operable in this condition.

The licensee performed a review of the Salem Nuclear Power Plant turbine failure and determined that a similar event here was unlikely due to the strengths of its preventive maintenance program.

Service water pump #3 experienced a sheared shaft due to excessive stresses on the shaft and vibrations resulting from worn radial bearings. The licensees vibration analysis program was unable to detect the degraded condition of the pump shaft. (See paragraph 9)

Safety Assessment/Quality Verification: NRC management presented the licensee its Systemataic Assessment of Licensee Performance (SALP) scores on March 3, 1992, followed by a public meeting at the Ottawa County Courthouse.

DETAILS

1. Persons Contacted

a. Toledo Edison Company

D. Shelton, Vice President, Nuclear
*G. Gibbs, Director, Quality Assurance
*L. Storz, Plant Manager
*J. M. Heffley, Manager, Maintenance
M. Bezilla, Superintendent, Plant Operations
E. Salowitz, Director, Planning and Support
*S. Jain, Director, DB Engineering
R. Zyduck, Manager, Nuclear Engineering
*G. Grime, Manager, Industrial Security
*D. Timms, Manager, Systems Engineering
*J. Polyak, Manager, Radiological Control
R. Coad, Supervisor, Radiological Protection
J. Lash, Manager, Independent Safety Engineering
G. Honma, Supervisor, Compliance
B. DeMaison, Manager, Emergency Preparedness
*J. Wood, Operations Administration
R. W. Schrauder, Manager, Nuclear Licensing
T. J. Myers, Director, Technical Services
*N. Peterson, Engineer, Licensing
*E. Caba, Manager, Performance Engineering
G. Skeel, Gen. Supervisor, Nuclear Sec. Operations

*J. W. Rogers, Superintendent, I&C Maintenance
L. W. Worley, Manager, Quality Assurance
*C. S. Bramson, Manager, Nuclear Plant Serv.
*A. V. Antrassian, Engineer-Licensing
*J. Basa, Emergency Planner
*J. Dillich, Superintendent, Operations

b. USNRC

*W. Levis, Senior Resident Inspector
*R. K. Walton, Resident Inspector

*Denotes those personnel attending the April 6, 1992, exit meeting.

2. Licensee Event Reports Followup (92701)

Through direct observation, discussions with licensee personnel, and review of records, the following licensee event reports (LERs) were reviewed to determine that reportability requirements were fulfilled, that immediate corrective actions to prevent recurrence was accomplished in accordance with Technical Specifications (TS).

(CLOSED) LER 91-007 and Rev 1 Shutdown Required by Technical Specification due to Emergency Diesel Generator (EDG) Problems. This

LER was discussed in Inspection Reports 50-346/91022(DRP) and 50-346/92002(DRP). The EDG #2 failure was attributed to a bad timing switch in the EDG starting circuitry. The licensee submitted the timing switch to an independent laboratory for failure analysis. The analysis revealed that a short circuit existed in a transistor on the power supply board of the switch as a result of a manufacturing defect. A previous speed switch failure was due likewise to a manufacturing defect, a bad cold solder joint. The vendor that supplied the switch reviewed the analysis and determined that this and the previous switch failures were isolated and random failures. This LER is closed.

(OPEN) LER 92-002 Reactor Trip from 40 Percent Power Due to Main Turbine Trip. This event is discussed in paragraphs 4, 6 and 9 of this inspection report. This LER will remain open until the inspectors review of the licensees corrective action.

No other violations or deviations were identified.

3. Plant Operations (71707, 93702)

a. Operational Safety Verification

Inspections were routinely performed to ensure that the licensee conducts activities at the facility safely and in conformance with regulatory requirements. The inspections focused on the implementation and overall effectiveness of the licensee's control of operating activities, and on the performance of licensed and non-licensed operators and shift managers. The inspections included direct observation of activities, tours of the facility, interviews and discussions with licensee personnel, independent verification of safety system status and limiting conditions of operation (LCO), and reviews of facility procedures, records, and reports.

