INITIAL SALP REPORT

U.S. NUCLEAR REGULATORY COMMISSION

REGION I

SYSTEMATIC ASSESSMENT OF LICENSEE PERFORMANCE

REPORT NOS. 50-245/89-99
50-336/89-99
50-423/89-99

NORTHEAST NUCLEAR ENERGY COMPANY

MILLSTONE NUCLEAR POWER STATION UNITS 1, 2, AND 3

ASSESSMENT PERIODS:

JUNE 16, 1989 - DECEMBER 15, 1990
(MILLSTONE 1 AND 2)

OCTOBER 16, 1989 - DECEMBER 15, 1990
(MILLSTONE 3)

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I. INTRODUCTION

The Systematic Assessment of Licensee Performance (SALP) program is an integrated NRC staff effort to collect available observations and data on a periodic basis and to evaluate licensee performance on the basis of this information. The program is supplemental to normal regulatory processes used to ensure compliance with NRC rules and regulations. It is intended to be sufficiently diagnostic to provide a rational basis for allocating NRC resources and to provide meaningful feedback to licensee management regarding the NRC's assessment of its facilities performance in each functional area.

An NRC SALP Board, composed of the staff members listed below, met on January 28-29, 1991, to review the observations and data on performance, and to assess licensee performance in accordance with Chapter NRC-0516, "Systematic Assessment of Licensee Performance."

Starting with this SALP period, Millstone Units 1, 2 and 3 SALP assessments will be combined. This report is the NRC's assessment of the licensee's safety performance at Millstone Nuclear Power Station for the period June 16, 1989, through December 15, 1990, for Units 1 and 2, and October 16, 1989, through December 15, 1990, for Unit 3.

The Millstone SALP Board members were:

CHAIRMAN:

J. Wiggins, Deputy Director, Division of Reactor Projects (DRP)

MEMBERS:

W. Hodges, Director, Division of Reactor Safety (DRS)
M. Knapp, Director, Division of Radiation Safety and Safeguards (DRSS)
E. Wenzinger, Chief, Projects Branch No. 4, DRP
W. Raymond, Senior Resident Inspector, Millstone
J. Stolz, Director, Project Directorate (PD) I-4, NRR
** M. Boyle, Project Manager, PD I-4, NRR (Millstone 1 Areas)
** G. Vissing, Project Manager, PD I-4, NRR (Millstone 2 Areas)
** D. Jaffe, Project Manager, PD I-4, NRR (Millstone 3 Areas)

** Individuals voted on their assigned plant only.

OTHER ATTENDEES:

W. Lanning, Acting Deputy Director, DRS
L. Rettenhausen Chief, Operations Branch, DRS
J. Durr, Chief, Engineering Branch, DRS
J. Joyner, Chief, Facilities Radiological Safety and Safeguards Branch, DRSS
D. Haverkamp, Chief, Reactor Projects Section 4A, DRP
D. Dempsey, Resident Inspector Millstone 1
P. Habighorst, Resident Inspector Millstone 2
K. Kolaczyk, Resident Inspector Millstone 3
R. Nimitz, Senior Radiation Specialist, DRSS
R. Keimig, Chief, Safeguards Section, DRSS
C. Anderson, Chief, Plant Systems Section, DRS
C. Amato, Emergency Preparedness Specialist, DRSS
B. Bores, Chief, Effluents Radiation Protection Section, DRSS

II. SUMMARY OF RESULTS

II.A. OVERVIEW

Millstone Units 1, 2, and 3 demonstrated a safe and generally conservative approach to facility activities. Licensee management attention to and involvement in nuclear safety or safeguards activities resulted in good to superior levels of performance in the seven functional areas that were assessed during this SALP period. Further, a strong commitment to training was noted in all performance areas.

In the area of Plant Operations, Millstone Station was considered generally very good with operations conducted in a safe and conservative manner. Some decline was noted in Millstone 2 Plant Operations performance at the end of the assessment period, as evidenced by instances of inadequate communications and personnel errors. Although performance in the area of Radiological Controls was generally good, the need for better control of radioactive materials and for improved performance-based audits and self-assessments was identified. Millstone Station performance in the area of Maintenance/Surveillance continued to be good overall. Superior performance was sustained in the areas of Emergency Preparedness and Security and Safeguards.

Millstone Station performance in the area of Engineering and Technical Support was assessed collectively for the three Millstone units, and was good overall, with staff training and expertise a continuing noteworthy strength. Responses to identified safety issues were generally thorough and complete; however, continued improvement in timeliness is needed in addressing identified safety deficiencies. An aggressive approach and significant licensee resources continue to be applied to minimize steam generator deterioration, and in preparation for their replacement at Unit 2 during the next outage.

The Safety Assessment/Quality Verification area was assessed collectively for the three Millstone units. Although performance in this area was generally good, tardiness of licensee response to some safety system operability issues was identified. Further, the NRC remained concerned that the licensee failed to address, adequately, the root causes of some employee concerns and has yet to effectively address the root causes for lapses observed this period in staff attention to detail and adherence to procedures during routine activities.

II.B. FACILITY PERFORMANCE ANALYSIS SUMMARY

MILLSTONE 1

Functional Area	Rating, Trend Last Period	Rating, Trend This Period
PLANT OPERATIONS	1	1
RADIOLOGICAL CONTROLS	2	2
MAINTENANCE/SURVEILLANCE	1	1
EMERGENCY PREPAREDNESS	1	1
SECURITY AND SAFEGUARDS	1	1
ENGINEERING AND TECHNICAL SUPPORT	2	2
SAFETY ASSESSMENT/QUALITY VERIFICATION	1	2

Previous Assessment Period: January 1, 1988, to June 15, 1989

Present Assessment Period: June 16, 1989 to December 15, 1990

MILLSTONE 2

Functional Area	Rating Trend Last Period	Rating, Trend This Period
PLANT OPERATIONS	1	1, declining
RADIOLOGICAL CONTROLS	1	2
MAINTENANCE/SURVEILLANCE	2	2
EMERGENCY PREPAREDNESS	1	1
SECURITY AND/ SAFEGUARDS	1	1
ENGINEERING AND TECHNICAL SUPPORT	1	2
SAFETY ASSESSMENT/QUALITY VERIFICATION	2	2

Previous Assessment Period: January 1, 1988, to June 15, 1989

Present Assessment Period: June 16, 1989, to December 15, 1990

MILLSTONE 3

Functional Area	Rating, Trend Last Period	Rating, Trend This Period
PLANT OPERATIONS	2	2
RADIOLOGICAL CONTROLS	1	2
MAINTENANCE/SURVEILLANCE	1	1
EMERGENCY PREPAREDNESS	1	1
SECURITY AND SAFEGUARDS	1	1
ENGINEERING AND TECHNICAL SUPPORT	2, improving	2
SAFETY ASSESSMENT/QUALITY VERIFICATION	1	2

Previous Assessment Period: June 1, 1988, to October 15, 1989

Present Assessment Period: October 16, 1989, to December 15, 1989

III. PERFORMANCE ANALYSIS

III.A. PLANT OPERATIONS

MILLSTONE 1

The previous SALP rated Millstone 1 Plant Operations as Category 1. Strengths were noted in operator performance, conduct of plant operations review committee (PORC) activities, and management support of operations. The NRC recommended that the licensee aggressively pursue improvements to the Millstone 1 emergency operating procedures (EOPs).

During the SALP period, management presence in the plant and attention to and support of operations were extensive. During unscheduled outages, unit management provided timely and unambiguous direction to the operations staff. At all times, management was cognizant of safety significant plant issues. Licensee management's conservative approach to operation of Millstone 1 effectively contributed to safe operation of the Unit and indicated licensee strength in this area.

Cooperation and communication among operations and other departments were generally excellent. Effective communication of information was fostered by attendance of shift supervisors at daily status meetings. Control room shift turnover briefings were attended often by supporting department personnel. A minor weakness was identified regarding communication to operators of new inservice test program requirements. Following a plant trip early in the assessment period, operations department supervisory and management personnel discussed event followup plans at the main control boards; this practice detracted from the operators' ability to monitor the boards. During a plant transient late in the assessment period, the command and control was weakened when a shift supervisor became involved in control manipulations. Unit management effectively corrected these issues by providing the requisite guidance.

Area decontamination and painting projects continued to improve the unit. Operations department shift supervisor staff assistants conducted weekly tours of the unit pursuant to explicit administrative guidelines. Results of the inspections were reviewed by both the operations manager and the unit director. These efforts were effective in maintaining acceptable plant housekeeping conditions.

The NRC found operations procedures to be of high quality. Licensee procedure upgrade program goals were met during the assessment period. In response to a licensee significant operating experience report concerning emergency power source fuel quality sampling program deficiencies, operations procedures were enhanced significantly. In addition, while performing a procedure upgrade, a licensed operator identified a discrepancy concerning the

emergency operating procedures (EOPs) and the design limits of the containment cooling heat exchangers. These examples indicated that the licensee's procedure reviews are contributing to the correction of significant deficiencies.

During this SALP period, the licensee implemented revision 4 of the EOPs. The NRC concluded that the licensee operators were able to implement the EOPs effectively. However, the NRC identified several concerns regarding incorporation of human factors principles into the EOPs. Deficiencies have been corrected either by procedure changes or enhanced plant labeling. Others are being addressed aggressively by the operations staff and are scheduled to be completed in 1991.

No reactor trips, forced shutdowns, or violations that were attributed to operator error occurred during the assessment period. However, two automatic trips occurred due to component failure, and one manual trip occurred due to loss of service water and circulating water cooling flow. One of the trips occurred during control room shift turnover. Since both the oncoming and off-going shift supervisors provided directions to operators during the event, the NRC was concerned that permitting the dual lines of authority could constitute a weakness in the shift command and control function. Unit management effectively addressed this issue by providing guidelines limiting access to the control room to essential personnel during operational events and clarifying the chain of command during transient conditions.

Overall, operator response to transients and operational events was excellent. However, one significant failure to follow procedures was noted in the review of licensee events during the period. During a period of severe weather and unfavorable tides, excessive fouling of the intake structure traveling screens occurred. Due to rapidly degrading service water and circulating water systems performance, operators manually tripped the reactor. The failure to trip the circulating water pumps on high traveling screen differential pressure, as directed by procedure, resulted in damage to three of five screens and fouling of the service water system strainer. Except for some initial communications problems and command and control lapses, operators demonstrated good performance by promptly restoring service water flow to essential components and placing the plant in the cold shutdown condition. This event was an exception to otherwise strong performance in adherence to procedures normally displayed by Millstone 1 operators, and did not indicate a significant programmatic weakness.

Four forced outages occurred during the assessment period. None were attributed to performance in the operations area. Following a shutdown due to an unisolable steam leak, the plant entered a service water and condensate systems outage. The NRC observed that the informal guidance provided to the operators regarding the service water system would have resulted in a configuration not described in plant procedures or the updated final safety analysis report. The licensee promptly changed the procedures, performed a safety analysis which demonstrated that system performance would not be affected adversely, and provided formal Plant Operational Review Committee (PORC) approved guidance to the operators. This practice was followed during subsequent outages. In all cases, operators demonstrated good configuration control and knowledge of plant systems status.

The operations department was staffed with highly experienced operators who consistently demonstrated professionalism and a conservative approach toward safe plant operation. Many plant equipment operators held reactor operator (RO) licenses and most control room operators held senior reactor operator (SRO) licenses. In order to introduce main control room-type protocol into the radwaste area, licensed operators were assigned to oversee the daily operation of the radiological waste processing facility.

Initial operator training continued to be successful; eight of ten candidates received licenses. Strengths were noted in use of EOPs and knowledge of plant design. Weaknesses were noted in knowledge of some technical specification requirements and crew communications skills.

During the assessment period, 20 requalification examinations were administered by the NRC. With one exception, all licensee personnel passed the examinations. One senior control room operator successfully completed a subsequent re-examination. Strengths were identified in event classification and utilization of EOPs. This is indicative of a strong training program.

Strong management commitment to professional development and high quality training was evidenced by several licensee initiatives. The operations manager evaluated training crew performance at the plant-specific simulator on a weekly basis. Industry scram frequency reduction evaluations were reviewed by the PORC and lessons learned transmitted to operators. Presently, shift supervisors are undergoing training to qualify as alternate members of the Unit 1 PORC.

In conclusion, operation of Millstone 1 was conducted by a well-trained, motivated, and capable staff which demonstrated a high regard for safety. With some minor exceptions, operator response to transients and equipment failures was excellent. Management involvement in all aspects of unit operations was extensive and effective. Improvements to plant EOPs were pursued aggressively by the operations staff.

Performance Rating: Category 1.

Board Recommendation: None.

MILLSTONE 2

The previous SALP rated Millstone 2 Plant Operations as Category 1. Strengths included good interdepartmental communications, management initiatives, infrequent personnel errors, good procedural adherence and plant configuration control, and a professional attitude in the control room. Lapses were noted in operator attention to detail associated with requirements of lesser safety significance.

Management attention to operations activities was focused appropriately on safety. Management directions to and expectations of operators were provided through plant night orders, shift supervisor crew turnover briefings, and operations department meetings. The directions were similarly focused.

Plant housekeeping was acceptable and continued to receive management attention. General equipment conditions were excellent reflecting good maintenance practices. Individual accountability for cleanliness in plant areas was instituted during the SALP period. Minor deficiencies were noted in securing of temporary equipment, and storage of non-essential equipment. At the end of the assessment period, restoration from the refueling outage required additional management attention due to a large amount of equipment adrift. General improvements were noted in equipment labeling and cleanliness of selected areas within the facility (i.e., spent fuel pool area).

