U.S. NUCLEAR REGULATORY COMMISSION
OFFICE OF NUCLEAR REACTOR REGULATION

Division of Reactor Inspection and Safeguards

Report No.: 50-346/87-24

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Inspection At: Davis-Besse Nuclear Power Station
Oak Harbor, Ohio

Inspection Conducted: September 28, 1987 - October 9, 1987

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1.0 Inspection Scope

This two-week Operational Safety Team Inspection (OSTI) reviewed the areas of; management oversight and safety review, operations, maintenance, surveillance testing, QA, and corrective action programs. The primary focus of the inspection, which included over 72 hours of continuous on-shift coverage, was the interface of the above activities with operating shift personnel. In addition to document reviews and interviews, the inspection included several plant tours, system walkdowns and witnessing of maintenance and surveillance activities. Inspectors attended several types of licensee meetings, including: on-site review committee; off-site review committee; the daily plan-of-the day meeting; vice-president's bi-weekly staff meeting; shift turnover meetings, and; a pre-audit planning meeting.

2.0 Summary of Significant Findings

In general, licensee programs in the areas inspected were found to be complete, effective, and capable of escalating problems to an appropriate management level. A number of particularly strong features were identified along with some potentially weak aspects of the programs. These are summarized below.

2.1 Strengths

In the area of operations, strengths included:

- good coordination of work efforts and communications among shift personnel and between shifts - including shift turnover,

- good operator awareness of plant conditions, radiological health issues, and maintenance activities,

- good operator awareness, understanding and implementation of plant procedures,

- shift supervisors, assistant shift supervisors and control room operators have extensive plant knowledge and experience

- plant tours demonstrated evidence of good housekeeping practices and good control over contaminated area size.

The following strengths were identified in the area of surveillance testing:

- the scheduling system is very effective in planning surveillance activities. No scheduled Technical Specification surveillance test has been missed since December 1986,

- surveillance procedures are well written and provide adequate guidelines to technicians and operators.

Strengths in the area of safety reviews and committees included:

- the predictive maintenance program is a potentially strong feature once fully implemented, as is the developing system engineer program,

- in the area of safety review, general programs are applicable across organizational lines and appear comprehensive. In addition, the layered approach results in independent review through peer and supervisory review, Company Nuclear Review Board (CRNB) subcommittee review, and Independent Safety Evaluation Group (ISEG) overview activities,

- the ISEG employs good engineering discipline, sophisticated processes as needed, and is aggressively involved while enjoying good acceptance and credibility with plant staff,

The area of QA and corrective action showed the following strengths:

- QA has become more assertive in the past year with regard to accepting corrective actions on Potential Conditions Adverse to Quality (PCAQs),

- the technical knowledge of QA audit teams has improved substantially through auditor qualification and increased use of consultants and loan personnel as technical specialists,

- corrective action programs in general are administratively well founded to identify, track and correct a wide range of problems

2.2 Weaknesses

Weaknesses in operations included:

- cases of inadequate log and record reviews and inconsistent log keeping,

- lack of SRO licensed incumbent in the positions of Operations Supervisor and Operations Superintendent,

- an excessive amount of administrative work assigned to the shift supervisor,

- work requests, tag out requests, new procedures and temporary procedures which reach the shift supervisor for approval are frequently in an inadequately reviewed condition resulting in unnecessary rejection and correction by the shift supervisor,

In the area of surveillance testing, weaknesses included:

- a temporary procedure change to a surveillance test was not reviewed by the Station Review Board and Plant Manager within the required 14 days.

- two local level instruments used for TS surveillance criteria were not included in a periodic calibration program.

Weaknesses in the maintenance area were:

- poor reviews of work instructions resulting in deficiencies identified by shift supervisor review,

- some evidence of poor procedure adherence to work instructions.

The following weakness was found in the area of corrective actions:

- a number of corrective actions were ineffective as demonstrated by inspection team and QA findings of recurrence. With the exception of QA audits, no corrective action system verifies that the stated resolution has solved the original problem.

Weaknesses in the area of safety review and committee activities were:

- a lack of operations user interface at the working level to provide input to the engineering design process,

- untimely resolution of approximately 120 CNRB SER Subcommittee comments on safety evaluations supporting installed 10 CFR 50.59 modifications.

- the ISEG functions well; however, the following factors could adversely influence its performance in the future: lack of organizational independence; lack of procedures for trigger and screening criteria, lack of guidance for mandatory response to ISEG recommendations.

2.3 Conclusion

The licensee has a number of effective programs in place, many of which have developed over the past two years. In general, the inspection team found that the programs, though fundamentally sound, were improving with use and with increased credibility on the part of plant staff.

3.0 Detailed Inspection Findings

3.1 Operational Performance

The inspection team observed control room operations, shift turnover briefings and reviewed applicable operator logs on all shifts encompassing 108 hours of continual surveillance. The inspection included interviewing operational management, all shift supervisors, virtually all assistant shift supervisors, control room operators, and contractor personnel assigned to support the operations department. The inspectors also conducted random interviews with equipment operators, and plant walk-throughs witnessing selected system surveillance testing and maintenance activities.

The inspectors monitored shift personnel for their awareness of plant status, plant safety conditions, application of plant operating procedures, the supervision of subordinates and the keeping of required station logs and plant status boards. In addition, the inspection team observed the tagging and removal of equipment from service for maintenance purposes, observed the realignment and return of systems to operational service, and conducted plant tours and equipment status checks.

The control room contained all the reference material for operators to review and follow for safe operation of the plant (e.g., administrative, startup, power operation, shutdown, abnormal, and emergency procedures; system P&IDs; and electrical drawings). The interviews with operators revealed that they were knowledgeable of procedure content and usage. However, a new procedure numbering system has been implemented which has caused some confusion in locating needed procedures.

Overall, the operating staff was knowledgeable, well informed of plant operations, and professional in the execution of their functions.

During the observation of one shift, the inspectors witnessed the operations crew take expedient corrective actions regarding the loss of seal water to a main feed pump and the loss of a control valve in the feedwater heater train which prevented inadvertent tripping of the plant.

Detailed discussion of the areas reviewed or observed is provided below.

3.1.1 Shift Routine

The inspector reviewed procedure AD 1839.06, "Operating Logs and Reading Sheet," to determine if management had issued an approved, up-to-date procedure to establish, control, maintain and review shift logs, plant status sheets, equipment status sheets, standing orders, night orders and the control room reading file. Primary system logs, Unit logs (Shift Supervisor Log) and Reactor Operator logs were also reviewed for the period December 5, 1986 through August 1987, for completeness, consistency, operability of selected emergency systems, and to verify that systems were properly returned to service.

While reviewing the Unit log of July 21, 1987, the inspector noted that the shift supervisor had reviewed Potential Condition Adverse to Quality (PCAQ) No. 87-0369 and had noted in his log that "fire protection valve No. 58 was closed and can't be opened." This valve is the east sectionalizing isolation valve. The shift supervisor also stated, "This placed us in Technical Specification (T.S.) 3.7.9.1.c. per discussion with assistant plant manager for Operations." Action Statement A of T.S. 3.7.9.1 required that the valve be restored to an operable condition in seven days or less or a special report be submitted within 30 days. The inspector noted that a maintenance work order (MWO 1-87-2145-00) was written on July 12, 1987, "to repair the safety-related fire main valve," yet it took nine and one half days to notify the shift supervisor of this T.S. violation. This delay is contrary to the requirements of Administrative Procedure AD 1807.00, "Control of Conditions Adverse to Quality," Revision 11, Paragraph 2.2.

The inspectors monitored the supervisory conduct of the different shift supervisors and found a consistent harmonious work relationship among all employees. The shift supervisors were observed training new reactor operators and potential senior reactor operator candidates. The shift turnovers were attended not only by operators, but also by maintenance foremen and health physics control personnel to maintain their awareness of plant conditions, status, and the required maintenance to be performed during that shift. A small maintenance contingent of all disciplines was assigned to the back shifts. Each shift was staffed with nine equipment operators to help perform tag-outs and to assist in surveillance tests as well as to perform other duties as assigned by the shift supervisor.

During shift observations, the inspectors also noted the large volume of material presented to the shift supervisor for review. Much of this material did not appear to require attention at the shift supervisor level. Examples include; fire watch postings, hourly check-ins by fire watches, shift assignments, and reviews of procedures not germane to operations.

3.1.2 Independent Verification

The inspectors reviewed surveillance procedures, witnessed numerous surveillance tests, performed system walk downs, valve line ups and plant tours in order to evaluate the adequacy of the licensee's performance of activities requiring independent verification.

The inspectors observed the performance of the surveillance tests listed in Section 3.3.2, Surveillance Program.

The confidence test of the auxiliary feed water pump (SP 1106.27), which is scheduled three times weekly, was witnessed by the inspection team on three separate occasions. On October 2, 1987, the licensee's Technical Specifications (T.S.) implemented a new requirement (T.S. 3.7.1.7) for the Motor Driven Auxiliary Feed Water Pump (MDAFW) to supplement the two turbine driven auxiliary feed water pumps. The inspectors reviewed the following related procedures:

SP 1106.28	MDFP Operating Procedures, Revision 4.
AB 1203.34	Steam Generator Over Fill - Revision 2.
EP 1202.01	Reactor Protection System SGFAS/SFRCS Trip - Revision 6.
ST 5071.08	MDAFP Monthly Test - Revision 1
ST 5071.10	MDAFP 18 month Test - Revision 1

The inspectors walked down the Motor Driven Auxiliary Feed Water Pump suction and discharge piping systems (ST 5071.08) to verify that the valve line up was correctly accomplished for the auxiliary feed water mode of operation. The system alignment and test conducted by the shift was independently verified to be correct by the Quality Assurance department. Observations by the NRC inspectors indicated that the verification had been performed properly and the system was ready to perform its support function. The test was completed successfully.

