ENCLOSURE 1

U.S. NUCLEAR REGULATORY COMMISSION

REGION I

SYSTEMATIC ASSESSMENT OF LICENSEE PERFORMANCE

INSPECTION REPORT NUMBER 50-423/87-99

MILLSTONE NUCLEAR STATION, UNIT 3

ASSESSMENT PERIOD: March 1, 1987 to May 31, 1988

BOARD MEETING DATE: July 12, 1988

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I. INTRODUCTION

I.A. Purpose and Overview

The Systematic Assessment of Licensee Performance (SALP) is an integrated NRC staff effort to collect observations and data and evaluate licensee performance. SALPs supplement the regulatory process through use of a collection of objective facts, findings and evaluations to generate a subjective evaluation of performance. They are intended to be diagnostic enough for allocating NRC resources and meaningful enough to guide licensee management on ways to promote quality and safety of operation.

This report assesses Millstone Nuclear Power Station Unit 3 safety performance from March 1, 1987 through May 31, 1988. The summary findings and totals reflect a 15-month assessment of operating and outage activities.

The SALP Board, composed of the NRC staff members listed below, met on July 12, 1988 to review performance observations and assess licensee performance in accordance with the guidance in NRC Manual Chapter 0516, "Systematic Assessment of Licensee Performance." A summary of the evaluation criteria is provided in Section II of this report.

I.B. SALP Board Meeting Attendees

I.B.1. Board Members

W. F. Kane, Director, Division of Reactor Projects (DRP), Chairman
S. Ebneter, Director, Division of Radiation Safety and Safeguards (DRSS)
W. Johnston, Acting Director, Division of Reactor Safety (DRS)
P. W. Eselgroth, Chief, PWR Operator Licensing Section, DRS
L. H. Bettenhausen, Chief, Projects Branch No. 1, DRP
E. C. McCabe, Chief, Reactor Projects Section No. 1B, DRP
J. Stolz, Director, Project Directorate PD I-4, Office of Nuclear Reactor Regulation (NRR)
D. Jaffe, Licensing Project Manager, Project Directorate PD I-4, NRR
W. Raymond, Millstone Site Senior Resident Inspector, DRP

I.B.2. Other Attendees

G. S. Barber, Resident Inspector
*W. Thomas, Radiation Specialist, DRSS
*M. Shanbaky, Section Chief, DRSS
*J. Kottan, Inspector, DRS
*W. Lazarus, Chief, Emergency Planning Section, DRSS
*C. Conklin, Inspector, Emergency Planning Section, DRSS
*R. Bailey, Physical Security Inspector, DRSS

*Part-time attendee.

II. CRITERIA

Licensee performance is assessed in selected functional areas significant to nuclear safety and/or the environment. The following criteria were used as appropriate to assess each functional area.

1. Management involvement and control in assuring quality.
2. Approach to resolution of technical issues from a safety standpoint.
3. Responsiveness to NRC initiatives.
4. Enforcement history.
5. Reporting and analysis of reportable events.
6. Staffing (including management).
7. Training effectiveness and qualification.

Based upon the SALP Board assessment, each functional area was classified into one of three performance categories. Those categories are:

Category 1. Reduced NRC attention may be appropriate. Licensee management attention and involvement are aggressive and oriented toward nuclear safety; licensee resources are ample and effectively used so that a high level of performance with respect to operational safety is being achieved.

Category 2. NRC attention should be maintained at normal levels. Licensee management attention and involvement are evident and concerned with nuclear safety; licensee resources are adequate and reasonably effective such that satisfactory performance with respect to operational safety is being achieved.

Category 3. Both NRC and licensee attention should be increased. Licensee management attention or involvement is acceptable and considers nuclear safety, but weaknesses are evident; licensee resources appear strained or not effectively used such that minimally satisfactory performance with respect to operational safety is being achieved.

The SALP Board also considered categorizing performance trends over the SALP assessment period. A trend was assigned only if a definite trend of performance was discernible and the SALP Board believed that its continuation might result in a change of performance level. The SALP trend categories are:

Improving: Licensee performance was determined to be improving near the close of the assessment period.

Declining: Licensee performance was determined to be declining near the close of the assessment period.

III. SUMMARY OF RESULTS

III.A. Overall Summary

During the previous SALP, the licensee staff was assessed as strong, with visibly involved managers. Strengths were observed in problem identification and response, and in locating root causes. There was diligent attention to performance at all levels. Performance improved as the period progressed.

Licensee performance continued to improve during the current SALP period. Strong operations programs, procedures, and management controls were evident. Command and control was very good. Activities were carefully planned and conducted, with outages being a noteworthy example. Managers were actively involved in decision making and activity direction at appropriate levels. Operating supervisors and plant personnel were knowledgeable and alert. Strong corrective action was evident when errors or malfunctions occurred.

The organization was staffed with capable and knowledgeable managers and supervisors. Workers attended to detail and demonstrated a safety conscious attitude. Procedures and programs were effectively implemented and focused on safe operations. Morale and attitudes were good. High standards were set and followed. Consistently high performance was strived for and achieved. A high regard for plant and personnel safety was strongly evident.

The previous SALP noted a need to decrease scrams (reactor trips) due to steam generator (SG) level transients. Replacement of the SG level measurement condensate pots with high pressure pipe tees improved steam generator level stability. That enhancement and improved operator handling of feedwater transients reduced the number of scrams: there were 11 scrams during this 15-month SALP period (0.7/month) and 16 scrams during the previous 18-month SALP period (0.9/month). Of the 11 scrams this period, two were due to inadequate control of feedwater, a significant improvement over the 10 such scrams during the last SALP period. While the scram reduction efforts have resulted in improvements, there needs to be continued emphasis on this program in the next SALP period.

The last SALP noted an improving, but still high, number of illuminated control room annunciators during operation. Licensee reassessment resulted in delaying their commitment to achieve a "black board" from the end of the first refueling outage to the end of the third refueling outage. That is generally appropriate, but some radiation alarm annunciators deserve increased attention. Currently, these alarms tend to desensitize operators to additional alarms on the same window.

Overall, this SALP reflects careful and safe performance during the first full operating cycle. There is, however, an ongoing licensee need to reduce avoidable scrams and unnecessary illuminated control room annunciators. The licensee also needs to prioritize changes to operating and surveillance procedures and assure that sufficient staffing is provided to accomplish those changes effectively.

III.B. Background

III.B.1. Licensee Activities

The licensee completed the first operating cycle and began the second during this SALP period. Millstone 3 operated at 70.3% capacity from the beginning of commercial operation on April 23, 1986 until the SALP period ended on May 31, 1988.

There were two unplanned, more than 48 hour outages and two planned outages (one for surveillance, one for refueling) during the period. The 5-day and 14-day unplanned outages (June 5, 1987 and April 13, 1988) followed scrams and were extended for maintenance. A planned outage in March 1987 was for snubber testing. The refueling outage began on October 30, 1987 and was scheduled to last 59 days. An additional 45 days was taken to repair loose reactor coolant pump (RCP) locking cups after seven were found on the lower core plate. There were about 2700 activities scheduled during the outage including refueling, resistance temperature detector (RTD) bypass manifold elimination, snubber reduction, steam generator sludge lancing, containment local leak rate testing, motor-operated valve testing, and safety system train-related maintenance.

III.B.2. Inspection Activities

Four NRC resident inspectors were assigned to the site during the SALP period. The senior resident inspector divided his time among all three units; a resident inspector was assigned to Unit 3. Both of these individuals were first assigned to the site during the SALP period. The NRC inspections represent 2425 inspection hours (1940 hours per year), distributed as shown in Table 1.

III.C. Facility Performance Analysis Summary

Functional Area (11 Areas)	Last Period (9/1/85 - 2/28/87)	This period (3/1/87 - 5/31/88)	Recent Trend (Past 3 Months)
A. Plant Operations	2	2	--
B. Radiological Controls	2	1	--
C. Maintenance	1	1	--
D. Surveillance	2	2	--
E. Emergency Preparedness	1	1	--
F. Security and Safeguards	1	2	Improving
G. Outage Management	1	1	--
H. Engineering Support	2	2	--
I. Licensing Activities	1	1	--
J. Training Effectiveness	2	1	--
K. Assurance of Quality	1	1	--

IV. PERFORMANCE ANALYSIS

IV.A. Plant Operations (1021 Hours, 42%)

IV.A.1. Analysis

The plant received its low power and full power license during the previous assessment period. It was rated in Plant Operations as Category 2, improving. Concerns included scram frequency, Power Operated Relief Valve (PORV) reliability and unnecessary illuminated annunciator reduction. Scram frequency is still high but has been reduced somewhat: 11 scrams (8.8/year) this assessment period versus 16 scrams last period (10.7/year). Three scrams in 1987 resulted from inadequate control of steam generator (SG) water level during startup or at power. In 1988, one scram has been attributed to inadequate SG level control. This reduction was in part due to operator experience in handling feedwater transients and in part due to replacement of the SG level measurement condensing pots with high pressure pipe tees to eliminate steam generator level oscillations previously experienced between 55% and 65% power. Although the scram frequency is being reduced, continued management emphasis is needed to ensure future reductions are realized.

PORV reliability showed marked improvement due to licensee programs that effectively dealt with seat leakage problems. The solution to this difficult problem involved installing flexible valve discs in the PORVs.

Reduction of illuminated annunciators has continued, but delays in the annunciator reduction program have been caused by the need for significant design changes. The original commitment to establish a "black board" by the end of the first refueling outage was revised to achieving a "black board" by the end of the third refueling outage. This change is generally acceptable. However, problem annunciators deserve increased licensee attention. For example, spiking on radiation monitors causes alarms to be received, acknowledged, and reset from about 10 to 50 times per hour, hazarding operator desensitization to that particular annunciator. In one instance this led to a high radiation condition not being discovered by the licensee. Continued management attention is needed to ensure sufficient priority to and timely resolution of this problem.

Overall, operating shift functioning was smooth and professional. Activities were conducted carefully and with sufficient formality. The operators themselves remained strong proponents of control room formality. Operator attitudes were positive and a concern for safety was evident. Attentive behavior was routinely observed in operator performance during day and backshift inspections. Distractions such as extraneous reading material were not permitted or observed in the control room. Shift turnovers were observed to be consistently thorough and effective. Briefings for tests and infrequent evolutions were detailed, and involved free exchanges of questions and answers. Written procedures were routinely followed. Shift logs and records were discrepancy-free during frequent review.

There were 11 scrams during the assessment period. Four were due to equipment failure and three were due to personnel error. (See Table 4A for a listing of causes.) Two of the equipment-related scrams were due to faulty Skinner solenoid

valves. Due to high temperatures and currents, these valves have been open circuiting and causing their respective feedwater isolation (FWI) valves to close. These valves were replaced in kind prior during the first refueling outage; low wattage valves for replacing these valves are due to arrive on site November 1988. The majority of personnel error-related trips were due to feedwater control problems. Differences between plant and simulator response exacerbated these problems but increased operator experience has reduced the frequency of such trips. Overall, the scram frequency and its reduction indicate satisfactory performance.

Operator response to scrams was excellent. Performance following the September 23, 1987 scram was an example. Operators performed immediate actions from memory without error and checked emergency operating procedures to verify their actions. They constantly referenced the procedures while performing follow-up actions.

Operator technical knowledge was good, based on their consistently exhibiting detailed and thorough knowledge of the equipment, its status, and associated requirements. New operating license candidate knowledge was satisfactory. During the NRC license examinations given this SALP period, 8 of 13 candidates passed, with no significant weaknesses noted. (Further details are provided in Section IV.J, Training Effectiveness.)

Licensee management support of training and operator proficiency has been evident. The licensee conducted training on a modern plant-specific simulator with a dedicated training staff of about 20 individuals. Several experienced operators have been promoted into the training staff. There was a six-shift rotation during power operation, with full-time training for one shift being a regular part of that rotation. Station management involvement in training was evident in their knowledgeable discussions with NRC personnel and in their obvious interaction with the training staff and attendance at simulator training. Most department heads maintained senior reactor operator (SRO) licenses and attended requalification training. Their dedication to training and to the understanding of system operations and interrelationships was especially evident in Plant Operation Review Committee (PORC) meetings.