A review team consisting of an experienced senior reactor operator and two reactor operators was established to revise and upgrade operation procedures. General procedure quality improved; however, one example of insufficient procedure guidance was noted during the refueling outage when a control element assembly was damaged. Improvements were noted in the emergency operating procedures, including upgrade to revision 3 of the CEN-152 guidelines, improved step documentation by the addition of a check-off to assure proper step completion, and development of a user's guide.

An operations support crew was the focal point for the three outages. The support crew provided valuable inputs to schedule changes, alternative approaches to system configuration control, and work control for effective management decision making. The crew also provided valuable insights on operational events evaluated by the PORC.

Operator response during plant transients was a strength, with good implementation of emergency operating procedures. Event analysis was timely and problem resolution was very good. Management decisions were conservative with a good regard for safety.

Operator implementation of complex procedures was effectively planned and professionally conducted. Operators were cognizant of plant conditions and the expected response to events and off-normal conditions. Responses to off-normal conditions were implemented well including those for increases in primary-to-secondary leakage, inadvertent main turbine control valve closures, inoperable service water strainers, discrepant estimated critical position during reactor start-up, and steam leakage from a steam generator pressure instrument stop valve.

Noteworthy personnel errors at the end of the assessment period resulted in one reactor trip, one engineered safety feature actuation, losses of containment integrity twice during fuel movement, a mispositioned valve on the service water system, and a failure to implement required controls for a process radiation monitor. The personnel errors included inadequate procedure implementation, inadequate control of equipment status, and an equipment tagging

error. Appropriate corrective actions were completed. In addition, one minor violation and one deviation were attributed to operator error in the control of the reactor vessel monitoring system during reduced inventory and inadequate procedural implementation of the loose parts monitoring system. A significant event regarding the control of containment integrity during refueling was under review at the end of the assessment period. Effective management use of the independent personnel performance enhancement process was noted as providing additional insight on the cause and corrective actions for the personnel performance issues.

Effective communications between licensed and non-licensed operators were demonstrated by effective shift turnover meetings. The effective interface resulted in very good teamwork. Occasional events of minor safety significance were attributed to lapses in communications between operations and the instrument and controls and chemistry departments. The lapses resulted in a failure to complete LCO actions for out of service radiation monitors, and a failure to develop an alternate pre-planned backup method for the high range noble gaseous radiation monitor when considered inoperable. Acceptable licensee corrective actions were taken following each event. Operations interface with engineering was excellent with one minor exception involving inadequate surveillance procedures for two areas of fire suppression.

Operators maintained a professional environment in the control room. System operation and control were generally very good with a good regard for safety. Operators were attentive and thoroughly knowledgeable of system configurations. Very effective command and control by the shift supervisor and supervisory control room operator over the operating crew were noted. Excellent plant management overview was noted during plant restoration from the two in-cycle outages and the refueling outage.

The operations department was staffed with experienced, knowledgeable operators and support staff. Authority and responsibilities were well defined. A questioning attitude was evident as indicated by operator review of a fire seal repair proposal, and by control of the service water system during the refueling outage.

Operator licensing and requalification examinations were conducted on three occasions. The licensed operator requalification training program was a strength. Written examinations and operating tests were administered to seven senior reactor operators (SROs) and six reactor operators (ROs). All SROs and ROs passed all portions of the examination. Facility grading paralleled that of the NRC in all aspects of the examination. Initial examinations were administered to three SRO and six RO candidates. Three SROs and five ROs passed these examinations. The pass rate in both initial and requalification examinations indicated very good preparation by the licensee and by the operators and candidates. The licensee's commitment to training was demonstrated by the considerable time expended in training operators.

In conclusion, over most of the assessment period the licensee demonstrated very good performance in plant operations. A professional environment existed within the control room. The staff was experienced and knowledgeable, and effective control generally was evident during plant startups and shutdowns. There was a strong focus of safety with extensive and effective management involvement. Continued effective use of the outage support crew was noted. Instances of inadequate communications and personnel errors at the end of the assessment were evident that require management attention to correct an adverse performance trend. Housekeeping was deemed to be acceptable, but continued management attention is needed.

Performance Rating: Category 1, Declining.

Board Recommendation:

Licensee: Discuss recent adverse trends in operator performance at a management meeting with the NRC staff.

MILLSTONE 3

During the previous Millstone 3 SALP cycle, Plant Operations was rated category 2. Areas of concern were noted in the frequency of personnel errors, fire protection program implementation, nuisance control room alarms, and the licensed operator requalification program. Licensee command and control of routine operating and shift activities was a noteworthy strength.

During this period, operators had positive attitudes and were knowledgeable of plant conditions and associated system status. Shift supervisor daily briefings concerning plant activities were well focused and thorough. Technical specification action statements were entered and exited when appropriate and were consistently applied. Previous shift events and scheduled activities were thoroughly discussed and evaluated. Shift control room turnovers were good with detailed control board walk-downs and discussions of plant status. However, occasional communication lapses between individual shift personnel occurred. These lapses resulted in the inadvertent isolation of the high pressure safety injection system during plant heatup, mispositioning of a containment isolation valve, and inadequate establishment of compensatory fire watches. Licensee corrective actions focused on the need for procedural adherence and improved shift communications. The corrective actions appear to be appropriate as communication related problems have decreased at the end of the assessment period.

A safety first attitude was evident during the assessment period. Conservative positions were consistently taken with regard to plant equipment when component operability was questionable. However, personnel errors detracted from otherwise good operational performance. These errors included an engineered safety features feedwater isolation during

plant cooldown when a main steam isolation valve was opened resulting in a steam generator swell; and an inadvertent isolation of the high pressure safety injection system during plant heatup. Additionally, operators did not initially recognize that the loss of the safety injection system was reportable per 10 CFR 50.72 and the NRC was not notified in a timely manner of this event. Untimely notification was also observed during two other events. These errors were the result of poor procedure compliance and a training deficiency. The effectiveness of licensee corrective action has yet to be determined by the NRC.

During this assessment period, forced outages were effectively managed. Work activities were well defined with two daily outage meetings which aggressively tracked the schedule of critical path work activities. Routine maintenance and surveillance activities were properly controlled and sequenced by operations personnel. Unusual tasks, such as troubleshooting operations, were carefully scrutinized by operators prior to release for performance. Overall the operations department coordinated the performance of work activities properly during this assessment cycle.

Housekeeping in the plant was good. Areas were generally clean with occasional lapses noted such as adrift insulation and tools. Painting of plant areas continued. Notable examples include the spent fuel pool area and diesel generator rooms. The continued painting of plant spaces underscores the licensee commitment to plant preservation and should ease decontamination efforts in radiologically controlled areas.

Through weekly reviews of main control board status panels and identification of illuminated annunciators, the licensee has attempted to reduce the frequency of nuisance alarms. During the review sessions, action plans were developed to eliminate nuisance alarms. However, results have been slowed by the need for an extended outage to affect setpoint changes and restore out of service equipment. Actions to reduce nuisance alarms from radiation monitor spiking were effective. Significant reductions in the amount of illuminated annunciators is scheduled for the February-March 1991 outage period and the licensee prioritization of this item is appropriate.

Intake system design deficiencies resulted in numerous power reductions and three manual plant trips. Through enhanced operator recognition of degrading intake structure conditions and revised operating procedures, plant operational performance improved at the end of the assessment period.

Operator response to reactor trips was good. Quick operator response to plant upsets caused by a reactor protection system power supply failure and balance of plant perturbations prevented additional potential challenges to safety systems. During the assessment period no plant trips were caused by operator error. However, personnel errors and procedure deficiencies caused operational events. The plant transients and events which occurred generally received proper management attention and followup. First hand observation and involvement in the resolution of plant events by management was frequently noted. Management understanding of plant operation was evident especially during daily reviews of

plant operating activities. Overall operator response to plant transients and management involvement in operational events were determined to be good.

Inconsistent implementation of the fire protection program, identified as a concern in the last SALP, continued during the assessment period. Fire watches were not established in designated areas, improper watches were established and required fire equipment was removed from required stations and not replaced. In response to these events, the licensee modified fire protection operating and surveillance procedures, clarified fire protection technical specifications, and completed lapsed fire protection surveillances which reduced the amount of compensatory fire watches required. Additionally, the number of posted fire watches was reviewed weekly at morning meetings, and target dates for removal were established. The attempt to reduce the amount of required fire watches is a positive improvement and reflected a pragmatic approach to a continuing problem. However, the recurring nature of fire protection events even after a reduction in the number of fire watches is an NRC concern.

The licensed operator requalification training program improved notably since the last requalification examination. Early in the assessment period, the program was determined to be satisfactory, based upon results of requalification examinations given to eight senior reactor operators (SROs) and four reactor operators (ROs). An additional requalification examination that was administered late in the assessment period to nine SROs and four ROs, also resulted in a satisfactory program evaluation. During the examinations, the facility graders applied more stringent grading criteria than required by the NRC requirements. The operations manager's direct involvement in the requalification examination administration was an important contributor to the quality of the activity. Development of an EOP usage procedure, improved ability of the training personnel to evaluate and critique operator actions during the exam, and increased management involvement in operator training all contributed to the improvement noted in the requalification program.

Seven candidates participated in an NRC replacement examination administered during the assessment period. Of these, one candidate failed the written and walkthrough portions of the exam. In general, the candidates were knowledgeable and demonstrated good understanding of plant systems and response to transients. The training staff was professional.

An emergency operating procedure (EOP) team inspection in early 1990 occurred while the licensee was reviewing and revising all EOP and EOP-related procedures. The procedure upgrade program was initiated by management in a timely fashion. A sufficient number of operations technical staff personnel were assigned to revise and maintain the EOPS in a usable condition. Observation of two operating crews on the simulator indicated that adequate training was provided to ensure that EOPs could be executed effectively.

During the current assessment period, a team inspection was conducted which focused on the implementation of training program for licensed and non-licensed operators. The training programs were well-designed, implemented, and supported both by training and operations

management. The programs satisfied all of the components of the Systems Approach to Training (SAT) based program and were found to be functioning well.

In summary, operators were knowledgeable and displayed good control of operational transients. Daily briefings of planned shift activities were thorough; however, communication lapses between shift personnel resulted in the occasional loss of system status. Control of forced outage and daily activities was good. Conservative action was consistently taken by unit management when equipment performance was degraded. Operator response to intake system design weakness had improved at the end of the period. Personnel errors concerning attention to detail during the performance of routine activities continued to require added unit management attention. Significant improvements have been noted in the licensed operator requalification program with an overall commitment to training noted in the licensed and non-licensed training.

Performance Rating: Category 2.

Board Recommendation: None.

III.B. RADIOLOGICAL CONTROLS

This section provides a combined analysis of the Millstone Station radiological controls program. Previous SALPs provided individual analyses of the program for each unit at the station. Since the program and direct management oversight of the program are common to all units, it is appropriate to evaluate the adequacy and effectiveness of the program, including program management, on a site-wide program basis.

The radiological controls program at Millstone Unit 1 was rated Category 2 the last assessment period. Overall, the program at Unit 1 was effectively implemented by knowledgeable and dedicated personnel. Exposure reduction initiatives were pursued actively. The licensee exhibited significant weaknesses with contaminated material control at Unit 1 and recurrent problems with high radiation area access controls.

The radiological controls program at Unit 2 was rated Category 1 last assessment period. Good radiological controls were provided for Unit 2 activities and radiological posting, barricading and access controls were effective. Despite effective planning to minimize personnel exposure, on-going problems with Unit 2 steam generators continued to result in high aggregate radiation exposure. Also, isolated weaknesses were noted at Unit 2 in the control of airborne radioactivity and personnel contamination.

The radiological controls program at Millstone 3 was rated Category 1 last period. The radiological controls organization was fully staffed with well qualified personnel and procedures and policies were found to be properly implemented. Exposure reduction efforts were effective as were the effluent monitoring and control programs. Weaknesses were

identified in return to service of the steam generator blowdown monitor and in control of contaminated material.

Radiation Protection

NRC reviews during the current assessment period indicated a good level of management involvement, control and support of the radiation protection program at Millstone Station. This was particularly apparent in the efforts underway to reduce aggregate radiation exposure at the station, the review and resolution of contamination control problems, the enhancement of the radiation protection organization through reorganization and establishment of new positions, and the resolution of previously identified concerns such as operational problems with radiation monitoring instrumentation.

NRC observations indicated aggressive efforts were initiated to correct identified concerns. However, NRC reviews indicated additional efforts in the area of proactive review and evaluation of program adequacy and effectiveness were warranted. This was supported by NRC findings and indications of weaknesses, as discussed in this assessment, in the reviews of on-going work activities.

NRC review indicated that, although supervisors appeared to be spending time in the field reviewing on-going activities during tours, there were limited independent audits conducted during periods of high program stress (e.g. during outages). NRC review found that the licensee's audit group performs audits on a five-year cycle. This was considerably longer than current industry practice. Also, the audits appeared to focus on review of documentation rather than review of on-going activities. In addition, despite procedure recommendations to perform quarterly assessments, the licensee's corporate radiological controls group performed assessments only twice a year, the assessments were not conducted during periods of high program stress, and the assessments appeared to focus on review of documentation. Supervisor tour findings were, however, presented to management on a quarterly basis. The NRC also identified weaknesses in program procedures. For example, NRC review of procedures for release of potentially contaminated material from the station, a problem experienced in the past, contained inconsistent and unacceptable guidance. The licensee initiated immediate action to address the problems but the NRC findings indicated the need for enhanced program review.

The licensee has demonstrated technically sound and timely resolutions of identified technical issues. For example, the licensee performed a review of the calibration and surveillance of all station process and effluent radiation monitoring systems to identify inadequacies and areas for improvement. Outstanding issues were resolved in an acceptable manner. The operability of the Unit 3 steam generator blowdown monitor was resolved during this assessment period with design changes implemented and the monitor placed in service. The effectiveness of the design change has yet to be evaluated.

