Enclosure 3

U.S. NUCLEAR REGULATORY COMMISSION

REGION I

SYSTEMATIC ASSESSMENT OF LICENSEE PERFORMANCE

NORTHEAST NUCLEAR ENERGY COMPANY

MILLSTONE NUCLEAR STATION UNIT 2

OCTOBER 24, 1983

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I. INTRODUCTION

a. Purpose and Overview

The Systematic Assessment of Licensee Performance (SALP) is an integrated NRC staff effort to collect the available observations on an annual basis and evaluate licensee performance based on those observations with the objectives of improving the NRC Regulatory Program and licensee performance.

The assessment period is September 1, 1982, through August 31, 1983. This assessment, however, contains pertinent observations and NRC and licensee activities through October 1983.

The prior SALP assessment period was September 1, 1981, through August 31, 1982. Significant findings of that assessment are provided in the applicable Performance Analysis Functional Areas (Section IV).

Evaluation criteria used during this assessment are discussed in Section III below. Each criterion was applied using the "Attributes for Assessment of Licensee Performance" contained in NRC Manual Chapter 0516.

b. SALP Attendees:

Board Members

R. W. Starostecki, Director, Division of Project and Resident Programs (DPRP)
E. G. Greenman, Chief, Projects Branch No. 1, DPRP
R. R. Bellamy, Chief, Radiation Protection Branch, Division of Engineering and Technical Programs (DETP)
J. R. Miller, Chief, Operating Reactors Branch No. 3, Division of Licensing, NRR
T. C. Elsasser, Chief, Reactor Projects Section 1B, DPRP
P. Leech, Licensing Project Manager, Division of Licensing, NRR
K. L. Heightner, Licensing Project Manager, Division of Licensing, NRR
J. T. Shedlosky, Senior Resident Inspector, Millstone 1 and 2

Other Attendees

M. M. Shanbaky, Chief, Facility Radiation Protection Section, DETP
D. R. Lipinski, Resident Inspector, Millstone Units 1 and 2

c. Background

1. Licensee Activities

Millstone Unit 2 operated at power throughout most of the evaluation period. Nominal end of core life was reached on May 12 and a power coast-down was conducted until May 28, 1983. The unit remained shutdown and defueled in a refueling and maintenance outage through the end of the evaluation period.

(PRE-OUTAGE OPERATIONS)
Millstone Unit 2 was operating at full power at the beginning of the evaluation period. A reactor scram from full power occurred on September 17, 1982, as a failure in the main turbine electro-hydraulic control system caused the main turbine control valves to shut. Reactor pressure was limited to approximately 2400 psi during the transient by pressurizer spray and power operated relief valve operation. The reactor was made critical on September 18 and returned to power on September 20. Spurious actuation of loss of power circuitry in the Engineered Safety Features Actuation System led to a loss of power to safeguards electrical buses and a reactor scram on October 27. The reactor was made critical later on October 27 and returned to power operation on November 1, 1982. The recovery from both these trips was delayed and complicated by high chloride ion concentrations in the steam generators. These occurrences are believed to be caused by hideout return. High chloride ion concentrations are known to cause deleterious effects on steam generator heat transfer tubes.

The unit continued to operate at power until November 5, 1982, when a spurious thermal margin/low pressure trip caused a reactor scram. The unit was returned to power on November 6. Steam generator chloride ion concentration again rose but was reduced during power operation. On November 20, a reactor scram occurred on low steam generator liquid level. The low level resulted from spurious operation of the Steam Generator Water Level Control system high level trip. Both spurious actuations have been attributed to electromagnetic interference from the plant's Chemical and Volume Control System.

A maintenance outage was conducted from December 31, 1982, through January 4, 1983, to repair secondary plant steam leaks. Millstone Unit 2 operated at power until February 19, when power was lost to the Control Element Assembly Drive Mechanisms (CEADM) due to a failure in the CEADM motor-generator output breaker. The unit returned to power on February 20. Abnormally high Reactor Coolant system leakage was observed, however. A maintenance outage was conducted from March 1 through 17 to identify and correct that leakage. Leakage paths included valve

packing and valve mechanical joint leakage and complete perforation of a Steam Generator heat transfer tube. The unit operated at power until May 28, when it was shutdown for refueling and maintenance. During operations, a service factor of 88% and a capacity factor of 83% were attained. The performance indicated by these figures is essentially the same as that achieved during the latter half of the previous evaluation period but did not reach the performance level attained during the preceding fuel cycle (service factor 99% and capacity factor 96%) early in the previous evaluation period.

(OUTAGE EFFORTS)
Millstone Unit 2 entered a refueling and maintenance outage on May 28. Major efforts during the outage have included Steam Generator primary side decontamination; inspection, using Non-Destructive Evaluation (NDE) techniques, of all heat transfer tubes in both steam generators; plugging or repair of degraded steam generator tubes using internal sleeves; disassembly and inspection, again using NDE techniques, of the reactor vessel and internals; in-service inspection of piping and components important to safety; and, secondary plant overhaul. As in the previous Steam Generator inspection cycle, a large number of heat transfer tubes continued to exhibit degradation. The causes of this apparent corrosive attack remain unidentified. Inspection and testing of irradiated fuel using visual and off-gas sample ("fuel sipping") analysis confirmed that fuel cladding failures had occurred. Fuel failures had been expected due to radio-chemical indications of clad failure observed during operations. Disposition of fuel cladding failures and other fuel assembly degradation observed during inspection continue. Inspection of reactor vessel internals revealed cracking failure of the reactor vessel thermal shield. Such failures have occurred at other plants of similar vintage and manufacturer. The licensee plans to remove the shield and, subsequently, operate the plant without such a shield.