1) On March 1, 1992, the licensee lowered reactor power to 6% to perform an inspection inside containment in an attempt to locate a source of unidentified reactor coolant system (RCS) leakage. The leak was quantified to be about 0.4 gpm.

A small leak was located on a high point vent line and was isolated by shutting valve RC44. Shutting this valve isolates the RCS loop 2 vent path and places the facility into a 30-day Action Statement for Technical Specification 3.4.11. Subsequently, RCS unidentified leak rate decreased to 0.3 gpm indicating that a small RCS leak continued to exist. The licensee determined that plant operation could continue with the leak, but recognized that the leak would have to be located at a later date.

On March 13, 1992, the licensee submitted an amendment request to allow submitting a special report if one of two RCS vent paths becom inoperable in lieu of placing the

plant in hot shutdown after 30 days if one RCS vent path becomes inoperable. The amendment could not be processed within the time constraints requested by the licensee, so on March 20, 1992, the licensee requested a Temporary Waiver of Compliance (TWOC) to allow continued operation with one RCS vent path inoperable until the license amendment could be processed.

On March 25, 1992, the two loop blowdown valves downstream of shut off valve RC44 were cycled. On March 26, 1992, the licensee entered containment and re-established the RCS loop 2 vent path by reopening RC44. The Action Statement for T.S. 3.4.11 was exited at this time. An inspection of the #2 RCS loop vent path revealed that no leakage existed. The licensee later withdrew the TWOC.

2) During the subsequent escalation of power on March 1, 1992, a reactor trip occurred from 40% power when a maintenance activity actuated a turbine high hood exhaust temperature switch (see paragraph 6). After the trip, the RCS temperature and pressure decreased at a rate greater than expected for about 3 minutes. Operators detected the condition and noted that two of the six turbine bypass valves (TBVs), which were required to shut after the plant recovered from the trip, remained open. Operators then manually actuated the Steam and Feedwater Rupture Control System (SFRCS) which secured steam to the TBVs and resulted in RCS parameters returning to normal. The inspectors' review of operator actions showed that their actions were timely and in accordance with operating procedures.

A TBV which stuck open was found to have a broken positioner arm. This arm is used in the feedback circuitry to aid in valve positioning. A second TBV had a damaged positioner arm. The linkages were replaced and the valves were tested. The licensee performed a safety evaluation to allow both TBVs to be isolated with the turbine in service. The safety evaluation concluded that the plant can continue to operate without restrictions with one TBV on each header isolated. Presently, the two affected TBVs are isolated.

The turbine bypass valves are located downstream of the Main Steam Isolation Valves and are used in startup and shutdown to control main steam pressure. During power operations, they are used to control pressure during load swings and are used to remove decay heat during cooldown. Normally, six TBVs are available and can relieve 25% of rated steam flow. The TBVs are normally shut and will open during a load rejection or turbine trip to minimize challenges to the steam generator relief valves. During emergency conditions, the TBVs are used to cool the plant down quickly during a steam generator tube rupture. Prior to isolation of the

affected steam generator, it is estimated that four TBVs would provide sufficient cooling capacity to remain within the USAR analysis. In order to maintain the USAR analysis cooldown rate of 100°F per hour during longer term cooldown of the RCS, the isolated TBV may have to be unisolated and utilized.

The licensee has had a history of post-trip operations problems with the TBVs. During the previous refueling outage, the licensee replaced two of these valves with valves of a different design. The licensee is studying the two newly installed valves to ensure they operate reliably. These valves have exhibited slight seat leakage but have provided reliable service. The licensee intends to replace the remaining four TBVs during the next refueling outage.