The inspectors conducted numerous plant tours on all shifts to monitor plant conditions and equipment operator duties. The plant tours included, but were not limited to: the ECCS pump room, auxiliary and main feed water pumps, emergency diesels, 125 volt DC safety-related batteries, component cooling water pumps and heat exchangers, service water pump, moisture separator reheaters, motor control centers, auxiliary shut down panel, high pressure injection pumps, water purification building, diesel and electric fire pumps, and the site perimeter.

Generally, the licensee's independent verification program appears to be properly implemented, with responsible supervisory and operations personnel cognizant of both the intent and requirements of the program. The licensee has also implemented a program of system engineers who work with the maintenance and operations departments to ensure plant modifications, maintenance, and special testing are completed and that systems are returned to the operations department ready for operation.

3.1.3 Procedures - Use and Adequacy

As part of the team's observations, the inspectors monitored each shift for use and knowledge of plant system procedures. Collectively, the team concluded that the shift operating personnel were anxious to share and demonstrate their knowledge of the plant and their startup, operating, surveillance, abnormal, emergency or test procedures. As witnessed by the inspectors, the actual performance of special or surveillance tests was completed with effective communications among the shift team working together to successfully complete the tests as described in the procedures.

As stated in Section 3.1, "Operational Performance," plant management instituted a new numbering system for all plant procedures which has caused some delay in obtaining the correct procedure. The previous long-standing procedures were assembled in similar number groups For example, all essential power procedures were assigned to the same number group of 3001.00 with the specific voltage or system application assigned to the two digits following the decimal, which

was an easy system for the operators to remember. However, with the new numbering system, an operator would find the "Reactor Service Crane System Procedure" in No. DB MM 06008, the "Component Cooling Water Pumps System" in No. DB MM 06001, the "Electrical Penetration Nitrogen Blanketing" procedures in No. EM SE 06002, and the "Fire Detection System" procedure in No. EN E FP 06003. This renumbering of procedures is a new system which must be learned by site personnel, and confusion is introduced by the above examples of similar number series for a variety of systems.

A second area of weakness was noted with respect to recently completed Field Change Request (FCR) 86-421, August 4, 1987, which added a hand grip to the trip throttle valve trip hook shaft. This hand grip was added to decrease the difficulty of manually tripping the Auxiliary Feedwater Pump Turbine (AFPT). The additional trip handle required an additional tripping step when testing the AFPT. On August 24, 1987, a formal procedure change was submitted by the Shift Supervisor to clarify the test procedure for the use of both manual trip levers.

While witnessing the surveillance test of the Auxiliary Feedwater Pump (ST 5071.11.02), the inspector noted that the procedure was inadequate to meet the testing requirement to verify all annunciator alarms were received in the control room. Operational management should take timely steps to ensure temporary procedure changes are necessary, and if so, ascertain that the change is made, related training is completed and the procedure implemented.

3.1.4 Log Reviews

During the review of the control room logs, the inspectors noted that the monthly review and approval of the Jumper/Lifted Wire and Temporary Mechanical Modification Logs had not been performed since May 21, 1987, as required by Davis-Besse Nuclear Mission Procedure, "Personnel Selection, Qualification and Certification," Revision 2, November 7, 1985. The assistant plant manager for operations, or his designee, is required to maintain, review and evaluate operating logs and records. A review of the unit tag log indicated over 100 tag-outs remained outstanding with four issued in 1985. No audit was conducted by the operations superintendent between May 21, 1987 and September 11, 1987, yet this log required a monthly review. Operations Information Tags had not been reviewed monthly or received a quarterly audit, per Paragraph 6.3 of AD 1803.2 "Operations Information Tags," Revision 1, for the tags listed below.

Tag No.	Date Issued
87-269	6-17-87
87-393	9-21-87
87-271	6-19-87
87-353	9-1-87
87-282	6-22-87
87-283	6-22-87
87-346 and 348	8-26-87
87-237	5-27-87

87-295	7-2-87
87-302	7-8-87
87-299	7-6-87

A review of the reactor operator turnover sheets for the month of September 1987 indicated four cases where individuals failed to sign the sheet even though the turnover sheets were completed. The following logs had inconsistent reviews during the past four to five months.

Reactor Operator Log
Locked Valve Log
Safety Tagging Log
Capped Valve Log
Posted Operator Aids
Unit Logs
Jumper and Lifted Wire Log

The absence of shift log reviews by the managers of the operations department are plant procedure violations and are related to the new appointments of personnel to the Operations Superintendent and Operations Supervisor positions within the past four months who do not have SRO licenses. This concern is addressed in Region III Inspection Report No. 87-14 which discusses an earlier attempt to concurrently assign the incumbent Operations Superintendant to license training.

These examples indicate some lack of administrative control over the management of the operations department.

3.1.5 Overtime

The inspectors reviewed the operating shift schedule for completeness, depth, and qualifications. The licensee has increased the number of shift supervisors since June 1987, and is taking steps to qualify additional personnel. The inspectors noted that one maintenance individual was working his third consecutive 16-hour day. The shift supervisor intended to document the working hours of this individual in a Potential Condition Adverse to Quality (PCAQ). This was the only incident of excessive working hours that was noted during the inspection. Plant management has implemented procedures to address earlier NRC concerns of excessive overtime which led to a shift supervisor sleeping (refer to NRC Inspection Report 50-346/87-15).

3.2 Maintenance Program

The inspectors reviewed station administrative controls, conducted interviews and observed station personnel to ascertain whether the licensee was implementing an effective program relating to maintenance activities. The review included the maintenance organization, procedures, programs and the interface with operations. The interviews included discussions with management personnel, supervisory personnel, shift supervisors, and journeymen. The observations

included performance of work in progress and performance of supervisory personnel in the conduct of their duties.

3.2.1 Organization and Planning

Station administrative procedure AD 1844.00, "Conduct of Maintenance," describes the program for maintenance of all station structures, systems, and components including identifying, planning, establishing priorities, authorizing, scheduling, assigning, performing, and documenting activities. The Assistant Plant Manager, Maintenance is responsible for the mechanical maintenance, electrical maintenance, and instrumentation and controls areas. He is supported by a well qualified staff and directed by detailed procedures. The Assistant Plant Manager, Maintenance and the three maintenance superintendents are new in their present positions since February 1987. The Davis-Besse Maintenance Management System (DBMMS) is a computerized system which initiates, tracks, and documents all maintenance activities performed. The system is capable of providing adequate status reports for management oversight of the program.

The Assistant Plant Manager, Maintenance was observed performing his duties during a Plan of the Day meeting and a Station Review Board meeting. The Instrumentation and Controls (I&C) Superintendent was observed performing his duties during a meeting for the establishment of a new computer support group, during a meeting with his foremen, and during a general staff meeting. The I&C foremen were observed for half a day while they were performing their normal duties of assigning and tracking jobs controlled by Maintenance Work Orders (MWO).

All levels of management from the Assistant Plant Manager, Maintenance to the I&C foremen recognized the need to reduce the large number of outstanding work request items. The I&C Superintendent was preparing a request to double his staff in order to deal with the ongoing I&C maintenance work load. Both the Assistant Plant Manager, Maintenance and the I&C Superintendent were concerned about worker morale, and stated that one of their goals was to build team work and to have the workers take responsibility for the condition of the plant.

The Outage and Program Management Department was responsible for providing short and long range maintenance schedules and coordinating related work orders between disciplines. The Plan of the Day Meetings provided an interface between all departments, and allowed discussion of work schedules and setting of priorities. The I&C General Foreman provided the I&C foremen with a weekly list of maintenance work orders which identified priorities given to specific MWOs. The responsibility for the assignment of work to journeymen in the I&C section was divided between two I&C foremen and the close out of work packages was conducted by a third I&C foreman. A scheduling board was posted to track priority work items and was updated at the end of the day with the I&C Superintendent to document status changes and to assign priorities for the following day.

The I&C foremen were knowledgeable of MWO requirements, the DBMMS system, and their responsibilities as delineated in the administrative procedures. The foremen appeared to be highly motivated and committed to the proper conduct of preventive and corrective maintenance. The I&C journeymen appeared to be supportive of the I&C foremen and consulted with the foremen when problems developed in the conduct of assigned jobs. The foremen were aware of the work load and ensured that work was conducted in accordance with priorities. Significant overtime was being assigned to complete work in progress and to complete validation of new I&C maintenance procedures.

In summary, there was a control system in place that effectively scheduled and tracked maintenance work. There was an effective exchange of information through all levels of the organization and plant personnel appeared to understand and properly implement the requirements of the program.