2. Inspection Activities

Two NRC resident inspectors were assigned to Millstone Units 1 and 2 for the entire appraisal period.

Total NRC inspection hours (both resident and region-based inspectors) expended were 1520. The distribution of inspection hours is shown in Table 3. A tabulation of these inspections is shown in Table 4.

II. SUMMARY OF RESULTS

MILLSTONE NUCLEAR POWER STATION, UNIT 2

FUNCTIONAL AREAS	CATEGORY 1	CATEGORY 2	CATEGORY 3
1. Plant Operations		X	
2. Radiological Controls • Radiation Protection • Radioactive Waste Management • Transportation • Effluent Control and Monitoring	X		
3. Maintenance	X		
4. Surveillance (Including Inservice and Preoperational Testing)	X		
5. Fire Protection	X		
6. Emergency Preparedness		X	
7. Security and Safeguards	X		
8. Refueling - Preparation & Planning		X	
9. Licensing Activities		X	

OVERALL SUMMARY

Throughout the assessment period, the licensee achieved an overall satisfactory level of performance with respect to operational safety. The involvement and attention of management and plant personnel is evident and contributes to the good performance noted. However, during the course of the assessment period NRC staff have noted several items which may be part of a negative trend relative to personnel errors and off site support. This perceived trend has resulted in the areas of Plant Operations and Licensing being assigned a Category 2, which is a reduction in performance from the previous appraisal period. Performance in Security and Safeguards has improved and is rated Category 1. Although an improvement in management controls has been noted during the current outage, the area of Refueling remains rated Category 2 for the overall period.

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OVERALL SUMMARY

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III. CRITERIA

The following evaluation criteria were applied to each functional area:

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

To provide consistent evaluation of licensee performance, attributes associated with each criterion and describing the characteristics applicable to Category 1, 2, and 3 performance were applied as discussed in NRC Manual Chapter 0516, Part II and Table 1.

The SALP Board conclusions were categorized as follows:

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

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

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

IV. PERFORMANCE ANALYSIS

1. Plant Operations (36%)

Analysis

The broad areas of operations, which includes engineering support, design changes and modifications, quality assurance and management effectiveness as well as plant operations, received the close and continuous attention of the resident inspectors throughout the evaluation period as well as the attention of thirteen region-based inspectors. During the preceding SALP appraisal period, a rating of Category 1 was attained. Although the level of performance remained generally very good, several serious lapses in performance have occurred which indicates that increased attention is required.

Although Millstone Unit 2 is operated by a staff of conscientious and knowledgeable persons, the overall quality of operations had declined from that achieved during previous evaluation periods. On several occasions, licensee personnel have failed to closely attend to the specific details of plant operations required by the Operating License. This has occurred during a period which plant conditions have necessitated a significant improvement in staff performance. The unit was operated during the last cycle with an estimated 0.08 percent fuel clad perforations and primary to secondary leakage in one of two steam generators at a significant fraction of the Technical Specification.

The licensee has performed commendably in mobilization for an unplanned repair outage in March during which defective steam generator tubes were identified and plugged. These evolutions were effectively managed in general area radiation fields of 30 Rem per hour. Likewise, the removal of a damaged reactor vessel thermal shield is presently proceeding well as the result of well managed programs. In addition, the installation of bi-metallic sleeves in steam generator tubes was a model of excellent performance, material and process control, radiation worker training, ALARA, and mutual support and job site coordination between the contractor and radiation protection personnel.

Several events have occurred which are indicative of poor performance of some plant personnel or licensee programs along with a lack of an aggressive program for improvement in the onsite safety committee, the Plant Operations Review Committee (PORC). As evidenced by its performance, the licensee, through the safety committee, does not effectively task all personnel, organizations and contractors.

Operators have demonstrated several serious lapses in monitoring plant parameters throught the control room instrumentation.

These have included one occasion with the reactor at 100% power in which the plant process computer failed for over six hours before it was recognized by control room operators. During that time, video displays were frozen, computer alarms were inoperable and plant hourly data recording did not occur. On a second occasion, with the reactor shut down and defueled, a multi-point recorder located in the control room for process and area radiation monitors failed for over an eight-hour shift before being noticed by control room operators. The plant process computer is required for monitoring fuel rod linear heat rate; the process radiation monitors for monitoring plant effluent paths.

On two occasions, November 4, 1982, and March 26, 1983, the plant was operated at power levels exceeding that permitted by Technical Specifications for the method of monitoring fuel rod linear heat rate then in use. The former occasion was a direct result of a failure to critically review computer output data for a computer conducted surveillance. Alarm values for monitoring linear heat rate were miscalculated and accepted while an input instrument was out of service for calibration. The computer output data for its calculation showed irregularities, the most apparent of which was calculation of main turbine output exceeding core thermal power. The latter occasion was a result of a computer failure which caused linear heat rate monitoring using in-core detectors to cease. As previously discussed, this failure was undetected for over six hours. Both events led to violations.