3) The Shift Manager responsibilities are described in the Administrative Procedure, DB-OP-00200, Shift Manager. These responsibilities include, coordinating activities with non-operations personnel in order to support plant operations and supporting the Shift Supervisor in matters pertaining directly to plant operations. Among the Shift Managers duties is to maintain a log which is required to contain evaluations of operating events and also contains reviews and evaluations of off-normal events.

The inspectors review of the Shift Managers log for the reactor trip of March ., 1992 revealed that the log identified the reactor trip, but made no mention of the failure of the two TBVs to close. The inspectors believe this to be worthy of a log entry since these valves normally shut after a trip and that two TBVs failing to close is considered off-normal. The log did not contain any reviews or evaluations of the trip or the TBV failures and the effects it had on plant post-trip response.

In addition, the Nuclear Quality Assurance Manual, section 16.4.14.1., requires that, "Plant operating logs shall be established and maintained in accordance with Station Administrative Procedures and shall document the performance of administratively controlled activities." The Shift Managers responsibilities include coordinating maintenance activities and "ensuring adequate engineering... expertise on shift." The Shift Managers logs did not reflect that reactor startup was progressing with the low vacuum turbine trip circuitry disabled. Maintenance performed on the low vacuum turbine trip system warranted taking compensatory actions for the disabled trip function but there was no mention of a change made to the normal operation of the facility in the Shift Managers log needed to support this activity. This condition was also not noted in the Unit log or reactor operators log.

Reviewing the event, the inspectors believed that there was inadequate documentation of compensatory actions taken to support the maintenance activity. The decision to allow the work to continue after placing the turbine on line was nonconservative and did not adequately assess the work and its possible repercussions. The operators felt that a trip could not occur since the leads for the low vacuum trip circuitry were lifted. The inspectors also noted that log keeping was not of sufficient detail to enable the reconstruction of events.

Administrative Procedure DB-OP-00005, Operator Logs and Reading Sheets, is applicable to logs maintained by Operations Department personnel. Section 6.1.1.b of DB-OP-00005 requires that the identification of the cause of an event shall be written in sufficient detail to enable the reconstruction of events. The cause of the reactor trip on March 1, 1992, could not be found in a review of the Shift Managers log, the Unit log or the Reactor Operators log.

The failure to maintain the Shift Managers log in accordance with DB-OP-00200, Rev 2 and the failure to identify the cause of the reactor trip of March 1, 1992, in the logs maintained by the Shift Manager, Shift Supervisor, (Unit) and Reactor Operator, as required by DB-OP-00005, Rev 1, is considered an Open Item (346/92003-01(DRP)).

The licensee plans to issue a change to its administrative procedures which will eliminate RO and Shift Manager logs. The licensee believes that other administrative procedures adequately document the causes of reactor trips and post trip plant responses and that additional log keeping by on-shift operators is redundant. The unit log will be maintained by the Assistant Shift Supervisor. The inspectors will monitor the implementation of the new log keeping practices.

4) On March 24, 1992, control room operators received a Low Service Water Discharge Pressure alarm. Operators alertly checked that the #3 Service Water Pump (SWP) was still running and noted that the motor was running with a low current. Operators suspected that SWP #3 had a sheared shaft. They secured the pump and entered the abnormal procedure for loss of service water. Operators placed the Backup SWP in service and stopped ongoing maintenance on SWP #2. SWP #2 was eventually placed in service and the Backup SWP was stopped. The operators quick detection, diagnosis of the problem and response to SWP #3 failure was considered to be a strength by the inspectors.

b. Off-Shift Inspection of Control Rooms

The inspectors performed routine inspections of the control room during off-shift and weekend periods. The inspections were conducted to assess overall crew performance and, specifically, control room operator attentiveness during night shifts. The inspectors determined that both licensed and non-licensed operators were alert and attentive to their duties, and that the administrative controls relating to the conduct of operations were being adhered to.

c. Engineered Safety Feature System Walkdown

The operability of selected engineered safety features was confirmed by the inspectors during walk-downs of the accessible portions of several systems. The following items were included: verification that procedures match the plant drawings, that equipment, instrumentation, valve and electrical breaker line-up status is in agreement with procedure checklists, and verification that locks, tags, jumpers, etc., are properly attached and identifiable. The following systems were walked down during this inspection period:

d. Plant Material Conditions/Housekeeping

The inspectors performed routine plant tours to assess material conditions within the plant, ongoing quality activities and plant-wide housekeeping. Housekeeping was generally adequate. Improvements were noted in the CCW pump room and the ECCS pump rooms.