Overall, the licensee implemented effective controls over external exposures of personnel. However, the NRC observed inconsistencies in external exposure controls between units. For example, high radiation area postings were inconsistent between units as were controls over use of integrating-alarming dosimeter alarm set-points, and access control to high radiation area access key lockers. Nonetheless, the licensee's performance in the area of external exposure controls has been good. This was particularly apparent during NRC observation of on-going work during the Unit 2 outage work. There was good adherence to radiation protection program procedures by personnel. The high radiation area access control problems identified during the last assessment period were effectively resolved. There were no unplanned external radiation exposures.

The licensee has taken aggressive action to maintain station cumulative radiation exposure as low as reasonably achievable (ALARA). Numerous initiatives are on-going at each unit to reduce cumulative exposure, including contamination control, hot spot reductions, zinc injection at Unit 1, enhancement of ALARA training, and replacement of steam generators at Unit 2. ALARA goals were challenging. Conservative personnel radiation exposure reduction goals were integrated effectively into the planning and execution of maintenance activities at Unit 1. This was evidenced by the low man-rem required to perform recirculation pump seal replacements during the assessment period.

In the area of internal exposure controls, the licensee experienced a problem with loss of control of airborne radioactive material during filter loading on the Unit 1 refueling floor. This event indicated significant weaknesses in the licensee's control of airborne radioactivity for this event and ineffective supervisory review of a significant work evolution. The licensee attributed the event to lack of adequate planning and weaknesses in supervisory review of work activities. The loss of control of airborne radioactive material also reflected weaknesses in corrective actions for previous occurrences during the assessment period. The licensee implemented aggressive corrective actions for the event including reassignment of the involved supervisor. The licensee's airborne radioactivity controls for routine evolutions were good.

The licensee also experienced problems with posting and labeling of radioactive materials, personnel exiting radiological controlled areas without performing frisking, and release of contaminated material off site. The original identification of the release of material offsite was made at the end of the last assessment period, with additional examples being identified early in this current assessment period through licensee self-initiated reviews. The licensee implemented extensive reviews and corrective actions for the identified concerns. Significant management involvement in resolving the identified problems was apparent. The small number of contaminated materials identified offsite did not result in any offsite safety concern and were returned to the station. The licensee also reduced, by 68, the number of access and egress points to the station's radiological controlled areas and provided video camera surveillance of unstaffed egress points. The substantial number of access and egress points previously maintained reflected insufficient licensee sensitivity for the potential for release of contaminated material from the radiological controlled area. Extensive NRC reviews indicated

a substantial improvement in the licensee's focus on control of radioactive material at the end of the assessment period.

The licensee experienced few operational events during the period. The principal events encountered were spills. For example, spills at Unit 3 from a waste test tank, refueling water storage tank, and reactor coolant pump seal filter were properly responded to and followed-up. Also, the Unit 2 steam generator leakage problems were properly identified and analyzed. NRC review indicated good overall licensee performance in the area of identification, response and corrective actions for operational events.

The licensee effectively staffed the radiation protection organization to support the Unit 2 outage. Properly trained and knowledgeable personnel were overseeing significant radiological activities. NRC review and observations of on-going Unit 2 outage activities indicated good control of activities and ample staffing. Additional ALARA staffing provided good ALARA oversight of planned and emergent work. Staffing to support routine activities was good. The licensee is reviewing the adequacy of current staffing levels and the mix of permanent licensee personnel and contractors.

Although on-hand staffing was adequate to support on-going activities, NRC review early in the assessment period found that the licensee had reorganized the radiological controls organization at least one and one-half years earlier and had not updated administrative procedures to reflect the new organization. Key positions were not fully described. Also, the licensee was unable to identify which organizational position fulfilled the requirements for radiation protection manager (RPM); two qualified individuals appeared to share this responsibility at the site, one with responsibility for in-plant health physics programs and the second in charge of the radwaste transportation program. As of the end of this assessment period, the licensee planned to continue using two individuals to fulfill the function of radiation protection manager; however, the responsibilities, authorities and interfaces of the two individuals were still not formally described.

The licensee implemented an effective radiation protection training and qualification program. The training programs contributed to a good understanding of the work and adherence to procedures. A defined training and qualification program was implemented for contractor personnel, special training was provided to radiological controls personnel on systems, and special ALARA training was provided for steam generator work activities and reactor coolant pump seal activities. No radiological deficiencies attributable to weaknesses in training were identified. However, there was no well defined program to ensure personnel were made aware of significant procedure changes in a timely fashion. The licensee initiated a review of this matter.

Solid Radwaste and Transportation

An inspection conducted towards the end of the assessment period indicated that the licensee's general program for transportation and radwaste processing was very good for normal evolutions, with the Quality Assurance and Training Departments making strong contributions in support of these programs. However, the licensee experienced two significant failures in its transportation and radwaste programs related to the shipment of a control rod shearer and a cask containing water. These performance deficiencies were all related to the non-routine fuel pool cleanup activities at Unit 1. The licensee's failures arose from evolutions which were out of the ordinary, and in which the licensee did not exercise adequate management oversight of the activities. The licensee's corrective actions for the failures were considered adequate.

Liquid and Gaseous Effluent Controls

An effective program is in place for controlling radioactive liquid and gaseous releases. Good surveillances were conducted on air cleaning systems. Required reports were completed. Although there were areas for improvement, the licensee conducted a good calibration program for the effluent/process radiation monitors. A noted strength was the issuance and implementation of the radiation monitor manuals for all units. These manuals demonstrated an excellent effort to maintain the monitoring system integrity and operability.

Radiological Environmental Monitoring Program (REMP)

The licensee continued to conduct an effective Radiological Environmental Monitoring Program (REMP). A noted strength of the licensee's REMP was an extensive study of the bioaccumulation factors for Zn-65 in shellfish. The licensee determined that Zn-65 was the predominant contributor for the ingestion dose pathway from oysters. Even though no radioactivity reporting levels existed for shellfish in the Offsite Dose Calculation Manual (ODCM), the licensee applied the reporting level for fish as a conservative measure. The licensee submitted a special report to the NRC to describe corrective actions which were found to be reasonable and satisfactory. There were no significant health and safety impacts to the public. Licensee actions reflected a clear understanding of ODCM requirements and technical issues, application of conservatism, and attention to the details for routine operations. An effective QC program was in place to assure the quality of sample analysis. The meteorological monitoring system was calibrated and maintained properly. Audits were thorough and of good technical depth to assess the implementation of the REMP.

Summary

The licensee implemented a good radiological controls program at the station. Effective external exposure controls were implemented, including efforts to reduce personnel radiation exposure to as low as reasonably achievable. There was clear evidence of management involvement and control in responding to events and problems and the licensee's

understanding of technical issues was good, with generally sound and thorough resolution of issues apparent. Performance of the REMP continued to be excellent as were the efforts to maintain the process monitors. An effective program to train and qualify radiological controls personnel was implemented. A well trained and adequately staffed radiological controls organization was present; however, there was no clear identification of the radiation protection manager. There were observed deficiencies in radioactive material and contamination controls and the procedures controlling the radioactive material and contamination control program, particularly for release of material from the radiological controlled area. The licensee's corrective actions for release of material were good but the occurrence of a significant airborne radioactivity event at Unit 1 reflected weaknesses in the establishment and implementation of comprehensive, effective controls for work activities involving radioactive materials. There were limited performance based independent audits during periods of high program stress associated with non-routine activities. Performance deficiencies were observed in the radwaste transportation area. Corrective actions for the transportation program deficiencies were adequate.

Performance Rating: Category 2.

Board Recommendation:

Licensee: Perform a self-assessment of the radiological controls program with special emphasis on the underlying cause(s) of the individual events which have occurred to determine if a common root cause exists. Provide the NRC the results of the self-assessment.

III.C. MAINTENANCE/SURVEILLANCE

MILLSTONE STATION AND CORPORATE PROGRAMS

This section describes those aspects of Millstone Station and corporate program performance in the Maintenance/Surveillance area that are common to all Millstone units. Those aspects of licensee performance that are unique to each unit are addressed separately. The previous SALP rated Millstone Units 1, 2, and 3 Maintenance/Surveillance as Category 1, 2, and 1, respectively.

During the current assessment period, daily site and unit management meetings were attended by department managers to report unit status and share information. Maintenance and instrumentation and controls departments requirements were communicated effectively and coordination of support services was facilitated. Daily meetings were supplemented during planned and forced outages to assure that all necessary resources were made available to support maintenance activities. Frequent tours by unit management and first line supervision contributed to awareness of material conditions and on-going field activities.

The production maintenance management system (PMMS) provided unit management with an overview of the maintenance program through equipment performance trending, inventory control, and maintenance history. The system documents the completion of work, re-work, and post-maintenance testing. PMMS reports provided an efficient means of tracking and planning maintenance and surveillance activities and were useful in reducing maintenance backlogs and assuring timely performance of surveillances.

Management support for maintenance at Millstone Station was considered to be a licensee strength. Corporate maintenance goals and policies were promulgated clearly in programs and procedures which were reviewed periodically by station management. Quarterly performance reports were reviewed by licensee management in order to identify areas in which equipment availability and reliability might be improved. Industry and NRC publications were routinely reviewed for lessons learned, which were then incorporated into maintenance and surveillance procedures as appropriate. Unit management attended peer evaluations at other nuclear facilitates in order to share information and operating experience.

Predictive maintenance formed a major part of the preventative maintenance program at Millstone Station. Predictive techniques used by the licensee included vibration analysis, MOVATS and VOTES systems for motor-operated valves, and infrared analysis. Maintenance and surveillance data were trended by the PMMS and reviewed by the reliability engineering group to prepare periodic equipment status reports to unit management. Through these management tools, operational reliability of equipment was enhanced by planning and performing maintenance before failure could occur.

An NRC maintenance team inspection was completed at the beginning of the assessment period. Management support for maintenance and maintenance implementation were functioning well. Maintenance shops were considered excellent and training facilities superior.

MILLSTONE 1

In the previous SALP, Millstone 1 Maintenance/Surveillance performance strengths included planning and control of work utilizing the PMMS; a knowledgeable and experienced work force; and training. A weakness was identified in understaffing of the PMMS planning position which resulted in excessive overtime by the Millstone 1 PMMS planner.

During this assessment period, licensee goals regarding the upgrading of maintenance and surveillance procedures were largely achieved. An administrative control procedure provided guidelines for procedure format, review methodology and requirements, and incorporation of human factors principles. Following the licensee discovery that the gas turbine generator had not been tested to the proper accident electrical loads, the guidelines

were enhanced to make explicit the requirement that reviewers consult design documents and technical specifications during the course of their review. Finally, the licensee has developed new procedure guidance for completion of post-maintenance retest requirements.

Other licensee initiatives included technical upgrading and review of instrument loop folders in response to a weakness identified at another Millstone unit, and development of an in-house tracking system and data base for spare parts. The latter program enhanced plant reliability by assuring that refurbished and qualified equipment spares were available when required.

Performance during the four forced outages which occurred during this SALP period was very good. Maintenance activities proceeded efficiently with excellent communication and coordination among supporting departments. Work items on the forced outage work list were aggressively addressed. Excellent performance was noted in the rebuilding in ten days of three intake structure traveling screens which were severely damaged late in the assessment period. Identification and correction of conflicting vendor information regarding recirculation pump mechanical seal stackup tolerances was good. Maintenance support in the design and installation of an improved feed pump discharge check valve retainer was also indicative of licensee strength in this area.

Unit management consistently demonstrated a safety perspective in resolution of technical issues during the assessment period. For example, the gas turbine generator was declared inoperable when a real power sensing unit failed to function properly, despite the fact that the sensor is not required to operate in the emergency mode.

The weekly forced outage worklist was used by management to track and plan work during outages and power reductions. Strong management attention to maintenance issues was evidenced by the low backlog of work at the unit.

The licensee effectively addressed a previously identified weakness regarding missed surveillances due to personnel error. For example, as a result of late performance of a surveillance on isolation condenser isolation system switches, the licensee enhanced its review procedure and developed a computer-based tracking program to back up the existing scheduling system. This response was successful in preventing similar errors for the balance of the SALP period. Two violations of NRC requirements, both of low safety significance, were attributed to this functional area: technical specification surveillance on a non-supervised gas turbine generator fire detection circuit was performed semi-annually vice monthly, and a delay in implementing a setpoint change request contributed, in part, to continued reactor power operation with non-conservative steam jet air ejector off gas radiation monitoring trip setpoints. The violations were atypical of licensee performance in this area and corrective actions were prompt and effective.

During the previous SALP period no engineered safety feature (ESF) actuations were attributed to maintenance or surveillance activities. An aggressive licensee program to reduce the frequency of these events continued to be successful during this assessment period. One ESF actuation, initiation of the standby gas treatment system during surveillance on a process radiation monitoring system, occurred this SALP period. No reactor trips were attributed directly to maintenance or surveillance activities. Frequent presence in the field of line supervision and management during the performance of high risk surveillance testing contributed to this result.

Two automatic reactor scrams were attributed to component failures; one low reactor vessel level due to leaking pressure switch isolation valves, and one high reactor vessel level due to lodging of a reactor feed pump discharge check valve disc retainer in a feed regulating valve. In both cases, licensee responses were comprehensive and effectively addressed the root causes of the failures.

The maintenance and instrumentation and controls departments were staffed with professional, motivated, and experienced personnel. Low turnover in the departments contributed to high quality performance in this area. Work assignments were rotated among staff members to assure that experience was not limited to single individuals. In addition, workers benefitted by temporary assignments to other Millstone units. Many supervisors and managers either retain or have had NRC operating licenses. This operational experience contributed to planning efficiency, reduction in personnel error, and effective communication with the operations department.