A series of unplanned or unauthorized releases of radioactive materials on September 16, September 24, December 23, and December 28, 1982, and on January 20, 1983, involved common management and personnel errors, particularly lapses in attention to detail and in first and second line management following evolutions. Among these were the discharge of the wrong waste monitoring tank, discharges by a continuous process when only a batch process was authorized by Environmental Technical Specifications, and valve line-up errors. One event also involved informal instructions by an intermediate plant manager to deviate from established procedures for the control of contaminated wastes during discharge. Several of these events led to a violation. On March 2 and on August 17, 1983, planned radioactive liquid discharges were conducted without continuous recording of radiation monitor readings as required by Environmental Technical Specifications. Recorder failures were involved in both events; however, on the former occasion, the failure was not identified until the completion of a four-hour discharge, while on the latter occasion the failure was not identified until two shifts after the discharge. It is reasonable to conclude that the intent of the requirement to continuously record monitor readings is to provide a readily interpreted trend of activity released to permit operators to terminate a discharge upon unexpected instrument or recorder response prior to an adverse environmental release. It seems clear that, in practice,

this tool is not used. Following an event late in the previous evaluation period (an unplanned and uncontrolled release of radioactive material on July 23, 1983), senior plant and station management promptly identified deficiencies and appeared to embark on a program of corrective actions. Subsequent performance suggests that corrective actions were applied piecemeal, conducted informally and without decisiveness, and resulted in little effect.

The quality of services depends greatly on the efforts of contractor personnel and their own programs. An organization with a poor program is frequently given the opportunity to begin implementation prior to being challenged by the licensee. Examples of this were the excellent radiation worker training program provided by the steam generator tube sleeving contractor and a weak program provided by the nozzle dam contractor.

The licensee has not been effective in dealing with the present reactor fuel vendor. Design and manufacturing problems concerning new fuel were identified and corrected prior to use during the past two operating cycles. However, inspections made of that fuel during the current outage have identified significant damage to the structural members of some of the same fuel. Results of preliminary analysis again indicate design and manufacturing errors.

An example of the failure to establish high performance standards concerns the installation of steam generator primary nozzle dams. Poor overall coordination and a lack of integrated testing prior to work in 25 to 30 Rem per hour radiation fields resulted in occupational exposure for the single activity of installing the dams and correcting deficiencies was 191 Man-Rem.

The safety committee, PORC, conducts most review work through subcommittees or using consultants to the committee rather than to actually have all members perform the review. This has resulted in a decrease in committee effectiveness in some of its review work. An example was a PORC meeting attended by the resident inspector during December 1982 (PORC Meeting 2-82-159). At that meeting, it was apparent that only two members had reviewed proposed procedures concerning diesel generator alignment and that not all members had had an opportunity to review procedural changes made to correct deficiencies in the control of radioactive liquid discharges. The presentation of these changes was not accompanied by a presentation of the deficiencies the changes were to correct. It was the impression of the inspector that PORC viewed its responsibility as being limited to identification of unreviewed safety questions. Plant problems with radioactive material discharges are discussed in preceding paragraphs.

During August 1983, a breach of vital area security boundary was made in the course of a planned facility modification. The facility modification package (Plant Design Change Request or PDCR) had been approved by PORC and several managers. Procedures required consideration of security impacts and specifically the integrity of vital area boundaries. Upon closer scrutiny, it became apparent that the actual evaluation of the security impacts was conducted by a junior member of the unit engineering department and further reviews were limited to noting that an evaluation had been made. As a result, the impact on security was identified only after the vital area barrier had been breached. This matter has led to a violation.

An analysis of Licensee Event Reports (LERs) indicates a continuing high level of performance. The key ratio of personnel related events to facility related events showed a decline in performance by increasing to 0.26 from 0.21 during the preceding SALP cycle and equaling the 0.26 for the "typical" PWR of NUREG/CR 2378. The ratio of management related events to facility related events showed improvement by declining to 0.03 from 0.24 during the previous SALP cycle and remaining well below the ratio of 0.29 attained by the "typical" PWR of NUREG/CR 2378.

As previously stated, despite several events which demonstrate some weaknesses, the licensee has been faced with significant material problems during the appraisal period and has generally approached each with sufficient resources and planning to effectively deal with activities such as:

-- decontamination of steam generator primary to reduce radiation fields by a factor of ten
-- lancing of sludge from the steam generator secondary
-- removal of a failed reactor vessel thermal shield from the core support barrel
-- identification and analysis of metallurgical defects in the reactor vessel, vessel nozzles and steam generator secondary shell
-- replacement of all old style General Electric Type HFA relays
-- modification of turbine rotor blades
-- inspection and replacement of extraction steam piping
-- modifications to main steam line restraints and associated structural modifications to the turbine building
-- replacement of steam generator feedwater control systems
-- replacement of reactor nuclear instrumentation and primary temperature detectors
-- replacement of the unit process computer

Conclusion

Category 2

Recommendations

Conduct increased inspection effort by a team of resident inspectors and region based specialist, particularly in the following areas: 1) Safety Review Committee activities (to be accomplished on a timely basis), 2) radioactive material processing by operating personnel, 3) control of contractor efforts, 4) analysis of reactor coolant system leakage, and 5) analysis of related chains of operating events.

2. Radiological Controls (20%)

There were six inspections performed in the area of Radiological Controls during the assessment period. The resident inspectors reviewed ongoing radiological controls activities.

The Radiological controls Program at the Millstone Station is common to both operating units and conducted under the same management supervision. The inspectors found it to be uniformly implemented between each unit.