3.2.2 Process, Procedures, and Retest

The inspectors reviewed Administrative Procedure AD 1844.02, "Control of Work," and observed work in progress. The licensee's program has established written procedures for initiating requests for routine and emergency maintenance. The criteria and responsibilities for review and approval of maintenance work orders have been well established. The administrative procedures also established a station retest program.

Maintenance tasks were identified by preventive maintenance schedules, modifications to the plant and conditions to be corrected. A Work Request (WR) was used to identify needed maintenance tasks and required a Maintenance Information Tag to be hung on the equipment addressed by the WR. Planning personnel initiated an MWO based on the WR. The MWO was assigned a priority by the Operations Department, approved by the Planning Supervisor and authorized to be worked by the Shift Supervisor or Foreman. The completed MWO was reviewed by planning and quality control, and post maintenance testing was initiated. Another mechanism, the Service Request, was used to control work, such as building cleaning, scaffolding construction, painting and general building maintenance, which did not include plant maintenance activities. The Service Requests were approved by a department foreman or supervisor and were tracked by Planning Supervisors.

A shift supervisor was required to review every MWO and to correct any errors through one of the methods shown in AD 1805.00, "Procedure Preparation and Maintenance." The MWO for post maintenance testing on the waste gas flow meter contained an error which shut the air supply valve before leak checking the fittings on the flow element. The procedure was reviewed by the systems engineer, the I&C Engineer and an I&C foreman without identifying the error. The error was identified by the shift supervisor prior to approving the start of the work but no formal change was made to the procedure as required by AD 1844.00, paragraph 6.6.2(a)(7)(f). The testing was completed in accordance with the intent of the procedure and there was no adverse effect on plant safety.

Maintenance information tags have been used to identify numerous plant problems and were intended to prevent duplication of work requests. Some tags were found in the plant that did not contain work request or MWO numbers as required by AD 1844.02. Some tags were found in the plant that indicated a temporary installation had been in place for over two years. Over one thousand maintenance information tags were hung throughout the facility. Expired maintenance information tags were required to be removed by journeymen when they completed the associated MWO, by foremen during zone inspections, and by planning engineers during system walkdowns. Due to the large number of tags which were hung, the errors identified on some tags and the mechanisms available for clearing tags, the inspector questioned whether there was adequate control over the maintenance information tags. The Assistant Plant Manager, Maintenance stated that the concern over the control of the maintenance information tags was being tracked as an INPO finding as a result of an audit conducted in 1986. He stated that he was weighing the benefits of using the maintenance information tags to identify equipment problems and the detrimental effects of losing control of the tags once they are hung. No changes to the use and control of maintenance information tags were currently planned.

In general, there appeared to be strict control over the conduct of maintenance even though there was one instance of a failure to exactly follow the required administrative guidelines. The maintenance information tag system has been effective in identifying equipment deficiencies but does not have the strict control systems associated with the operations information tags.

3.2.3 Preventive Maintenance

The inspector observed tracking of the completion of required I&C monthly preventive maintenance and reviewed recently prepared base line calibration data and preventive maintenance procedures.

An I&C foreman was assigned to track and to close out MWOs associated with preventive maintenance activities and was assisted by an administrative assistant who was knowledgeable of the scheduling and status of the MWOs associated with preventive maintenance items.

In the past, technical manuals and the "skill of the craft" were the primary source of documentation and control used to conduct I&C maintenance in accordance with an MWO. The "skill of the craft" was broadly defined, and the quality and conduct of the maintenance was the responsibility of the journeyman conducting the maintenance. Currently, base line calibration data is being developed for each instrument and instrument string. The job is extensive and ongoing due to the large number of different vendor and model types of instruments used throughout the facility. In addition, detailed procedures were being developed and validated for the equipment control process and the preventive maintenance program. The I&C Superintendent stated that the base line data and surveillance procedures should increase the quality and consistency of the maintenance which is conducted.

There appeared to be an adequate scheduling and tracking system for the conduct of preventive maintenance. The base line calibration data and maintenance procedures appeared to be of sufficient detail and clarity to provide adequate direction for the completion of maintenance and were an improvement over the previous guidance for conducting maintenance.

3.2.4 Maintenance Activities Witnessed

The inspectors observed portions of selected corrective and preventive maintenance activities to ascertain that these activities were being conducted in accordance with approved administrative and maintenance procedures. During the observation the inspector verified that: the required administrative approvals were obtained prior to initiating the work, approved procedures were being used, the procedures used were adequate to control the activity, and radiological controls were properly implemented.

On October 2, 1987, the inspector observed portions of the activities performed under MWO No. 1-87-2109-00, concerning the replacement of the waste gas flow element. The portion of the MWO observed was a post maintenance test of the flow cell. The test was a continuation of the MWO due to the inability of a prior testing rig to attain desired flow rates. The system engineer, two I&C maintenance technicians and an auxiliary operator were involved with the procedure. The procedure was written to set the flow rate to the reading on flowmeter FT-1821A and to record readings on flowmeter FT-1822A. The systems engineer decided that, due to the location of the flowmeters and the regulating valve, the flow would be set to the readings on flowmeter FT-1822A and readings would be taken from flowmeter FT-1821A. Once the data was taken the I&C technician shut the air supply valve and began disassembling the test connections. The systems engineer identified the fact that the fittings on the flow element had not been leak checked and required the I&C technician to reassemble the test connections and properly check the flow element fittings. All personnel involved in the test had been given the procedure and no formal briefing had been conducted. The work was successfully performed. However, there was little evidence of strict compliance with the steps written in the MWO; and the I&C foreman was not consulted prior to deviating from the steps in the MWO, as required by AD 1844.00, paragraph 6.6.2 (a)(2) and paragraph 6.8.2 (a). By October 6, 1987, the test rig had been disassembled and removed with the exception of an air hose which had been run to an air supply point which was located a floor above the connection point to the waste gas system.

On October 5, 1987, the inspector observed portions of the activities performed under MWO No. 1-87-2167-03, which referenced preventive maintenance procedure MC 7005.01, "Miscellaneous Procedure for Conducting Vibration Monitoring," which was being performed on the Main Feedwater Booster Pumps. The MWO had been properly completed and the required authorization for commencing the work had been granted. The technicians were familiar with the use of the vibration test equipment and were aware of the required format of the data needed by the system engineer. Multiple readings were taken at some

points to ensure output graphs were properly scaled to allow meaningful interpretation of the data.

In summary, the journeymen appeared to be well qualified to conduct maintenance and interfaced effectively with supervisory personnel. One instance was noted where there was not strict compliance with written procedures.

3.2.5 Procurement and Storage

The team interviewed personnel and made observations of the availability of material for scheduled maintenance and of the storage condition of the facility.

Discussions were held with the Assistant Plant Manager, Maintenance; I&C Superintendent, Shift Supervisors; I&C foremen; I&C journeymen; and a system engineer concerning material and parts support for maintenance activities. No one identified an instance in which there was a perceived lack of material parts support. However, during the two week inspection period several instances of lack of parts support were noted. For example, parts could not be procured for a flow control valve on the boron recovery system because the system was considered ASME code 2 and the only qualified supplier was no longer in business. The replacement parts for a reducer and solenoid valve on the emergency fire pump diesel could not be installed in the same piping configuration as the present reducer and solenoid valve. The only conductivity cell in the storeroom for the stator cooling water system was unusable because it did not have an electrical plug and was missing a screw on the end of the conductivity cell. The storeroom could not support work on replacement of resistance elements because there were none in stock. The piping in the waste gas system was required to be modified in order to install a replacement flow element.

Cleanliness and storage throughout the plant was adequate. Efforts had been made to assure that equipment and materials were properly stored and that no unauthorized storage areas were established. Responsibility for authorizing the storage of equipment in the plant has not been formally assigned and has resulted in some coordination problems between departments in the temporary storage of test equipment.

Procurement and storage appear to be adequate for supporting the conduct of maintenance activities.

3.3 Surveillance Program

The inspectors reviewed the surveillance program and controls, interviewed personnel responsible for administering the program, and reviewed plant records to verify proper implementation of the program.

3.3.1 Surveillance Program Management

The licensee implemented the surveillance program requirements through administrative procedure AD-1838.00, "Surveillance and Periodic Test Program." This procedure delineated the responsibilities and actions required of plant personnel to accomplish surveillance tests and also contained a matrix which cross referenced the TS surveillance requirement by paragraph to the applicable plant test procedure.

The licensee used the Davis-Besse Maintenance Management System (DBMMS) to schedule and provide status of TS required surveillance tests and periodic tests which were not required by TS. Various status reports can be generated from this system to inform plant personnel of scheduled testing. A Surveillance and Periodic Test Schedule was distributed to the responsible groups to provide a weekly look-ahead of scheduled tests. This schedule, which segregated tests by responsible group, specified the date on which test accomplishment was desired, test procedure number and title, quality inspections required, and administrative early and late dates for test accomplishment. A Critical Surveillance Test Report was generated daily which provided a list of current tests which had not been completed and had reached their administrative late date. The administrative late date was a date established to provide a conservative time interval for test performance prior to the TS required date of accomplishment. Finally, a daily Surveillance Test Alert Report was generated which listed those tests which were within three days of the TS late date so that priority could be given to performing these tests. The above status reports were routed to the responsible group managers and the shift supervisor on a daily and weekly basis.

