U.S. NUCLEAR REGULATORY COMMISSION

REGION I

SYSTEMATIC ASSESSMENT OF LICENSEE PERFORMANCE

INSPECTION REPORT 50-423/84-19

NORTHEAST NUCLEAR ENERGY COMPANY

MILLSTONE NUCLEAR POWER STATION, UNIT 3

ASSESSMENT PERIOD: SEPTEMBER 1, 1983 - August 31, 1984

BOARD MEETING DATE: OCTOBER 25, 1984

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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 available observations periodically and evaluate licensee performance based on those observations. SALP objectives are to improve the NRC Regulatory Program and licensee performance.

This assessment period is September 1, 1983 through August 31, 1984. The prior assessment period was September 1, 1982 through August 31, 1983. Significant findings from prior assessments are discussed in the applicable Performance Analysis (Section III) function areas. This SALP is primarily an assessment of the construction of Millstone Unit 3.

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

B. SALP Review Board and Attendees

SALP Review Board Members

R. Starostecki, Director, Division of Project and Resident Programs (DPRP)
T. Martin, Director, Division of Engineering and Technical Programs (DETP)
E. Wenzinger, Chief, Projects Branch No. 3, DPRP
E. Greenman, Chief, Projects Branch No. 1, DPRP
L. Bettenhausen, Acting Chief, Engineered Programs Branch, DETP
B. D. Liaw, Chief, Materials Engineering Branch, NRR
E. McCabe, Chief, Reactor Projects Section 3B, DPRP
T. Rebelowski, Senior Resident Inspector, Millstone Unit 3
E. Doolittle, Licensing Project Manager, NRR

Other Attendees

T. Johnson, Project Engineer, Reactor Projects Section 3B, DPRP
J. Durr, Chief, Materials and Processes Section, DETP

C. Background

1. Licensee Activities

During this SALP period, the licensee considered Construction to have continued on schedule. The Construction thrust shifted from area-oriented work to system-oriented work. Concurrently, the craft staffing onsite decreased from about 4000 to about 3200.

The 17 Construction Deficiency Reports (CDR's) for this assessment period are summarized in Table 1. Two of these were subsequently determined not to be reportable by the licensee.

A major effort in progress is the "as-built" design verification. For this, a significant movement of the Stone & Webster engineering staff from Boston to the site has occurred.

System turnover and pre-operational test activity increased. During this assessment period, about 100 systems were "turned over" by construction to operations for test performance, and 129 of 228 systems were turned over as of the end of the SALP period.

The licensee considers Millstone-3 to be 88% complete, as compared with 78% at the end of the previous SALP period. (No NRC estimate of completion status has been made.) Northeast Utilities' current estimate for fuel loading is November 1985. The critical path to achieving this date includes the Reactor Coolant System Hydro (Feb 85), the Structural Integrity Test and Integrated Leak Rate Test (May 85), and the Integrated Hot Functional Test (July 85).

2. Inspection Activities

One NRC Senior Resident Inspector was assigned throughout the SALP period. Resident inspection assistance was provided by the Millstone 1/2 Resident Inspector. In addition, a major inspection effort was conducted by a Regional Construction Team of six inspectors and a Region I section chief.

The NRC inspection effort during the period totalled 2446 hours: 1717 hours were by resident and region-based inspectors, and 729 hours were by the Regional Construction Team. The distribution of inspection hours is shown in Table 2. Inspection activities and enforcement data are summarized in Tables 3 and 4, respectively.

QA and QC activities were an integral element of all inspections performed during the assessment period. In addition, two inspections were devoted specifically to the QA/QC program.

3. Other Activities

The Safety Evaluation Report (SER), NUREG-1031, was issued by NRR during July 1984. It concluded that, subject to favorable resolution of the items it discussed, the facility can be operated by the applicant without endangering the public health and safety.

On September 10, 1984, after this SALP period, the ACRS reported to the NRC Chairman that, subject to resolution of open NRC items and to the satisfactory completion of construction, staffing, and pre-operational testing, the ACRS believes that there is reasonable assurance that Millstone-3 can be operated at up to 3411 MWe without undue risk to public health and safety.

The Millstone-3 simulator is scheduled to be delivered in December 1984. Operator licensing exams using the Millstone-3 simulator are scheduled to begin in May 1985.

II. 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 events and construction deficiencies.
6. Staffing (including management).
7. Training effectiveness and qualification.

To evaluate licensee performance consistently, attributes of Category 1, 2, and 3 performance were applied as discussed in NRC Manual Chapter 0516, Part II and Table I. The categories are defined 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 construction performance 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 construction performance 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 construction performance is being achieved.

The SALP Board also categorized the licensee's performance trend during this assessment period. That categorization describes the general or prevailing tendency (the performance gradient) and is defined as follows:

Improving: Performance generally improved during this SALP period.