No other violations or no deviations were identified.

4. Radiological Controls (71707)

The licensee's radiological controls and practices were routinely observed by the inspectors during plant tours and during the inspection of selected work activities. The inspection included direct observations of health physics (HP) activities relating to radiological surveys and monitoring, maintenance of radiological control signs and barriers, contamination, and radioactive waste controls. The inspection also included a routine review of the licensee's radiological and water chemistry control records and reports.

Health physics controls and practices were satisfactory.

1) The licensee conducted meetings during the week of February 24, 1992, to determine the most effective way to locate the RCS leak and to clean boron crystals from the containment air coolers (CACs). The inspectors attended these meetings and found good participation by the cognizant organizations. Goals were stated, plans of attack were formed and specific organizations were made

responsible for task performance. ALARA concerns were adequately addressed and hazardous activities involved were discussed in the ALARA brief. The inspectors observed the licensee's CAC cleaning activities and noted that the activity was well planned and conducted. Radiological technicians assigned to the job ensured that the proper radiological work practices were followed to minimize exposure to personnel.
The inspectors note that the licensee's planning of entry into containment to clean the CACs and attempt to locate the unidentified RCS leak was considered a strength.

2) Tours conducted by radiological controls technicians of the Auxiliary Boiler room found that temporary hoses used to drain residual water from the auxiliary boiler blowdown tank were directed to the turbine storm drain system and not to the Turbine Building Drain System (TBDS). The TBDS is used for the disposal of potential contaminated liquids whereas the storm drain system is used for disposal of nonradioactive liquids. Since the auxiliary boiler system is considered potentially contaminated, the drains should have been directed to the TBDS. Two Radiological Awareness Reports documented this condition. Even though no liquid was drained through this line, the potential existed for their to be an unplanned release of potentially radioactively fluids. The inspectors believe that the attention to detail demonstrated by the RC technicians during their routine tours, is considered a strength.

No violations or deviations were identified.

5. Maintenance/Surveillance (61726, 62703)

Selected portions of plant surveillance, test and maintenance activities on systems and components important to safety were observed or reviewed to ascertain that the activities were performed in accordance with approved procedures, regulatory guides, industry codes and standards, and the Technical Specifications. The following items were considered during these inspections: limiting conditions for operation were met while components or systems were removed from service; approvals were obtained prior to initiating work; activities were accomplished using approved procedures and were inspected as applicable; functional testing or calibration was performed prior to returning the components or systems to service; parts and materials used were properly certified; and appropriate fire prevention, radiological, and housekeeping conditions were maintained.

1) During a tour of the auxiliary building, the inspectors noted that portions of carbon steel service water piping which supply cooling water to the emergency core cooling system room coolers, were severely rusted on their external surfaces. These affected portions of pipes were not insulated or painted and had no other external protective coatings. The inspectors determined that some of these pipes have been worked in past outages and have not yet

been relagged. The inspectors spoke to Maintenance Services management about lagging missing from the pipes and its effects to the piping. The inspectors note that on recent tours of the ECCS rooms, some safety related service water piping has been relagged.