PORC performance was very good. Meeting inputs were well prepared and showed a clear understanding of issues. The approach to problem resolution was technically sound, very thorough, and routinely conservative. Root causes of problems were actively pursued. During meetings and in NRC discussions with higher level managers, there was a licensee willingness to deal with difficult issues and an atmosphere of healthy self-criticism. (Further details are provided in Section IV.K, Assurance of Quality.)

Management attention to operations was evident in plant superintendent control room tours and detailed weekly plant material walkdowns by Health Physics and Operations supervisory personnel.

A significant operating event occurred on January 19, 1988 when a low temperature overpressure (LTOP) transient was caused by pulling a fuse in a Solid State Protection System (SSPS) cabinet. That resulted in closure of a residual heat removal (RHR) suction valve, isolating the on-line relief valve. Unavailability of re-

quired LTOP cold overpressure protection systems (COPS) made the pressure transient possible. Prompt operator action with the plant in a water solid condition held the resulting pressure transient to less than 600 psi. Licensee post-event analysis showed that plant pressure could have exceeded 2500 psia before damage would have occurred. If pressure had risen near that level, the power-operated relief valves (PORVs) were operable at their high pressure setpoint to mitigate the transient. Control of operations-related activities that led to this event was deficient in that the procedure for ensuring operability of the COPS did not adequately address operability of supporting equipment. Further, there was no positive indication in the control room when the COPS was armed. In addition, the I&C technician who pulled the fuse that resulted in the RHR relief valve isolation was not adequately trained in the associated complex circuitry interrelationships. Also, the activity was performed without a procedure and without adequate formal review. This event resulted in escalated enforcement action. (Further details on procedural aspects are contained in Section IV.D, Surveillance.)

Three other instances of deficient operational controls were identified. The first involved entering Mode 3 (hot shutdown) during heatup with one of two required charging pumps inoperable. The second involved entering Mode 3 with an auxiliary feed pump and a supplementary leak control and recovery system fan inoperable. Procedures were then changed to require a test run of safety-related pumps prior to entry into Mode 3 and to require danger-tagging safety-related pumps not specifically lined up for service. These procedure enhancements, along with improved attention to detail, have enhanced licensee performance as evidenced by an absence of problems during the most recent startup. The third situation involved the improper securing of a locking device on an AFW suction valve. A prompt reverification of other safety-related system valve lineups was conducted, with no other inadequacies identified. In these three matters, licensee response and corrective actions were prompt, appropriate and effective.

Personnel routinely followed procedures and operators and workers routinely recommended procedure improvements. Some changes were substantiative but most were minor. Procedure changes were implemented at a rate of 80-100 per month, reflecting a diligent effort to eliminate inadequacies. The licensee's expectation that the procedure change workload would be reduced was not, however, realized. PORC meetings occurred almost every other day to cope with the numerous changes. Operations administrative personnel were continually burdened with procedure changes. Staffing to cope with procedure changes was adequate but, because of the work load, the individuals involved were not available to work on surveillance-related administrative problems. (Further discussion of such problems is contained in Section IV.D, Surveillance, and Section IV.K, Assurance of Quality.) During this SALP period, the need to aggressively upgrade procedures continued, and a greater resource commitment to this function may be needed.

Housekeeping was evaluated as satisfactory in the last SALP. Significant improvements have since been seen. Epoxy painting of the Engineered Safety Features (ESF) building cubicles was recently completed and reduced the amount of decontamination necessary in these areas. Plant spaces were very clean and workers routinely cleaned their areas when finished with assigned tasks. One housekeeping concern that was identified and corrected was the securing of non-safety related conduit

covers which were removed in the upper levels of the ESF building. These had been left open for post-work inspection and remained open after the inspection was complete. Otherwise, housekeeping was very good.

Licensee Event Reports were routinely reviewed and generally found to be complete, accurate, timely and to contain adequate corrective actions. (Further details are provided in Section IV.J, Training Effectiveness.)

Licensee command and control of operations were strong overall. Managers were aware of operating status and details, and actively asserted themselves at the appropriate organizational level. Shift management was knowledgeable and exerted positive control over activities affecting operation. Three notable exceptions were a heatup with one of two charging pumps inoperable, the LTOP transient, and a failure to station an additional operator during startup to manually control SG water level (this resulted in a scram). Subsequent procedure enhancements were positive. Licensee review found a lack of potential for other similar events.

Overall, licensee management was strong. Corporate and unit goals and policies were detailed and well communicated, and administrative controls were effectively implemented. There was a strong safety-first orientation at all levels in the licensee's organization. Licensed operators were professional, knowledgeable, thorough, and confident, and their performance improved over time. Housekeeping was very good. Previous SALP concerns were effectively addressed with the exception of the masking of radiation alarms by existing backlit annunciators.

In summary, operating performance was satisfactory. To achieve a higher performance rating, the licensee needs to reduce scrams and events such as the LTOP transient and the mode changes without required equipment operable, to further improve procedures, and to aggressively continue to reduce unnecessary annunications.

IV.A.2. Conclusion

Category 2.

IV.A.3. Board Recommendations

Licensee:

-- Accelerate correction of radiation monitor spiking problem.

-- Identify and correct procedure problems based on safety significance. Evaluate operations support staffing levels established to cope with frequent procedure changes and with surveillance-related administrative problems.

NRC:

None.

IV.B. Radiological Controls (334 Hours, 14%)

IV.B.1. Analysis

The Radiological Controls Program during the previous SALP period was rated as Category 2 improving. Minor program weaknesses identified during the previous assessment period related to lack of attention to detail in the implementation of radiological control audits, chemistry/radiological effluents, and transportation programs. All program weaknesses identified during the previous assessment period were effectively addressed and corrected during this assessment period.

IV.B.1.1. Radiation Protection

An effective, well-defined, and adequately staffed organizational structure was in place to control Unit 3 Radiological work activities. Levels of supervisory and technical personnel were adequate to support radiological activities. Staffing and oversight of significant radiological operations, such as containment entries at power to perform repairs, were good. Radiological Protection (RP) management staff exhibited a strong "in-the-field" presence and were actively involved in the radiation protection program on a continuing basis. RP and Operations continue to regularly perform joint tours of the radiologically controlled areas to identify sources of exposure, contamination and potential radiological concerns. As a result, the licensee successfully minimized the spread of contamination.

The number and quality of radiological operations audits of routinely performed by the Quality Services Department with assistance from the Corporate Radiological Assessment Branch (RAB) was assessed as good. A past criticism of the audit program conducted by the RAB was that it tended to review station RP activities in total without providing an in-depth review of individual unit activities. This weakness was corrected by planning and performing separate audits of each unit under the direction of the Quality Services Department. Overall, during this assessment period, corporate management involvement in on-site activities was frequent and of high quality, with timely corrective action on audit findings.

Clear radiation protection procedures and policies were in place and effectively implemented. Radiation protection records are complete, well maintained and available for review. Procedure adherence was a strength.

Radiation protection personnel were trained and qualified in accordance with a well defined program, which was implemented with dedicated resources and applied to all staff. The licensee's integration of good training, qualification, and program oversight contributed to safe conduct of radiological operations.

The program for surveying, posting, and controlling radiological areas continued to be well implemented. An extensive and thorough radiation survey program to evaluate shielding effectiveness was performed by the licensee during Unit 3 startup. The results were used by the licensee to control radiological work activities and make adjustments to the radiation work permit system.

The ALARA program was effective with good management support, and represented an additional program strength. ALARA reviews for planned work, completed work, and continuous exposure evaluation of work in progress were good. A notable positive example of the licensee's ALARA program involved the Reactor Coolant Pump (RCP) Locking Cup Repair that extended the refueling outage for 6 weeks. The use of a spare RCP to plan work was viewed as a very useful mock-up that allowed workers to complete repairs while receiving 50% less than the projected exposure.

The licensee's ALARA person-rem exposure goal for 1987 (first refueling outage) was 444 person-rem. Although the goal compares favorably with the industry average for pressurized water reactors for 1987, it was not a particularly aggressive goal when considering that the plant recently completed their first operating cycle. Actual exposure accumulated during 1987 was 357 person-rem which was good when considering that the goal was not increased when repair work to the RCP locking cups became necessary.

Overall, occupational radiological safety was a notable licensee strength. This is attributed to a sound program, a capable staff, and supervisory excellence.

IV.B.1.2. Chemistry/Radiological Effluents

Gaseous and liquid radioactive effluent control programs were inspected midway through the SALP period. The chemistry group was responsible for program implementation. Clear corporate support for effective program implementation was evident. Management controls were evident in the procedures for controlling discharges and for scheduling surveillances. Radioactive effluent control instrumentation was maintained and calibrated in accordance with requirements. All effluent release records were complete and well maintained. The licensee was responsive to NRC initiatives in this area. Corporate audits of the program were comprehensive and technically sound. The licensee was responsive to a weakness in the radiological measurements QA/QC program area identified by the NRC during the previous SALP period.

Chemical measurement capability was evaluated against technical specification and other regulatory requirements. The licensee was adequately staffed and had state-of-the-art equipment for nonradiological chemistry. They were responsive to NRC suggestions for program improvements. Licensee performance on NRC-supplied chemistry standards was good, with 28 of 30 (93%) in agreement.

A review was made of the secondary water chemistry control program implemented during the February-December 1987 period. Sodium, chlorides, sulfates and silica were generally below the values that could be determined by the on line "state-of-the-art" equipment used for analysis.

Based on these data, the licensee was responsive to NRC and industry initiatives and maintained secondary water chemistry within EPRI (Electric Power and Research Institute) recommended guidelines. In the case of chlorides and sulfates, it appears that the quantities measured were approaching the lower limit of the equipment the licensee has available to perform the analysis.

IV.B.1.3. Transportation

The solid radwaste/transportation program was site administered for all three units at the Millstone site. During the previous Unit 3 SALP, this area was not evaluated because of low radwaste activity as a result of initial startup. Two transportation inspections were conducted during the assessment period. Following previous incidents which resulted in several violations and weaknesses in the last assessment period, the licensee restructured the organization responsible for packaging and shipping radioactive materials. The responsibilities and authorities of the Radioactive Material Handling Department (RMH) were defined adequately.

Documentation of shipments has been improved and all paperwork for a given shipment was kept as required during the SALP period. Job-related procedures and QA audit procedures have been revised and improved. The frequency, quality and scope of QA audit activities has also improved. The Radwaste Review Committee has been reactivated.

Following violations pertaining to radwaste transportation training during the last assessment period licensee modules were completely rewritten. All staff received required training. The training and qualification contributed a positive direction to the effectiveness of RMH group activities. Close management attention to planning and implementing the program was noted, with strong peer review of the technical aspects of preparation, packaging and shipping activities.

IV.B.1.4. Summary

An effective, well-organized and adequately staffed radiation protection organization was in place at Unit 3 to control radiological work activities. Corporate management involvement with on-site activities was frequent and provided an effective level of oversight and support.

The program for surveying, posting, and controlling radiological areas continued to be well implemented. The ALARA program was effective, with good management support. Overall, in-plant health physics was a notable licensee strength due to a sound program, a capable staff, and supervisory excellence.

SALP performance in solid radwaste/transportation during the current SALP period was substantially improved over the previous assessment period.

IV.B.2. Conclusion

Category 1.

IV.B.3. Board Recommendations

None.

IV.C. Maintenance (317 Hours, 13%)

IV.C.1. Analysis

The previous SALP rated maintenance as Category 1. During that SALP period, the maintenance program was found to be properly established, implemented and staffed. Plant equipment was highly reliable, with only one scram attributed to maintenance.

A long standing licensee-identified problem identified in the last SALP, power-operated relief valve (PORV) seat leakage, has been resolved. In March of 1987, the valves were disassembled, inspected and repaired. From plant startup on April 4, 1987 to May of 1988, the valves remained leak tight and their associated block valves did not have to be closed. Technical competence was evident in the implementation of bench testing of the PORVs and PORV solenoids. Further, the original requirement for the PORVs to be flanged so that repairs and testing could be more readily done indicated good decision making and good technical planning. The flexitallic discs now used have been essentially leak-free. PORV operability and reliability has been consistently high.

Improper feedwater isolation (FWI) valve packing adjustments caused a failure to isolate and an overfeeding during the last assessment period. Effective implementation of a partial stroke testing program has subsequently prevented recurrence of this type of event.