During this appraisal period, no significant radiological operations were conducted at Unit 1 (BWR). However, signifcant radiological operations, involving steam generator maintenance and repair, were conducted at Unit 2 (PWR). Therefore the licensee's performance, during the Unit 2 radiological operations, is emphasized in this analysis.

Because the licensee has established a radiological control program for the site, this analysis is common for both units. During the preceding SALP assessment period, a rating of Category 1 was assigned. The licensee continues a high level of performance in this area.

a. Radiation Protection

Three inspections in this program area were conducted by Regional Radiation Specialists. This included a special inspection to review radiological controls during an unplanned outage and two inspections to review radiological controls during a planned outage.

No major or minor violations were identified in this area which would indicate programmatic breakdown. A minor administrative problem resulted from a difference in the station organization chart as depicted in the Technical Specifications and the plant procedures. The licensee submitted a proposed Technical Specification change to correct the problem.

The inspections during the planned and unplanned outages indicated the licensee established effective control of radiologically significant work activities. This included an adequate outage radiation protection organization. The personnel used for this organization were carefully selected and trained to perform their assigned responsibilities. The licensee provided both comprehensive and task specific training as needed for there personnel. A review of the training of radiation protection technicians in procedure changes and new procedures indicated that the licensee had made timely revisions of procedures to assure proper assessment of "MPC-hours" for airborne radioactivity exposure. However, the licensee's administrative controls procedures did not provide

for timely review of procedures. As a result, the licensee is investigating methods to assure timely review of procedures and to improve technician awareness of procedure changes.

During this assessment period, the licensee performed extensive steam generator maintenance. The licensee performed and documented comprehensive radiation surveys to support the steam generator work. The radiation surveys were effectively integrated into the licensee's ALARA Program. Because the licensee encountered high radiation dose gradients during steam generator sludge lancing, significant effort was made to define allowable maximum exposures and define proper dosimetry placement. The External Exposure Control Program for the steam generator work was proper and effective.

The review of the use of respiratory protection equipment during the steam generator work indicated the licensee implemented a generally acceptable program.

The review of the licensee's radiation protection facilities and equipment used to support outage activities indicated acceptable facilities and equipment were present and used.

Regarding the adequacy and effectiveness of the licensee's ALARA Program, the reviews during this assessment period indicated that licensee management attention is directed to this important area. The licensee generally uses effective pre-planning and on-going job reviews and makes extensive use of mock-up training to minimize exposure. However, as a result of apparent inter-group communications and a lack of attention to design control and verification, deficiencies were identified in the area of mock-up training and use of steam generator nozzle dams. Resident Inspector and licensee review of mock-up training indicated the training was not being conducted as realistically as possible. It was found that mock-up trainees did not dress in the same protective clothing and equipment as would be required in the steam generator. Also, it was found that stay-time limits were not simulated during the training entries. In addition, during the mock-up training, and during pre-operational testing; the steam generator nozzle dam bladders were not inflated. As a result, the licensee failed to identify an incorrect fitting which precluded inflation of the nozzle dams after their installation in the steam generator waterbox. In addition to this problem, the licensee encountered other problems with the nozzle dams, e.g. alignment, which resulted in a total exposure of approximately 200 man-rem for their installation. The licensee had originally estimated 30 man-rem for installation and removal of the dams.

Millstone Unit 1 (BWR) sustained about 930 man-rem for 1982. Millstone Unit 2 (PWR) sustained about 1400 man-rem for 1982. The 1982 average man-rem for all BWRs was about 990 man-rem. The 1982 average for all PWRs was about 750 man-rem.

The licensee initiated corrective actions for the identified deficiencies in the training program and nozzle dams to prevent recurrence.

b. Radioactive Waste Management

One onsite inspection of this program area was conducted by a Regional Radiation Specialist. The resident inspectors reviewed ongoing radioactive waste management activities.

The inspections during this assessment period indicated that the licensee's performance in this area was satisfactory.

c. Radioactive Waste Transportation

Two onsite inspections were conducted by Regional Radiation Specialists. The Residents Inspector review ongoing work.

A review of licensee implementation of radioactive waste training indicated the licensee had not fully implemented the Radioactive Waste Training Program. Certain key personnel, responsible for program implementation did not receive training in DOT and NRC regulatory requirements a radioactive waste burial requirements. The training in these matters was to be established in accordance with IE Bulletin 79-19. The licensee committed to provide the required training for these personnel.

d. Effluent Control and Monitoring

Two onsite inspections were conducted by regional Radiation Specialists. The resident inspector reviewed this program area during the assessment period.

During this period, the licensee experienced a number of unplanned releases of radioactive liquid from Unit 2. In September 1982 plant operators inadvertently released about 170 gallons of contaminated service water to a building sump while the contents of the sump was being discharge. During the same month, a valve alignment error resulted in simultaneous discharge of the contents of two sump tanks when only one was to be discharged. In November 1982, plant operators discharge the contents of the wrong radioactive waste monitoring tank. Following this event, the licensee implemented two-person control over all radioactive waste discharges. This requirement was included in procedures the following month.

However, in December 1982, it was found that the radioactive liquid from a sump pit was being intermittently discharged to a sump tank which itself was being discharged. This resulted in unsampled liquid from the sump pit being discharged to the environment. A Severity Level IV violation was issued for failure to adhere to plant discharge procedures.