The DBMMS system was updated when surveillance tests were performed and a history of test completion was thereby maintained which enabled the system to also check for consecutive test performance to establish sequential due dates which were within the time interval allowed by the TS.

Other tests not covered by the DBMMS system such as tests dependent on special plant conditions, or tests required upon entry into a TS action statement for inoperable equipment, were documented in applicable logs or were contained within specific procedures. For tests performed more frequently than every 7 days, the licensee had established a Monthly Activity Log Sheet to manually record and track test accomplishment. This log sheet specified the test procedure number and title, frequency, and day which the test was last performed.

3.3.2 Implementation of the Surveillance Program

The inspectors reviewed current surveillance test status reports generated from the DBMMS system and observed the end use of these reports by the shift supervisors and Instrumentation and Controls supervisors. The supervisors reviewed these reports to determine

which tests were due and assigned appropriate personnel, obtained from qualification lists, to perform required testing.

The inspector verified that surveillance requirements specified by TS action statements for current inoperable equipment were being performed and also reviewed the September-October, 1987, Monthly Activity Log Sheet to verify that short duration surveillance tests were being performed.

The licensee's program for controlling the calibration of in-plant process instrumentation was also reviewed. These calibrations were performed in accordance with procedures in the preventive maintenance program and were conducted at the frequencies specified by these procedures. As well, the inspector conducted a spot check of calibration for instrumentation used in the performance of the surveillance tests listed below.

Surveillance test procedures listed below were reviewed to ensure that the tests were adequate to verify equipment operability and included the requirements of the TS. The performance of several of these tests was also observed to verify that test equipment was properly calibrated, approved procedures were used, qualified personnel conducted the test, and the system was properly restored following testing.

The following surveillance procedures were reviewed and the asterisk indicates tests that were observed:

- AD 1838.00 - Surveillance and Periodic Test Program, Revision 16

- AD 1838.02 - Performance of Surveillance and Periodic Tests, Revision 16

*- ST 5011.04 - Boron Injection Flowpath Boric Acid Pump Test, Revision 3

*- ST 5030.01 - Reactor Protection System (RPS) Daily Heat Balance Check, Revision 9

- ST 5042.01 - Reactor Coolant System (RCS) Leakage (Monthly), Revision 9

*- ST 5042.02 - RCS Water Inventory Balance, Revision 9

*- ST 5062.01 - Containment Spray System Monthly Test, Revision 17

*- ST 5071.08 - Motor Driven Feed Pump Monthly Test, Revision 1

*- ST 5071.09 - Motor Driven Feed Pump Quarterly Test, Revision 2

- ST 5071.10 - Motor Driven Feed Pump 18 Month Test, Revision 1

*- ST 5071.11 - Auxiliary Feedwater Pump 1 Monthly Jog Test, Revision 2

*- ST 5075.01 - Service Water System Monthly Test, Revision 22

*- ST 5099.01 - Miscellaneous Instrument Shift Check, Revision 22

*- ST 5099.02 - Miscellaneous Instrument Daily Check, Revision 21

- DM-MI-3000.01 - Channel Functional Test of PSL-4535A, Main Turbine Hydraulic Oil Trip, Anticipatory Reactor Trip System (ARTS), Channel 1, Revision 00

- DB-MI-3001.01 - Channel Functional Test of PSL-4533A, Main Feed Pump 1 Turbine Hydraulic Oil Trip (ARTS), Channel 1, Revision 00

*- DM-MI-3002.01 - Channel Functional Test of ARTS Channel 1, Output Logic, Revision 0

*- DB-MI-3002.02 - Channel Functional Test of ARTS Channel 2, Output Logic, Revision 0

3.3.3 Observation

The licensee's use of the DBMMS system to schedule the performance of surveillance tests was a strength of this program. Since the licensee began using this system in December 1986 to schedule surveillance tests, no tests have been missed or have exceeded the TS required time interval for test completion due to scheduling problems. By providing the status reports to the responsible group managers and shift supervisor, tests were planned and accomplished prior to exceeding the maximum time interval allowed by the TS.

The inspector's review of surveillance procedures found them to be detailed and well written, providing sufficient guidance to the technicians or operators. A review of completed tests found all required data entered and within tolerance. During the review of procedure ST-5075.01, however, the inspector noted that Temporary Approval TA-21, which implemented a temporary change to this surveillance procedure, did not receive the approval of the Station Review Board or Plant Manager within 14 days of implementation as required by TS 6.8.3.c. This weakness in the temporary change approval process was identified to the licensee who subsequently performed an audit of all TA implemented since May, 1987. No similar problems were identified.

The review of the calibration of in-plant process instrumentation revealed a problem associated with the calibration of two level instruments. Level indicators LI-MU49-2 and LI-MU65-2, which measure level in the boric acid addition tanks, are required in step 6.8 of procedure ST-5011.04 to be recorded so that the suction pressures at the boric acid pumps could be calculated. This suction pressure was then used to define an acceptable pump discharge pressure which was eventually used to determine pump operability. Preventive maintenance procedures PM-1670 and PM-1672, respectively, were written to provide calibration instructions for these instruments. These proce-

dures did not contain a specified interval for performance of periodic calibrations but instead were only performed on an "as fail" basis. Although corrective maintenance had been performed on this instrumentation, which included string calibrations, on July 18, 1985 and July 16, 1987 respectively, no routine calibration intervals have been established as required by the licensee's Nuclear Quality Assurance Manual, section 12.4. Failure to establish specified calibration intervals for this instrumentation was considered to be a weakness of this program.

3.4 Management Oversight and Safety Review

The general functions of engineering, committee activities, and independent safety evaluation were assessed in their roles of providing operational overview and support.

The Engineering Division was created in its present form about two years ago. The licensee has progressively defined and refined the Division's roles and staffing. Current efforts continue in this vein and include replacement of initial contractor staffing with permanent employees. The general functions of the entire Engineering Division, including Design Engineering, Engineering Services, and the respective support functions were also reviewed where they interfaced with the aforementioned group and committee functions.

The major functional areas evaluated focused on the Systems Engineering Group, the Performance Engineering Group, the Corporate Nuclear Review Board (CNRB), the Station Review Board (SRB), and the Independent Safety Engineering Group (ISEG).

The principal attributes evaluated included the organizational structure, personnel and staffing, and definition and implementation of organizational functions.

The organizational structure was reviewed to determine that it was prescribed by corporate policy documents, that its functions were adequately defined by charter documents and procedures, that staffing and staffing plans appeared adequate to fulfill the chartered roles.

The status of implementation of major organizational functions was determined by review of the procedures in place to fulfill charter functions, review of records of procedure implementation, interviews and discussions with licensee managers, supervisors, and staff personnel inside and outside the departments of interest.

Specific implementation of selected functions such as interdepartmental communications, plant engineering support and problem resolution was assessed by review of multiple department inputs to common tasks. This portion of the assessment included observation of plant and equipment and interviews of operations personnel while the inspector was on day and back shift duty in the control room and plant spaces.

3.4.1 Goals, Objectives, and Staffing

Procedures listed in Attachment B were reviewed in order to assess the level of definition of goals, objectives and staffing including the Nuclear Mission Procedure series, the Nuclear Engineering Procedure series, Systems Engineering Major Responsibility Area Descriptions, and CNRB and SRB charters and procedures.

The details of the procedures and individual department and group staffing levels and staffing plans were discussed with licensee management and staff. Specific emphasis was given to Performance Engineering, Systems Engineering, and ISEG.

Each organizational unit was found to have a well-defined charter with specific roles defined for sub-units. In some cases, as discussed below, the performance objectives were either still under some development or in transition with respect to implementation.

The training programs established for engineering personnel were reviewed, including review of procedures NG-NT-0600, "Indoctrination, Training, and Qualification of Nuclear Group Personnel," and NES-060, "Indoctrination and Development of Engineering Personnel."

The training programs were established on the basis of Institute for Nuclear Power Operations (INPO) Guidelines and will be submitted for INPO accreditation. The programs administered by the Engineering General Manager and his staff were developed in early 1987 and were in the process of initial implementation.

Although many of the training administration aspects of the programs were not fully implemented (e.g. job analyses, individual development plans, etc.), the licensee has developed and administered about 142 engineering training sessions from January through September, 1987. Pending full implementation of the administration portion of the program, the licensee has aimed the training plans at specific problem areas (root cause analysis, PCAQ administration, etc.) and at improving design engineering capability.

During review of individual training records and supervisory interviews for ISEG and Systems Engineering personnel, the inspector noted that actual training activity for the selected individuals was more sporadic in 1987 than in 1986.

Discussions with cognizant ISEG management indicated that some training had been deferred due to work load considerations and that some training had been deemed inappropriate for certain individuals. The program required that waivers for training program deviations be approved by the Engineering General Director. The ISEG Director indicated that waivers for the individuals in question were still being processed.

System Engineering management advised that training attendance had been lower in early 1987 due to individual engineers electing to miss training sessions in favor of workload needs. Supervisory attention

had been directed at workload and time management, and this increased attention was expected to result in improved training attendance.

Although still somewhat developmental, the engineering training program appears comprehensive and aggressive.

The engineering support interface with operational activities appeared to be adequately established. Systematic program interfaces had been established and appeared to be functioning. The PCAQ system, Request for Assistance system, Licensing Commitment Tracking System, workload monitoring programs, etc., provide a manageable structure for control of interface activities.