In the last SALP, three instances were noted where fire, control building, or Supplemental Leak Collection and Release System (SLCRS) barriers were breached by fluid hoses or scaffolding. There were also three occurrences during the current period where a fire barrier was breached or left open without a fire watch being established. LERs also identified the failure to establish required fire watches (see LER causal analysis). These events might have been avoided if the barriers were better labeled and identified. The licensee has since included a listing of all SLCRS barriers and fire doors in the governing work procedure, facilitating prior identification of these boundaries in Automated Work Orders (AWOs). In addition, the licensee committed to label all doors by December 1988. These actions were positive and reflected management attention to problems.

NRC Generic Letter 83-28 discussed actions to be taken regarding reactor trip circuit breaker reliability. Review of the two licensee procedures for reactor trip breaker maintenance showed that the licensee followed the recommendations of the Westinghouse Maintenance Program. Further, it was noted that licensee procedures were updated to reflect a problem with bracket cracking on DS-416 breakers (the type in use at MP3) and that bracket inspection was performed as part of the maintenance program. The [illegible] reliability/operability issues have been resolved. This indicated good management and engineering personnel responsiveness to NRC and vendor guidance, and appropriate addressing of applicable industry problems.

Other maintenance activities [illegible] the assessment period included repairs to leaking Main Steam [illegible]s), trouble-shooting of an emergency diesel-generator (EDG), [illegible] reserve station transformers, and repairs to steam generator [illegible]. The maintenance manager and maintenance

engineers were actively involved in the oversight and supervision of these maintenance activities. Also, I&C personnel were knowledgeable in their area of expertise and were well informed of site requirements.

Administrative control of maintenance was cited in the last SALP as a problem area. Lack of licensee control was observed in the commencement of work without approved AWOs. Performance in this specific area improved during the current period. Work was consistently approved prior to performance and was signed off on completion. Maintenance and modification activities during normal plant operations were controlled and performed within the bounds of Technical Specification Limiting Conditions for Operation. This was evident in the routine daily performance of 6-8 preventive maintenance activities. Maintenance activities were well thought out and planned. Workers generally performed repair and testing activities without error. During this SALP, control of maintenance and testing was generally very effective.

Review found the maintenance department fully staffed with well-trained, competent and dedicated mechanics, electricians and machinists of diverse backgrounds. Maintenance assistance available from the other three Northeast Utilities plants was frequently utilized. Observations and discussions found maintenance supervisors and managers knowledgeable, and active in oversight of activities.

Effective planning minimized outage and operational scheduling impacts. Coordination with other departments was excellent. Communication and cooperation between all departments, both at worker and management levels, was a key to timely and effective troubleshooting and corrective maintenance on numerous occasions. Notable positive examples of coordination and cooperation involved the Reactor Coolant Pump (RCP) Locking Cup Repair that extended the refueling outage for 6 weeks and the repair of defective primary sample valves during an unplanned shutdown. Licensee scheduling of activities during the RCP repair shortened the original downtime from an estimated 10 to 12 weeks to 6 weeks. The use of a spare RCP facilitated timely completion of the repair work.

Although the scheduling and coordination of previously unplanned work was a notable strength, the completion of routine activities was untimely in a few instances. One example was the repair of intake structure components. This was viewed as a direct contributor to the April 13, 1988 scram. The relatively large number of intake structure components out-of-service made the plant vulnerable to adverse weather conditions. Excessive seaweed impingement on the traveling water screens would normally have been cleaned off by the screenwash system. However, reduced system capabilities did not permit proper screen cleaning. Subsequently, increased licensee attention to such vulnerabilities was observed by the NRC. Continued licensee sensitivity to areas vulnerable during adverse circumstances is warranted.

The computerized Preventive Maintenance Management System (PMMS) continued to show benefits throughout the first operating cycle. PMMS was used in planning, controlling and documenting work. Its machinery history function was routinely used to trend equipment performance for establishing corrective actions. The system was an excellent tool for managing maintenance.

In summary, the licensee had an effective and well-managed maintenance program. Maintenance personnel were well trained, proficient in performing repairs, and familiar with procedural and regulatory requirements. Maintenance managers and maintenance engineers were actively involved in the oversight and supervision of maintenance. Completed work packages were well maintained. Controls were in place to ensure that post-maintenance testing was accomplished, where applicable, prior to declaring systems or components operable. In only one instance did a maintenance inadequacy lead to a reactor scram. Overall, Maintenance was a licensee strength.

IV.C.2. Conclusion

Category 1.

IV.C.3. Board Recommendations

None.

IV.D. Surveillance (136 Hours, 6%)

IV.D.1. Analysis

Surveillance was rated Category 2 during the previous SALP. Performance and understanding of surveillances was a strength, but weaknesses in procedures led to incorrect safety system setpoints and five unnecessary system challenges. One of these was the isolation of service water to a safety injection pump heat exchanger.

During the current period, surveillance procedures were found to be a detailed and solid base for a successful program. Changes were requested and drafted by persons working with surveillance tests, and were processed in accordance with the Technical Specifications. These actions reflected licensee determination to eliminate procedure inadequacies.

The surveillance program was managed conscientiously. Surveillance procedures were generally performed properly, with well-documented test results that met technical specification (TS) requirements. Surveillance procedures contained easy to follow instructions and included features for ensuring that out-of-tolerance conditions were reviewed and acknowledged by supervision. There were provisions for ensuring that results were trended and that recommendations were sent to management for action when required. Personnel were well-trained and sufficient in number. Technicians and operators conducting surveillances generally showed a very good understanding of both system and procedure requirements. The computerized Plant Maintenance Management System (PMMS) tracked TS requirements. Surveillances were generally performed when required. As the instances discussed below demonstrate, however, an administrative control problem was evident.

There were 19 surveillance-related Licensee Event Reports (LERs) during the period. Typical examples were a missed diesel generator fuel oil particulate sample and a late fire protection system surveillance. All 19 of these LERs were for licensee-identified conditions, and the next surveillance showed acceptable conditions in each case. Eleven of the 19 LERs documented seven missed, two late and two incomplete surveillances; 9 of the 19 attributed the root cause to personnel error. Although these 19 lapses represent a very small fraction of the surveillances (19 of thousands) and no out-of-tolerance conditions were missed as a result, increased licensee attention to program implementation is needed. This is a continuing problem.

During a shutdown (July/August 1986) before the SALP period, required visual inspection of snubbers mandated a second inspection of certain mechanical snubbers. For that inspection, performed in March of 1987, the licensee showed safety conservatism by inspecting all snubbers, not just the two types required. NRC review of the licensee's evaluation, which included test data and snubber disassembly and repair records, found the testing and evaluations sound and conservative.

The licensee's eddy current testing (ECT) program was effective. During Inservice Inspection (ISI) of the Unit 3 steam generators (SGs), the now standard method of controlling ECT from a remote location effectively reduced radiation exposures. Data analysis by two individuals who analyzed the same data increased the assurance

that no defects were missed. For differences in analysts' conclusions, a certified Level III contractor examiner was used to make the determination. The SG ISI results were excellent. The steam generators for Unit 3 are in the best inspection category allowed by Technical Specifications since less than 5% of the total tubes were degraded and no tubes were defective. The licensee attributed these excellent results to constant attention to steam generator chemistry control.

Eddy current testing was used by the licensee to detect incore thimble tube thinning. Fourteen tubes had greater than 20% through-wall wear, and seven had 30% to 50% through-wall wear. The worst case tube was capped and the other tubes were withdrawn slightly to take the worn area out of the high vibration region just above the core plate. Effective use of ECT allowed early detection of this problem. Further evaluation of this problem is to be conducted after ECT during the second refueling outage.

The use of In-Service-Tests (ISTs) to analyze equipment performance was a noteworthy strength. ISTs were well analyzed and professionally conducted, as was evident by the IST done to identify the cause of a control bank not moving as required during routine surveillance. This IST led to the replacement of a bad instrument card, correcting the problem with minimal impact on operation.

Contractors were used by the Instrument and Controls (I&C) department to perform some surveillance work and were trained to the same level as licensee technicians. Contractor technician work was good with one notable exception. A contractor I&C technician pulled a fuse in a solid-state protection system (SSPS) cabinet in which he was not trained. (This is further discussed in Area IV.J, Training Effectiveness.) The resulting loss of low temperature overpressure protection (LTOP) systems and the overpressure transient, though mitigated by operator action, demonstrated a need for more stringent control of surveillances and work activities. In this case, the surveillance procedure also was inadequate because it did not specify the proper steps for disabling the low temperature interlock (P-12) to the steam dump system. After this transient, the licensee committed to restrict maintenance and surveillance of complex systems such as the SSPS to specifically qualified technicians. The licensee also emphasized the need for better oversight and a more formal review of work activities by qualified peers and first line supervisors. Corrective actions were positive and focused on providing better control of surveillances and work activities.

In summary, the surveillance program is sound overall, but administrative problems have continued to detract from overall performance. Improved technician performance and better control of work on complex systems is needed. Excellence was noted in the performance of the great majority of surveillances, but the continuing problems indicate that past corrective actions have not been effective enough.

IV.D.2. Conclusion

Category 2.

IV.D.3. Board Recommendations

Licensee:

-- Reduce the number of inaccurate, late and missed surveillances.

-- Schedule a meeting with the NRC early in 1989 to discuss effectiveness of surveillance program corrective actions.

NRC:

-- Perform a mid-SALP period assessment of adequacy of surveillance performance.

IV.E. Emergency Preparedness (24 Hours, 1%)

IV.E.1. Analysis

During the previous assessment period, licensee performance in this area was rated Category 1. That rating was based on observation of a full participation exercise which included the ingestion pathway results of a routine safety inspection, and on licensee support of offsite activities in response to a hurricane warning.

During the current assessment period, there was one routine safety inspection and observation of a full participation exercise for Millstone Unit 2. Emergency Preparedness is a site function and the Emergency Plan as well as Emergency Response Facilities are common to all three units. Qualified Emergency Response Organization personnel are drawn from any unit and respond to an incident at any Millstone unit.

Routine safety inspection indicated that the Emergency Plans and Emergency Plan Implementing Procedures were current, and were reviewed and approved per procedures. Emergency Response Facilities were maintained ready, as evidenced by satisfactory checks of communications systems, instrumentation being functional and calibrated, and plans and procedures being current. An Emergency Preparedness Training Manual has been developed, reviewed, approved, and placed in use. That Manual states Emergency Preparedness Training policy, lists Emergency Response Organization positions and associated qualifications, required training for each position, and set the requalification period. The procedures for accident classification have been revised and incorporate human factors engineering principles. A review of these indicate they meet 10 CFR 50.47(b)(10) requirements, and that accident classification is based on plant status in keeping with NRC guidance. A review of audit procedures intended to meet the requirements of 10 CFR 50.54(t) indicated some minor improvements were needed: auditors needed an improved knowledge of Emergency Preparedness requirements and procedures; procedures or guidelines for preparing audit checklists needed to be developed; and documentation was needed to demonstrate compliance with the requirement to make available to State and local governments the results of licensee-government interfaces, and an offer needed to be made to review Emergency Action Levels with offsite authorities.

The annual exercise was observed on October 7-9, 1987 with one minor weakness noted. Accidents were classified promptly and correctly, offsite notifications were made within the required time, Protective Action Recommendations were developed, the Offsite Based Information System was available and functioned satisfactorily, projected doses and dose commitments were performed frequently and differences between corporate and site were quickly resolved, operation of the Post-Accident Sampling System was demonstrated with very knowledgeable personnel, and response team actions showed the results of effective training.

The licensee has developed and maintains a sound Emergency Preparedness Program as evidenced by very good exercise performance, well maintained Emergency Response Facilities and a satisfactory working relation with offsite authorities.

IV.E.2. Conclusion

Category 1.

IV.E.3. Board Recommendations

None.