A potential weakness regarding insufficient staffing of the maintenance department PMMS planning office was assuaged early in the assessment period by temporary assignment of technical personnel. By the end of the SALP period, a full-time planning assistant was added to the office. This resulted in a major reduction in office backlog and elimination of excessive overtime. In addition, the department increased its engineering staff to provide more direct field support. Finally, an engineering material control group was established to enhance the evaluation and dedication of commercial grade parts.

Maintenance and instrumentation and controls training facilities were excellent. Formal classroom training was supplemented by extensive use of equipment mock-ups and retired equipment representative of that found in the Unit. Use of a full scale mock-up of a recirculation pump mechanical seal contributed to the effectiveness of seal replacement activities during the assessment period. Frequent communication with the licensee training group resulted in tailoring courses to meet the goals and requirements of the departments. Feedback from workers concerning experiences in the field were integrated into training course outlines.

In summary, the licensee maintenance and surveillance programs were implemented by a professional and experienced staff. Management aggressively pursued improvement in the reliability of equipment important to safety and maintained a conservative approach to nuclear

safety. Training and communications effectively contributed to excellent performance and continued to be a licensee strength in this area.

Performance Rating: Category 1.

Board Recommendation: None.

MILLSTONE 2

In the previous SALP, Millstone 2 Maintenance/Surveillance performance strengths included good management involvement in the inservice inspection program. Weaknesses included the need for more timely root cause analysis, additional surveillance staffing to support completion of preventive maintenance activities and the occurrence of personnel errors.

During this assessment period, management implemented programmatic improvements to address identified weaknesses in the surveillance program. Areas addressed were verification of surveillance procedure objectives in comparison to technical specification requirements; development of a generic troubleshooting guide with emphasis on technician/engineer interface; consolidation of all corrective action systems into a single common administrative procedure; modification of procedure changes as they relate to procedural compliance; and a procedural compliance internal audit program. The programs were extensive and generally well implemented.

Preparation and planning of maintenance and surveillance routine activities functioned well. Unit management awareness was manifested in daily planning meetings, and operations was provided work lists one day prior to initiation of preventive or corrective maintenance. Good inter-departmental interface was noted during outage preparation.

Inservice inspection activities, and engineering inservice tests, were well documented, properly evaluated, and implemented by knowledgeable personnel. Examples of good performance included steam generator eddy current testing and effective pressurizer heater sleeve inspections. One isolated lapse in the inservice program was failure to incorporate a previously committed action to inspect emergency diesel outlet service water check valves. The item was appropriately resolved.

Management approach to technical and safety issues was conservative as noted in modifications to the steam generator eddy current testing program, in modifications for the feedwater regulating valves, service water pipe replacements, and in response to industry experience on susceptible steam generator tube plugs. An isolated weakness in the management approach to a safety issue was identified during the assessment period. The issue involved an incomplete causal review of the "A" emergency diesel generator voltage and excitation problems, with a decision to prematurely remove from service the alternate emergency power source for preventive maintenance activities.

When significant plant issues were identified, generally effective communications existed between unit and corporate engineering, contractors, vendors and plant maintenance and surveillance staff. Examples of effective communication and adequate resolution of issues included reported defects from another facility concerning large-bore hydraulic snubbers, examination of control element assemblies susceptible to cracking, contractor support for reevaluation of safety-related check valve applications, engineered safety feature troubleshooting, neutron logging of high density spent fuel pool poison boxes, and steam generator inspection and repair. Occasional events of minor safety significance were attributed to lapses in communication between the surveillance and operations staffs. The lapses resulted in a failure to complete limiting conditions for operation (LCO) actions for out of service radiation monitors. Notwithstanding, overall communications were assessed as good.

Reportable personnel errors in the surveillance area included a missed surveillance; a misinterpretation of a technical specification definition to include alarm checks during surveillances; and a missed source check for a process radiation monitor. The errors did not compromise safe operation of the facility. Performance errors in the maintenance area included incorrect assembly of an air supply check valve to a service water operator and improper procedure implementation during reactor disassembly that resulted in dropping the incore instrumentation plate. The causal analyses for each event was extensive, and corrective actions were appropriate.

Collectively, the maintenance and surveillance errors were not a repetition of similar events, but were isolated deficiencies in man-machine interfaces, manifested by inattention to detail during work activities. The dropping of the incore instrumentation plate into the upper guide structure, however, demonstrated the continual need for diligence in the review process for procedures to eliminate any over-reliance on personnel experience for critical activities.

Maintenance enhancements to improve component reliability and performance included a predictive maintenance program on rotating equipment that incorporated additional surveillances, reactor vessel head cleaning equipment that resulted in radiation exposure savings on head cleaning evolutions, and successful implementation of a new reactor coolant pump seal design for improved durability and longevity. One manual reactor trip and one engineered safety feature system actuation were a direct result of component failures; and in addition, three plant downpowers were a result of balance of plant equipment failures. A reduction in plant transients as a result of component failures was indicative of improved component reliability from the previous assessment period.

The maintenance and surveillance program was staffed by dedicated, highly trained, and knowledgeable engineers, mechanics, electricians, and technicians. The staffing deficiency identified in the previous SALP was adequately addressed by supplementing station staff with contractor technicians. Overall, maintenance staffing was adequate as indicated by a

relatively low backlog of outstanding work requests during routine operations; however, overtime hours were extensively used during plant outages. Effective use of contractor personnel was noted to supplement the department engineering staff.

The rotational assignment of maintenance mechanics and electricians into the work planning group and quality control department, and the temporary assignment of I&C technicians to supervisory roles was a positive training enhancement.

In conclusion, the licensee demonstrated a generally conservative management approach to safety and technical issues. Improvements to the surveillance program and a reduction of plant transients resulting from component failures were noted. Staffing was adequate. However, several performance errors were a result of inattention to detail and communication lapses.

Performance Rating: Category 2.

Board Recommendation: None.

MILLSTONE 3

In the previous SALP, Millstone 3 Maintenance/Surveillance performance strengths included a well managed and staffed maintenance program, use of an SRO qualified individual as work control coordinator, and an effective, well-equipped technical training program. Weaknesses included some surveillance procedures which failed to adequately test plant systems and resulted in three reactor trips.

During this assessment period, the backlog of outstanding work requests was small and well managed. Preventive maintenance activities were routinely accomplished in a timely manner. This is attributed in part to a progressive planning department which provides maintenance supervisors a two week look ahead of scheduled activities. A notable long range planning department initiative consists of providing system schematics with work order packages. Interaction with the operations department was good. System isolation was established and work packages were ready to be released when activities were scheduled.

While performing routine surveillance/maintenance activities, personnel followed procedures and identified to appropriate supervision abnormal results obtained. One example was the apparent temperature sensitivity of a hydrogen analyzer noted by an instrumentation and controls technician during the performance of a routine surveillance. Subsequent licensee followup of this observation determined that the hydrogen analyzers were not environmentally qualified for the area in which they were located. Appropriate compensatory action was taken.

Maintenance procedures were detailed and usable. However, two examples of inadequate procedures were noted. Deficiencies in the maintenance procedures for installation of steam generator access covers and a feedwater pump coupling resulted in the lengthening of two forced outages and a reactor trip. The procedures which installed the steam generator secondary side access covers utilized vendor supplied torque values which did not assure a metal to metal fitup, resulting in subsequent leakage. The feedpump coupling installation procedure contained incorrect bolting installation instructions and the pump hot alignment was performed using extrapolated cold growth values. These procedure weaknesses were subsequently corrected through revised steam generator torquing instructions and revised alignment methods. The procedure inadequacies are considered isolated as equipment rework was, in general, low.

Work performance in the field was good, although minor exceptions were noted, such as: the use of incorrect weld wire by an unqualified welder during an ASME Code Class III service water leak repair; improper installation of a linkage on a pressurizer spray valve during the previous refueling period resulted in a plant depressurization; and, inadvertent loss of reactor coolant pump seal injection during a seal filter changeout. Licensee investigation and response to these occurrences were prompt and effective.

Surveillances were performed on schedule with minor exceptions noted. Missed surveillances included the untimely performance of a measurement for average disintegration energy (E-bar) which necessitated the issuance of a waiver of compliance to allow a plant startup. Fire protection surveillances were allowed to lapse by the operations department because personnel who would perform those surveillances were diverted to additional tasks at the intake structure. This action resulted in the use of additional fire watches, an increased administrative workload and the generation of licensee event reports when proper watches were not established.

Troubleshooting efforts during the report period were conducted in a systematic and safe manner, and provided timely support to the operations department. Examples include the instrumentation and controls department investigation of an inadvertent partial containment depressurization signal, a dropped control rod, and electrical maintenance investigation of a failed trip coil on a control room chiller breaker.

Maintenance personnel provided timely support to plant operations during routine plant activities and when responding to operational events. Staffing was ample and personnel were frequently utilized from the other Northeast Utilities plants. First line supervisors and engineers assigned to the maintenance department were knowledgeable and actively involved in the progress of work activities. Frequent visits to active work sites were noted.

In summary, the surveillance and maintenance areas remained notable strengths during the assessment period. Technicians were properly trained and followed procedures. Personnel errors were infrequent during this period. No plant trips were caused by technician error. Troubleshooting operations conducted by the maintenance organizations were safe and well

controlled. Communications between the operations department and the support organizations were good. Anomalous equipment performance was reported properly by technicians and dispositioned appropriately.

Performance Rating: Category 1.

Board Recommendation: None.

III.D. EMERGENCY PREPAREDNESS

During the previous SALP period, Emergency Preparedness was rated Category 1. This rating was based on strong performance during a full-participation exercise which included the ingestion pathway. No emergency plan or implementing procedure deficiencies were identified during routine inspections. Emergency preparedness at Millstone is treated as a site function as the emergency plan as well as site 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. The licensee had developed and was maintaining a strong emergency preparedness program.

During this assessment period, two partial-participation exercises were observed and two routine evaluations of the emergency preparedness program were performed. No violations were identified during these inspections. Performance during the exercises indicated that the staff was well-prepared to implement the site emergency plan. No weaknesses were identified.

Management involvement in emergency preparedness remains effective and extensive. Managers maintain emergency response organization position qualification, review and approve emergency plan and procedure changes, participate in drills and exercises, resolve audit non-compliance issues, exercise oversight functions, and interface with Connecticut State government and town governments. Emergency preparedness policies and procedures have been clearly delineated in corporate administrative procedures which also assign and define responsibilities.

During this evaluation period, no technical issues arose which required resolution. Initiatives during this assessment period included clarifying the emergency plan implementing procedure for event classification, developing a users' guide for emergency action levels, relocating the Operations Support Center for Units 1 and 2, using a probabilistic risk assessment of siren test results to reduce testing frequency, and identifying siren system components with high failure rates, which were replaced or subjected to preventive maintenance. Licensee management involvement was apparent in assuring quality which enhanced program effectiveness.

As a means of improving the ability to alert various response organizations of an emergency at the Millstone site, the existing prompt notification system was replaced in 1990 by a computer based Emergency Notification and Response System. This system is used to notify the state, towns and licensee corporate and site emergency organization staff of declarations of any emergency and transmits hard copies of the notification forms. Verification of notification is obtained in one third the time required by the former system. The system was successfully demonstrated during the 1990 exercise.

Although generally very effective, management involvement in assuring quality was not fully effective in two areas. Examples were failure to identify to the Training Department the identity of personnel requiring site emergency organization training, and evidence of lax distribution control of implementing procedures. Current revisions of classification procedure were not found at two locations where classification would be made.

Licensee initiatives to improve the training value of emergency exercises is demonstrated in continued efforts to explore the feasibility of running the exercises from the simulators. The licensee plans to award a contract to extend simulator capability to replicate accidents more severe than design basis.

The licensee has implemented a well-defined emergency preparedness program. Site emergency organization staff positions have been identified, authorities and responsibilities assigned and needed expertise provided. The emergency preparedness staff is stable and is staffed by personnel with the discipline mix needed to do the job. Additional personnel needed to develop scenarios are drawn from station staff on a temporary duty basis. The Millstone Senior Site Nuclear Emergency Preparedness Coordinator maintains the site emergency preparedness program. He maintains an on-going liaison with the Director, Unit Services, maintains the site emergency response facilities in a state of readiness, and participates in scenario development. One of the chief responsibilities of the Unit Services Director is emergency preparedness, including responsibility for upgrading the Emergency Plan Implementing Procedures (EPIP). An analyst who has an emergency preparedness background has been added to this Director's staff to undertake the EPIP upgrade.

Management actions showing a high priority on assuring the quality of offsite support activities include: public information material is current and is distributed to all places in the Emergency Planning Zone; Letters of Agreement are current; siren availability was maintained at 99%, a value which significantly exceeds US FEMA specifications; program staff regularly meet with state and town officials to discuss emergency preparedness issues; off-site officials are trained in their emergency response roles, and drills are held with off-site organizations.

The extent of the licensee's involvement in providing support to the local communities in training for and responding to emergencies indicates an effective, realistically oriented emergency preparedness program.

An emergency preparedness training program has been developed and is maintained by the Training Department. Adequacy was demonstrated by response to four actual situations requiring classification as well as during the October 1989 and December 1990 exercises. The basis for the training is clearly described in the Nuclear Training Manual which delineates policy, specifies the training matrix, lists course content, and states requalification policy. Reactor operators receive classroom, table top and simulator training in classification. Severe accident management training is also given. These activities and performance are reflective of an excellently conceived and implemented training program.

In summary, the licensee maintains a strong emergency preparedness program. Management remains involved with a demonstrated commitment to quality. The Emergency Preparedness Program staff is stable and well qualified to maintain an effective program. Training is well developed and is effective as demonstrated by response to situations requiring classification. A good working relationship is maintained with the state and towns with regular meetings, training, and frequent drills.