3.4.2 Performance Engineering

The Performance Engineering Department was found to be in transition. The department was tasked with responsibility for plant thermal performance monitoring, operations assessment functions, the ASME Section XI Inservice Inspection (ISI) and Test (IST) Programs, reactor analysis and refueling support, and related programs.

Although its major roles appeared well defined, recent changes in responsibilities such as the transfer of the Inservice Inspection program from QA and the formulation of a predictive maintenance function had not been fully absorbed or implemented. Most previously assigned programs appeared acceptably established with reasonable staffing levels and plans, definition of activities and roles, and procedures in place and implemented.

However, management was dissatisfied with the effectiveness of implementation for key programs including operations assessment functions, advanced maintenance and diagnostic programs (NPRDS, NOMIS, etc.), and related activities. The inspector reviewed these areas and found licensee management's assessment to be accurate, requiring additional management attention and resources to be directed to them. For example, management appeared aware of and had provided direction and resources for development or revision of procedures needed to achieve the desired levels of performance and meet regulatory requirements.

Staffing appeared adequate with about 65 permanent and contractor employees. An additional aspect of the department's transitional status was the appointment of a new department director about 2 months prior to this inspection, replacing an experienced contractor who had been acting in that role. The new director had extensive experience in various civilian positions with the naval nuclear program and appeared to be rapidly gaining knowledge and experience required of the current position. The prior acting director remained available to assist the incumbent.

3.4.3 Systems Engineering

The Systems Engineering group was tasked with plant support responsibilities such as resolution of equipment problems (including root cause analyses), identification and resolution of PCAQs, preventive

maintenance programs, conceptual design of modifications, surveillance test support, and related activities.

The licensee's programs were generally in place and were under continuing refinement. No major developmental programs were in progress except support to the Predictive Maintenance and Configuration Management Programs being developed.

Staffing levels and plans appeared appropriate for the defined roles. About 50 permanent employee billets plus ten contractor positions were assigned as Systems Engineers.

The licensee had made a major effort in establishing the System Engineer program and had staffed it at levels which should permit it to be very effective. Although the assignees varied substantially in experience, the group was developing credibility with, and acceptance by, the operating staff. Operator interview results indicated that past plant support engineering activities were erratic with little actual support perceived by operations. While the interviews indicated a residual skepticism about the eventual effectiveness of the current program, they also indicated that tangible results were being achieved.

For example, Systems Engineering has implemented engineer plant tour and system walkdown programs which were rapidly increasing the engineers knowledge levels and were identifying new and chronic problems for resolution.

The inspector reviewed the backlog of department tasks and assignments via review of the Engineering Planning Update Report (DSS-87-01505) and Engineering 60 Day Look Ahead (DSS-87-00902). These reports, interviews with supervisors and staff, and a sampling review of open tasks indicated that the department was reasonably meeting its workload commitments.

The inspector noted that many backlog items resulting from the System Review and Test Program and restart from the 1985 shutdown were due for completion in the April 1988 outage time frame. Although the overall backlogged effort appeared massive, managers seemed well aware of detailed needs and were progressively addressing them. No detailed assessment of progress was made by the inspector.

The System Engineer program and its activities are considered to be developing into a strength.

3.4.4 Station Review Board

The Station Review Board (SRB) fulfills the Technical Specification (TS) 6.5.1 requirements for onsite review committees and was awaiting NRC issuance of a license amendment which would substantially change its operation.

The SRB operated in accordance with a formally issued charter which reproduced the TS requirements with minor amplification. The absence of detailed implementing procedures was notable, particularly in

contrast to the Company Nuclear Review Board, which had an extensive procedure base. The SRB Chairman advised that detailed procedures were prepared but implementation was awaiting issuance of the license amendment discussed above.

These changes would permit "Qualified Reviewers" to conduct most procedure and procedure change reviews now conducted by the SRB. Currently, the SRB is tasked to review all procedure changes and, as is typical through the industry, continually processed hundreds of such reviews. Such large volume created the concern that the committee was unable to provide the detailed review that each procedure warrants and may miss the need to thoroughly address significant safety matters.

While awaiting the license amendment, the licensee had implemented the Qualified Reviewer process (including training and qualification programs) as a precursor to full committee review, thereby improving the review process.

Committee minutes for 1987 were reviewed and were found to be occasionally too brief. However, negative findings and comments by the committee were well documented and appeared to reflect an appropriate level of critical review applied by the committee. All key elements of the TS required reviews were apparent.

The SRB Chairman identified two areas in which the licensee was not in literal compliance with the TS. These areas involved TS 6.5.1.6.e, .l, and .m for investigation of violations of TS and review of the Offsite Dose Calculation Manual and Process Control Program activities. The Chairman noted that these functions were performed by review of third party reports rather than direct performance by the committee. The Chairman further noted that this matter had been discussed with the Senior Resident Inspector, NRR Licensing Project Manager, and was addressed in the pending TS amendment.

One apparent weakness was identified with respect to the process for control of temporary approval of on-the-spot procedure changes and is further discussed in Section 3.3.3, Surveillance.

3.4.5 Company Nuclear Review Board

The Company Nuclear Review Board (CNRB) fulfills the offsite review committee functions of TS 6.5.1.2. The Board included both Toledo Edison (TED) and outside expert consultant members who appeared to provide a good span of experience and expertise. The Board appeared well organized with detailed procedures in place.

The Board employed a full time Coordinator and a clerk/secretary to support administration. Major committee workloads were divided among three fully chartered and proceduralized subcommittees: 1) Audit/QA/Security (AQS), 2) Operations, Maintenance, and Training (OMT), and 3) Safety Evaluation Review (SER) Subcommittees. The subcommittees appeared pro-active and participated extensively with plant and corporate staff to complete their review and audit functions.

Minutes, action item tracking systems, and action item responses for the subcommittees and full board were reviewed. Portions of a regular CNRB meeting were observed by the inspector on October 8. Satisfaction of the TS audit requirements were met by CNRB participation in QA audits. The audit program was reviewed in conjunction with inspection team members' evaluation of the QA Department functions and was found acceptable.

The Board's activity level appeared reasonable and responsive to the TS requirements. The major functions of the three subcommittees and plant responses to Board and subcommittee initiatives were reviewed and, with one exception, found acceptable.

That exception involved the Engineering Division response to SER Subcommittee review findings and is discussed in Section 3.4.7 below.

3.4.6 Independent Safety Evaluation Group

ISEG roles were particularly well defined except for specific minor observations on its implementing procedures as discussed below.

The group was staffed by six engineers or physical science specialists including a supervisor and director. The ISEG charter included the overview of engineering functions such as 10 CFR 50.59 safety evaluations, calculations, modifications, and engineering problem resolution.

The incumbent ISEG Director was also the Director of Nuclear Engineering and in that latter role reported to the Engineering General Director. In the ISEG Director role, he reported to the Vice President Nuclear. This presented the potential for organizational conflict of interest in situations which require ISEG critical review of Nuclear Engineering or other engineering functions under the cognizance of the Engineering General Director. Examples of reviews involving a potential conflict of interest included ISE 86-018 and 87-022 which document deficient review of IE Information Notices and the latter of which was a finding against the Nuclear Engineering Division. However, interview results indicated that the incumbent's professionalism and integrity were major positive factors in maintaining both the group's independence and effectiveness. A similar conclusion was reached during a prior independent review by the resident inspectors. However, any organization changes which might perturb the current structure and personnel may have deleterious effect.

Review of ISEG implementation activities indicated that the group was pro-active while maintaining a position of good credibility and receptiveness with the plant staff. Numerous ISEG reports reviewed as part of the inspection displayed an unusually good sensitivity to rigorous safety engineering and regulatory considerations. The ISEG management and staff appeared to have and apply extensive engineering and regulatory knowledge that resulted in comprehensive reviews which were well accepted by the line departments.

ISEG's procedures and functional role were very well developed. Good engineering discipline was observed in the group's processes. The processes were sophisticated and commensurate with the complexity of the subject evaluated. This approach is considered a strength.

For example, extensive reviews of MSIV problems during 1986-87 included consideration of the full spectrum of design basis and regulatory requirement issues and identified dozens of salient findings on which the licensee is currently acting.

Reception of findings on a technical basis and referral of new problems or review items by the facility staff appeared to reflect good professional respect for the group's actions. This and the pro-active interaction with operational activities is also considered a strength.

However, ISEG management may be overly optimistic regarding their perception of the facility staff's ability to carry out the results of their work. Interviews indicated that although well accepted, the facility staff's workload was already significant and ISEG's outputs were frequently met with passive reception and required additional ISEG interaction to achieve plant action as further discussed below.

The integrity and success of ISEG processes relied heavily on individual efforts and involvement of the current ISEG Director and Supervisor. Although very well developed otherwise, ISEG procedures did not include specific guidance or requirements for:

- Methods for selection of ISEG review/agenda items, i.e. screening criteria which provided mandatory thresholds for review item selection, deferral, and deletion.

- Specific plant activities, internal and external correspondence, to be screened for potential review items.

- Documentation of the selection process for items selected to ensure completion or management approved deletion from action lists.

- Periodic review of agenda and establishment of review priorities.

- Pre-review organization of work plans or task outlines to ensure proper breadth and depth of review and accountability for important considerations.