IV.F. Security and Safeguards (63 Hours, 3%)

IV.F.1. Analysis

During the previous SALP, Millstone 3 performance was Category 1. That rating was largely influenced by the timely completion of the Unit 3 security systems and equipment and integration of those with the existing systems and equipment for Units 1 and 2, while still maintaining an effective security program. During this assessment period, routine inspections by the Resident Inspectors continued throughout the period. Two routine and two special unannounced physical security inspections were performed at the Millstone Nuclear Station (Units 1, 2, and 3) by region-based inspectors. Region-based security inspections were performed for the integrated site (Units 1, 2, and 3) and it is not practicable to separate the units for assessment purposes. The same comments and assessments that were mentioned in the Units 1 and 2 SALP (SALP Report 50-245/86-99 and 50-336/86-99) were repeated here if the inspections were current to this SALP period. The added comments reflect changes occurring during the past six months.

Corporate security management involvement in site security program matters was apparent early in the period. There were visits to the site by the corporate staff to provide assistance, program audits, and direct support in the budgeting and planning processes affecting program modifications and upgrades. Corporate security management personnel were actively involved in the Region I Nuclear Security Association and other industry groups engaged in nuclear plant security matters. This demonstrated program support from upper level corporate management. However, an apparent reduction in the oversight and audit function occurred as a result of the loss of two key corporate personnel during the period, as discussed in the following.

During the previous assessment period, the licensee was heavily involved in integrating the Millstone Unit 3 security program into the existing programs for Units 1 and 2. This was accomplished with minimum impact on the overall security program. The licensee decided that, with the integration of the program, modifications to and restructuring of the proprietary and contract organizations would be necessary to accommodate the increased workload. While that decision was made in late 1985, the licensee did not start acting upon the decision until late 1987. Several proprietary supervisory positions to which the licensee had committed were filled on a rotating basis without ensuring that the incumbents understood their duties and responsibilities, and without properly monitoring these individuals' performance. Therefore, the majority of the identified increased workload remained the responsibility of one person on site. As a result, effective oversight, interface and communications between the licensee and the contractor organization began to degrade. Concurrently, it appears that a complacency with program implementation and an insensitivity to NRC requirements began to occur. These conditions were identified during an NRC inspection in August, 1987. That inspection resulted in the assessment of a civil penalty on the integrated security program. While the individual violations were of low significance, they represented a significant lapse in management attention to, and control of, the security program at Millstone. Five violations were identified during physical security inspections and were aggregated under the November 1987 civil penalty. Several of these violations had

existed for an extended period and should have been obvious to knowledgeable and attentive licensee security personnel. Additionally, several of the violations were attributed to the licensee's oversight of the contractor's security force and to the training and attentiveness of the security force. To increase the effectiveness of their oversight of the contract guard force activities, the licensee filled all vacant positions during the last half of the Unit 3 SALP period. Several more positions were created and filled as well. Members of the security force, as well as licensee line supervision, patrol the site frequently and should be alert for deficiencies.

The annual audit of the security program by the licensee's quality assurance group appeared to be comprehensive in scope and depth. However, the number of violations identified by the NRC, several of which had existed for a lengthy period of time, called into question the effectiveness of those audits relative to NRC security objectives. Late in this assessment period, the licensee strengthened the corporate security staff and began performing comprehensive audits as they had during prior assessment periods. In addition, the licensee submitted a security plan amendment clarifying the audit functions of the NUSCO Quality Services Group with regard to the annual audit of the security program to increase their effectiveness.

In March of 1988, region-based inspectors conducted a comprehensive security program review and determined that all previous unresolved items and violations had been adequately addressed and corrective actions taken were effective to prevent recurrence. Further, no additional violations of NRC-approved security plans were observed. The licensee took strong, positive action to not only provide adequate follow-up on past issues, but initiated several significant actions to enhance the effectiveness of the security program.

This turn-around in direction and hands-on participation by senior management resulted in a total security system upgrade, new administrative offices and classroom facilities for the security force contractor, additional patrol vehicles and the establishment of a security review committee to review changes to security plans, procedures, and other security related records. These actions required large capital expenditures and demonstrated the licensee's desire to have a high quality and effective security program.

Further, the licensee mobilized the resources of all essential plant operations in preparation for a forthcoming NRC Regulatory Effectiveness Review (RER). As of the most recent security inspection, the licensee had completed about 60% of the voluntary upgrades identified by this effort. This further demonstrated the licensee's desire for an effective security organization and their responsiveness to NRC concerns and initiatives.

At the end of the assessment period, the security union's bargaining unit personnel went on strike. Union members of the contract security force walked offsite after being properly relieved by a pre-trained strike contingency security force. An NRC follow-up inspection found that the picketing by contractor security personnel was orderly and peaceful. All required security posts were manned, the required

response force was available, and all necessary compensatory measures were in place. The walkout preplanning demonstrated that the licensee had the capability to manage a major event that could have a significant impact on the quality and effectiveness of facility security.

Review of the licensee's security event reports and reporting procedures found them consistent with the NRC's regulation (10 CFR 73.71) and implemented by personnel knowledgeable of the reporting requirements. The reports were clear and contained sufficient information for NRC assessment. Licensee actions following each of the events were prompt and appropriate. Twenty-five reports were received during the assessment period. Ten of these were attributed to security force personnel errors which indicated a need for improved training. The remaining events were not causally linked.

Staffing of the contractor's security force appeared adequate. The training and requalification program was sound and well-developed, but because of the problems identified during this assessment period, it needs to be reviewed for fundamental weaknesses along with the manner in which it is being implemented.

During the assessment period, the licensee submitted four revisions to the Millstone Nuclear Power Station Security Plan and two revisions to the Guard Training and Qualification Plan under the provisions of 10 CFR 50.54(p). The plan changes were of good quality and indicated knowledge and understanding of NRC security program objectives.

The licensee's security program, when properly implemented, is sound as evidenced by the licensee's past performance record. During the first half of this assessment period, ineffective control of the integrated security program was evident in the multiple violations of the approved security program. During the last half of this assessment period, the licensee actively pursued a program to correct all deficiencies, fill all vacancies, increase oversight of the contract guard force, and increase the effectiveness and scope of the audit program. Follow-up NRC review of licensee corrective actions found very good correction of problem aspects, plus several significant enhancements to increase the effectiveness of the security program. The licensee's physical security program is improving.

In summary, while substantive problems were identified earlier in the SALP period, later assessment of the corrective actions and effective planning and management of the security function during a strike indicated much better performance. Effective continuation of this trend could restore the performance rating to its previous high level.

IV.F.2. Conclusion

Category 2, Improving.

IV.F.3. Board Recommendations

None.

IV.G. Outage Management (272 Hours, 11%)

IV.G.1 Analysis

Outage management was evaluated as Category 1 in the last SALP. Strengths were noted in planning, scheduling, and overall conduct of outages. Minor weaknesses were noted in tagging and the control of maintenance, leading to Mode 3 being entered with a hot leg injection valve tagged shut.

As discussed in Area IV.A, Plant Operations, configuration control continued to be a problem during the current period. On two separate heatups, Mode 3 was entered without the required full complement of safety equipment.

There were two unplanned outages, and one planned and one refueling outage. The unplanned outages were short (less than 2 weeks) and resulted when recoveries from plant trips were delayed to perform maintenance. Management at the unit and department head level proved very capable at adapting to rapidly changed conditions to support these unplanned outages. Department heads quickly provided unplanned shutdown work lists and generated detailed hourly work breakdowns for major activities. Licensee management used unplanned shutdown time to accelerate work on committed repairs and modifications. Cooperation was strongly evident at all levels of management when scheduling and planning tasks and at the grass roots level when performing work. Unplanned outage duration was effectively limited in length by aggressively prioritizing and completing work.

The first refueling outage was also well planned. Outage meetings were held at frequent intervals in the year prior to the outage. Planned activities were sequenced in the licensee's sophisticated "living schedule" system. That system was used to generate a master outage schedule complete with bar charts, a sensitivity analysis for each task that might impact the critical path, and logical ties between tasks. The schedule received senior and supervisory management reviews and modifications prior to outage commencement. Twice daily during the refueling outage, an expanded time-base printout of the current three-day window, including all recent updates to the master schedule was provided to all supervisors during a status meeting. These meetings were characterized by accurate assessment of work in progress and resolution of conflicts. Tight controls over the schedule and plant conditions were maintained. Many potential problems were avoided by early addressal. During these meetings, NRC observers noted a strong spirit of cooperation and a very positive attitude toward nuclear safety and high quality performance.

Refueling outage planning was set back when foreign objects were discovered on the lower core plate on November 17, 1987. These were locking cups for hold-down bolts for the reactor coolant pump (RCP) internals. The need to remove and identify these objects required a complete core off-load. Subsequent work extended the refueling outage for six weeks. The licensee shortened the initial expected duration of 12 extra weeks to 6 by effective use of a "Living Schedule." Inspector observations found that the actual performance of work was timely and safety con-

scious. The use of an actual RCP as a mockup substantively improved work sequencing and timeliness. Licensee control of refueling outage activities was otherwise strong as well.

In summary, control of outage activities was a noted strength. The twice daily meetings and use of the "Living Schedule" allowed excellent control and management of outages.

IV.G.2. Conclusion

Category 1.

IV.G.3. Board Recommendations

None.

IV.H. Engineering Support (209 Hours, 9%)

IV.H.1. Analysis

Engineering Support was a new area for the last SALP and was rated as Category 2. This area encompasses technical and engineering support activities provided by onsite and offsite organizations to the line departments. It also incorporates line department activities that support operations, maintenance, surveillance and other technical organizations.

In the previous SALP, recommendations were made to the licensee to resolve issues requiring engineering attention. The cited issues were: steam generator (SG) feedwater flow oscillations; elimination of illuminated control board annunciators; power-operated relief valve (PORV) internal leakage problems; and main steam valve building heating and cooling problems. All of these issues were addressed by the licensee.

The SG feedwater flow oscillation (and SG level control) problem was ameliorated by a change to the SG condensate pot design implemented during the first refueling outage. Installation of a high pressure tee and straightening of the condensing line corrected the 10% level oscillation that had been observed between 55% and 65% power. Testing and operation confirmed that the design change corrected the oscillation problem. A significant reduction in scram frequency from feedwater oscillations has since been seen.

A total review of annunciators illuminated during power operation was completed in 1987. At the end of the Cycle 1 refueling outage, all but 18 of the identified annunciators had been permanently corrected. As discussed in Section IV.A, Plant Operations, completion of the annunciator reduction program has been delayed to the end of the third refueling outage. This delay is generally appropriate, but continued engineering support is needed to address problem annunciators (radiation monitor spiking) and to assure that the program is completed as expeditiously as practicable.

When maintenance was performed on leaking PORVs, technical competence was evident in the implementation of bench testing of the PORVs and the associated solenoid valves. In addition, the use of flanged joints on the PORVs was a coordinated decision involving management, engineering and maintenance and was an example of good decision making and technical planning.

The onsite and offsite engineering and technical support groups were very capable and staffed with experienced, knowledgeable personnel. They were dedicated to performing tasks correctly the first time. Examples of support activities to improve safety and reliability were conversion of the service water discharge valves from a lined material to corrosion resistant materials, redesign of the feed pump seal injection system to extend seal life, and shaving of the turning gear oil pump impeller to eliminate pressure transients caused by securing the pump.

Two other engineering support activities were noted as being beneficial to operation. These were the elimination of the reactor coolant system (RCS) resistance temperature detector (RTD) bypass manifolds and the substitution of a hypochlorite system for the existing gaseous chlorine system. The removal of the RTD bypass manifold will pay ALARA dividends in future outages. Its removal has reduced the outage radiation levels to 50% of the previous levels. The removal of the gaseous chlorine system, used as a biocide in the condenser circulating water system, has resulted in the last gaseous chlorine source being removed from Millstone Station. This has allowed the removal of the chlorine monitoring requirement for control room habitability. These modifications have enhanced Unit 3 operations.

Offsite corporate engineering support was evident but not always timely. Both plant engineering and corporate engineering dealt with the same engineering issues at various times. This organizational relationship sometimes created conflicts. The reliability of the Rosemount RCS flow transmitters was an example. Five failures of these transmitters occurred between March and October of 1987. Since only one failure occurred at a time, the trip functions of the flow instrumentation remained operable. After each failure the transmitters were replaced in kind. No subsequent failures have been experienced. Because of the frequency of these failures with the same root cause, the plant evaluated the failures as a potential substantial safety hazard reportable under 10 CFR Part 21 and forwarded their findings to corporate engineering in November 1987. Corporate engineering, after contacting the vendor, disagreed with plant engineering. Rosemount stated to corporate engineering that there was an error in the manufacturing process but it had already been corrected. Corporate engineering changed its position in March 1988 and the failures were then reported under 10 CFR 21. Independent NRC followup showed that this same failure mechanism was identified in prior transmitter failures at the J.A. FitzPatrick Nuclear Power Plant. Corporate engineering's late reporting of this problem unnecessarily delayed report dissemination to other Rosemount users.