Consistent: Performance was generally constant during this SALP period.

Declining: Performance generally declined during this SALP period.

MILLSTONE NUCLEAR POWER STATION, UNIT 3

III. SUMMARY OF RESULTS

Overall Facility Evaluation

Overall, this SALP generally found a consistent high level of licensee performance. Improvement of previous satisfactory performance to high performance was found in two of the three such functional areas, and the third such area also showed improvement. In Piping and Supports, the only area where performance was considered to be declining, the overall performance level was nonetheless considered adequate to assure proper construction and the decline was attributed to failure to demonstrate as much foresight, thoroughness, and aggressive resolution of items as had been considered the case previously. In general, however, aggressive licensee management involvement in facility activities was noted, as was responsiveness to and cooperation with the NRC, good facility programs, and sound understanding of technical issues. A concern that some items (e.g., a few CDRs) could be dispositioned more swiftly carried over from the previous SALP, but the problems noted were minor ones. This SALP dispensed with the Soils and Foundations area because of activity completion and eliminated Document Control as a separate functional area because it had been eliminated as a significant programmatic discrepancy. Preoperational Testing was introduced as a functional area because it is appropriate to this construction phase, and Engineering-Construction interfaces was added to reflect its importance.

	FUNCTIONAL AREAS	CATEGORY LAST PERIOD (9/1/82-8/31/83)	CATEGORY THIS PERIOD (9/1/83-8/31/84)	TREND
A.	Containment/Safety-Related Structures	1	1	Consistent
B.	Piping Systems and Supports	1	2	Declining
C.	Safety-Related Components	2	1	Consistent
D.	Support Systems	1	1	Consistent
E.	Electrical Power, Instrumentation and Controls	2	1	Consistent
F.	Preoperational Testing	N/A	1	None
G.	Engineering-Construction Interfaces	N/A	1	Consistent
H.	Licensing Activities	2	2	Improving

IV. PERFORMANCE ANALYSIS

A. Containment and Other Safety-Related Structures (8%)

1. Analysis

Previous licensee performance in this area was high (Category 1).

During this assessment period, there were resident and region-based inspections of the licensee identified containment liner out-of-tolerance and stud spacing concerns. Although final liner qualification will require NRR safety evaluation of higher liner stresses and stud loads, the licensee's analysis reflected technical soundness, clear understanding of the issues, and extensive effort.

NRC region-based specialist review of safety-related structural steel and supports for equipment outside the containment building found no problems.

Prior to this SALP period, the resident inspector noted that safety-related fillet welds on Nelson Studs met requirements but were close to minimums in width. Welder retraining by the licensee resulted. During this SALP period, the resident inspector found no inadequacies in that retraining. This is an instance of licensee responsiveness to the NRC.

The licensee found and repaired a minor concrete void in the fuel building. Resident inspector review found no corrective action inadequacies.

NRC inspections were made of the closure of the containment construction opening to verify rebar and stud placement. Secondary closure building erection was observed, as was the licensee's disassembly of the reactor internals and the placement of the refueling crane and indexing units. No significant problems were found.

One violation was identified for failure to maintain closures to the primary loop at the steam generator area. The licensee then instituted acceptable programs to upgrade containment cleanliness. Containment remains the area of most concern from a housekeeping viewpoint, but it's cleanliness was considered good as of the end of the SALP period.

Licensee monitoring of structural settlement found insignificant settling. Such monitoring is to continue during construction and into the operations phase.

Performance during this SALP period was consistently high. No significant trend in performance during this SALP period was identified.

2. Conclusion

Category 1, consistent.

3. Board Recommendation

None.

B. Piping Systems and Supports (17%)

1. Analysis

The previous SALP found licensee performance in this area to be high (Category 1). This area received both resident and region-based inspection during this SALP period.

Periodic resident inspector checks and region-based specialist inspections in November 1983 and August 1984 have provided additional confirmation of the overall high level of pipe and support quality noted in the independent measurements inspection conducted by the NRC in August 1983 (just prior to this SALP period).

The licensee was responsive to and cooperative with the NRC during the construction team inspection. The team selected several pieces of equipment for detailed examination or testing. In some cases, draining of systems, disassembly of flanges, opening of manholes or retorquing of bolts was accomplished to facilitate the inspection. However, in the case of the request for exemption from General Design Criterion 4 received shortly after this SALP period, it appears that the licensee's submittal has been neither timely nor sufficient to address the NRR concerns. The licensee's response to the construction team inspection was inadequate in the description of corrective actions for five of the ten response items, necessitating NRC regional management followup to prompt the establishment of additional corrective measures.