2) The licensee has detected an increase in unidentified reactor coolant system (RCS) leakage since reactor startup on December 11, 1991. The unidentified RCS leakage is estimated to be 0.4 gpm. Technical Specification 3.4.6.2 limits this leakage to 1 gpm. Since the RCS also contains trace amounts of boron, the leak caused boron to precipitate on the cooling coils of the operating CAC. The boron crystal build up on CAC #2 degraded the heat transfer abilities sufficiently enough to require the licensee to remove it from service and operate the reserve cooler, CAC #3. (See paragraph 9 for engineering evaluation of CAC performance).

A containment entry was made on February 26, 1992, and determined that the crystal coating on CAC #2 was the consistency of 'powdered sugar' and was able to be removed with a brush. However, this method of cleaning the CACs was not efficient from an ALARA standpoint. Another attempt to clean CAC #2 was made on February 27, 1992, using a pressurized demineralized water supply which yielded good results. Two of the four sides of CAC #2 were cleaned of boron deposits.

On March 1, 1992, the licensee lowered power to 6% and made a containment entry to clean CACs #1 and #2 and to locate the RCS leak. The two CACS were cleaned using both pressurized steam and water. The boron deposits dissolved upon contact with the pressurized source. The inspectors witnessed the cleaning evolutions and noted that activity was well planned and conducted (see paragraph 5).

With the heat transfer coefficient of the operating CACs declining due to boron crystals forming on the CACS, the licensee made a containment entry again on March 26, 1992, with the plant at 100% power to clean all three CACs. The light coating of boron crystals were removed easily from the CACs using a pressurized water source. The licensee estimates that the CACs will need to be cleaned every 4 weeks until the source of the unidentified RCS leak is located and repaired.

a. Maintenance

The reviewed maintenance activities included:

- Testing of overcurrent relay, BD transformer to D2 bus.
- Modification to allow computer readout of hot leg level monitoring system
- Corrective Maintenance Service Water Pump/Strainer #3.

- Calibration Check of Boric Acid Mix Tank Level Transmitter

- Troubleshoot Battery Charger DBC-1P Monitoring Circuit

- Rewire High Pressure Turbine Low Vacuum Trip Pressure Switches

1) A maintenance work order was written to investigate a discrepancy between an ammeter reading and a computer reading for the #2 circulating water pump. On February 19, 1992, electricians researching electrical drawings for the MWO detected a difference between the drawings and the condition found in the field. The electricians wisely notified their supervisor of the condition and documented the deficiency on a potential condition adverse to quality report. The MWO was suspended by operations. The deficient condition will be corrected at a later date. The inspectors note maintenance workers, with a questioning attitude, detected a faulty condition, and stopped work. Had they proceeded with their work, a possible maintenance induced plant transient, a circulating water pump trip, could have occurred.

2) On September 21, 1991, the licensee wrote a Potential Condition Adverse to Quality Report (PCAQR 91-0395) to document improper wiring of the turbine low vacuum trip circuitry. The circuitry was still functional with these wiring discrepancies but it was not redundant as shown in the electrical drawings. A maintenance work order (MWO), 7-91-0395-01, was written to correct the wiring discrepancies with the turbine on line, but on March 1, 1992, an opportunity existed to work the MWO with the turbine off line. The low vacuum circuit was deenergized by removing the power supply leads prior to rewiring the circuit. After the wiring changes were completed, the I&C technician verified that the switch contacts were open and installed jumper wires to simulate trips and verify proper operation of the computer points. During these checks a technician discovered that the circuit was energized when he received a 120 volt shock to his hand. The technician was not injured, but did not notify his supervisor about the shock he had received. The technicians, unaware that their wiring changes introduced an alternate power supply to the low vacuum trip system, commenced troubleshooting the circuitry to find the power source. When a technician checked an adjacent energized circuit with a voltmeter in the ohms mode, the technician actuated the turbine exhaust hood high temperature trip circuit. A turbine trip and a reactor trip resulted.