Current department management was effective and appeared to provide very energetic management of long term and day-to-day activities. This practice resulted in accomplishment of the items listed above even though these activities were not prescribed by the program. Informal methods such as personally maintained working notes and extensive staff - supervisor interaction were used to control the activities.

The ISEG Director advised on October 1 that TED would review current practices regarding documents and correspondence received by ISEG to ensure that no major sources of potential review items are omitted. No action is planned for the other aspects described above.

ISEG and divisional procedures did not specify mandatory responses or implementation for ISEG findings and recommendations. ISEG procedures dictated that safety evaluation and review findings be issued to the cognizant department management and variously indicated that the recipients should provide a response which reports disposition. Current practice frequently resulted in no such response with the ISEG personnel periodically determining status of other departments' response actions and documenting the status via memo issued by the ISEG supervisor.

Inspector review of the 1986-1987 ISEG reports and the "Independent Safety Engineering Recommendation Tracking System" status report found that:

- Although most ISEG recommendations did not elicit a formal response, nearly all were actually addressed (as confirmed by ISEG itself).

- Significant ISEG findings appeared to result in ISEG issuance of a PCAQ or specific Vice President endorsement. This was done at the discretion of ISEG management and was reserved for issues which management believed contentious.

- Fifty of 104 items from 1986 and 40 of 54 from 1987 remained open at the time of this inspection. ISEG knew the informal status of most items and most were in an acceptable status. The majority of recommendation items found open were either: a) administrative in nature (recommendations for further reviews, additional program controls, etc.), or; b) pending future actions (such as outage modifications).

- Several open recommendations involved recurrent items (ineffective IE Notice review and results implementation) and actions needed to prevent recurrence of ISEG findings (administrative controls improvements necessary to properly control voiding of Facility Change Requests).

- Upward fluctuations in ISEG workload directly impacted the group's ability to personally verify or encourage plant actions as currently was done. Several 1986 open recommendations fell in this category.

Perpetuation of the above practices requires a diversion of limited ISEG resources which seems disproportionate when comparing staffing levels of ISEG with those of the responding organizations.

Similar to the related finding regarding control of the ISEG review agenda and priorities, the success of the program currently resides with the vigor of current department management. The ISEG Director and Supervisor indicated that the current procedural basis for handling of ISEG recommendations was based upon their philosophy of

"earning" the plant staff's respect for their findings by competent output rather than through procedural enforcement.

A change in corporate priorities, departmental resources or personnel, or plant attitudes regarding ISEG effectiveness could significantly impact the current effectiveness.

The current "aged" open recommendations require additional management attention to ensure adequate disposition.

3.4.7 Safety Review Functions

Safety review functions were conducted in several forms by each of the engineering and committee organizations. This inspection concentrated on the performance of 10 CFR 50.59 evaluations, root cause determinations, and management overview activities.

An apparent strength was the comprehensiveness of the various programs which were applicable across organizational lines. The programs were well defined and provided a layered approach which resulted in several levels of independent review including: 1) peer and supervisory review, 2) CNRB SER Subcommittee review, or 3) ISEG overview activities.

Procedure NEP-012, "Safety Review and Evaluation," Revision 1, established the general 10 CFR 50.59 safety review requirements for the entire engineering staff. The procedure was particularly comprehensive and included specific review elements required for consideration required detailed bases for reviewer findings, provided for peer and management review, and appeared to be adaptable to all expected applications.

NEP-012 additionally included the invocation of specific NUREG 0800, Standard Review Plan and 10 CFR 50, Appendix A, General Design Criteria, review elements for selected subjects. Application of NUREG 0800 was noteworthy in that it resulted in an ordered consideration of contemporary safety and licensing considerations.

Root cause evaluations done as a result of equipment failures, operational errors, or PCAQs, had been previously identified by NRC as being inadequate due to lack of depth and thoroughness and in some cases a remedial cause was used as the root cause. No procedure or formal structure exists for the conduct of the evaluations.

The licensee has not specified a particular analysis technique (Kepner - Tregoe or MORT) but has recently provided general training in the approach and methods of analysis. Licensee management advised that they believed the training was preferable to a structured program. Training materials and records were reviewed by the inspector. The inspector noted that the training had been provided to 329 staff members through September 30, 1987.

Root cause evaluations and ISEG review packages were reviewed and were found to vary substantially in form but appeared sufficiently comprehensive. The data sampled was developed since administration of the training above.

The inspector noted that, although the recent analyses were acceptable, the potential existed for future quality problems. The non-proceduralized approach selected by the licensee requires good supervisory control and recurrent refresher training to ensure that quality is maintained.

As indicated above, the CNRB SER Subcommittee provides a TS mandated review of all 10 CFR 50.59 Safety Evaluations (SEs). The subcommittee reviews a large volume of the SEs and tracks the status using detailed comment sheets and a computerized tracking system. As of October 5, 1987, about 120 SEs dating to early 1986 (involving primarily Facility Change Requests (FCRs)) were listed on the SER Subcommittee Review Log computer run as requiring response from the cognizant department. These included some changes which were already implemented.

The licensee categorized these open SEs as either Category 2 (requiring additional information to permit determination that no unreviewed safety question exists) or Category 3 (acceptable with comment or amplification required). Of the 120 SEs above, approximately 10 were characterized as valid Category 2 items by the subcommittee chairman. The chairman further indicated that although they were valid Category 2 items, he believed that no actual unreviewed safety question existed based on his review (i.e. documentation problems, some FCRs voided or cancelled).

About 44 other items listed as Category 2 were considered to have negligible potential for latent unreviewed safety questions based on their content or actual implementation status. The remaining 66 items were Category 3 and involved only documentation issues.

On October 3, prior to the inspector's observations above, the subcommittee chairman had taken action to notify the Engineering General Director of the above status and to solicit action. The matter had also been added to the full CNRB agenda for the October 8, 1987 meeting.

Further, on October 6, the CNRB Coordinator was advised by Engineering Division management that additional effort would be placed on closing the subcommittee comments and that the "target" for closure of all aged items would be "about 2 weeks".

The lack of prior engineering attention to the backlog of SE review comments is considered a weakness.

3.5 Quality Programs

3.5.1 QA/QC Oversight of Safety-Related Activities

During this inspection, the team reviewed and assessed the oversight of safety-related activities by the licensee's Quality Assurance organization, including the conduct and reporting of audits and surveillances, the qualifications of auditors and inspectors, and the trending of and follow up on audit and surveillance findings. Review of the corrective action programs used to rectify identified deficiencies is discussed in Section 3.5.2 below.

The review of the QA/QC audit and surveillance activities covered the selection and scheduling of areas and specific activities for the audits and surveillances, the preparation for the activities, the reporting of results, and the follow up on responses and corrective actions.

A CNRB Subcommittee for Audits/QA/Security was involved in reviewing and affecting the development of the yearly audit schedule and the quarterly updates, and in reviewing all audit reports and findings. The inspector noted specific examples of subcommittee involvement, including its placing a highly-qualified consultant from another plant on a major Plant Operations audit scheduled to begin on December 1, 1987. The inspector's review of previous and planned audits found that, prior to mid-1986 the use of technically knowledgeable outside consultants was infrequent, but that in the past year such enhancement of audit team capabilities has been relatively frequent. Impetus for this improvement appears to come from both QA and the CNRB subcommittee.

Development of the audit schedule was based on three sets of documented requirements, in addition to special requests by management: 1) the CNRB audit requirements contained in Section 6.5 of the Technical Specifications; 2) the functional areas covered by the Nuclear Quality Assurance Manual (NQAM); and 3) the functional areas covered by the ASME Quality Assurance Manual (AQAM).

The inspector reviewed the most recent audit and surveillance schedules, discussed the schedules and their development with QA management, and compared the schedules with the requirements of the Technical Specifications, the Nuclear Quality Assurance Manual (NQAM), and the ASME Quality Assurance Manual (AQAM). The schedules reviewed included the Internal 1987 Audit Summary, Revision 2; the 1987 Annual Audit Schedule (Internal), Revision 2; the 1987 Annual Surveillance Schedule, Revision 2; the First Quarterly Surveillance Schedule 1987, Revision 1; the Second Quarterly Surveillance Schedule 1987, Revision 1; and the Third Quarterly Surveillance Schedule 1987, Revision 0. Correlation between the Technical Specification, NQAM, and AQAM requirements and the previous and planned audits was excellent.

The licensee initiated two major audits during this inspection, one on Fitness for Duty and one on Technical Specifications. The inspector attended the Fitness for Duty pre-audit meeting and reviewed the

plans for both audits. The detailed planning effort normally begins two to three weeks prior to an audit, and includes compilation of checklists based on previous audits and surveillances and on INPO, NRC and internal findings and concerns. The inspector's review of the checklists for the Fitness for Duty and Technical Specifications audits, as well as for other recent audits selected at random, determined that the checklists included adequate consideration of previous findings, and also required verification of follow up on those findings.

The inspector also reviewed the Audit Action Tracking Log and the surveillance log; these two documents contain the complete listing of past audits and surveillances. From the logs the inspector selected a representative sample of four audit reports and four surveillance reports for in-depth review. The inspector verified, through review of the audit and surveillance reports and through discussions with applicable QA personnel, that the selected audits and surveillances covered appropriate areas, were sufficiently technical in nature, and resulted in meaningful findings which were adequately reported.