Most large and small bore pipe is installed. The great majority of this work and its management has been proper and well-controlled. There have, however, been a few problems with a relatively small amount of pipe. For example, one problem developed with dents of over one-half inch in depth in thin-walled (0.125") service water pipe. The dents were caused by physical contact incident to other construction work. Dent removal was attempted by welding bolts to the center of the dents to facilitate pulling them out. This welding produced thru-wall cracks in the thin-walled pipe. The dented pipe was found to be acceptable as is. Later, welding of trunnions for the attachment of pipe supports also produced thru-wall cracks in this pipe, showing that the problem with welding this pipe was not adequately addressed when it was first identified. The subsequent rework and retest is presently being performed.

Another problem was the adequacy of Tubeco pipe and fittings. In March 1984, in response to a concern (film density and penetrameter placement) generated during an NRC Region I independent measurements inspection (NDE Van), the licensee reported that a sample of Tubeco radiographs identified only isolated cases of radiograph inadequacy and no pipe inadequacies. Two months later, separate licensee review found problems (with film density, penetrameter placement and identification, undocumented linear indications, excessive geometric unsharpness) with 58 of about 125 radiographs sampled as a result

of a licensee audit. A significant deficiency was reported. After the SALP period, the final CDR stated that rework was found necessary on two welds only and that no additional sampling or rework was planned. This conclusion has not been concurred in by the NRC. However, in this case, although the later licensee audit was effective, the control over NDE quality was not adequate initially and the licensee's response to the NRC identified concern did not confirm the presence of problems which existed.

Another problem is the analysis of piping stresses where heavier than specified piping and fittings are installed. The heaver pipe and fittings are conservative in that they are stronger, but the greater stresses they impose on supports was not considered. Assumed pipe and fitting sizes were used in stress calculations instead of actual sizes. This issue has been unresolved since September 1983. No progress towards resolution has been identified; the licensee appears to be waiting for resolution at another site. This is an instance of where licensee corrective actions could have been more aggressive.

The problems identified are considered to represent a decrease in performance during this SALP period, in that they reflect less foresight, thoroughness, and aggressive resolution of items than has been considered a characteristic of this licensee. However, the licensee's overall performance in this area during this SALP period is considered to be satisfactory in regard to assuring that piping systems and supports will be adequate to perform their required functions.

2. Conclusion

Category 2, declining.

3. Board Recommendation

Licensee: Evaluate the problems in this area as an indication of a potential trend toward reduction of facility design conservatism, in this area and others.

NRC: Additional inspection of the concerns in this area should be conducted.

C. Safety-Related Components (14%)

1. Analysis

The previous SALP found licensee performance to be satisfactory in this area (Category 2). This area received resident and region-based inspection during this SALP period. NRC inspection covered the reactor vessel, the fuel storage racks, and placement of the refueling crane complex. Licensee activity in this area decreased during this period as a result of normal construction completion. Turnover of plant systems from construction to operations is approximately 60% complete.

As discussed in Section F, Pre-Operational Testing, progress has been made in correcting an increasing number of incomplete construction work items.

The problems (noted in the previous SALP) with Limitorque valve operator protection during field storage and after installation were corrected.

Inspection of Pre-Service Inspection (PSI) of the reactor vessel and safety-related piping found that, based on the present workload, the staff assigned to PSI is ample. The licensee has assigned an NDE Level III and at least one QA engineer to the PSI program. These are in addition to contracts with NDE Engineering Consultants, Inc., who are responsible for managing the program. The performance of PSI was observed and found satisfactory.

NRC:RI Specialist comparison of performance data as shown in the FSAR, electrical specifications, vendor documents, and equipment nameplates showed good agreement between these documents.

The licensee found inadequate staffing of Field Quality Control in the mechanical installation area, as shown by a backlog of work and required overtime for FQC inspectors, and instituted corrective action consisting of subcontractor assistance. The effectiveness of this action has not yet been evaluated by the NRC, but it does preliminarily appear that the additional QC effort has arrested the backlog buildup, and that continued licensee attention to this area will result in the substantive backlog reduction that is needed. Licensee recognition of this condition was considered to be late, but no equipment safety inadequacy has been correlated to this condition.

The licensee was cited for a violation for failure to provide criteria for aligning pipe to pump flanges. This is considered an exception to normal licensee practice of having clearly defined acceptance criteria. In general, potential Field QC problems have been addressed by the licensee in a timely manner.

In general, construction deficiencies have been carefully analyzed by the licensee and their resolution is considered to be timely and to incorporate sound engineering practice. The senior resident inspector concluded that the fact that a CDR is needed is generally being identified more promptly by the licensee and that CDR quality is generally improved over the previous SALP period. This is an example of a performance improvement over that noted in the previous SALP report.