The occurrence of the unplanned releases and the improper discharge of liquid without a proper procedure indicate an apparent ineffectiveness of corrective measures. Additional management attention may be necessary in this important area.

Conclusion

Category 1

Recommendations

Reduce inspection effort for routine inspection activities. Maintain the same level of effort for refueling and major outages.

3. Maintenance (8%)

Analysis

During the previous appraisal period, this area was assigned a Category 1 rating. Inspection efforts during the present cycle included a programmatic inspection by two region-based specialist inspectors as well as periodic inspection of maintenance in progress by the resident inspectors. The continued level of high performance in this area is discussed below.

The maintenance program including definition of organization and responsibility, Quality Assurance, equipment safety tagging, housekeeping and cleanliness during maintenance, and control of special processes was found to be well planned. A particular strength of the program is the detail included in the prepared procedures for anticipated maintenance activities. Implementation of the program continues to receive the close attention of the first and second level supervision. Integrated work packages are prepared for safety-related maintenance and repair evolutions. These include work procedures, safety isolation, retest requirements, and Quality Assurance inspection plans. The resident inspector observed this program in action by observing portions of maintenance activities during the period.

Inspections and testing of Reactor Protection System Switchgear demonstrated that the licensee has been implementing a program which has been effective in maintaining these components, critical to reactor safety in good working order. Manufacturer's recommendations have been incorporated into station procedures providing a basis for a program which has been upgraded as problems are identifed. The inspectors noted that the licensee places extra emphasis on cleanliness in switchgear areas. This has demonstrated to have a positive impact on reliability.

Conclusion

Category 1

Recommendation

Continue the program review.

4. Surveillance (12%)

Analysis

The performance level in this area remained comparable to that of the previous appraisal period which received a Category 1.

The surveillance program, including In-Service Testing, at Millstone Unit 2 has received the close attention of the resident inspectors and of three region-based inspectors.

Through the evaluation period, the resident inspectors observed the conduct of 38 surveillance tests generally with little or no warning. The depth of knowledge as well as the degree of pride in workmanship displayed by the individual technicians involved in the surveillance is noteworthy.

Two region-based specialist inspectors reviewed and evaluated the surveillance program segment which addresses measurement and test equipment. The program was found to address all required attributes of: calibration at specified frequencies, calibration standards traceable to the National Bureau of Standards, accountability and control of test equipment and usage, and reanalysis of equipment usage following incidents of failures of instruments at calibration. One weakness was identified. Documentation of analyses of instruments which failed calibration to determine the validity of test data taken with the affected instrument was found to be limited to the initials of the analyst.

The pump and valve In-Service Testing Program has received the attention of the resident inspectors and one region-based specialist inspector. The program has been observed to meet applicable requirements of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code Section XI. The technicians assigned to the In-Service Testing Program are knowledgeable and conscientious. The program has permitted early diagnosis and corrective maintenance on several pumps.

Analysis of Licensee Event Reports indicates marked improvements in the area of surveillance. During the prior evaluation period, two causally linked chains of events had been identified related to missed surveillance due to management oversight and to instrumentation and rendered inoperable due to personnel error. Neither chain continued into the present period. The improved performance in the area of surveillance is indicated by the sharp improvement in the ratio of management-related to facility-related events. It is also responsible for the continuation of the overall ratio of personnel-related to facility-related events at a low level.

Conclusion

Category 1

Recommendations

Continue same inspection coverage using resident inspectors.

5. Fire Protection (6%)

Analysis

The Fire Protection Program at Millstone Unit 2 continued to receive the close attention of the resident inspectors. Frequent plant tours by the inspectors identified no major fire protection problems. Records of quarterly fire brigade training were reviewed but found not to be maintained in the manner indicated by the National Fire Protection Association (NFPA) Code 37. This deficiency has been corrected and reinspection has confirmed acceptable record keeping. The inspectors observed an unannounced fire drill during the autumn of 1982. The drill was found to be well planned, well executed, and followed by an appropriate critique.

The Fire Protection Program continues to be well organized and well implemented. During the previous SALP assessment period, a rating of Category 1 was assigned. Performance in this area continues to justify a high rating.

Conclusion

Category 1*

Recommendations

None

*This rating is assigned without regard to the licensee's position with respect to 10 CFR 50, Appendix R. This area remains under review and discussion.

6. Emergency Preparedness (4%)

Analysis

During the preceding SALP assessment period, a rating of Category 1 was assigned. This present appraisal period included one emergency preparedness inspection conducted on May 16-19, 1983, to evaluate corrective actions regarding the 19 significant findings and the 44 improvement items identified during the Emergency Preparedness Implementation Appraisal conducted on January 4-14, 1982. The inspection verified that corrective actions had been completed on all but two significant findings and one improvement item. No exercises of the licensee's state of emergency preparedness were conducted during the assessment period that were evaluated by the NRC. A full scale exercise was conducted, however, on October 12, 1983, after the period. Its results will be considered in the assessment period which includes this date.

NRC observations and findings indicate management's commitment to Emergency Preparedness and improved performance in this area. The licensee has generally been responsive to NRC initiatives and acceptable resolutions have been implemented. Delays, however, in completing three significant findings from the EPIA were identified and further management attention to these areas is warranted to ensure timely implementation of corrective actions in this area.