Two scrams in the period were caused by the failure of normally energized Skinner solenoid valves for the feedwater system's containment isolation valves (CIVs). The licensee also determined that an earlier, out-of-period scram was due to this solenoid's malperformance. The original design uses high-wattage solenoids for these fail-shut CIVs. These solenoids have been shorting out with age. The licensee replaced the solenoids during the refueling outage and ordered new low-wattage solenoids with an expected delivery date in November 1988. Licensee efforts to correct this problem have been reasonable. However, procurement delays due to long lead times have hindered prompt correction.

In response to an allegation related to the seismic adequacy of the battery room masonry walls, NRC review found a violation and a deviation. Upon receipt of further information from the licensee, the NRC concluded that the apparent deviation was the result of an incorrect licensee assumption about the design requirements of the masonry walls and that this represented an isolated oversight. The battery room walls were built to the same standards as the control building. That was

found to be adequate after detailed staff review of the licensee's reanalysis. Although the walls were acceptable in the as-built condition, this event indicated a need for attention to detail when implementing standards.

In the area of Environmental Qualification (EQ), the one inspection performed during this assessment period identified multiple apparent violations. The licensee's efforts to support the EQ inspection were only marginally acceptable. At the time of the inspection, the licensee was attempting to strengthen their staff to upgrade the experience levels over that previously provided by contract personnel. Management involvement was evident in the response and participation of management personnel with significant EQ issues. NRC concerns raised over the electrical EQ of Litton-Veam connectors elicited concern and an immediate response from the licensee. Cognizant personnel were gathered to discuss and address the issue. Engineering personnel quickly provided an analysis and a viable operation justification statement. Management understanding, acknowledgement and concern for public safety was evident in the actions taken. (The enforcement considerations associated with this matter carry over into the next SALP period and will therefore be considered in the next SALP report.)

Overall, the engineering staff did a good job of supporting maintenance and surveillance. Engineering support contributed to good and technically sound decisions by plant management relative to maintenance and surveillance activities.

IV.H.2. Conclusion

Category 2.

IV.H.3. Board Recommendations

Licensee:

-- Improve knowledge level of personnel implementing the EQ program. Ensure high level management attention is given to resolving EQ issues.

NRC:

None.

IV.I. Licensing Activities (No hours assigned)

IV.I.1. Analysis

The previous SALP rated this area as Category 1 and recommended that the licensee assure the accuracy of submittals to the NRC.

During this SALP period seventeen (17) license amendments and eighteen (18) other licensing actions were completed. These thirty-five (35) licensing actions included the completion of licensee commitments, Cycle 2 reload, Resistance Temperature Detector (RTD) modification and Technical Specification improvements.

Licensee management has been aggressive in meeting commitments, promptly resolving issues, and improving the Technical Specifications. This attention resulted in submittals that were mostly accurate and complete. Frequent contacts, by meetings or telephone, with the NRC licensing staff resulted in the prompt resolution of issues and on satisfactory schedules for completion of licensing actions. Most licensing actions were completed without requiring review on an exigent or emergency basis. Prompt management attention was provided to resolve issues associated with providing overcurrent protective devices for containment electrical penetrations, three loop operation, ATWS consideration in the Cycle 2 reload analysis, and the improvement of licensee event reports.

The licensee submittals indicated a sound technical approach to resolving safety issues. They also indicated a good understanding of the safety issues, and provided technically sound proposals with reasonable justifications for resolution.

The licensee has been responsive to NRC initiatives. Priorities and schedules established for NRC initiatives were acceptable to both the staff and the licensee. The licensee responded in a positive and timely manner to provide information for the Safety Issues Management System (SIMS), for consideration of Anticipated Transients Without Scram (ATWS) in their Cycle 2 reload analysis, and for resolution of long standing issues associated with the Safety Parameter Display System (SPDS), the Nuclear Review Board Quorum, the vendor information program for certain safety related components, and the cleaning of feedwater venturis.

The quality of the licensee's submittals has improved; however, inaccuracies still existed in a few submittals: (1) in the May 20, 1987 letter on Class IE Containment Electrical Penetration Protection, the analysis did not satisfy the requirements of 10 CFR 50.59 or 10 CFR 50.109; (2) in the March 24, 1987 letter on Containment Systems Air Partial Pressure, the "no significant hazard" finding was not correct because the proposed change created the possibility of an unevaluated accident; and (3) the February 25, 1988 letter regarding Steam Generator Low-Low Level Reactor Trip Setpoint did not provide supporting analysis for the justification. In addition, the licensee subsequently informed the staff that certain errors were not considered in the analysis.

Notwithstanding the above noted instances, the licensee's licensing staff was well qualified and supported, as necessary, by a qualified technical staff. Requests for information were promptly responded to in conference calls, correspondence or

meetings as deemed appropriate. Responses were usually technically sound, had appropriate management review and approval and were submitted on or ahead of schedule.

In summary, licensee management was aggressive in providing prompt, accurate, complete and technically sound responses that were oriented toward nuclear safety. Licensing resources were ample and effectively used to achieve a high level of performance.

IV.I.2. Conclusion

Category 1.

IV.I.3. Board Recommendations

Licensee: Continue the effort to assure accurate submittals.

NRC: None.

IV.J. Training and Qualification Effectiveness (No hours assigned)

IV.J.1. Analysis

Training and Qualification Effectiveness, a new area in the last assessment period, is also an evaluation criterion for each functional area. This area is a synopsis of the assessments in the other areas. Training effectiveness has been measured primarily by the observed performance of licensee personnel and, to a lesser degree, through program review. During the last SALP, a Category 2 rating was assigned.

The plant specific simulator was a significant benefit in operator training and was used to train managers as well. The licensee developed an experienced training staff with over twenty instructors, three-quarters of whom maintained operating licenses. There was a strong supervisory organization to manage the training staff. Recent promotions of key in-house people within the training organization have helped the licensee to strengthen an already strong organization.

The INPO Accreditation Self-Evaluation Report for the four Northeast Utilities operator training programs was submitted by the licensee on November 1987. An INPO accreditation team visited in late January 1988 and Millstone 3 programs were accredited in April 1988. (The Technical Training Programs had previously received INPO accreditation in the areas of instrumentation, health physics, chemistry, mechanical and electrical maintenance, and technical staff and managers.) Thus, INPO accreditation is complete for Millstone 3 and the station as a whole. With this accreditation, Millstone 3 became a member of the National Academy for Training by virtue of the fact that they now have received accreditation for all ten of the INPO accreditable programs at their site. Completion of the total accreditation process for all three units reflected strongly on the licensee's dedication to training, especially since Millstone 3 was in the NTOL (near term operating license) phase until late 1985. Review of Millstone 3 programs did not occur until after full power license issuance because of other INPO accreditation commitments.

Thirteen candidates participated in the two NRC replacement examinations administered during the assessment period. Of these, five candidates failed the written and/or operating portion of the examination. This is an overall pass rate of 61% and a decline from the overall pass rate of 83% (43 of 57) achieved during the last SALP period. During the simulator portion of the examinations, the performance of crews was inconsistent. Some crews operated quite well together with good communications and the ability to diagnose problems, whereas other crews were sometimes weak in communications and problem diagnosis. Four of the five individual failures were based partly or solely on the operating portion of the examination. Although the number of operators examined was relatively small, this indicated that better screening of operators by the licensee may be needed prior to NRC exam administration.

Cooperation between the plant and the training staffs has led to effective development of programs to assist the operating staff in the preparation for complex tasks. One example was a training program specifically developed to address a positive moderator temperature coefficient (PMTC). This program was given to all operating

shifts and covered reactor start-up, low-power operation, and selected malfunctions on the simulator, permitting a successful startup after the first refueling with no operational problems associated with PMTC.

Maintenance and I&C technician training programs were in place during this assessment period. NRC observations of these programs found that they were effective. An inadequacy was noted in an I&C contractor technicians's training when he pulled a fuse in a SSPS panel, causing a loss of LTOP protection and an overpressure transient (see Area IV.D, Surveillance). The transient was partially attributable to the way the technician was trained to analyze system prints for the fuse pulling evaluation and partially attributable on the inadequate emphasis on the SSPS-COPS interrelationship during both operator and technician training. These programs now emphasize this interrelationship. Further refinement of the review of drawings before disabling equipment was established by the licensee. The licensee imposed restrictions to only allow specifically qualified technicians to work certain panels.

Licensee Event Report (LER) review found that, of 58 LERs, 28 were due to personnel error. Personnel errors fell into three categories: lack of attentiveness, lack of attention to detail, and inadequate training. The majority of events were caused by inattentiveness or lack of attention to detail. Examples were failing to restore cooling water lineup to the operable charging pump, failure to perform an engineering evaluation after replacement of a defective snubber, and failure to perform a required Diesel generator fuel sample. However, training in systems, procedures and integrated plant response was generally effective: there was no significant challenge to safety systems other than the overpressure event (analyzed in Section IV.A, Plant Operations)

It is apparent from the maintenance and surveillance activities observed during the assessment period that Millstone 3 personnel are well-trained and carry out their jobs in a professional manner. A particular instance of this was maintenance department identification of a problem while installing "handhole" covers on a steam generator. Even though the covers were installed per the procedure, the workers questioned the end result. Because of this, a procedure change was issued to install the covers via an alternate method. Their willingness to question the outcome of a job indicated good training of the workers.

In summary, licensee training was a notable strength. The licensee's commitment to training was evident in enhanced training staffing with a high percentage of experienced licensed operators and expenditure of considerable resources for training. Operators were assessed as excellent performers on shift. Also, a high level of operator and support personnel knowledge was consistently demonstrated. Training was generally effective in providing well qualified personnel who contributed positively to safe operation, but better licensee screening of operator candidates is needed to increase performance on NRC exams.

IV.J.2. Conclusion

Category 1.

IV.J.3. Board Recommendations

None.

IV.K. Assurance of Quality (No Hours Assigned)

IV.K.1. Analysis

Assurance of quality is addressed as a separate functional area even though it is an evaluation criteria in other functional areas. The licensee's quality assurance program is included, but this assessment primarily addresses the effectiveness of licensee management efforts to assure quality in day-to-day activities. Worker performance, attitudes, involvement by supervisors, and the adequacy and use of management and administrative controls were used as performance indicators.

During the previous SALP period, observations found Millstone 3 personnel to have a standard of completing assigned work correctly. This positive attitude was repeatedly displayed.

During the current SALP period, workers and supervisors showed pride in their workmanship and close attention to detail was typically demonstrated. Department Heads were very knowledgeable of the status of work. Plant personnel exhibited a good attitude towards QA and adherence to procedures. The individuals closest to the work (operators, technicians, mechanics, electricians, engineers, etc.) exhibited high personal performance standards and detailed knowledge of equipment and procedures. Worker morale was observed to be high. Additionally, it was clear that management has imbued the workers with a sensitivity for quality in the work place.

Workers performing maintenance and surveillance activities exhibited good work practices and brought concerns to the attention of their supervisors. For example, during the installation of steam generator "handhole" covers, mechanics performing the job questioned the installation of the covers even though all the procedural requirements were met. As a result, the covers were removed and reinstalled using an improved torquing sequence. This showed a concern for and attention to quality workmanship by the "front line" personnel doing the work.

QA/QC personnel were found knowledgeable of the tests they were monitoring, as observed during main steam safety valve testing. QC inspectors were found to be trained, qualified and certified to the level of their responsibilities. Site staffing levels were found adequate to support and normal operations, with headquarters and contractor personnel available as needed.

The licensee's QA/QC organizations performed effective surveillances and inspections and promptly identified problems to management for resolution. Discussions with QA/QC supervisors and QC inspectors and review of completed work packages indicated sufficient QA/QC involvement with site activities. Maintenance instructions were clear and appropriate QC sign-offs were included in the QC inspection plans for each job. In addition to routine inspection hold points, corporate engineering QA and plant engineering QA/QC groups performed audits, surveillances and activity observations. Concerns identified as a result of QA surveillances and QC inspections were resolved in a timely fashion. Management was kept apprised of appropriate findings and resolution of findings was effective.