Operations, maintenance, and engineering personnel discussed

the job before work commenced and agreed that the work could best be performed with the turbine off line. The MWO, however, did not specify this and in fact stated that work could be done in Mode 1. Around noon on March 1, 1992, the work was not completed, but the shift manager and the shift supervisor agreed to commence rolling the turbine with the low vacuum trip circuitry bypassed. They felt that a turbine trip could not occur from the work since the leads for the low vacuum trip circuitry were lifted. Operators were stationed to monitor condenser vacuum and perform the steps of the abnormal procedure if a low vacuum condition were to occur. Operations raised reactor power to about 40% and enabled the Anticipatory Reactor Trip System (ARTS) when the turbine trip occurred.

The MWO allowed wiring the low vacuum trip system in accordance with an electrical diagram but did not authorize troubleshooting work. The workers did not recognize that voltage checks of the adjacent circuit would result in a turbine trip and did not discuss the hazards of performing voltage checks of adjacent circuits. No formal pre-job brief was performed since the work was being done with the turbine off line. However, the job was not completed when operations commenced rolling the turbine. Since the original plant conditions established for maintenance changed, the inspectors believe that the a formal pre-job brief was warranted.

The inspectors spoke to I&C department management about the event and relayed to them their following concerns. DB-MN-00001, Conduct of Maintenance, step 6.4.4., requires a pre-job inspection be performed which requires the maintenance supervisor to analyze the job and determine potential hazards and that the workers have a thorough understanding of the job hazards prior to commencing work. The I&C supervisor and technician did not know that working on adjacent circuitry would cause a turbine trip and result in a reactor trip and were not aware that their work caused the trip. DB-MN-00001 step 6.5.4., requires that during maintenance activities, workers may manipulate plant equipment which could affect plant operations only when performed within the scope of an approved MWO and when the shift supervisor provides specific instructions for equipment manipulations when work is performed without safety tagging. In addition, maintenance tasks must be performed in accordance with the MWO. The inspectors reviewed the MWO and found that it did not authorize troubleshooting. The shift supervisor did not provide specific instructions for work in the adjacent circuit. Work performed on the turbine exhaust hood high temperature circuit was outside the scope of the MWO. This is a violation (346/92003-02(DRP)) of Technical Specifications

v.8.1.a. failure to implement DB-MN-00001.

The technician which received a shock to his hand did not file a near-miss accident report and safety personnel were unaware of the incident. Additionally, the inspectors believed that there was a weakness in the planning and execution of the job and the work performance copy of the MWO did not provide documentation of sufficient detail to allow reconstruction of the work performed. The licensee reconstructed the maintenance activities and determined that a change was made to the MWO without proper review and a jumper used in calibrating the pressure switches was not controlled in accordance with its procedures. The licensee documented these findings on a Potential Condition Adverse to Quality Report (PCAQR 92-0134). The inspectors will follow the corrective actions associated with this PCAQR along with some personnel issues during future inspections.

b. Surveillance

The reviewed surveillances included:

Procedure No.	Activity
DB-MI-03012	Functional Test Reactor Protective System Channel 2 Trip Module & Breaker Test
DB-MI-03059	Reactor Protective System Channel 3 Flux/Delta Flux/Flow Calibration Check
DB-MI-03202	Functional Test Steam and Feedwater Rupture Control System Channel 2 Steam Pressure Instrument Calibration Check
DB-SP-03159	Auxiliary Feedwater Pump #2 Monthly Jog Test

No violations or deviations were identified.

6. Emergency Preparedness (71707)

An inspection of emergency preparedness activities was performed to assess the licensee's implementation of the emergency plan and implementing procedures. The inspection included monthly observation of emergency facilities and equipment, interviews with licensee staff, and a review of selected emergency implementing procedures.