Performance Rating: Category 1.

Board Recommendation: None.

III.E. SECURITY AND SAFEGUARDS

During the previous assessment period, the licensee's performance was rated Category 1 based upon the significant enhancements made to the program during that period. Improvements in the audits and self-assessment programs were effective and the results achieved to upgrade the operations and reliability of systems and equipment were commendable.

Effective management attention to the security program was evident during this period by the comprehensive actions taken to correct identified weaknesses in testing of intrusion detection systems, vital area barriers and turnover in the security force. Additionally, security supervisory personnel were directly involved in planning daily work activities that affected security systems and equipment. This direct involvement kept the need for security force overtime at a minimum even during plant outages. The licensee also continued to implement an effective vital area access control program, limiting access to only those with a work-related need.

Corporate security management continued to be actively involved in all plant security program matters. This involvement included visits to the plant by the corporate staff to provide assistance, program appraisals and support in the budgeting and planning processes affecting program modifications, upgrades and enhancements that were made during the period. These included assessment aids, a new access control facility with improved vehicle

search capabilities, and protected area intrusion detection system, for example. Security personnel also remained actively involved in groups engaged in nuclear plant security matters. This level of involvement demonstrated program support from upper level management.

The licensee continued the use of self-assessments to provide oversight of security program implementation and personnel performance. The self-assessment, along with improvements in the training and qualification program discussed later in this assessment, contributed to reducing personnel errors. Members of the security force that were interviewed during the period exhibited a comprehensive knowledge of their duties and responsibilities and displayed a professional demeanor. The NRC-required annual audit of the security program was reviewed and found to be comprehensive and generally performance-based. Corrective actions on findings and recommendations identified during the audit and the self-assessments were prompt and effective, with adequate follow-up to ensure their implementation.

However, the NRC identified two weaknesses in the program that had not been found during the self-assessments or audit. One involved the test procedure for personnel search equipment, in that it did not ensure adequate performance of the equipment; and the other involved personnel access control. The licensee took prompt comprehensive and effective corrective action in each instance.

The licensee's fitness for duty program was found to be generally aggressive, but some deficiencies in the training of supervisors (licensee and contractor) were identified. These deficiencies and an incident involving an individual being granted unescorted access after a presumptive positive drug screen were the subjects of an enforcement conference late in the assessment period. Corrective actions were acceptable and the NRC determined that escalated enforcement was inappropriate. The program was being effectively implemented.

The licensee submitted three one-hour event reports during the assessment period, none of which were repetitive. The events were properly reviewed for root cause and appropriate corrective actions for each event were taken. A review of the licensee's recordable security event reports found the events to be tracked, analyzed and corrected, as necessary. The reporting procedures were found to be well understood by security supervisors and consistent with NRC regulations.

The security training and qualification program was administered by a supervisor and seven full-time trainers. Three of the seven conduct training while assigned to specific shifts. Training aids, including upgraded lesson plans and films on various security topics, were readily available for classroom or individual use and enhanced weapons qualifications and tactics training were implemented during the period. Contingency drills were conducted for training purposes, and the Operations Department participated in these drills when the postulated event could affect plant operation. Drill critiques were very thorough and were

utilized to improve the training program. The licensee's efforts to improve the quality of the program were evidence of its commitment to an effective training program. Staffing of the contract security force was consistent with program need, as evidenced by the minimal use of overtime.

During this assessment period the licensee submitted one revision to the security plan. This revision was technically sound and generally demonstrated a thorough knowledge and understanding of NRC requirements and security objectives.

In summary, the licensee committed adequate resources to maintaining an effective security program. Management attention to and support for the program were clearly evident in all aspects of program implementation. The efforts expended to maintain and upgrade the program were commendable and demonstrated the licensee's continued emphasis on a high quality, effective program. The licensee's strong training and qualification program, along with an effective self-assessment and audit program, were key elements which contributed positively to effective program implementation during the period.

Performance Rating: Category 1.

Board Recommendation: None.

III.F. ENGINEERING AND TECHNICAL SUPPORT

MILLSTONE STATION AND CORPORATE SUPPORT

This SALP will provide a combined assessment for the Millstone Station in the Engineering and Technical Support area.

During the previous SALP period, Millstone 1 received a Category 2 rating in this area, and strengths were noted in an effective interface between site and corporate engineering staffs and a knowledgeable engineering staff. Errors in an EQ exemption request which necessitated a justification for continued operation, the failure to identify the absence of seismic anchors on a non-safety related 4kv bus which could have resulted in a loss of unit AC power, and weaknesses in supporting evaluations for Revision 2 EOPs demonstrated a need to improve the quality of technical reviews.

During the previous SALP period, Millstone 2 received a Category 1 rating in this area. Engineering groups were staffed by personnel who were competent and actively involved in plant modifications, design improvement and resolving problems. In addition, the licensee took aggressive steps in the evaluation and dispositioning of previous steam generator tube issues.

During the previous SALP period, Millstone 3 received a Category 2 (improving) rating in this area. Strengths were noted in the engineering support provided by both site and corporate personnel to identify and correct corrosion and erosion problems in ASME Class III service water piping, and in a task force which was formed to recommend corrections to underlying design problems with intake structure equipment. A number of mechanical failures including leaking loop isolation valve to bonnet joint gaskets and feedwater pump mechanical seals demonstrated a need for continued engineering support for operational problems.

During the current assessment period, engineering support to Millstone was provided by both onsite (Northeast Nuclear Energy Company - NNECO) and corporate (Northeast Utilities Service Company - NUSCO) staffs. Approximately 1000 engineering employees of various technical disciplines supported the four Northeast Utilities plants. Millstone received an equitable share of the corporate engineering support during the SALP cycle.

The engineering organizations are staffed with qualified and well-trained engineers. An NRC review of plant modifications concluded that the modifications were done in conformance with the controlling procedures. Good interaction was observed between the various responsible engineering groups. Communications between NNECO and NUSCO personnel are frequent and extensive. At the site, communications among engineering and other departments is a strength, as evidenced by the technical support provided for an enhanced material procurement group. Some exceptions to good communications were identified. In one case IST program changes were poorly communicated to the operations department and, in another, resolution of an appropriate cooldown rate for Unit 2 was delayed, but the NRC viewed these as isolated cases.

Project work load is controlled in accordance with licensee administrative procedures. Technical issues are assigned, prioritized, and tracked by engineering work request, Project Assignment, or Level of Effort processes which are reviewed by management monthly. This is viewed as a strong program which maintains positive control of the work effort. The quality of design work is high.

Training and experience levels exceed requirements and are a licensee strength. Outside consultants rarely are required to resolve safety issues. Several NNECO engineering department personnel held SRO qualification, which further strengthens interdepartmental understanding of plant issues.

Previous NRC inspections at the Millstone Station have noted instances where the timeliness for reportability/operability determinations could be improved. As a result, major changes were incorporated in the latest revision to control documents to correct this condition. These changes are beginning to prove effective in correcting previous lapses in timeliness of operability and reportability determinations; however, instances of untimely determination continued to occur during this period.

Engineering actively supported responses to NRC generic communications. Programs developed to address issues contained in Generic Letters 89-10 "Safety Related Motor Operated Valve Testing" and 89-13 "Service Water System" and in Bulletin 90-01 "Loss of Fill-Oil in Transmitters Manufactured by Rosemount" were technically well supported. Sufficient justification was provided to support planned courses of action.

MILLSTONE 1

During the current SALP period, the licensee has implemented several programmatic initiatives which demonstrate management commitment to the safe operation of Unit 1. These programs include: (1) a setpoint verification program for reactor protection and engineered safety features instrumentation, which resulted in the discovery of nonconservative reactor trip setpoints; (2) a technical specification improvement program, which led to the discovery that the gas turbine generator had not been tested to accident loads, and that the accident load profile in the UFSAR was incorrect; (3) a procedure upgrade program that led to the discovery that the EOPs directed operators to exceed design flow of the containment cooling (LPCI) heat exchangers; and (4) a design basis reconstruction program. While not always timely, licensee resolutions of the safety issues were conservative, technically sound, well documented, and indicative of a high regard for the safe operation of the unit.

The licensee identified that failure of certain house heating steam system lines would degrade areas of the unit which previously were classified as EQ mild environments. In contrast to the deficiencies identified above, licensee response to this issue was timely and comprehensive. In addition, corrective maintenance on diesel generator control power transformers led the licensee to conduct a comprehensive review of all class 1E cabinets by NUSCO's seismic engineering staff. The high quality of these responses is typical of licensee performance once a safety issue is recognized.

High quality engineering support was demonstrated in the resolution of concerns regarding low temperature effects on main station batteries and the gas turbine generator hydraulic control unit, two service water system outages, raising the minimum speed of recirculation pumps and replacement of seals, analysis of the effects of diesel generator governor speed droop on core spray and low pressure coolant injection systems flow rates, and undervoltage protection of the LPCI swing bus.

The licensee implemented Revision 4 EOPs during this SALP period. In an effort to assure that the EOPs conformed to the plant design, the licensee took two major deviations to the generic emergency procedure guidelines. Although licensee technical justifications for the deviations appeared technically sound, these deviations are currently under review by the NRC staff.

MILLSTONE 2

During the current SALP period, the licensee continued to aggressively and comprehensively resolve the steam generator tube issues. Examples include a good primary-to-secondary leakage rate monitoring program and an improved eddy current data analysis. In addition, the licensee has developed an excellent system for the control of water chemistry where purity is approaching the current technological limit of the ability to measure impurities present. The steam generators will be replaced during the next outage.

A comprehensive engineering analysis was conducted to address the impact of the house heating system on safety related equipment, which demonstrated a high regard for safety. In addition, licensee actions to identify reactor quadrant power tilt, to evaluate its root cause and significance, and to plan corrective actions were thorough and extensive.

During this SALP period, the licensee determined that the technical specification cooldown limits for the reactor coolant system pressurizer were non-conservative. A fatigue stress analysis determined that the allowable cooldown rate should have been lower than the technical specification limit. One instance of poor performance was observed in the normally aggressive communications between corporate and site engineering and in corrective action timeliness, which delayed resolution of this issue for approximately one month. Otherwise, engineering provided timely support to operations.

An NRC review found plant modifications were well engineered. Most of the modifications contained a thorough justification to support the conclusion that the criteria of 10 CFR 50.59 were met. Although a few safety evaluations required better documentation to support the conclusions, reasonable assurance existed that the modifications did not involve unreviewed safety questions.

MILLSTONE 3

The inability of the intake structure traveling screens to clear themselves of debris resulted in two reactor trips during the last assessment period. This underlying design deficiency continued to cause plant transients during this assessment period, with three reactor trips manually initiated when circulating water pumps automatically tripped due to clogged intake traveling screens. Management was sensitive to this significant plant vulnerability and applied appropriate resources to address this weakness. Engineering support included modifying the screenwash control system logic, installing temporary screenwash pumps, and improving screenwash spray patterns. However these modifications did not substantially improve intake system capabilities and as a result, significant modifications that include increasing traveling screen speed, which were planned during future refuel periods were appropriately rescheduled to commence during the February - March 1991 refuel outage.

Further, service water leaks in ASME Class III piping continued to require engineering staff involvement. The licensee produced timely evaluations to repair the deficient conditions and good coordination between the site and corporate staff was observed. Also, the licensee's engineering staff was observed to be knowledgeable and experienced. This was particularly demonstrated in the licensee's implementation of Regulatory Guide 1.97 recommendations which relate to post accident monitoring instrumentation. The licensee's implementation of Regulatory Guide 1.97 was technically sound and thorough.

A noteworthy initiative in the area of training consists of providing site engineers instruction in Unit 3 piping and electrical systems, and overall theory of operation. The instruction program, which included simulator scenarios, has provided engineers with a valuable first hand observation of integrated plant operations.

Engineering support to the operations department was good. Major Unit 3 projects that required extensive corporate engineering support included: the spent fuel pool sigma crane reliability and human factor improvements; proposed relaxation of sub-atmospheric technical specification requirements; and the planned deletion of the residual heat removal automatic closure interlock during the upcoming refueling period. However, additional support was needed to address the recurring auxiliary feedwater check valve back-leakage and feedwater heater relief valve failures subsequent to reactor trips. Temporary compensatory actions taken to address these issues were determined to be adequate. 10 CFR Part 21 reports which required extensive corporate engineering involvement were well supported and timely during the assessment period.

Overall Summary

In summary, frequent and extensive interactions occurred between onsite NNECO and corporate NUSCO engineering personnel. Communications between engineering and other site departments were good. High quality design work was accomplished by a strong, positive work control process. Training and experience levels were a strength, such that contractors were rarely consulted to resolve safety issues. Once identified, technical problems were conservatively and comprehensively resolved. However, instances have occurred where the timeliness of reportability and operability determinations needed improvement. Corporate support for the site, particularly for operations, was good.

Performance Rating: Category 2.

Board Recommendation: None.

III.G. SAFETY ASSESSMENT/QUALITY VERIFICATION

MILLSTONE STATION AND CORPORATE PROGRAMS

This SALP will provide a combined assessment for the Millstone Station in the safety assessment/quality verification area. In the previous SALP, Millstone 1 Safety Assessment/Quality Verification received a Category 1 rating. The SALP noted that the licensee maintained a well-managed and knowledgeable staff and was effective in implementing self-assessment programs and corrective actions.

In the previous SALP period, Millstone 2 received a Category 2 rating in this area. Licensing issues were characterized by extensive analysis and applications were well prepared and provided adequate support for license amendments. A noted weakness was the lateness of an application for an amendment for Cycle 10 operation and a proposed emergency amendment that failed the emergency provisions criteria of 10 CFR 50.91. The previous SALP also noted concern related to a Millstone 2 fire protection issue.