Three items not completed were: (1) installation of the High Range Monitoring and Sampling Systems for the Unit 1 Stack and the Unit 2 Vent which are scheduled for completion by September 26, 1983; (2) lack of training lesson plans for each functional area of the emergency response organization; and (3) a procedure or method to align training categories with the functional areas of emergency activity in the emergency organization. The licensee plans to obtain an individual for the Training Department to conduct and coordinate emergency training/retraining.

Conclusion

Category 2

Recommendations

Conduct continued inspection effort, focusing on the full scale emergency planning exercise and response to findings.

6. Emergency Preparedness (5%)

Analysis

During the preceding SALP assessment period, a rating of Category 1 was assigned. The present appraisal period included one emergency preparedness inspection conducted on May 16-19, 1983, to evaluate corrective actions regarding the 19 significant findings and the 44 improvement items identified during the Emergency Preparedness Implementation Appraisal conducted on January 4-14, 1982. The inspection verified that corrective actions had been completed on all but two significant findings and one improvement item. No exercises of the licensee's state of emergency preparedness were conducted during the assessment period that were evaluated by the NRC. A full scale exercise was conducted, however, on October 5, 1983, after this period. Its results will be considered in the assessment period which includes that date.

NRC observations and findings indicate management's commitment to Emergency Preparedness and improved performance in this area. The licensee has generally been responsive to NRC initiatives and acceptable resolutions have been implemented. Delays, however, in completing two of the three significant findings from the EPIA were identified and further management attention to these areas is warranted to ensure timely implementation of corrective actions in this area.

The two significant items not completed were: (1) Installation of the High Range Monitoring and Sampling Systems for the Unit 1 Stack and the Unit 2 Vent which are scheduled for completion by September 26, 1983; and (2) lack of training lesson plans for each functional area of the emergency response organization. The licensee plans to obtain an individual for the Training Department to conduct and coordinate emergency training/retraining.

Conclusion

Category 2

Recommendations

Conduct continued inspection effort, focusing on the full scale emergency planning exercise and response to findings is indicated.

7. Security and Safeguards (3%)

Analysis

During the assessment period, there was one routine and one special physical protection inspection performed by region-based inspectors. Additionally, one material control and accountability inspection was conducted by a region-based inspector. Routine resident inspection continued throughout the assessment period. During the preceding SALP appraisal period, a rating of Category 2 was assigned. Performance during this assessment period has improved as discussed below.

The license carefully analyzed the event, isolated the causes and instituted corrective actions. These actions were related in detail to the Region I Staff at an Enforcement Conference held on September 8, 1983. At that time, the Regional Staff requested the licensee to further study the transient ramifications of design modification changes to preclude their adversely impacting safety/security program requirements during the work completion phase. The licensee agreed to address this suggestion.

The Corporate Audit Program continued to provide effective oversight and improvement of the Site Security Program during this period. Additionally, corporate and site drug and alcohol awareness training programs are in development to ensure a high degree of human reliability of the employee work force. The licensee has taken a "no nonsense" approach to the establishment of these programs. This was evidenced earlier this year when the licensee reacted to information that some contract employees were reportedly using drugs socially. An investigation was initiated and several employees were terminated for cause. The Region I Safeguards Staff was kept apprised of this matter. To further upgrade employee fitness, the licensee is studying the implementation of a random urinalysis sample testing program.

NRC inspections revealed that records management is very effective and accessible to inspectors. Maximum cooperation and frankness is exercised by all staff supervisors in aiding the resolution of inspection related questions and interviews. This was especially evident during the Region I special inspection of the vital area event.

Several apparent violations resulted from a licensee identified event involving the degradation of a vital area structural barrier. The causes were attributed to ineffective design review planning; ineffective implementation of vital area inspections/surveillances and a breakdown of communications between the contract maintenance organization and the security organization in assuring the effective maintenance of required compensatory measures.

Inspections revealed that event reporting was timely, detailed and reflected the performance of quality reviews. Staffing appeared adequate to meet security organization workload requirements.

8. Refueling, Preparations and Planning (11%)

Analysis

This area had been rated Category 2 during the previous SALP appraisal period. Although an improvement in management controls has been noted through the current refueling/maintenance outage, the conclusion reflects an overall rating for the period.

The unit began a routine refueling and maintenance outage on May 28. That outage has been extended significantly beyond its original completion date of September 11 and is presently estimated to be December 23. The removal of a damaged reactor vessel thermal shield has increased the outage activities significantly.

Overall, the preparation and execution of outage activities has been very good. However, as discussed in paragraph one, "Plant Operations," an organization with a weak program is frequently not forced to improve until problems have escalated. Examples used in that section included radiation worker training for steam generator activities and proof checks and tests of equipment prior to use in high radiation fields. The tendency for station management to relinquish its authority when an activity is turned over to an outside contractor along with the lack of aggressiveness of responsible QA organization can contribute to these problems.

As the outage has progressed, the licensee's management control systems have become more effective in dealing with these types of activities. The thermal shield removal is a good example of several organizations working closely together to minimize errors.

In addition to other areas of outage repair and modification identified in paragraph one, "Plant Operations," which reflect strong management controls, the accelerated quality control program associated with the steam generator tube eddy current examination deserves recognition. Because of the magnitude of the data, and the possibility for error in identifying defects or tube location, the licensee verified each defect by completely retesting the tube location and comparing data. Each tube location which passed the testing had its data analyzed a second time. This was all in an effort to avoid passing a tube with a defect and to avoid sleeving or plugging a good tube location.