On March 11, 1992, the licensee performed an integrated emergency preparedness drill. The purpose of the drill was to monitor the performance of designated plant personnel during a simulated plant emergency and to correct noted weaknesses prior to the performance of the Emergency Preparedness Exercise which is scheduled for May 13, 1992. The inspectors observed the drill from the simulator, the Technical

Support Center (TSC), and the Operational Support Center (OSC). The licensee believes that the drill objectives were met. Supervisory personnel were properly focused on plant parameters and conditions and the event was properly classified. Some weaknesses were noted in response to a radiological casualty. These weaknesses were also noted by the licensee in their post drill critique. The personnel in the OSC were adequately briefed for the job they were assigned and were properly debriefed after the task was completed. Communications between OSC and the other emergency facilities was good. Briefings provided by the OSC director were timely and informative.

No violations or deviations were identified.

7. Security (71707)

The licensee's security activities were observed by the inspectors during routine facility tours and during the inspectors' site arrivals and departures. Observations included the security personnel's performance associated with access control, security checks, and surveillance activities, and focused on the adequacy of security staffing, the security response (compensatory measures), and the security staff's attentiveness and thoroughness. Security personnel were observed to be alert at their posts. Appropriate compensatory measures were established in a timely manner. Vehicles entering the protected area were thoroughly searched.

No violations or deviations were identified.

9. Engineering and Technical Support (62703, 71707)

An inspection of engineering and technical support activities was performed to assess the adequacy of support functions associated with maintenance/modifications, operations, surveillance and testing activities. The inspection focused on routine engineering involvement in plant operations and response to plant problems. The inspection included direct observation of engineering support activities and discussions with engineering, operations, and maintenance personnel.

1) During a tour of containment on February 21, 1992, maintenance personnel noted a buildup of boric acid crystals on the two operating Containment Air Coolers (CAC #1 and #2). The source of the boron deposits was from an unidentified RCS leak (see paragraph 4). That same day, DB-PF-04729, Containment Air Cooler Monitoring Test, was performed and discovered that CAC #2 performance had degraded. The Performance Engineering then relayed his concerns to the Shift Supervisor. On February 24, 1992, Performance Engineering again recommended to the Shift Supervisor to remove #2 CAC from service and place #3 CAC in service. Later that day #2 CAC was removed from service until it could be cleaned. Operations management never considered CAC #2 to be inoperable due to its degraded condition, but insisted that during a post-LOCA environment the humid conditions would cause

the boron deposits on the CACs to dissolve. The CAC had passed its surveillance test and was considered to be operable by the operations department.

Nuclear Engineering performed a computer analysis of post-LOCA heat conditions and found that for the first 3 hours, the CACs have little effect on containment temperature and pressure. The report concluded that #2 CAC was capable of performing its safety function for the existing plant conditions during a LOCA or a main steam line break and that boric acid crystals would be dissolved by the humid conditions prevalent in containment post-accident. Performance Engineering continues to monitor CAC performance twice a week. CAC performance criteria have been established which, if exceeded, would require cleaning the CACs. Performance Engineering estimates that the CACs would need to be cleaned about once every 4 weeks with the 0.4 gpm unidentified RCS leak rate. The licensee believes that it can continue operation with the unidentified RCS leak provided that the CACs are cleaned prior to exceeding their performance criteria.

2) Systems Engineering assembled a team to review and investigate a turbine generator failure which occurred at the Salem Nuclear Station on November 9, 1991. The team, which was assembled from several onsite engineering organizations and a turbine vendor representative, studied the event to determine if similarities existed at Davis-Besse.

The Salem event was caused by a failure of solenoid valves to operate in the turbine trip system, inability of plant personnel to recognize the symptoms of a failed turbine trip test, and ineffective root cause investigation of a previous turbine trip failure.

The licensee does not believe the facility is prone to this event since it performs all vendor recommended preventive maintenance (PM) activities. The activities include weekly testing of solenoid trip valves and inspection of these valves each refueling outage. Monthly sampling and analysis of hydraulic oil and quarterly replacement of hydraulic system filters is also included in the PM program. The hydraulic fluid samples indicate that chemical parameters are within the vendors recommended values. Every 5 years the hydraulic fluid reservoir is drained, inspected, and cleaned. Periodic tests performed on the turbine trip system have identified a failed solenoid valve which was replaced. The licensee is continuing to examine its turbine preventive maintenance program to determine if program enhancements are necessary.