With regard to the evaluation of audit and surveillance findings by the licensee, the inspector reviewed and discussed with QA management the Quarterly Trend Report - Second Quarter 1987, QAD-87-20182, dated September 23, 1987. The report identified major deficiencies, root causes, times in the processing cycle, and responsible organizations. Areas trended in the report included licensee event reports (LERs), INPO findings, NRC findings, Potential Conditions Adverse to Quality (PCAQs), Audit Finding Reports (AFRs), and Supplier Deviation Reports (SDRs). The inspector found the trending analysis to be comprehensive, usable by management, and distributed with recommendations to the appropriate areas and levels of management within the organization.

The inspector selected and reviewed a sample of approximately 40 PCAQs covering the latter half of 1986 and the first half of 1987, to determine whether appropriate corrective actions were specified, and whether they were carried out and verified. The review identified a significant change in responses to the findings, and in final close-outs, during the period reviewed. It was apparent that QA had become more aggressive in identifying findings and in following up on corrective actions during the one-year period of the review.

The review of the above areas by the inspector resulted in the conclusion that the selection of audit and surveillance areas, the preparation and staffing of audit and surveillance teams, the identification of findings, the technical quality of the findings, and the follow up on significant findings have all improved significantly at Davis-Besse during the past year. At present, the auditing and surveillance of safety-related activities by Quality Assurance is considered to be a licensee strength.

As part of an inspection of the technical qualifications of audit and surveillance personnel, the NRC inspector selected 5 of 11 auditors and 5 of 21 QC inspectors, reviewed their documented qualifications, and interviewed two of the personnel. The inspector

also discussed with QA management the use of outside consultants and specialists from other site departments. No discrepancies or weaknesses were identified in the qualifications of the selected audit and surveillance personnel.

With regard to QA overview and verification of the qualifications and training of maintenance personnel, the inspector reviewed the job descriptions for 18 categories of maintenance personnel, from the Assistant Plant Manager for Maintenance to Maintenance Engineers. The inspector then discussed maintenance qualifications with the QA personnel responsible for audits and surveillances in this area, and reviewed applicable audit and surveillance reports.

Craft training activities have undergone routine surveillances by QA, and the training program was audited on an infrequent but regular basis. Basic skill training was provided by the union locals, and plant nuclear training was provided by Toledo Edison at the site. The inspector determined that QA auditing of the qualification and training of maintenance personnel was thorough, and included verification that required documentation of experience and education had been provided, that maintenance skill training was accomplished through approved apprenticeship programs or specialized training courses, that training in the QA area was provided as part of General Employee Training, that continuing training was provided through scheduled training sessions, that specialized training was provided for maintenance activities outside of the normal training scope, and that training was performed to make maintenance personnel aware of changes in maintenance procedures, equipment or requirements.

3.5.2 Corrective Action Programs

Corrective action programs were inspected to determine whether Davis-Besse has developed comprehensive and effective means to identify, track and correct problems. To this end, Davis-Besse policy and procedures were reviewed to evaluate the implementation of the necessary broad management controls for the tracking and resolution of problems identified by: operational events; NRC inspections; Quality Assurance audits; employee concerns; internal inspections and special reports, and; concerns raised by outside organizations.

Corrective action programs inspected were: Radiological Awareness Reporting (RAR); Quality Assurance Audits; Quality Assurance Surveillances; Licensing Commitment Tracking System (LCTS); Supervisory Backshift Tours Program; Plant Cleanliness Inspections; Director's Tour Inspections, and; the PCAQ system. During the inspection, applicable procedures and records were reviewed, and supervisory and administrative personnel associated with each program were interviewed. All of these programs have either been newly created, or significantly revised, within the past two years.

The RAR program "provides the methods for the identification, evaluation, and correction of Radiological Deficiencies, reporting and addressing any areas of Radiological Concern, and improving the overall Radiological Controls performance through the submittal of Radiological Suggestions." This program has recently been instituted

and thus is still in the process of becoming firmly established. By procedure, anyone at Davis-Besse may submit an RAR, but up until the time of the inspection, only a few of the approximately seventy RARs written were produced by non-health physics personnel.

The Quality Assurance Audits program consisted of a series of scheduled audits covering areas such as Fire Protection, Emergency Planning, Corrective Actions, Technical Manuals, Plant Operations, Operations Training, and others. The audits were performed by teams made up of QA staff, members of Davis-Besse site and Toledo Edison corporate staffs, and experts from various outside organizations. Audit deficiencies were documented as AFRs, which were serialized and assigned to the appropriate organization for correction within three weeks of the date of assignment. All AFRs were discussed at least once at the Vice President-Nuclear's bi-weekly staff meeting. AFRs not resolved within ninety days of issue were elevated to upper level management attention by being placed on the agenda of every Vice President-Nuclear bi-weekly staff meeting until corrective action was complete.

The Quality Assurance Surveillance program provided for the observation of on-going activities in the plant. Surveillances were assigned to QA staff by a quarterly schedule. Surveillance inspectors prepared inspection guides from master checklists of inspection items; these inspection guides were approved by supervisory QA personnel prior to use. Surveillance findings were documented either as PCAQs or as "observations." PCAQs were tracked per site procedure NG-QA-702. The observations were delivered to the cognizant organization for correction, with no further follow-up by the QA organization.

The LCTS identified and tracked through final resolution all issues relating to licensing. Commitments were identified from various sources, including NRC correspondence, regulatory agency correspondence, and others. Once a commitment was identified, responsibility for fulfilling it was assigned to the appropriate site organization. Weekly and monthly reports were produced to keep high-level management informed of commitment status. The LCTS appeared to be effective in ensuring licensing commitments are answered.

The Supervisory Backshift Tours program was coordinated by the General Superintendent, Outage and Program Management Planning, to ensure that frequent backshift tours were conducted by mid-level plant management. The primary objective of these tours, which occured between two and four times a week, was to inspect for operator alertness and to verify that scheduled maintenance was in progress. Inspection reports were routed to the Plant Manager, who then assigned corrective action on any noted deficiencies to the cognizant department.

The Plant Cleanliness Inspections Program existed to "assure that the Station facilities and equipment are maintained at an acceptable state of material readiness at all times." This program had been implemented by the Plant Manager and was coordinated by the Assistant Plant Manager for Maintenance. Deficiencies noted during inspections

resulted in the preparation of Service Requests or Maintenance Work Requests. The overall success of this program was demonstrated to the NRC inspection team by the generally high level of plant cleanliness.

The Director's Tour Inspections program has been implemented by the Vice President-Nuclear to ensure that Davis-Besse upper management frequently tour the plant. Findings were reported to the Vice President-Nuclear, who then forwarded noted deficiencies to the responsible directors for action.

The procedures associated with the corrective action programs appeared to be written to ensure that effective means were established to identify, track and correct problems. The implementation of the procedures had generally been successful, particularly in the area of problem identification. There was much ongoing effort to establish and improve computerized data bases to manage the large numbers of problems identified.

Problem correction appeared to be adequately handled at Davis-Besse. However, some problems appeared to recur, either due to inadequate root cause analysis and correction, or from poor implementation of planned corrective actions. For example, during a March 1987 audit of Plant Operations (AR-87-PLOPS-01), AFR AR-87-PLOPS-01-02 identified that, "in a random check of about fifty Operational Information Tags [OITs] listed OPEN in the Tagging Log, five tags were found missing." Section 6.3 of AD 1803.2, "Operational Information Tags," was revised in response to this AFR to require monthly review of each OIT log entry and a quarterly audit of actual tag placement and OIT log entries by Operations management. Review of the OIT log on October 1, 1987, found that numerous tags issued since May 1987, had been subject to neither review nor audit. The last audit documented in the log was November 22, 1986. Discussions with the Operations Superintendent confirmed that the responsibility for the reviews and audits was his and that, due to temporary assignment of his duties to others while he was in license training, the required actions had not been accomplished.

The station has recognized root cause analysis as a weak area, and most personnel have recently been trained in that subject; record review indicated an improving trend in this area. Most supervisors interviewed were strongly supportive of increased use of root cause analysis to improve the effectiveness of their corrective action programs.

Generally, there appeared to be insufficient follow-up to, or re-audit of, completed corrective actions. The QA Audit Program was the only program found to formally institute follow-up re-audit of previously corrected audit findings. Five of the nine AFRs resulting from the October 1987 Corrective Action audit were recurring deficiencies.

Overall, each corrective action system reviewed was found to be effective in tracking identified potential problems to specific resolution.

4.0 Exit Meeting

The inspection team leader conducted an exit meeting with licensee management on October 9, 1987, to provide a summary of issues identified during the inspection. The licensee's representatives at the exit meetings are identified in Attachment A. Mr. J. G. Partlow, Director, Division of Reactor Inspection and Safeguards, Office of Nuclear Reactor Regulation, represented NRC management at the meeting. The scope of the inspection was discussed, the observations were presented for each area inspected, and team members responded to questions from the licensee representatives.