The licensee should also be recognized for the upgrade of reactor nuclear and primary process instrumentation. These instruments along with a new steam generator feedwater control system should have a positive impact on plant operation. These modifications represent a significant expenditure of resources for projects which, like some others highlighted in paragraph one, "Plant Operations," were approached with effective planning and will contribute to reactor safety.

The Training and Qualification Program is currently being upgraded with the implementation of the recently approved T&Q Plan. The licensee is in the process of developing lesson plans to meet this program need. Careful consideration should be given to the training needs of non-security organization personnel who perform security-related duties.

Contract guards and watchpersons appeared knowledgeable of their duties. Their appearance standards were notably professional.

Conclusion

Category 1

Recommendations

Rely on increased inspection by resident inspectors to supplement a reduced schedule of inspections by region-based specialist. Examine the interface between site and corporate security staff as they support security operations.

Conclusion

Category 2

Recommendations

None

8. Refueling, Preparations and Planning (11%)

Analysis

This area had been rated Category 2 during the previous SALP appraisal period. An improvement in management controls has been noted through the current refueling/maintenance outage, despite the increasing length and complexity of that outage. Accordingly, performance in this area has been assessed as Category 1.

The unit began a routine refueling and maintenance outage on May 28. That outage has been extended significantly beyond its original completion date of September 11. The removal of a damaged reactor vessel thermal shield has increased the outage activities significantly.

Overall, the preparation and execution of outage activities has been very good. However, as discussed in paragraph one, "Plant Operations," an organization with a weak program is frequently not forced to improve until problems have escalated. Examples used in that section included radiation worker training for steam generator activities and proof checks and tests of equipment prior to use in high radiation fields. The tendency for station management to relinquish its authority when an activity is turned over to an outside contractor along with the lack of aggressiveness of responsible QA organization can contribute to these problems.

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9. Licensing Activities

The licensee senior management continues to be involved with licensing matters, thus ensuring adequate management reviews and consistent submittals to the NRC.

The licensing personnel in the corporate offices are responsive to staff requests and answer oral questions promptly. Written responses to NRC queries are almost always provided on schedule. Furthermore, the licensee has kept the staff informed of its plans and actions to resolve matters important to safety. The licensee briefings for the staff conducted in May and June on steam generator decontamination and tube sleeving plans are illustrative of this point.

Reviewers have noted that written submittals are not always complete and sometimes must be supplemented (i.e., a vendor report on steam generator sleeving). The RETS review and the resolution of purge/vent and fire protection issues have been hampered by differences of opinion or approach between the licensee and NRC staff. These circumstances and the fuel failures and thermal shield damage discovered during 1983 have delayed completion of the associated licensing actions.

Although staff licensing review schedules have been extended somewhat for the reasons cited above and may require considerable effort during the next few months, the overall burden on NRR resources has not been greater than usual during this grading period.

Conclusion

Category 2

Recommendations

The licensee should assure that supporting technical information and analysis for proposed licensing actions be more complete or reference material be made available in a more timely manner.

Conclusion

Category 1

Recommendations

None

V. SUPPORTING DATA AND SUMMARIES

1. Licensee Event Reports

Tabular Listing

Type of Events:	Licensee Classification	NRC Classification
A. Personnel Error	7	9
B. Design/Man./Constr./Install	3	2
C. External Cause	0	0
D. Defective Procedure	0	1
E. Component Failure	25	26
X. Other	9	6
Total	44	44

Licensee Event Reports Reviewed 82-36 through 83-25, including plant related environmental reports (83-01 and 83-03) but excluding non-plant related environmental reports.

Causal Analysis

Nine sets of common mode events were identified:

a. LERs 82-41, 83-04, and 83-15 reported incidents of dropped Control Element Assemblies. This chain is a continuation of a series of 5 events extending through the previous assessment cycle.

b. LERs 82-38, 82-50, 83-03, and 83-19 reported sharp rises in dose equivalent Iodine-131 concentration in the reactor coolant. Similar increases were reported during the same fuel cycle in the preceding assessment period.

c. Environmental LERs 83-01 and 83-03 reported incidents of radioactive liquid discharges during which radiation monitor recorder failures occurred.

d. LERs 82-51 and 83-01 reported failures of the plant computer. This chain is a continuation of a series of 2 events extending throught the previous assessment period.

e. LERs 82-44 and 83-09 reported personnel errors which led to failures to monitor fuel rod linear heat rate using incore neutron detectors.

f. LERs 82-39 and 82-40 reported leakage from containment air lock components. This chain is linked to a single event which occurred during the previous assessment period.

g. LERs 82-43 and 83-11 reported damaged Main Steam System piping hangers.

h. LER 83-05 reported high Reactor Coolant System leakage. This event is a continuation of a series of 3 events during the previous assessment periods.

i. LER 83-18 reported setpoint drift in Steam Generator low pressure bipass removal bistable. This event is linked to two events during the previous assessment period involving the same instrument.

2. Investigation Activities

No special investigations were conducted during the evaluation period.

3. Escalated Enforcement Actions

a. Civil Penalties

None

b. Orders

An Order dated March 14, 1983, confirming commitments on past TMI related issues.

c. Confirmatory Action Letters

None

4. Management Conferences

a. Enforcement Conference

An Enforcement Conference was held in the Region I office on September 8, 1983, to discuss the licensee's corrective actions following the breach of vital area barrier.