The rating for the previous SALP period for Millstone 3 was Category 1. With the exception of two submittals, all applications were sound. The 10 CFR 50.59 program was effectively implemented. The Nuclear Safety Engineering Group (NSEG) produced technically adequate reports and performed a thorough examination of the plant activities, but there was no system to track disposition of NSEG recommendations. The licensee implemented an adequate QA program; however, responses to audit findings could have been more timely, and identified weaknesses at other units could have been better assessed for applicability to Millstone 3. Plant problems were aggressively identified and investigated.

The NRC has found the Quality Services Department personnel to be knowledgeable and qualified to relevant industry standards. The level of staffing was adequate to support its role. The licensee has established a new material control group and is splitting the Station Services group into a Unit Services group and a Site Services group to better meet the needs of the individual units and the site in general.

The licensee's QA program is well-documented and effectively administered. Audits were of high quality and received appropriate management attention. NRC expressed some concerns early in the SALP period over untimely responses to QA audit findings. This concern was effectively resolved after management reaffirmed their policies on audit findings and responses, and after stronger administrative instructions were issued to require direct management overview of audit responses.

The licensee's QA surveillance program was newly implemented during this period and was considered to be generally effective as part of the threefold QA program (QA audits/QA surveillances/and QC inspections). Further improvements were made later in the period.

During the current SALP cycle, the Nuclear Safety Engineering Group (NSEG) conducted aggressive investigations of personnel performance issues. Review personnel were trained in several root cause methodologies. Reports involving personnel factors were well prepared and insightful, and were critically examined by senior management. The NRC considers the review product to be uniformly excellent and indicative of a strength in this area. In response to a previous SALP item, NSEG now tracks licensee dispositioning of significant NSEG recommendations. The licensee is responsive to issues identified by the NSEG staff and has implemented actions where appropriate. Noteworthy initiatives have been undertaken by the NSEG staff in the area of trip reduction and the proposed human factor training of personnel who investigate events at their facility.

In general, transmittal of common operating information by station management among the units was good and was improved during the assessment period. However, one noteworthy lapse occurred, as indicated by the October 1990 screen failure at Millstone 1. Operators at Millstone 1 were not prepared to deal with degraded intake conditions which routinely occur at Millstone 3, and as a result, Unit 1 operators did not correctly deal with the significantly degraded condition in its screen house systems. More intensive training, operator awareness, and preparedness could have minimized subsequent physical damage.

In accordance with the requirements of 10 CFR 50.59, unreviewed safety question determinations were found to have been performed with a good overall regard for nuclear safety. The staff concluded that the licensee continues to maintain an effective program for addressing equipment and procedural changes at Millstone Station. However documentation which addressed the "No unreviewed safety question criteria" was in some cases incomplete or lacked detail.

During the period, NRC noted instances in which events or performance problems resulted from weaknesses in either attention to detail in operating activities or on the procedural review process. For example, NRC analyses of the Unit 3 events determined that personnel errors (eighteen) and deficient procedures (fifteen) were the cause for the majority of the events. A majority of problems involving deficient procedures were identified only after a combination of plant events or system failures challenged the procedure. This is an indication of weakness in detailed technical review prior to procedure issue. Seven of the eighteen events caused by personnel error were attributed to inattention to detail. The remaining events were a result of a failure to follow procedures. Misinterpretation of procedural requirements resulted in three events. Similar problems were found at the other two units. They suggest a need for more site management attention to assure routine activities are properly carried out.

During this SALP period, a special inspection was conducted at Millstone 2 in July 1989 to address a series of allegations. This inspection concluded that, although there were no major safety significant issues in any of these allegations, there were weaknesses in the licensee's deficiency reporting methods and there appeared to be a reluctance on the part of some employees to use formal procedures and their line management for recording deficiencies.

The NRC recommended that the licensee modify its allegation/safety issue management system to encourage employees to properly report issues and to promote a process wherein issues are consistently reported and resolved within the licensee's programs. In response to these concerns, the licensee implemented corrective actions including establishment of a nuclear safety concerns program.

In October 1990, the NRC conducted an inspection of the Millstone and Haddam Neck sites and the corporate office to evaluate the structure and effectiveness of the Nuclear Safety Concerns Program (NSCP). The inspection team concluded that the program was fundamentally sound. Furthermore, it found that the overwhelming majority of employees have a preference for and confidence in resolving issues through their supervisors. Finally, the team found that nuclear safety concerns were generally being brought forward by employees and appropriately resolved.

However, despite the corrective actions described above, the licensee has not been totally effective in satisfactorily resolving some employee concerns. The shortfall appears to NRC to be due primarily to two broad reasons. First, instances have continued to exist where routine activities by both site and corporate organizations lack rigor and formality in conformance to established administrative controls. These instances form the basis of many concerns. Secondly, the licensee has not convinced all its employees that it would deal with their concerns completely and forthrightly, on a priority schedule commensurate with the significance of the concerns. The NRC is not confident that the root causes of these issues have been identified and resolved by the licensee.

MILLSTONE 1

During the SALP period, amendment requests were characterized by well-planned submittals containing sufficient analysis such that NRC requests for additional information were kept to a minimum. The licensee's overall timeliness of submittals was very good.

Licensee management, the plant operations review committee (PORC) and the nuclear review board (NRB) were actively involved in the review of operational events, temporary waiver of compliance preparation, safety evaluation reviews, implementation of the QA program, and technical specification change request reviews. The quality of management, PORC and NRB involvement were generally very good. Performance of the Unit 1 PORC is a licensee strength. However, the NRC has noted instances where licensee performance could be improved, including the initial PORC review of the test procedure for a modification made to the control circuit for the non-safety-related instrument air compressor. In addition, there was untimely licensee followup of non-conservative setpoints on main steamline high flow isolation instrument and the long-standing failure to test the gas turbine at actual accident load.

Millstone 1 implemented a conservative approach during routine plant operations while resolving equipment failures and other events affecting operations. Examples of this approach were the identification of the gas turbine generator load issue identified by the licensee during a licensee initiated technical specification improvement program. When problems are identified by the licensee or the NRC, the licensee's management involvement and corrective actions and safety evaluations are generally of very high quality. However, four safety system deficiencies identified and corrected during the period had common root causes and showed the need for improved performance. The deficiencies involved the lack of seismic qualification for the FWCI minimum flow valves; the failure to recognize and incorporate LPCI heat exchangers design flow limitations in plant procedures; the non-conservative trip setpoints on the main steam line (MSL) flow instruments; and, the inadequate load test procedure and the inadequate load carrying capability of the gas turbine generator (GTG). The LPCI, GTG and FWCI issues revealed the need to better utilize (research or appreciate) available design basis information in the course of routine review activities. The MSL instrument and the LPCI heat exchanger issues showed the need for more thorough and timely dispositioning of identified design basis discrepancies. The licensee's first review of the LPCI heat exchanger deficiency was weak.

The NRC has found the quality of licensee event reports to be high. However, the NRC identified an instance of an LER not being updated to reflect new information regarding the root cause of a snubber failure. This was an isolated problem in otherwise good performance.

MILLSTONE 2

During this SALP period, the licensee was timely in resolving licensing issues. A number of longstanding issues were resolved including a fire protection issue, the 10 year inservice testing program and the final resolution of the issue of the Appendix J, Type C testing of the reactor building component cooling water (RBCCW) system containment isolation valves through the application for an exemption from the requirements of Appendix J. However, a more timely response to Generic Letter 87-09, "Section 3.0 and 4.0 of the Standard Technical Specifications (STS) on the Applicability of Limiting Conditions for Operation and Surveillance Requirements," May 4, 1987, a voluntary Technical Specification line item improvement, would have precluded the need to request an emergency technical specification change.

A good regard for safety was noted in the PORC meetings during routine operation and post-event reviews. The PORC continued to demonstrate a conservative attitude toward radiological and personnel safety, with deliberations that were probing and technically sound. NRB involvement was strong. Its audit reviews were comprehensive and had generally good findings.

Licensee event report (LER) quality was generally acceptable. Instances of insufficient event description and safety significance detail were noted in LER 89-09, and 90-16. Both LERs were followed up by updated reports in a timely manner. One technical specification violation was identified for failure to report a condition prohibited by the technical specifications on the operation of the control room ventilation system.

The licensee justification for continued operation (JCO) on steam generator tube plugs was thorough. The licensee identified more than 400 tube plugs that could be susceptible to cracking and repaired them by the plug-in-plug (PIP) method. Also, two mid-cycle shutdowns of the plant for the purpose of steam generator tube inspection were performed to confirm if measures to arrest steam generator tube circumferential cracking was effective. The licensee showed a good safety awareness in the steam generator tube inspection effort. The licensee provided significant management attention and awareness regarding leakage values and trends in primary to secondary leakage.

MILLSTONE 3

During the current SALP period the licensee continued to aggressively pursue licensing initiatives; licensee submittals were technically sound and complete. The licensee submitted sufficient information to allow the NRC staff to close 21 NRC issues (bulletins, multi-plant actions, and TMI-related issues). A total of 18 license amendments and two American Society of Mechanical Engineers (ASME) Code Reliefs were issued in response to applications from the licensee; two exemptions from NRC rules were also issued. Although the licensee assigned priorities well, in one instance the delay in the response to Generic Letter 87-09, "Section 3.0 and 4.0 of the Standard Technical Specifications (STS) on the Applicability of Limiting Conditions for Operation and Surveillance Requirements," dated June 4, 1987, resulted in the need for two emergency licensee amendments to correct specific problems that would have been addressed through this Generic Letter.

The plant operations review committee (PORC) and nuclear review board (NRB) functioned well in probing station practices and problems, thus assuring clear definition and comprehensive resolution of issues. The NRB has prioritized safety items of concern at Millstone 3, and tasked individuals with followup of these concerns and development of a program for dispositioning.

During the current SALP period, licensee event reports (LERs) were generally complete and well written. Root causes were identified and corrective actions targeted to address the concern. A weakness was noted in the timely station implementation of correction actions committed to in several LERs.

A noteworthy initiative at Millstone 3 involves the temporary assignment of quality assurance (QA) personnel to the operations department in the Shift Supervisor Staff Assistant position. This initiative should provide valuable operations experience to the QA department.

OVERALL SUMMARY

In summary, the QSD department has knowledgeable personnel qualified to industry standards. QA program areas are effectively implemented and audits of high quality are performed. Third party reviews of personnel performance issues are a strength. Changes performed under 10 CFR 50.59 are effectively documented. PORC and NRB activities have been very good. The licensee has generally appropriately prioritized licensing issues. Overall LER quality was acceptable. However, some noteworthy weaknesses involving attention to detail and procedural adherence, intra-unit information transfer and handling of employee concerns were identified.

Performance Rating: Category 2

Board Recommendation:

Licensee:

1. Aggressively identify and address the root causes for lapses in attention to detail in routine activities, procedural quality and adherence, and the continuing employee safety concerns.

2. Adopt a more aggressive approach toward dealing with continuing employee safety concerns in a way that fosters employee confidence and assures that all concerns can be dealt with consistent with their safety priority.

NRC:

Conduct a team inspection focused on the issues in 1, above, to validate and confirm the licensee's root causes and to judge the effectiveness of corrective actions.

IV. SUPPORTING DATA AND SUMMARIES

IV.A. LICENSEE ACTIVITIES

MILLSTONE 1

Millstone Nuclear Power Station (Millstone 1 or the plant) began the assessment period at 100% of rated power. Except for the occasions discussed below and for periodic reductions in power to perform routine surveillance testing and minor maintenance, Millstone 1 operated at full rated power during the SALP period.

Two automatic reactor trips occurred during the assessment period. On October 19, 1989, while at 50% of rated power, a loose part from a broken reactor feed pump discharge check valve became lodged in a feed regulating valve resulting in an automatic turbine trip/reactor trip on high reactor vessel level. Full power operation resumed on October 24 following repairs. On September 14, 1990, the reactor tripped on low reactor vessel level during performance of a routine calibration check of a reactor pressure switch. Leaking switch isolation valves were identified as the cause of the level transient. Full power operation was achieved on September 15.

On October 4, 1990, during conditions of severe weather and unusually high tides, a sudden influx of seaweed to the intake structure resulted in high differential pressure across the traveling screens and significant degradation of service water and circulating water systems flow. The reactor was tripped manually from 45% of rated power when the condition could not readily be corrected. Major damage occurred to three of the five traveling screens. Full power operation was achieved on October 19 following screen repair in cold shutdown.

Plant shutdowns required by technical specifications occurred on four occasions. On March 3, 1990, the licensee determined that for several years the emergency gas turbine generator had not been tested to the emergency load described in the updated final safety analysis report (UFSAR). The licensee considered the technical specification limiting condition for operation (LCO) to have expired, declared an Unusual Event, and commenced an orderly plant shutdown. At 90% of rated power, the gas turbine generator was tested successfully and declared operable, and the plant was returned to 100% of normal power.

On March 5, 1990, the licensee determined that the Group I isolation setpoints of the main steam line flow switches had been non-conservative for several years. An Unusual Event was declared and plant shutdown was commenced. The switches were recalibrated and the shutdown stopped at 38% of rated power. Full power operation was restored on the same day. On May 12, the licensee declared an Unusual Event and commenced a controlled shutdown when it discovered that a newly calculated UFSAR accident load exceeded the capacity of the gas turbine generator. At 90% of rated power, the licensee disabled the post-LOCA/LNP (loss of normal power) automatic initiation feature of the feedwater coolant injection system, placing the unit in a seven-day LCO, and restoring the operability of the gas turbine generator. The plant was returned to 100% of rated power. Subsequently, the licensee received a three-day temporary waiver of compliance from the LCO to implement and test modifications to the feedwater flow and the gas turbine generator control systems.