First line supervisors provided close oversight of work activities. Maintenance, I&C, and Production Test supervisors were generally knowledgeable of the plant design and station administrative requirements. They were often observed to be providing technical guidance and oversight to workers at the work site. Further, Shift Supervisors demonstrated that they were generally knowledgeable of plant activities and that they were managing activities and shift personnel on an as-needed basis except in one instance regarding insufficient staffing for feedwater control during startup (see Area IV.A, Plant Operations).

Plant Operation Review Committee (PORC) performance was very good. Meeting inputs were well prepared and showed a clear understanding of issues. The approach to problem resolution was technically sound, very thorough, and routinely conservative. Root causes of problems were actively pursued. During meetings and in NRC discussions with higher level managers, there was a licensee willingness to deal with difficult issues and an atmosphere of healthy self-criticism. A conservative approach to safety was demonstrated by operating departments in the resolution of problems and routine activities. This was demonstrated in the Spring 1987 outage for snubber work and, more recently, in troubleshooting to investigate and correct the failure of a control bank to move. There was a high regard for meeting regulatory requirements and commitments. Site management was effective in establishing nuclear and personnel safety as well as efficiency as a prime operating goal.

During review of procedures for testing of the containment penetration overcurrent protection devices, the NRC noted that some procedures contained over three changes. Licensee procedures require that, after three changes, the changes be incorporated as a revision. This particular problem was previously identified by the licensee in a QA Surveillance Report. At the time of inspection, the licensee stated that the backlog of procedure revisions should be eliminated by June 1988. The licensee's method for updating procedures and the manpower associated with the task along with management attention and support of the update program may not be sufficient since, as of the SALP Board meeting, 74 procedures needed revision because they contained three or more changes. The licensee failed to meet their goal of zero backlog by the end of the second quarter of 1988.

NRC inspections observed that corporate management was routinely involved in plant activities. The licensee has successfully implemented a tracking system (controlled routing) to assign corrective actions to responsible individuals for meeting NRC and other commitments. The use of controlled routings as a tracking tool for meeting commitments was a notable strength.

Corporate management responsiveness was demonstrated by their addressal of NRC staff concerns with the environmental qualification (EQ) of Litton-Veam connectors. The ability of the connector's internal silicone rubber gasket to be leak-free over plant life was the focus of the issue. The questionable EQ of these connectors was attributed to licensee control of EQ during construction. During this SALP period, licensee review of the design attributes allowed the NRC staff to evaluate the connectors as posing no immediate hazard. Connector replacement is scheduled during the next refueling outage.

Another example of a sound licensee approach to problems involved their actions when foreign objects were discovered on the lower core plate on November 17, 1987. These objects were locking cups for hold-down bolts for the reactor coolant pump (RCP) internals. The decision to completely off-load the core to remove and identify these objects was a prime example of the licensee's safety conscious approach. Subsequent work extended the refueling outage for six weeks. The licensee cut the initial expected duration of 12 extra weeks in half by effective use of a "Living Schedule." Use of a spare RCP as a mockup substantively improved work sequencing and timeliness. Licensee control of other refueling activities was equally strong.

Additional licensee attention to the timeliness of 10 CFR 21 reports was needed. Oil leaks from the internal diaphragm of Rosemount transmitters was reported under 10 CFR Part 21 on March 24, 1988. Five transmitter failures between March and October 1987 were due the same root cause. Inability of the licensee's corporate engineering staff to obtain a complete historical record of the transmitters significantly contributed to the delay in initiating the Part 21 report. Prompt reporting of this issue would have allowed other Rosemount users to benefit from the licensee's experience (see Section IV.H., Engineering Support).

In summary, both licensee management and staff were committed to high quality in operations. There was effective implementation of the formal QA/QC function and solid support of operations and related activities. Management exhibited a conservative and safe approach to performing surveillances and exercised good judgement in decision making and technical planning of maintenance. A high level of concern and attention to quality work was strongly evident from the working level to station management. Programs were established to bring abnormal results to the attention of supervisors and management for resolution. Changes to procedures were underway to ensure that they were current with respect to industry information and NRC requirements. Increased licensee sensitivity to the timeliness of 10 CFR Part 21 Reports and the backlog of procedure changes were was the only noted problems.

IV.K.2. Conclusion

Category 1.

IV.K.3. Board Recommendations

Licensee: Resolve the procedure change backlog problem.

NRC: None.

V. SUPPORTING DATA AND SUMMARIES

V.A. Investigation and Allegation Review

-- Battery walls did not meet seismic design criteria. This allegation was substantiated. A violation and deviation were issued. The licensee's response justified their design as equivalent to that used for the control building. This was found acceptable by the NRC staff.

-- A foul smell was emanating from radioactive releases from the site. This allegation was unsubstantiated.

-- Widespread illegibility of certified material test reports (CMTRs) associated with Millstone 3 purchase orders. Two out of 450 CMTRs sampled were found illegible during NRC follow-up; this allegation was unsubstantiated.

V.B. Escalated Enforcement Actions

Civil Penalties

-- $25,000 - IR 87-22, Physical Security
-- $50,000 - IR 88-03, Low Temperature Overpressure Transient

V.C. Management Conferences

-- November 3, 1987 at the Region I Office: to discuss station security violations.

-- March 8, 1988 at the Region I Office: to discuss a Low Temperature Overpressure transient.

V.D. Licensee Event Reports

V.D.1. Tabular Licensing

Type of Events

A.	Personnel Error	28
B.	Design/Mfg/Construction/Install Error	8
C.	External Cause	0
D.	Defective Procedure	10
E.	Component Failure	13
X.	Other	0
	TOTAL	59

A tabulation of Licensee Event Reports (LERs) by functional area, and an LER synopsis, is attached as Table 3.

Licensee Event Reports Reviewed

LER Nos. 87-08 through 88-15

V.D.2. Causal Analysis

Millstone 3 LERs were reviewed to determine if causal links could be established. The LERs reviewed were 87-08 through and including 88-15. These LERs are inclusive of the SALP period (3/1/87 - 5/31/88). Some supplemental LERs were published by the licensee during the period as their investigation was completed and were reviewed as the sole source writeup on a given event since they provided the most up-to-date information. LERs were reviewed with the intent of establishing causal links, if appropriate, to events that were due to the malperformance of a procedure, an individual, a department, a program or other commonly related items. Where events were the result of isolated failure or deficiencies, no causal link was established.

LERs 87-21, 87-25, 87-37, 88-09 describe reactor trips that resulted from inadequate integrated control of SGWLC (Steam Generator Water Level Control), steam dump and rod control systems. SG level oscillations were compounding the control problem between 55% and 65% power due to faulty design of the level condensate pots (see LER 87-22). The frequency of these events is decreasing and the replacement of the condensate pots with high pressure tee fittings has eliminated the level oscillations at 55%-65% power.

LERs 87-12, 87-35, 87-39, 87-40, 87-42, 87-44, 87-45, 87-46, 87-50, 87-51, and 88-11 document the malperformance of required surveillances. Generally, the problems cited were administrative, with one notable exception being late or missed surveillances. Such a problem was identified in the last SALP as due to the tardy development of procedures to implement the Technical Specification surveillance program. The continually large number of problems in this area indicates a need for further management attention to surveillance.

LERs 87-29, 87-48, and 88-12 describe events where fire watches were not established as required when breaching a fire barrier or intentionally disabling suppression systems.

LERs 87-30 and 88-06 document events where mode changes were made inadvertently or without a full complement of safety equipment. The licensee's internal Plant Incident Reporting system has also documented mode changes without a full complement of safety equipment.

V.E. Licensing Activities

V.E.1. NRR/Licensee Meetings

3/27/87	Shutdown in advance of severe weather
6/2-3/87	Inservice testing program for pumps and valves
7/7/87	Interlocks for three loop operation
8/5/87	Safety Parameter Display System
9/1/87	Cycle 2 Reload and RTD Modifications
4/25/88	Safety Parameter Display System

V.E.2. NRR Site Visits

5/20-22/87	Orientation
10/13-16/87	Review 50.59 changes (1986)
4/11-15/88	Review 50.59 changes (1987)

V.E.3. Reliefs Granted

ASME Boiler and Pressure Vessel Code - Section XI and Applicable Addenda: 29 relief requests granted related to inservice testing of pumps and valves.

V.E.4. License Amendments Issued

AMENDMENT	SUBJECT	DATE
2	Engineered Safety Features Atmosphere Cleanup System	4/7/87
3	Engineered Safety Feature Response Time for Low Steamline Pressure	4/9/87
4	Diesel Generator 18-month Inspection Schedule	5/13/87
5	Containment Purge Supply and Exhaust Isolation Valves Leak Test Interval	6/15/87
6	Organization Change - Station Services	6/15/87
7	Reactor Coolant Loops Operating During Hot Shutdown	7/9/87
8	Reactor Trip Bypass Breakers	8/7/87

V.E.4 (CONTINUED)

AMENDMENT	SUBJECT	DATE
9	Control Building Inlet Ventilation Signals	8/21/87
10	Diesel Generator Startup Time	8/24/87
11	Main Turbine Control Valve Test Interval	9/30/87
12	Cycle 2 Reload	1/20/88
13	Instantaneous Trip Element Surveillance Tests	1/20/88
14	Chlorine Detection System	2/16/88
15	Nuclear Review Board Records	2/23/88
16	Snubber Sample Plans	4/7/88
17	Reactor Coolant System Leakage Systems	4/18/88
18	Reactor Coolant System Vent Area for Cold Overpressure Protection	5/19/88

TABLE 1: INSPECTION HOURS AND REPORTS

TABLE 1A: INSPECTION HOUR SUMMARY

AREA	HOURS	% OF TIME
PLANT OPERATIONS	1021	42.1
RADIOLOGICAL CONTROLS	334	13.8
MAINTENANCE	317	13.1
SURVEILLANCE	136	5.6
EMERGENCY PREP.	34	1.4
SEC/SAFEGUARDS	102	4.2
OUTAGE MANAGEMENT	272	11.2
ENGINEERING SUPPORT	209	8.6
TRAINING EFFECTIVENESS	*	0.0
ASSURANCE OF QUALITY	*	0.0
TOTALS:	2425	100.0

*The inspection hours for these composite assessments are incorporated in the other 8 functional areas listed in this table.

Note: The Licensing Activities functional area is not a direct inspection activity and no inspection time is accumulated in this area.