The Engineering Department has been proactive in their investigations to determine if this facility is prone to similar operational events which have occurred at other nuclear facilities. Inspection Report

50-346/92002(DRP) discussed the licensee's efforts to determine the applicability of a loss of RCS pressure control event to this facility.

3) On March 24, 1992, operators detected that Service Water Pump (SWP) #3 had a low discharge pressure and its motor was operating with lower than expected amps. Operators stopped the pump, and later placed SWP #2 on line to supply cooling water to necessary loads.

Upon disassembly of SWP #3, the licensee discovered that SWP #3 shaft had sheared at a coupling which connects the pump head shaft to a lower line shaft. The licensee believes that a crack formed in the shaft due to high stresses at a keyway which connects the two shafts. The crack grew in size due to fatigue which was induced by a pair of worn radial bearings in a lower shaft. These bearings were worn due to entrainment of silt in the bearings and due to the shafts not being hardened. The other 2 line shafts, which make up the pump, had shafts made of hardened material at the bearing contact area. The inspectors noted that these shafts were only slightly worn.

The licensee plans to replace all the line shafts on SWP #3 with shafts made of hardened material in the bearing contact area. The licensee is evaluating redesigning the shaft keyway joint. The licensee monitors vibrations on the SWPs, but was unable to detect this condition prior to its failure.

In April of 1986, SWP #1 also experienced a shaft shear. As a result, the licensee implemented a 5 year preventive maintenance (pm) program which would replace damaged shafts prior to their failure. The licensee planned to replace the SWP #3 shaft during the last outage but delayed the pm until this Spring. SWP #1 was rebuilt prior to the last outage and SWP #2 was rebuilt 3 years ago.

No violations or deviations were identified.

9. Safety Assessment/Quality Verification (30702, 92701)

An inspection of the licensee's quality programs was performed to assess the implementation and effectiveness of programs associated with management control, verification, and oversight activities. The inspectors considered areas indicative of overall management involvement in quality matters, self-improvement programs, response to regulatory and industry initiatives, the frequency of management plant tours and control room observations, and management personnel's participation in technical and planning meetings. The inspectors reviewed Potential Condition Adverse to Quality Reports (PCAQR), Station Review Board (SRB) and Company Nuclear Review Board meeting minutes, event critiques, and related documents; focusing on the licensee's root cause determinations and corrective actions. The inspection also included a review of

quality records and selected quality assurance audit and surveillance activities.

On March 3, 1992, the NRC Regional Administrator and members of his staff met with the senior licensee management and members of their staff to present results of the Systematic Assessment of Licensee Performance (SALP). Members of the State of Ohio and local county emergency preparedness managers were in attendance. Following the presentation, the Regional Administrator and NRC staff toured the facility.

On March 27, 1992, the licensee met with Region III managers to discuss the special circumstances surrounding the plant trip of March 1, 1992, and other items of mutual interest.

On March 30, 1992, two representatives of the NRC operating licensing program met with upper licensee management and their staff. The NRC representatives toured the facility and the simulator and discussed items of mutual interest.

No violations or deviations were identified.

10. Meeting With Local Officials (94600)

On the evening of March 3, 1992, the Regional Administrator and members of his staff conducted a public meeting with local officials and members of the State of Ohio to discuss the Davis-Besse SALP and other topics.

11. Exit Interview (71707)

The inspectors met with licensee representatives (denoted in Paragraph 1) throughout the inspection period and at the conclusion of the inspection and summarized the scope and findings of the inspection activities. The licensee acknowledged the findings. After discussions with the licensee, the inspectors have determined there is no proprietary data contained in this inspection report.