TABLE 1

TABULAR LISTING OF LERs BY FUNCTIONAL AREA

MILLSTONE NUCLEAR POWER STATION - UNIT 2

	Area	Number/Cause Code		Total
1.	Plant Operations	6/A 2/B 1/D 10/E 2/X	(6/A 2/B 10/E 3/X)	21
2.	Radiological Controls			0
3.	Maintenance	3/E 3/X	(3/E 3/X)	6
4.	Surveillance	1/A 9/E 1/X	(1/A 1/B 7/E 2/X)	11
5.	Fire Protection	1/E	(1/E)	1
6.	Emergency Preparedness			0
7.	Security and Safeguards			0
8.	Refueling			0
9.	Licensing Activities	1/A	(1/X)	1
	Other (Original Design Errors and Equipment Failures not Classifiable Into Areas 1-9)	4/E	(4/E)	4
			TOTAL	44

Cause Codes

A. Personnel Error
B. Design, Manufacturing, Construction, or Installation Error
C. External Cause
D. Defective Procedures
E. Component Failure
X. Other

*NRC reclassfication of causes is tabulated, licensee classification of causes is shown parenthetically.

TABLE 2

VIOLATIONS (9/1/82 - 8/31/83)

MILLSTONE NUCLEAR POWER STATION - UNIT 2

A. Number and Severity Level of Violations

Severity Level	
Severity Level I	0
Severity Level II	0
Severity Level III	0
Severity Level IV	3
Severity Level V	0
Total	3

B. Violations vs. Functional Area

	Severity Levels				
FUNCTIONAL AREAS	I	II	III	IV	V
1. Plant Operations				2	
2. Radiological Controls					
3. Maintenance					
4. Surveillance				1	
5. Fire Protection					
6. Emergency Preparedness					
7. Security and Safeguards					
8. Refueling					
9. Licensing Activities					
Others					
Total				3	

TABLE 3

INSPECTION HOURS SUMMARY (9/1/82 - 8/31/83)

MILLSTONE NUCLEAR POWER STATION - UNIT 2

		Hours	% OF TIME
1.	Plant Operations	555	36
2.	Radiological Controls	298	20
3.	Maintenance	130	8
4.	Surveillance	181	12
5.	Fire Protection	88	6
6.	Emergency Preparedness	62	4
7.	Security and Safeguards	44	3
8.	Refueling	162	11
9.	Licensing Activities	No Data Available	
	*Total	1520	100%

*Allocations of inspection hours vs. Functional Areas are approximations based upon inspection report data.

TABLE 4

INSPECTION ACTIVITIES

MILLSTONE NUCLEAR POWER STATION - UNIT 2

Report No. and Inspection Dates	Inspection Hours	Inspector	Areas Inspected
82-19 8-8-82 thru 9-25-82	125	Resident	Routine Safety
82-20 9-20-82 thru 9-21-82	37	Specialist	Steam Generator Repairs - modification
82-21 9-28-82 thru 9-29-82	14	Specialist	Safeguards
82-22 9-29-82 thru 10-1-82	39	Specialist	Maintenance and Measurement and Test Equipment Program
82-23 10-19-82 thru 10-21-82	24	Specialist	Special Event: Loss of D C. power on January 2, 1981
82-24 9-26-82 thru 11-20-82	104	Resident	Routine Safety
82-25 11-21-82 thru 1-9-83	102	Resident	Routine Safety
82-26 12-28-82 thru 12-30-82	0	Specialist	Radioactive Material and Transport
83-01 1-24-83 thru 1-28-83	25	Specialist	Routine Safety
83-02 1-9-83 thru 1-29-83	66	Resident	Routine Safety

Report No. and Inspection Dates	Inspection Hours	Inspector	Areas Inspected
83-03 2-2-83 thru 2-4-83	25	Specialist	In Service Testing Program
83-04 2-8-83 thru 2-11-83	14	Specialist	Environmental Monitoring Independent Measurements
83-05 2-8-83 thru 2-11-83	34	Specialist	Health Physics Program
83-06 1-30-83 thru 2-26-83	92	Resident	Routine Safety
83-07 3-6-83 thru 3-9-83	30	Specialist	Health Physics practices, ALARA Program implementation
83-08 2-27-83 thru 4-16-83	200	Resident	Routine Safety
83-09 4-11-83 thru 4-14-83	49	Specialist	Radiation Shielding Review
83-10 5-8-83 thru 6-4-83	112	Resident	Routine Safety
83-11 4-28-83 thru 4-29-83	4	Specialist	Follow-up of radioactive material audit questions from inspection 82-26
83-12 5-16-83 thru 5-19-83	62 total 22 on site	Specialist	Follow-up of corrective actions from Emergency Preparedness Appraisal (82-01)
83-13 4-17-83 thru 5-7-83	58	Resident	Routine Safety

Report No. and Inspection Dates	Inspection Hours	Inspector	Areas Inspected
83-14 5-18-83 thru 5-20-83	15	Specialist	Health Physics Program
83-15 6-27-83 thru 7-1-83	15	Specialist	Radiochemical and Chemical Independent Measurement
83-16 6-5-83 thru 7-2-83	112	Resident	Routine Safety
83-17 7-11-83 thru 7-15-83	31	Specialist	In Service Inspection practices and data review
83-18 7-3-83 thru 8-6-83	65	Resident	Routine Safety
83-19 8-8-83 thru 8-12-83	31	Specialist	Security
83-20 8-8-83 thru 8-12-83	35	Specialist	Health Physics practices during refueling