Glossary

AFR	Audit Finding Report
CNRB	Company Nuclear Review Board
DBMMS	Davis-Besse Maintenance Management System
FCR	Field Change Request
I&C	Instrumentation and Controls
INPO	Institute of Nuclear Power Operations
ISEG	Independent Safety Engineering Group
ISI	Inservice Inspection
IST	Inservice Testing
LCTS	Licensing Commitment Tracking System
MSIV	Main Steam Isolation Valve
MWO	Maintenance Work Order
NRC	U. S. Nuclear Regulatory Commission
OIT	Operational Information Tag
OSTI	Operational Safety Team Inspection (NRC)
PCAQ	Potential Condition Adverse to Quality
QA	quality assurance
QC	quality control
RAR	Radiological Awareness Report
SER	Safety Evaluation Report
SRB	Station Review Board
TED	Toledo Edison
TS	technical specifications
WR	work request

ATTACHMENT A - PERSONS CONTACTED

Licensee Contacts

C.E. Ackerman	ISEG Nuclear Safety Evaluator
S.J. Aparicio	Associate Engineer, Nuclear
R.H. Bechtel	Reactor Operator
D.L. Bondy	Reactor Operator
* N.L. Bonner	Assistant Plant Manager Maintenance
R.J. Bonwell	Station Corrective Action Coordinator
J.M. Branum	Compliance Coordinator
D.W. Briden	C&HP General Supt, SRB Chairman
R.D. Butler	Instrument and Controls Superintendent
J. Byrne	Quality Verification Auditor
R.W. Clark	Equipment Operator
J.B. Cleveland	Equipment Operator
R.B. Coad	Senior Nuclear Engineer
C.T. Daft	Technical Planning Superintendent
S.W. Delicate	CNRB Coordinator
D.L. Erickson	Radiological Superintendent
J.E. Fawcett	Reactor Operator
* R.K. Flood	Assistant Plant Manager Operations
* G.A. Gibbs	Performance Engineering Director
* D.L. Haiman	Engineering General Manager
* P.C. Hildebrandt	Engineering General Director
G.L. Hillebrecht	Assistant Shift Supervisor
* G. Honma	Compliance Supervisor - Licensing
L.W. Isbell	Reactor Operator
* S.C. Jain	Nuclear Engineering & ISEG Director
W.S. Johnson	Primary Systems Manager
J.R. Kasper	Operations Superintendent
L.G. Keller	Assistant Shift Supervisor
M.L. Klein	Equipment Operator
W.G. Klippstein	Assistant Shift Supervisor
D.G. Kuhtenia	ISEG Assistant Engineer, Nuclear
M.A. Lalor	Licensing Engineer
T. L. Lehman	Shift Supervisor
M.J. Lewczynski	Nuclear Technologist
A.J. Lewis	Reactor Operator
L.M. McCloskey	Records Management
J.M. McKinstray	Operations Supervisor
J.L. Michaelis	Shift Supervisor
R.E. Mizik	Assistant Shift Supervisor
J.E. Moyers	Quality Verification Manager
T.J. Myers	Nuclear Licensing Director
V.J. Patton	Equipment Operator
* L. Phillips	Executive Vice President
S.F. Piccolo	Consultant, Performance Engineering

Licensee Contacts

*	L.O. Ramsett	Quality Assurance Director
	D.P. Ricci	Shift Supervisor
	R.R. Rinderman	Quality Verification Supervisor
*	E.M. Salowitz	General Superintendent Outage and Program Management
*	R.W. Schrauder	Manager Nuclear Licensing
*	D.C. Shelton	Vice President Nuclear
	P.D. Sigler	Engineering Training Coordinator
	D.M. Snyder	Shift Supervisor
	D.T. Staudt	Shift Supervisor
*	M.L. Stewart	Training Director
	K.A. Stiger	Reactor Operator
*	L.F. Storz	Plant Manager
	J.C. Sturdavant	Licensing Principal
	N.L. Wahl	Assistant Shift Supervisor
	R.T. Wallman	Assistant Shift Supervisor
	H.C. Whitcomb, III	Preventive Maintenance Program Manager
	J.E. Willard	Technical Specifications Surveillance Specialist
*	R.G. Wingerter	Member, Board of Directors
*	J.K. Wood	Systems Engineering Director
	G.L. Wylie	Equipment Operator
	L.R. Young	Fire Protection Engineer
*	A.K. Zarkesh	ISEG Supervisor
	S.M. Zunk	Ombudsman

NRC

*	J.G. Partlow	Director, Division of Reactor Inspection and Safeguards
*	N.J. Chrissotimos	Deputy Director, Division of Reactor Safety, R III
*	R.W. DeFayette	Section Chief, R III
*	P.M. Byron	SRI, Davis-Besse
*	A.W. DeAgazio	Project Manager, NRR
*	Team Members	

* Attended exit meeting on October 9, 1987

ATTACHMENT B - PROCEDURES AND DOCUMENTS REVIEWED

Number	Title	Rev.
NG-AV-0112	Correspondence Control Program	1
NG-DS-0200	On-Call Management Duty	0
NMP-DS-0206	Request for Assistance	0
NG-DS-0221	Radiological Awareness Reporting	0
NG-NT-0600	Indoctrination, Training and Qualification of Nuclear Group Personnel	0
NG-QA-0702	Potential Condition Adverse to Quality	2
NE	Nuclear Engineering - Organization Staff and Duties	0
NEP-012	Safety Review and Evaluations	1
NEP-074	Predictive Maintenance	1
NEP-090	Design Verification	0
NEP-180	Processing Requests for Assistnance	0
NES-060	Indoctrination & Development of Engineering Personnel	1
NES-100	Design Interface Control	0
NEI-326.1	Lubrication Analysis and Monitoring	0
NL-LC-0004	Commitment Tracking	1
QADP-18.1	Quality Assurance Audits System	2
QADP-18.2	Quality Assurance Surveillances	0
AD-1803.2	Operational Information Tags	1
AD-1835.00	Plant Cleanliness Inspection Program	7
AD-1840	Transient Assessment Program	1
AD-1840.1	Determination of Allowable Operating Transient Cycles	9
VP-IE-00001	ISEG Organization	0
VP-IE-00006	Safety Evaluation Effectiveness Review	0
VP-IE-00008	Review of Nuclear Safety Related Documents, Systems, Processes or Activities	0
VP-IE-00011	Document Sampling for ISE Reviews/Probes	0
CNRB-101	CNRB Administration	3
CNRB-102	CNRB Review	3
CNRB-121	CNRB Audit/QA/Security Subcomittee	2
CNRB-131	CNRB Operations, Maintenance & Training Subcommittee	2
CNRB-151	CNRB Safety Evaluation Review Subcommittee	2
SRB Charter	Davis Besse Station Review Board Charter	12
DSS-87-00902	Engineering 60 Day Look Ahead	7/22/87
DSS-87-01505	Engineering Planning Update Report	9/22/87
NES-8720148	Electrical Control Systems Monthly Report	8/20/87
ISE-86002	ISEG Technical Evaluation of IEB 85-01 on AFW Steam BInding	--
ISE-86007	Voiding of Backlogged FCRs	--
ISE-86018	Effectiveness of IE Notice Reviews	--
ISE-86028	Alignment of "Swing" SW & CCW Pumps for Appendix R Scenarios	--
ISE-86027	Implementation of GL 83-28, Item 2.2.2 Control of Vendor Interface Information	--

ISE-86026	Independent Review of ASME Valve Testing Program	--
ISE-87002	AFPT Overspeed Trips	--
ISE-87003	Possible CCW Pump Room Low Temperature Condition	--
ISE-87008	DHS Valve Pit Internal Leakage	--
ISE-87015	MFP Vibration	--
ISE-87016	Reactor Coolant System Leakage	--
ISE-87018	Effectiveness of Abnormal Procedure Update Process	--
ISE-87021	Independent Assessment of Ops Shift Personnel Alertness	--
--	Engineering Training Program Summary	9/30/87
--	Engineering Division Training Schedule	10/8/87
--	Thermography Program Description	--
--	Systems Engineering Major Responsibility Area Descriptions	4/10/87
--	CNRB Minutes, 1987	--
--	CNRB SER Subcommittee Minutes, 12/86-8/87	--
--	CNRB SER Subcommitee Review Log	9/16 & 10/8/87
--	CNRB Operations, Maintenance & Training Subcommittee Minutes 1986-87	--
--	CNRB Agenda - 10/8/87 Meeting	--
--	NNI System Engineer Inspection Items	9/87
--	ICS System Engineer Monthly Summary Report	9/87
--	Lighting & Communications System Monthly Summary Report	9/87
--	DC Electrical System Engineer Monthly Summary Report	9/87
--	Engineering Evaluation - Turbine Bypass Valve Failure	9/14/87
--	Engineering Evaluation - CRD Stator Motor Fuse Failures	--
--	Engineering Evaluation - Reactor Coolant Pump 2-2 Bearing Failure (PCAQR 86-0454)	10/7/86
--	ISEG Staff Training Records, through 9/87	--
--	Systems Enginering Staff Training Records, through 9/87	--
--	Performance Engineering Staff Training Records, through 9/87	--

ISE-86026	Independent Review of ASME Valve Testing Program	--
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ISE-87003	Possible CCW Pump Room Low Temperature Condition	--
ISE-87008	DHS Valve Pit Internal Leakage	--
ISE-87015	MFP Vibration	--
ISE-87016	Reactor Coolant System Leakage	--
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