On September 7, during a routine operating procedure review, the licensee determined that plant emergency operating procedures (EOPs) directed operators to initiate containment cooling water flow in excess of the design limits of the low pressure coolant injection system heat exchangers. The licensee declared the heat exchangers to be inoperable, declared an Unusual Event, and placed the plant in the cold shutdown condition. The licensee received a

temporary waiver of compliance on September 11, to modify and validate procedures, train plant operators, and prepare a technical specification change request. The plant was returned to full power operation on September 13, 1990.

Component failures required the unit to be shutdown on three occasions. On June 29, 1989, the plant was placed in the cold shutdown condition to remove the internals from a condensate pump suction isolation valve. On April 3, 1990, an unisolable main steam leak on a steam jet air ejector steam trap level switch test fitting forced a shutdown to cold conditions. Full power operation was restored on April 7 following leak repairs and other preventive maintenance. On June 19, the mechanical seal on the "A" recirculation pump failed resulting in high leakage to the drywell. Cold shutdown was attained on June 20. Difficulties attributed to inadequate replacement seal stacking tolerances required the licensee to terminate plant heatup and shutdown the reactor on June 23 and June 26. The seal was repaired successfully on June 30, and Millstone 1 was returned to 100% of rated power on July 1.

Several minor reductions in reactor power occurred during the SALP period. On August 8, 1989, power was reduced to 25% to facilitate entry into the drywell to replenish the "A" recirculation pump motor oil reservoirs. On November 9, 1989, power was reduced to 70% in order to retrieve a loose part which became lodged in a feed regulating valve. On November 28, 1989, the "A" recirculation pump automatically ran back to minimum speed, reducing reactor power to 76%. Full power was restored in approximately one hour. On December 17, 1989, while at 65% of rated power for routine main steam system valve testing, repeated drift alarms on control rod 10-35 occurred. The rod was inserted fully, a leaking inlet scram valve was repaired, and the rod scram time tested successfully. The plant was returned to full power operation on December 18. On May 2, 1990, power was lost inadvertently to the main generator hydrogen and stator cooling panel, causing an automatic runback to 82% of rated power. Full power operation promptly was restored on the same day.

On May 18, 1990, while the feedwater coolant injection system was inoperable, a core spray system injection valve failed during a surveillance test. The licensee declared an Unusual Event, but the valve was returned to operable status before power reduction commenced. On July 10, a transformer fire in the emergency diesel generator voltage regulator cabinet caused the licensee to enter a seven-day technical specification LCO action statement. The licensee received a three-day temporary waiver of compliance in order to permit continued power operation while making repairs. The licensee exited the LCO on July 17, 1990.

MILLSTONE 2

At the beginning of the assessment period, Millstone Nuclear Power Station, Unit 2 (Millstone 2 or the plant) was operating at 100% rated thermal power. On July 12, 1989 the licensee responded by letter to the NRC's request for a mid-cycle shutdown to conduct steam

generator eddy current testing examinations. The NRC's request was based on the necessity to confirm that secondary boric acid treatment had effectively arrested the caustic circumferential cracking mechanism of the steam generator tubes and additionally, to provide continued assurance of operability for the steam generators. The licensee committed to a mid-cycle shutdown in October, 1989.

On September 9 and September 12, 1989, the No. 2 turbine control valve inadvertently closed during full power operations. The licensee identified a malfunction of the servo valve connected to the electro-hydraulic control positioning circuitry. The corrective actions were to install a by-pass jumper for the position circuitry and maintain the control valve closed until the mid-cycle outage. The facility operated at 92% of rated power until October 21, 1989.

On October 21, 1989 the plant commenced a controlled shutdown for the in-cycle inspection on the steam generators. The outage duration was 36 days. A total of 115 circumferentially-oriented tube cracks and 129 tube pits were identified. A decrease in tube cracks from the previous inspection in March 1989 was noted.

During the in-cycle outage, the licensee determined that, based on inadequate seismic design margins for the service water system, the emergency diesel generators were deemed administratively inoperable and declared an Unusual Event between November 9 - 14. The facility returned to full power operations on November 25, 1990.

On May 8, 1990 the control room operators manually tripped the reactor based on decreasing water level in the No. 1 steam generator. Licensee investigation identified a failure in the plug-to-stem connection for the No. 1 feedwater regulating valve. While the facility was in a hot stand-by condition on May 10, primary-to-secondary leakage indications increased from approximately 20 gallons per day (GPD) to 87 GPD, and the licensee decided to place the facility in cold shutdown to identify the source of leakage within the steam generators. The outage duration was 41 days. Based on secondary pressurization tests, the licensee identified four leak locations within the steam generators. The leakage locations were two mechanical plugs with plug-in-plugs installed, a welded tube plug, and a tube sleeve. The licensee also completed an eddy current examination of both steam generators that identified and repaired 22 tube cracks. The facility returned to full rated power on June 20, 1990.

On August 27, 1990, an automatic reactor trip occurred. The cause of the trip was control room operator error in the performance of a reactor protection system surveillance. The facility returned to full rated power on September 4, 1990.

On September 14, 1990 the licensee commenced a plant shutdown for the scheduled cycle 10 refueling outage. Major outage activities included replacement of the moisture separator tube bundles, steam generator eddy current testing, service water pipe replacement, control room design review modifications, inspection of control element assemblies, and refueling. On November 1, 1990 the facility commenced a plant heat-up and at the end of the assessment period the unit was at 75% of rated power.

MILLSTONE 3

At the beginning of the assessment period, the Millstone Nuclear Power Station, Unit 3 (Millstone 3 or the plant) was operating at 100% of rated thermal power (full power). On November 11, 1989, the turbine was taken off the grid to replace the electric overspeed trip solenoid which was not actuating within design values. The solenoid was replaced and the plant returned to 100% full power on November 13, 1989.

On November 28, 1989, a containment entry was made to investigate containment leakage. Inspection revealed leakage from the "C" pressurizer safety valve adjustment screw and the "C" and "D" steam generator secondary inspection covers. The plant was taken to cold shut down to replace the safety valve and rework the covers. On December 5 while opening the main steam isolation valves during the final phase of plant heatup, a safety injection occurred due to low steam line pressure when a main steam isolation valve was opened. Full power was reached on December 9, 1989.

On January 18, 1990, a manual reactor trip was initiated by operators in expectation of an automatic trip on low steam generator water level when a coupling failed on the "B" turbine driven main feedwater pump. A plant startup was commenced on January 20 after the issuance of an NRC temporary waiver of compliance due to the licensee's discovery that the surveillance for average disintegration energy or E-Bar had lapsed.

A turbine/reactor trip occurred on March 9, when a stator cooling water temperature control valve malfunctioned. The resulting feedwater transient caused two feedwater heater relief valve inlet pipes to fail. After repairing the relief and stator cooling valves, full power was reached on March 13.

On March 30 a manual reactor trip was initiated by operators due to intake system fouling. Following intake repairs, the reactor was taken critical on April 15. On April 16 with the plant at 50% of rated power, operators tripped the plant when the "B" circulating water pump tripped because of intake system fouling. The plant was restarted on April 20 and reactor power was held at 30% for the next several days while intake structure performance was monitored. On April 27, a power ascension was commenced with full power reached on April 28.

Operators manually tripped the reactor on May 10 from 60% power during rough weather conditions when the "B" circulating water pump tripped due to seaweed loading. A post trip containment entry identified leakage on the steam generator secondary inspection covers. The plant was placed in cold shutdown to conduct repairs and was restarted on May 21.

On June 6, the plant automatically tripped on high negative rate when a control rod dropped. The failure resulted from corrosion buildup on a control rod cable connector which was repaired. The plant was restarted on June 8. On June 15, the turbine was taken off line to repair leaking feedwater heater relief valves. On June 18, the turbine was placed on the grid. Plant power was reduced on September 14 to 50% because of intake system fouling and taken to 25% to perform troubleshooting operations on the "B" feedwater regulating valve. Plant power was increased to 100% on September 16. On October 25 reactor power was reduced to 30% because of high sulfate steam generator chemistry levels caused by resin intrusion. Reactor power was increased to 100% on October 30 and remained at this level for the remainder of the assessment period.

IV.B. MAJOR DIRECT INSPECTION AND REVIEW ACTIVITIES

During the assessment period, four resident inspectors were assigned to the Millstone Station site.

April-July 1989	Maintenance Team Inspection The team concluded that Millstone Units 1, 2, and 3 are implementing maintenance programs that are functioning well with only a few minor weaknesses.
June - July 1989	Allegation Inspection In July 1989, the NRC staff conducted a two-week inspection in response to the numerous concerns being voiced by employees at the Millstone 2 plant. The inspection team concluded that the majority of the safety concerns were being addressed and that the utility had, in most cases, responded properly. During the inspection, it was noted that the licensee needed to identify and address potential concerns more aggressively.

March 21 - May 8 1990 — Mid-SALP Inspection

This inspection effort conducted halfway through the SALP cycle by resident, regional and headquarters personnel, was used to assess licensee performance in each of the SALP functional areas and to form a bases for inspection followup during the remainder of the assessment period. Overall licensee performance was noted to be consistent with prior assessments. Strengths were noted in licensee initiatives to improve performance and strong orientation to safety in plant operations. Weaknesses were located in the transportation of radioactive materials and timeliness of completing reportability evaluations. An area needing improvement in performance was timeliness in licensee technical specification submittals.

April 16-25 1990 — Millstone Unit 3 Emergency Operating Procedure Inspection

The inspection team determined that the Millstone Unit 3 EOPs were adequate. Operating crew usage of the EOPs was also determined to be acceptable. The inspection team noted that the licensee had instituted a procedure upgrade program. Procedures which had been revised were significantly improved over previous items.

July 4-8 1990 — Training Effectiveness Inspection

This inspection team examined: (1) how the training program is implemented at Millstone Unit 3; (2) the effectiveness of the training program; and, (3) how the program is received by individuals at Millstone Unit 3. The team determined that the training program is well developed, supported and implemented at Millstone Unit 3.

September 10-14 1990 — Allegation Followup Inspection Team

This inspection effort reviewed the adequacy of the licensee followup to the open issues identified during the allegation team inspection conducted in July 1989 at Millstone Unit 2. The team determined that the licensee followup and response to the specific open issues identified in Report 50-336/89-13 were acceptable.

October 1-12 1990 — Nuclear Safety Program Inspection

This inspection team examined the adequacy of the NU nuclear safety concerns program (NSCP) and whether plant personnel would use the program to address safety issues. The inspection team found that, while employees are generally aware of the NSCP, most employees feel that safety concerns are adequately addressed by supervisors and the "chain of command."

October 24-28 1990	Reportability/Operability Determination Program Inspection This inspection team examined the NU practices for reportability/operability determinations with regard to the timeliness of licensee evaluations. The inspection team found that the licensee has an adequate program to ensure that safety issues are evaluated properly for operability and reportability.

IV.C. REACTOR TRIPS AND UNPLANNED SHUTDOWNS

UNIT 1

	Date	Power Level	Root Cause	Functional Area
1.	10/19/89	70%	Random Equipment Failure	N/A

Automatic Scram due to high reactor vessel water level. A loose part from the "A" reactor feed pump discharge check valve became lodged in the "A" feed regulating valve causing it to fail open.

2.	4/2/90	100%	Random Equipment Failure	N/A

Manual shutdown to repair an unisolable steam leak in the steam jet air ejector system. The steam leak was from a failed level switch test fitting.

3.	6/19/90	100%	Installation Error	Maintenance/Surveillance

Manual shutdown due to high drywell leakage from failed "A" recirculation pump mechanical seal.

4.	6/23/90	0%	Installation Error	Maintenance/Surveillance

Manual shutdown due to high drywell leakage from failed "A" recirculation pump mechanical seal.

5.	6/26/90	0%	Installation Error	Maintenance/Surveillance

Manual shutdown due to high drywell leakage from failed "A" recirculation pump mechanical seal.

6.	9/7/90	100%	Deficient Procedure Review	Safety Assessment/ Quality Verification

Manual shutdown required by technical specifications due to declaring the low pressure coolant injection system heat exchanger inoperable. EOPs directed operators to maximize flow in excess of heat exchanger design limits.

7.	9/14/90	100%	Random Equipment Failure	N/A

Automatic scram on low reactor vessel level. Pressure switch violation valves leaked during annual calibration check, perturbing reactor vessel level reference leg.

8.	10/4/90	45%	External Cause	Operations

Manual reactor scram due to degrading service water and circulating water systems flow. Intake structure traveling screens were damaged by excessive fouling by marine growth during adverse weather and tidal conditions.

UNIT 2

	Date	Power Level	Root Cause	Functional Area
1.	5/8/90	100%	Equipment Failure	Maintenance/Surveillance

Manual reactor trip based on decreasing level in No. 1 steam generator (LER 90-06-00), which resulted from a failure of the valve stem-to-plug connection on the No. 2 feedwater regulating valve. The failure was a result of manufacturing error on valve stem taper specifications.

2.	5/10/90	0%	Equipment Failure	Safety Assessment/Quality Verification

Controlled shutdown to inspect steam gererator tubes. The inspection was necessitated by an increase in primary to secondary leakage while the plant was in a hot shutdown condition. The leakage was from previously repaired tubes.

3.	8/27/90	100%	Operator Error	Plant Operations

Automatic reactor trip during reactor protection system surveillance (LER 90-12-00). The trip was caused by operator error during performance of a surveillance procedure.

UNIT 3

	Date	Power Level	Root Cause	Functional Area
1.	11/28/89	100%	Manufacturer's defect	N/A

Controlled shutdown because of boron leakage from safety valve adjusting screw.

2.	1/18/90	100%	Defective Procedure	Maintenance/Surveillance

Manual reactor trip initiated by operators when "B" turbine driven main feedwater pump coupling failed.