TABLE 1B: SYNOPSIS OF INSPECTION REPORTS

REPORT/ DATES	TYPE OF INSPECT.	HOURS	DESCRIPTION
87-05 2/18-3/16/87	RESIDENT	110	SHUTDOWN PLANNING, PLANT OPERATIONS, RADIATION PROTECTION, SECURITY, FIRE PROTECTION, SURVEILLANCE AND MAINTENANCE
87-06 3/9-13/87	SPECIALIST	2	SOLID RADWASTE CLASSIFICATION, HANDLING AND TRANSPORTATION, ENVIRONMENTAL MONITORING, AND RADIOCHEMISTRY QUALITY CONTROL
87-07 3/26/87	SPECIALIST	57	EXTERNAL AND INTERNAL EXPOSURE CONTROLS, FACILITIES AND INSTRUMENTATION, TRAINING AND OUTAGE ALARA
87-08 3/17-5/11/87	RESIDENT	121	SHUTDOWN PLANNING, PLANT OPERATION, RADIATION PROTECTION, SECURITY, FIRE PROTECTION, SURVEILLANCE AND MAINTENANCE
87-09 3/30-4/3/87	SPECIALIST	74	MAINTENANCE ORGANIZATION AND IMPLEMENTATION, TRANSFORMER PROGRAM, TRENDING

REPORT/ DATES	TYPE OF INSPECT.	HOURS	DESCRIPTION
87-10 5/4-8/87	SPECIALIST	36	SNUBBERS, PORVS, MSIVS, CONTROL ROOM PRESSURIZATION SYSTEMS, SURVEILLANCE DATA
87-11 5/18-20/87	SPECIALIST	9	WHOLE BODY COUNTING PROGRAM
87-12 5/12-7/10/87	RESIDENT	196	SHUTDOWN PLANNING, PLANT OPERATIONS, RADIATION PROTECTION, SECURITY, FIRE PROTECTION, SURVEILLANCE AND MAINTENANCE
87-13 6/29-7/2/87	SPECIALIST	1	EMERGENCY PREPAREDNESS
87-14 7/6-10/87	SPECIALIST	12	RADIATION PROTECTION, STATION AUDITS, AND HOT PARTICLE PROGRAM
87-15 6/8-25/87	SPECIALIST	61	SEISMIC ADEQUACY OF THE MASONRY WALLS AROUND BATTERY ROOMS
87-16 8/17-21/87	SPECIALIST	0	NRC EXAMINATION OF SIX SENIOR REACTOR OPERATOR CANDIDATES
87-17 7/11-9/21/87	RESIDENT	201	ACTIONS ON OPEN ITEMS, SECURITY, PLANT OPERATIONS, ALLEGATION RI 87-A-65 (CERTIFIED MATERIAL TEST REPORTS)
87-18 8/31-9/4/87	SPECIALIST	43	SECURITY AND SAFEGUARDS
87-19 9/14-17/87	SPECIALIST	17	OPEN ITEMS IN POST-ACCIDENT SAMPLING, MONITORING AND ANALYSIS.
87-20 10/7-9/87	SPECIALIST	33	EMERGENCY PREPAREDNESS AND OBSERVATION OF LICENSEE'S ANNUAL EMERGENCY EXERCISE
87-21 9/22-11/2/87	RESIDENT	133	PLANT OPERATIONS, SECURITY, LER REVIEW, COMMITTEE ACTIVITIES
87-22			(REPORT CANCELLED)
87-23 6/12/87	SPECIALIST	0	EXAMINATION REPORT

Table 1

REPORT/ DATES	TYPE OF INSPECT.	HOURS	DESCRIPTION
87-24 11/3-12/7/87	RESIDENT	179	OUTAGE ACTIVITIES: FOREIGN OBJECTS ON LOWER CORE PLATE, ABNORMAL RWST AND RCS SODIUM, MAINTENANCE AND SURVEILLANCE
87-25 11/16-20/87	SPECIALIST	37	GASEOUS AND LIQUID EFFLUENTS
87-26 11/16-20/87	SPECIALIST	37	ECCS SURVEILLANCE AND ACTIONS TO IMPROVE IMPROVE REACTOR TRIP BREAKER RELIABILITY
87-27 11/16-20/87	SPECIALIST	63	REVIEW RAD PROTECTION ACTIVITIES ASSOCIATED WITH THE UNIT 3 OUTAGE
87-28 12/14-18/87	SPECIALIST	0	EXAMINATION REPORT
87-29 11/30-12/4/87	SPECIALIST	21	SG EDDY CURRENT INSPECTION, WATER CHEMISTRY CONTROLS, RADIATION CONTROLS
87-30 11/25/87-1/15/88	RESIDENT	90	SHUTDOWN PLANNING, PLANT OPERATIONS, RADIATION PROTECTION, PHYSICAL SECURITY, FIRE PROTECTION, SURVEILLANCE AND MAINTENANCE
87-31 11/30-12/4/87	SPECIALIST	8	SURVEILLANCE OF COMPLEX SAFETY-RELATED SYSTEMS, INPLANT INSTRUMENT CALIBRATION, MEASURING AND TEST EQUIPMENT
87-32 12/14-18/87	SPECIALIST	56	NONRADIOLOGICAL CHEMISTRY PROGRAM AND ANALYTICAL PROCEDURE EVALUATIONS
87-33 12/8/87-1/19/88	RESIDENT	118	OUTAGE DECAY HEAT REMOVAL, UNEXPECTED SAFETY INJECTION, SNUBBER FAILURES
87-34 12/7-11/87	SPECIALIST	10	SOLID RADWASTE AND TRANSPORTATION PROGRAMS
88-01 1/12-15/88	SPECIALIST	5	RADIATION PROTECTION DURING THE OUTAGE
88-02 1/20-2/22/88	RESIDENT	123	OUTAGE ACTIVITIES, SURVEILLANCE, SECURITY, QA

REPORT/ DATES	TYPE OF INSPECT.	HOURS	DESCRIPTION
88-03 1/19-29/88	RESIDENT	66	INOPERABILITY OF REQUIRED REACTOR COOLANT SYSTEM OVERPRESSURE PROTECTION FEATURES
88-04 3/14-18/88	SPECIALIST	153	ENGINEERING SUPPORT
88-05 2/23-4/4/88	RESIDENT	132	PLANT OPERATIONS, EQ OF FLOW TRANSMITTERS, OVERTEMPERATURE DELTA-T SPIKING, MAXIMUM REACTOR POWER DETERMINATION, PLANT INFORMATION REPORTS, SECURITY
88-06 3/28-4/1/88	SPECIALIST	26	SECURITY INSPECTION
88-07 4/15/88	SPECIALIST	37	RADIATION PROTECTION ACTIVITIES
88-08 4/5-5/23/88	RESIDENT	158	PLANT OPERATIONS, SAFETY SYSTEM OPERABILITY, REACTOR VESSEL HEAD SEAL INNER "O" RING LEAK, MAINTENANCE AND SURVEILLANCE

TABLE 2: ENFORCEMENT

TABLE 2A: ENFORCEMENT ACTION SUMMARY

AREA	SEVERITY LEVEL 1	2	3	4	5	DEV	TOTAL
PLANT OPERATIONS			1	2			3
RADIOLOGICAL CONTROLS							
MAINTENANCE							
SURVEILLANCE							
EMERGENCY PREP.							
SEC/SAFEGUARDS			1				1
OUTAGE MANAGEMENT							
TRAINING EFFECTIVENESS							
ASSURANCE OF QUALITY							
ENGINEERING SUPPORT (Note 1)				1		1	2
TOTALS:			2	3		1	6

TABLE 2B: SYNOPSIS OF VIOLATIONS

REPT/DATE	REQUIREMENT	SEVERITY	AREA	DESCRIPTION
423/87-15 6/8-25/87	10 CFR 2, APPENDIX C	4	ENG SUPPORT	FAILURE TO VERIFY ADEQUACY OF BATTERY ROOM WALL DESIGN
423/87-15 6/8-25/87	10 CFR 2, APPENDIX C	D	ENG SUPPORT	DEVIATION OF MASONRY WALLS FROM FROM APPENDIX A OF STANDARD REVIEW PLAN SECTION 3.8.4
423/87-18 8/31-9/9/87	SECURITY PLAN	3	SEC/ SFGDS	INADEQUATE BARRIERS, VISITORS WITHOUT ESCORT, IMPROPER COMPENSATORY MEASURES
423/88-02 1/20-2/2/88	TS 3.5.2	4	OPS	CHANGED MODES WITH ONE CHARGING PUMP INOPERABLE
423/88-03 1/19-29/88	TS 3.4.9	3	OPS	LTOP INOPERABLE DURING OVERPRESSURE EVENT WHILE SHUTDOWN
423/88-04 3/14-18/88	10 CFR 50.49	(NOTE 1)	ENG SUPPORT	ENVIRONMENTAL QUALIFICATION OF LITTON-VEAM CONNECTORS
423/88-05 2/23-4/4/88	TS 6.8.1	4	OPS	AFW PUMP SUCTION VALVE NOT LOCKED

Note 1: Potential enforcement actions are pending.

TABLE 3

SUMMARY OF LICENSEE EVENT REPORTS (LERs)

MILLSTONE 3

AREA	CAUSE CODES A	B	C	D	E	X	TOTAL
PLANT OPERATIONS	11	3		2	4		20
RADIOLOGICAL CONTROLS							
MAINTENANCE				1	2		3
SURVEILLANCE	13			6			19
EMERGENCY PREP.							
SEC/SAFEGUARDS							
OUTAGE MANAGEMENT	1	1		1			3
TRAINING EFFECTIVENESS							
ASSURANCE OF QUALITY	1	1			4		6
ENGINEERING SUPPORT	2	3			3		8
TOTALS:	28	8		10	13		59

CAUSE CODES

A -- PERSONNEL ERROR
B -- DESIGN, MANUFACTURING, CONSTRUCTION/INSTALLATION
C -- EXTERNAL CAUSE
D -- DEFECTIVE PROCEDURE
E -- EQUIPMENT FAILURE
X -- OTHER

TABLE 3A

SYNOPSIS OF LICENSEE EVENT REPORTS (LERs)

MILLSTONE 3

LER NUMBER	EVENT DATE	CAUSE CODE	FCT AREA	DESCRIPTION
87-008-00	3/7/87	E	1	REACTOR TRIP DUE TO LOW LOW STEAM GENERATOR LEVEL CAUSED BY FAILED SOLENOID VALVE
87-009-01	3/11/87	E	9	EARLY LIFTING OF PRESSURIZER SAFETIES FOR UNDETERMINED REASONS
87-010-01	2/22/87	B	1	LOOSE PART DETECTION SYSTEM INOPERABLE CHANNEL FOR UNKNOWN REASONS
87-011-00	3/19/87	D	4	4.16KV EMERGENCY BUS TRIP SETPOINTS LOW DUE TO SETPOINT DRIFT
87-012-00	3/20/87	A	4	MISSED TECHNICAL SPECIFICATION SURVEILLANCE ON SNUBBER VISUAL INSPECTIONS DUE TO ENGINEERING OVERSIGHT
87-013-00	3/21/87	A	10	MISSING CONTAINMENT PENETRATION SECONDARY PROTECTION DUE TO PERSONNEL ERROR
87-014-00	3/22/87	E	3	FAILURE OF "B" EMERGENCY DIESEL GENERATOR TO START IN LESS THAN 10 SECONDS
87-015-00	3/24/87	D	1	INABILITY OF MAIN STEAM ISOLATION VALVES TO CLOSE IN REQUIRED TIME FRAME
87-016-00	3/25/87	D	4	TRAIN A SAFETY INJECTION CAUSED BY INSTRUMENT TECHNICIAN DUE TO DEFECTIVE PROCEDURE
87-017-00	3/29/87	B	10	FAILURE TO ADEQUATELY DETERMINE/MEASURE RESPONSE TIMES
87-018-00	4/2/87	A	4	OPERATION WITH INOPERABLE CONTROL BUILDING RADIATION MONITOR DUE TO PERSONNEL ERROR
87-019-00	4/11/87	B	10	AREA TEMPERATURE MONITORING-ES07
87-020-00	4/12/87	E	3	REACTOR TRIP DUE TO LOW LOW STEAM GENERATOR LEVEL CAUSED BY AIR LEAK TO FEEDWATER REGULATING VALVE

Table 3A

LER NUMBER	EVENT DATE	CAUSE CODE	FCT AREA	DESCRIPTION
87-021-00	4/12/87	A	1	FEEDWATER ISOLATION AND REACTOR TRIP DUE TO STEAM GENERATOR WATER LEVEL TRANSIENT CAUSED BY OPERATOR ERROR
87-022-00	4/25/87	B	10	INACCURATE STEAM GENERATOR WATER LEVEL INDICATION DUE TO SYSTEM DESIGN
87-023-01	4/25/87	E	10	AREA TEMPERATURE MONITORING CS01
87-024-00	5/6/87	D	4	ONE TRAIN EMERGENCY DIESEL GENERATOR-TRIP/ FAILURE TO START IN LESS THAN 10 SECONDS
87-025-00	5/7/87	D	1	REACTOR TRIP DUE TO LOW LOW STEAM GENERATOR LEVEL CAUSED BY PROCEDURE INADEQUACY
87-026-00	5/14/87	A	4	REACTOR TRIP FROM B REACTOR TRIP BREAKER OPENING DUE TO UNKNOWN (SPURIOUS) CAUSES
87-027-00	6/5/87	A	1	REACTOR TRIP DUE TO LOSS OF VITAL BUS CAUSED BY PERSONNEL ERROR
87-028-00	6/6/87	E	1	CONTROL BUILDING ISOLATION SIGNAL DUE TO CHLORINE DETECTOR FAILURE
87-029-00	6/7/87	A	1	FAILURE TO POST FIRE WATCHES DUE TO OPERATOR ERROR
87-030-00	6/8/87	A	1	INADVERTENT MODE CHANGE FROM COLD SHUTDOWN TO HOT SHUTDOWN DUE TO OPERATOR ERROR
87-031-01	6/14/87	E	9	REACTOR TRIP DUE TO TURBINE TRIP ON LOW LUBE OIL HEADER PRESSURE
87-032-00	7/6/87	D	4	INADVERTENT DISCHARGE OF CO2 DUE TO PROCEDURAL DEFECT
87-033-00	8/14/87	A	4	REFUELING WATER STORAGE TANK LEVEL BELOW PLANT TS DUE TO INCORRECT LEVEL TRANSMITTERS CALIBRATION AND PERSONNEL ERROR
87-034-00	9/23/87	E	10	REACTOR TRIP DUE TO LOW LOW STEAM GENERATOR LEVEL CAUSED BY FAILED SOLENOID VALVE
87-035-00	10/16/87	D	4	SURVEILLANCE TEST METHOD NOT IN ACCORDANCE WITH TECHNICAL SPECIFICATIONS

Table 3A

LER NUMBER	EVENT DATE	CAUSE CODE	FCT AREA	DESCRIPTION
87-036-00	10/31/87	E	10	SETPOINT DRIFT ON MAIN STEAM SAFETY VALVES
87-037-00	11/1/87	A	1	FEEDWATER ISOLATION DUE TO HIGH STEAM GENERATOR LEVEL CAUSED BY OPERATOR ERROR
87-038-00	11/10/87	A	7	PERSONAL ERROR WHEN JANITOR STRUCK BREAKER ENCLOSURE WITH BROOM WHILE CLEANING AND TRIPPED BREAKER
87-039-00	11/11/87	A	4	FAILURE TO SAMPLE EMERGENCY DIESEL GENERATOR FUEL OIL TANKS FOR PARTICULATE
87-040-00	11/9/87	A	4	FIRE PROTECTION SURVEILLANCE PERFORMED LATE DUE TO HUMAN ERROR
87-041-00	11/16/87	A	4	INADEQUATE TESTING OF CONTAINMENT PENETRATION CIRCUIT BREAKERS
87-042-00	11/17/87	D	4	MISSED INTERMEDIATE RANGE/POWER RANGE SURVEILLANCE DUE TO PROCEDURAL INADEQUACY
87-043-00	11/18/87	E	9	BYPASS LEAKAGE IN EXCESS OF TECHNICAL SPECIFICATION LIMITS
87-044-00	11/20/87	A	4	VENTILATION RADIATION MONITOR SURVEILLANCE PERFORMED LATE
87-045-00	11/21/87	A	4	FAILURE TO SAMPLE DIESEL FUEL OIL FOR KINEMATIC VISCOSITY PRIOR TO ADDITION TO STORAGE TANKS
87-046-00	11/24/87	A	4	SAMPLE RIG ACTION STATEMENT SURVEILLANCE MISSED
87-047-00	11/30/87	D	7	CORE ALTERATION PERFORMED WITHOUT PROPER COMMUNICATIONS OR SRO COVERAGE DUE TO PROCEDURAL ERROR
87-048-00	12/3/87	A	1	FAILURE TO MONITOR INOPERABLE FIRE ASSEMBLIES
87-049-00	12/16/87	A	1	MISSED ENGINEERING EVALUATION DUE TO MISINTERPRETATION OF TECHNICAL SPECIFICATIONS
87-050-00	12/21/87	A	4	MISSED AREA TEMPERATURE MONITORING SURVEILLANCE DUE TO PERSONNEL ERROR

Table 3A

LER NUMBER	EVENT DATE	CAUSE CODE	FCT AREA	DESCRIPTION
87-051-00	12/29/87	A	4	MISSED SURVEILLANCE ON FIRE RATED DOORS DUE TO PROCEDURAL DEFECT
88-001-00	1/5/88	B	1	INADVERTENT SAFETY INJECTION DUE TO SENSITIVE EQUIPMENT
88-002-00	1/13/88	B	9	INSUFFICIENT SEISMIC SUPPORT OF REACTOR COOLANT PUMP OIL COLLECTION SYSTEM
88-003-00	1/16/88	B	1	DIESEL SEQUENCED START DUE TO SPURIOUS RELAY ACTUATION
88-004-00	1/18/88	E	1	CONTROL BUILDING ISOLATION SIGNAL DUE TO CHLORINE DETECTOR FAILURE
88-005-00	1/19/88	A	1	COLD OVERPRESSURE PROTECTION SYSTEM FAILS TO OPERATE DURING PRESSURE TRANSIENT
88-006-00	1/30/88	A	1	VIOLATION OF TECHNICAL SPECIFICATION-MODE CHANGE WITHOUT REQUIRED ECCS EQUIPMENT
88-007-00	2/3/88	E	1	MANUAL REACTOR TRIP DUE TO INOPERABLE DIGITAL ROD POSITION INDICATOR
88-008-00	2/8/88	A	9	FIRE DETECTION ZONES IMPROPERLY WIRED DURING CONSTRUCTION
88-009-00	2/10/88	A	1	REACTOR TRIP AND FEEDWATER ISOLATION DUE TO STEAM GENERATOR LEVEL TRANSIENT
88-010-00	2/9/88	B	7	IMPROPER NUCLEAR INSTRUMENT CALIBRATION DUE TO LOW LEAKAGE CORE
88-011-00	2/22/88	A	4	MISSED CONTAINMENT LEAKAGE DETECTION SYSTEM SURVEILLANCES DUE TO DEFECTIVE PROCEDURE DUE TO PERSONNEL ERROR
88-012-00	3/18/88	D	3	FAILURE TO MONITOR AN INOPERABLE FIRE BOUNDARY DOOR
88-013-00	3/28/88	A	10	INCOMPLETE INSTALLATION OF DAMPER CIRCUIT IN THE HYDROGEN RECOMBINER SYSTEM
88-014-00	4/13/88	E	9	REACTOR TRIP DUE TO TURBINE TRIP DUE TO LOW CONDENSER VACUUM
88-015-00	4/15/88	A	1	UNUSUAL EVENT TERMINATED W/O A QUANTITATIVE ASSESSMENT OF THE LEAK RATE

TABLE 4

SUMMARY OF FORCED OUTAGES, UNPLANNED TRIPS, AND POWER REDUCTIONS

MILLSTONE 3

AREA	A	B	C	D	E	X	TOTAL
PLANT OPERATIONS	3			1			4
RADIOLOGICAL CONTROLS							
MAINTENANCE						1	1
SURVEILLANCE							
EMERGENCY PREP							
SEC/SAFEGUARDS							
OUTAGE MANAGEMENT					1		1
TRAINING INADEQUACY							
ASSURANCE OF QUALITY							
ENGINEERING SUPPORT		2			2		4
TOTALS:	3	2		1	3	1	10

CAUSE CODES

A -- PERSONNEL ERROR
B -- DESIGN, MANUFACTURING, CONSTRUCTION/INSTALLATION
C -- EXTERNAL CAUSE
D -- DEFECTIVE PROCEDURE
E -- EQUIPMENT FAILURE
X -- OTHER

TABLE 4A

FORCED OUTAGES, UNPLANNED TRIPS, AND POWER REDUCTIONS

MILLSTONE 3

DATE	POWER LEVEL	DESCRIPTION	LER NUMBER	CAUSE AND AREA (NOTES 1, 2, 3, 4)
3/2/87	100%	POWER REDUCTION TO REPLACE FAILED PUMP SEAL IN MOTOR-DRIVEN MAIN FEED WATER PUMP (MDFWP)	--	EQUIPMENT FAILURE SEAL DEGRADATION (NO AREA ASSIGNED)
3/7/87	100%	REACTOR TRIP FROM "D" SG LOW-LOW LEVEL CAUSED BY FWI WHEN THE FWI VALVE SOLENOID OPEN CIRCUITED	87-08	EQUIPMENT FAILURE - FAULTY SOLENOID ON FWI VALVE (ENGINEERING SUPPORT)
4/12/87	66%	REACTOR TRIP ON "D" SG LOW-LOW LEVEL CAUSED BY AIR LEAK ON "D" FRV CONTROLLER	87-20	EQUIPMENT FAILURE - AIR LEAK FROM SUPPLY LINE LINE FITTING ON "D" FRV FRV (OUTAGE MGMT)
4/12/87	15%	REACTOR TRIP DURING STARTUP DUE TO INADEQUATE CONTROL OF THE FEEDWATER SYSTEM	87-21	PERSONNEL ERROR - INADECONTROL OF MDFWP AND FRVS (OPERATIONS)
5/7/87	44%	REACTOR TRIP ON "D" SG LOW-LOW LEVEL DUE TO TRIPPING MDFP IN SG LEVEL OSCILLATION REGION	87-25	PROCEDURE INADEQUACY - PROCEDURE DID NOT DESCRIBE POWER LIMITATIONS WITH EXISTING SG OSCILLATIONS (OPERATIONS)
5/11/87	100%	POWER REDUCTION DUE TO RECURRING FEEDWATER PUMP SEAL PROBLEM	--	INADEQUATE DESIGN SEAL DEGRADATION (ENGINEERING SUPPORT)
5/14/87	69%	REACTOR TRIP DUE TO APPARENT SPURIOUS TRIP PING OF "B" REACTOR TRIP BREAKER WHILE PERFORMING A SURVEILLANCE ON THE "A" REACTOR TRIP BREAKER	87-26	NO CAUSE - DISCOVERED AFTER DETAILED INVESTIGATION (NO AREA ASSIGNED)

Table 4A

DATE	POWER LEVEL	DESCRIPTION	LER NUMBER	CAUSE AND AREA (NOTES 1, 2, 3, 4)
6/5/87	100%	REACTOR TRIP ON LOW LOW SG LEVEL DUE TO LOSS OF EMERGENCY BUS 34C	87-27	PERSONNEL ERROR - OPERATOR DROPPED RACKING MOTOR HELD IN HAND AGAINST ADJACENT 34C BREAKER ENCLOSURE TO INITIATE TRIP (OPERATIONS)
6/14/87	100%	REACTOR TRIP DUE TO TURBINE TRIP FROM LOW LOW PRESSURE AFTER STOPPING TGOP	87-31	IMPROPER DESIGN - TGOP IMPELLER OVERSIZED (ENGINEERING SUPPORT)
9/23/87	100%	REACTOR TRIP DUE TO LOW LOW LOW LEVEL IN "A" SG CAUSED BY FWI VALVE CLOSING	87-34	FAULTY SOLENOID ON FWI VALVE (ENGINEERING SUPPORT)
2/3/88	0%	MANUAL REACTOR TRIP DURING PHYSICS TESTING ROD WITHDRAWAL DUE TO DRPI DUAL INDICATION	88-07	EQUIPMENT FAILURE - DRPI CARD BOWED, INDICATED ROD SIMULTANEOUSLY FULL AND MID CORE (NO AREA ASSIGNED)
2/10/88	20%	REACTOR TRIP DUE TO LOW LOW LEVEL IN "B" SG CAUSED BY INADEQUATE CONTROL OF FEED REG VALVES	88-09	PERSONNEL ERROR -INABILITY OF OPERATOR TO CONTROL ALL FEED REG VALVES (OPERATIONS)
4/13/88	100%	REACTOR/TURBINE TRIP CAUSED BY LOSS OF 2 CW PUMPS DUE TO SEAWEED IMPINGEMENT ON INTAKE SCREENS	88-14	OTHER - SEAWEED IMPINGEMENT ON INTAKE SCREENS BEYOND CAPACITY OF SCREENWASH (SCREENWASH SYSTEM ORIGINALLY OPERATING AT REDUCED CAPACITY) (MAINTENANCE)
4/28/88	70%	POWER REDUCTION TO REPAIR STEAM LEAK ON DRAIN PIPING		INADEQUATE INSTALLATION - INADEQUATE WELD ON DRAIN PIPING (NO AREA ASSIGNED)

Note 1: Isolated cases of equipment malfunctioning and component failure (not directly attributable to functional area). Multiple causally linked failures are assigned to the area that should have prevented the recurrence.

Note 2: Cause and area assigned was the result of independent NRC review of the events and may not agree with the licensee's identified root cause.

Note 3: Cause equals root cause and is that single element, if removed, that would not have allowed the event to happen.

Note 4: Cause and Area Codes were assigned by NRC Region I.