3.	[illegible]	100%	Design Error	Engineering and Technical Support

Automatic reactor trip on high generator stator cooling water temperature caused by stator cooling temperature control valve failure.

4.	3/30/90	80%	Design Error	Engineering and Technical Support

Manual reactor trip initiated by operators due to decreasing vacuum in main condenser due to circulating water pump trip on high differential pressure caused by seaweed impingement on traveling screens.

5.	4/15/90	51%	Design Error	Engineering and Technical Support

Manual reactor trip initiated by operators due to decreasing vacuum in main condenser due to circulating water pump trip on high differential pressure caused by seaweed impingement on traveling screens.

6.	5/10/90	100%	Design Error	Engineering and Technical Support

Manual reactor trip initiated by operators due to decreasing vacuum in main condenser due to circulating water pump trip on high differential pressure caused by seaweed impingement on traveling screens.

7.	6/6/90	100%	Installation Error	N/A

Automatic reactor trip on high negative rate due to a dropped control rod caused by a defective cable connection.

TABLE 1

Inspection Hours Summary*#

Millstone 1

June 16, 1989 - December 15, 1990

FUNCTIONAL AREA	HOURS	ANNUALIZED HOURS	% OF TIME
PLANT OPERATIONS	985	656	36.1
RADIOLOGICAL CONTROLS	162	108	5.9
MAINTENANCE/SURVEILLANCE	555	369	20.4
EMERGENCY PREPAREDNESS	138	92	5.1
SECURITY AND SAFEGUARDS	71	47	2.6
ENGINEERING AND TECHNICAL SUPPORT	144	96	5.3
SAFETY ASSESSMENT/QUALITY VERIFICATION	672	448	24.6
TOTALS:	2727	1816	100%

Inspection Reports: 50-245/89-14 to 89-23; 89-25; 89-27; 89-80; 89-81; 90-02 to 90-05; 90-07 to 90-09; 90-11 to 90-20; 90-22 to 90-24; 90-80 to 90-83

*Does not include NRC licensing staff hours.

#Includes 282 hours for the Maintenance Team Inspection, 150 hours for the Nuclear Safety Concerns Program Team Inspection, and 35 hours for the Reportability/Operability Program Team Inspection.

TABLE 1

Inspection Hours Summary*#

Millstone 2

June 16, 1989 - December 15, 1990

FUNCTIONAL AREA	HOURS	ANNUALIZED HOURS	% OF TIME
PLANT OPERATIONS	979	619	26.9
RADIOLOGICAL CONTROLS	129	82	3.5
MAINTENANCE/SURVEILLANCE	1232	779	33.9
EMERGENCY PREPAREDNESS	60	38	1.7
SECURITY AND SAFEGUARDS	87	55	2.4
ENGINEERING AND TECHNICAL SUPPORT	158	100	4.4
SAFETY ASSESSMENT/QUALITY VERIFICATION	987	624	27.2
TOTALS:	3632	2297	100%

Inspection Reports: 50-336/89-13 to 89-24, 89-80, 89-81, 90-01 to 90-27, 90-80 to 90-82

*Does not include NRC licensing staff hours.

#Includes 295 hours for the Maintenance Team Inspection and 525 hours for the Allegation Team Inspection.

TABLE 1

Inspection Hours Summary*#

Millstone 3

October 16, 1989 - December 15, 1990

FUNCTIONAL AREA	HOURS	ANNUALIZED HOURS	% OF TIME
PLANT OPERATIONS	1364	1169	53.5
RADIOLOGICAL CONTROLS	171	146	6.7
MAINTENANCE/SURVEILLANCE	265	227	10.4
EMERGENCY PREPAREDNESS	61	52	2.4
SECURITY AND SAFEGUARDS	42	36	1.6
ENGINEERING AND TECHNICAL SUPPORT	147	126	5.8
SAFETY ASSESSMENT/QUALITY VERIFICATION	498	426	19.6
TOTALS:	2548	2182	100%

Inspection Reports: 50-423/89-19 to 89-23, 90-01 to 90-20, 90-22, 90-23, 90-25 to 90-27, 90-80 to 90-83

*Does not include NRC licensing staff hours.

TABLE 2

Enforcement Summary

Millstone Station

June 16, 1989 - December 15, 1990

FUNCTIONAL AREA	Number/Severity Level of Violations IV	III	TOTAL
PLANT OPERATIONS			
RADIOLOGICAL CONTROLS	2	1	3
MAINTENANCE/SURVEILLANCE			
EMERGENCY PREPAREDNESS			
SECURITY AND SAFEGUARDS	2		2
ENGINEERING AND TECHNICAL SUPPORT			
SAFETY ASSESSMENT/QUALITY VERIFICATION	1		1
TOTALS	5	1	6

Enforcement conferences were held with the licensee on February 20, 1990, to discuss shipment of an underwater shearer/compactor package with exterior radiation levels in excess of regulatory limits which resulted in the imposition of a $3,750 civil penalty, and on October 22, 1990, to discuss weaknesses identified as a result of a fitness-for-duty program inspection which resulted in a Severity Level IV violation.

TABLE 2

Enforcement Summary

Millstone 1

June 16, 1989 - December 15, 1990

FUNCTIONAL AREA	Number/Severity Level of Violations V	IV	III	TOTAL
PLANT OPERATIONS				
RADIOLOGICAL CONTROLS		2	1	3
MAINTENANCE/SURVEILLANCE	1			1
EMERGENCY PREPAREDNESS				
SECURITY AND SAFEGUARDS				
ENGINEERING AND TECHNICAL SUPPORT				
SAFETY ASSESSMENT/QUALITY VERIFICATION			2	2
TOTALS	1	2	3	6

Enforcement conferences were held with the licensee on May 25, 1990, to discuss failure to meet a condition required by a technical specification limiting condition for operation concerning main steam line flow switches and failure to perform a surveillance test of the gas turbine generator in accordance with technical specification requirements, which resulted in the imposition of a $25,000 civil penalty; on June 15, 1990, to discuss a shipment of irradiated hardware for disposal at a low-level waste disposal facility in violation of regulatory requirements, which resulted in the imposition of a $50,000 civil penalty; and on December 4, 1990, to assess the potential for flow-induced failure of the low pressure coolant injection system heat exchangers during post-accident conditions, which resulted in a Severity Level III violation with no civil penalty imposed.

TABLE 2

Enforcement Summary

Millstone 2

June 16, 1989 - December 15, 1990

FUNCTIONAL AREA	Number/Severity Level of Violations V	IV	III	NOD	TOTAL
PLANT OPERATIONS		1	*	1	2
RADIOLOGICAL CONTROLS					0
MAINTENANCE/SURVEILLANCE	1	5		1	7
EMERGENCY PREPAREDNESS					0
SECURITY AND SAFEGUARDS					0
ENGINEERING AND TECHNICAL SUPPORT		1		1	2
SAFETY ASSESSMENT/QUALITY VERIFICATION		3			3
TOTAL	1	10		3	14

*Enforcement Action pending at the end of the SALP period.

TABLE 2

Enforcement Summary

Millstone 3

October 16, 1989 - December 15, 1990

FUNCTIONAL AREA	Number/Severity Level of Violations V	IV	TOTAL
PLANT OPERATIONS		4	4
RADIOLOGICAL CONTROLS		1	1
MAINTENANCE/SURVEILLANCE			
EMERGENCY PREPAREDNESS			
SECURITY AND SAFEGUARDS		1	1
ENGINEERING AND TECHNICAL SUPPORT			
SAFETY ASSESSMENT/QUALITY VERIFICATION	1		1
TOTALS	1	6	7

TABLE 3

Licensee Event Reports

Millstone 1

June 16, 1989 - December 15, 1990

FUNCTIONAL AREA	Number of LERs by Cause Code A	B	C	D	E	X	TOTAL
PLANT OPERATIONS	2		1	1			4
RADIOLOGICAL CONTROLS	1			1			2
MAINTENANCE/SURVEILLANCE	2			3	2		7
EMERGENCY PREPAREDNESS							
SECURITY AND SAFEGUARDS	2				1		3
ENGINEERING AND TECHNICAL SUPPORT	1			1			2
SAFETY ASSESSMENT/ QUALITY VERIFICATION	1	1				5	7
TOTALS:	9	1	1	6	3	5	25

* Cause Codes:
- A - Personnel Error
- B - Design, Manufacturing, Construction, or Installation Error
- C - External Cause
- D - Defective Procedure
- E - Component Failure
- X - Other (Management Quality Assurance Deficiency)

LERs Reviewed: 1-89-018 to 1-90-017, SERS 90-01 to 90-03

The causal analysis shows that personnel errors, defective procedures, and management quality assurance deficiencies were responsible for most of the reportable events. The causal factors primarily involved the operations, maintenance/surveillance, and safety assessment/quality verification functional areas. A common cause of personnel error appeared to be lack of attention to detail either in interpretation of technical specification requirements or implementation of procedures. Defective procedures involved either ambiguities regarding actions to be performed, or incorrect or insufficient information. Management quality assurance deficiencies were characterized by failure either to identify or correct promptly conditions adverse to quality. The reported events included ten violations of NRC requirements, all but one of which were licensee identified, and five of which were not cited. Three of the events resulted in escalated enforcement on two occasions.

TABLE 3

Licensee Event Reports

Millstone 2

June 16, 1989 - December 15, 1990

FUNCTIONAL AREA	Number of LERs by Cause Code A	B	C	D	E	X	TOTAL
PLANT OPERATIONS	5			2			7
RADIOLOGICAL CONTROLS	1						1
MAINTENANCE/SURVEILLANCE	4			1	4		9
EMERGENCY PREPAREDNESS							
SECURITY AND SAFEGUARDS	2				1		3
ENGINEERING AND TECHNICAL SUPPORT	3	2					5
SAFETY ASSESSMENT/ QUALITY VERIFICATION	1						1
TOTALS :	16	2		3	5		26

* Cause Codes:
- A - Personnel Error
- B - Design, Manufacturing, Construction, or Installation Error
- C - External Cause
- D - Defective Procedure
- E - Component Failure
- X - Other

LERs Reviewed: 89-07 to 89-11, 90-01 to 90-02, 90-04 to 90-10, 90-12 to 90-19, and SERS 90-01 and 90-03.
LER 90-03 and 90-11 not issued

The causal analysis shows that personnel errors and component failures comprised a majority of all reportable events. The causal factors involved plant operations, maintenance/surveillance, engineering/technical support and safety assessment/quality verification and led to three cited and ten non-cited violations of technical specifications (all but one were licensee identified). Two reportable events were under enforcement action review at the end of the assessment period. Common causes for personnel errors were related to inattention to detail and inadequate interdepartmental communications. Common causes were not identified for component failures or design, manufacturing, construction/installation errors.

TABLE 3

Licensee Event Reports

Millstone 3

October 16, 1989 - December 15, 1990

FUNCTIONAL AREA	Number of LERs by Cause Code A	B	C	D	E	X	TOTAL
PLANT OPERATIONS	10			5	4		19
RADIOLOGICAL CONTROLS	2						2
MAINTENANCE/SURVEILLANCE	3			10	2		15
EMERGENCY PREPAREDNESS							
SECURITY AND SAFEGUARDS	2				1		3
ENGINEERING AND TECHNICAL SUPPORT	1	4			2		7
SAFETY ASSESSMENT/ QUALITY VERIFICATION							
TOTALS:	18	4		15	9		46

* Cause Codes:
- A - Personnel Error
- B - Design, Manufacturing, Construction, or Installation Error
- C - External Cause
- D - Defective Procedure
- E - Component Failure
- X - Other

LERs Reviewed: 89-20 through 90-28, SERS 90-01 to 90-03

The causal analysis shows that personnel errors and procedure deficiencies were responsible for most of the events. Personnel errors resulted in two engineered safety feature (ESF) actuations, four instances of degradation of the fire protection program, and three occasions of mispositioning of safety related valves. Procedure deficiencies resulted in three ESF actuations, and a reactor trip when a main feedwater coupling failed. The majority of events involving personnel error were attributed to inattention to detail during the performance of routine activities. The procedural weaknesses were attributed to a lack of thorough technical procedure review prior to issuance.

ATTACHMENT 1

SALP EVALUATION CRITERIA, PERFORMANCE CATEGORIES AND TRENDS

The following evaluation criterion were used, as applicable, to assess each functional area:

1. Assurance of quality, including management involvement and control.

2. Approach to the identification and resolution of technical issues from a safety standpoint.

3. Enforcement history.

4. Operational and construction events (including response to, analyses of, reporting of, and corrective actions for).

5. Staffing (including management).

6. Effectiveness of training and qualifications program.

The performance categories used when rating licensee performance are defined as follows:

Category 1. Licensee management attention to and involvement in nuclear safety or safeguards activities resulted in a superior level of performance. NRC will consider reduced levels of inspection effort.

Category 2. Licensee management attention to and involvement in nuclear safety or safeguards activities resulted in a good level of performance. NRC will consider maintaining normal levels of inspection effort.

Category 3. Licensee management attention to or involvement in nuclear safety or safeguards activities resulted in an acceptable level of performance; however, because of the NRC's concern that a decrease in performance may approach or reach an unacceptable level, NRC will consider increased levels of inspection efforts.

Category N. Insufficient information exists to support an assessment of licensee performance. These cases would include instances in which a rating could not be developed because of insufficient licensee activity or insufficient NRC inspection.

The SALP Board may assess a performance trend, if appropriate. The trends are:

Improving: Licensee performance was determined to be improving during the assessment period.

Declining: Licensee performance was determined to be declining during the assessment period and the licensee had not taken meaningful steps to address this pattern.

Trends are normally assigned when one is definitely discernable and a continuation of the trend is expected to result in a change in performance during the next assessment period.