A few significant construction problems appear to be getting less than timely, full disposition. Examples include emergency diesel load sequencer reset feature omission (a CDR open for over 10 months) and full identification of safety-significant NAMCO Limit Switch shaft slippage (a CDR not fully scoped out in over 8 months in regard to what equipment is affected). These items are tracked by the licensee's system which weekly disseminates NUSCO responsible items to NUSCO management, and were not due to be resolved by the end of the SALP period. The NRC concern here is that failure to resolve such items promptly increases the potential for system testing being invalidated by subsequent rework. There is a system for prescribing such rework, but the potential for error would be reduced by swifter resolutions which minimized the need for rework. In this regard, it is felt that continued licensee sensitivity to the effectiveness of his management controls is the appropriate mechanism for assuring that this concern does not develop into a problem area.

During this SALP period, licensee performance is considered to have been high and generally constant.

2. Conclusion

Category 1, consistent.

3. Board Recommendation

None.

D. Support Systems (11%)

1. Analysis

The previous SALP found licensee performance in this area to be high (Category 1). This SALP reflects resident, region-based, and Vendor Programs Branch inspection. Construction is essentially complete in this area.

Resident inspection of turbine building component cooling water, of feedwater lines and supports, of steam lines and supports, and of secondary system steam relief valves identified no problem areas.

Resident inspection of radwaste facilities identified minor concerns about valve packing, reach rods, and tank footings. These were promptly and satisfactorily resolved.

Heating, ventilation, and air conditioning (HVAC) concerns developed during this SALP period. The NRC Headquarters Vendor Programs Branch found that HVAC blower fan to frame bolting was of lower strength than specified. The licensee found instances of improper material substitution, other low strength bolt usage, and undersize welds on seismic ductwork, and was unable to fit seismic ducting flat against its supports. So far, the fit tolerance has been increased a number of times, and the support (riveting) restrictions have also been changed substantially. The adequacy of the licensee's actions has not been evaluated yet. In the case of seismic ductwork, it has been necessary to identify the NRC concerns to the licensee several times. This is an instance of where responsiveness could be improved.

Fire Protection System pipes are a concern. They are not seismically supported and their potential impact on other systems is an open item. NRR is evaluating this item. A concern that the fire system piping for HEPA filters had not been hydrostatically tested and that the HEPA filter nozzle spray patterns had not been verified is to be addressed through the preoperational test program. No inadequacy in licensee responsiveness in these matters has been identified.

Considering the nature and amount of support system work, the above concerns are minor in severity and number. The problems were largely licensee identified. In general, the high level of performance noted in the previous SALP has been maintained during this SALP period.

2. Conclusion

Category 1, consistent.

3. Board Recommendation

None

E. Electrical Power, Instrumentation, and Controls (18%)

1. Electrical Power Analysis

The previous SALP found this area to be satisfactory (Category 2). During this SALP period, the NRC conducted resident and region-based inspections. This SALP includes observations made during the Regional Construction Team (RCT) inspection. Strong Northeast Utilities upper management involvement in the construction of Millstone-3 was shown by their onsite presence and daily involvement in ongoing activities.

Licensee audits have been thorough and effective, and their findings have been responded to in a timely manner.

The licensee's records of the AC and DC systems associated with the Emergency Diesel Generators verified that the equipment and cable installations are in accordance with the Safety Analysis Report (SAR) and site procedures. NRC electrical inspections found no overall problem with cable separation. Instances of cable separation discrepancies are being identified and pursued by the licensee, and this licensee's actions thus far appear to be appropriate to the circumstances.

A resolution was obtained on the NRC concern (addressed in the previous SALP) over the adequacy of mathematically determining cable pull tensions. Actual pull tension monitoring for safety-related cables was resumed. Inspections of manual and machine pulls found them satisfactory. Only a small amount of cable was pulled without pull tension monitoring, and subsequent insulation resistance checks are a safeguard against cable faults. Licensee resumption of the better method of cable pull control was responsive to the NRC.

Observation of splicing of 240 volt and 4160 volt cables found that the work was performed in accordance with established criteria. However, cable splicing is undesirable because of the increased potential for high resistance junctions, and the FSAR commits to having no splices in raceways. A deviation was issued. (NRR evaluation of the acceptability is in progress). However, in this area, procedural adequacy and adherence is generally considered to be very good.

Overall, the electrical power area is improved over the previous SALP, and reflects a consistently high performance during this SALP period.

2. Instrumentation and Control (I&C) Systems Analysis

This analysis is based on resident and region-based inspections, and addressed programmatic aspects primarily. Hardware installation will be addressed in the next SALP.

In general, the licensee has translated the SAR technical commitments into appropriate specifications, drawings, and work procedures. Licensee audits of I&C were numerous and of generally high quality.

The licensee has an extensive training program for instrument technicians and a well equipped and organized permanent facility to support operation, maintenance, and surveillance testing. Personnel were selected so that varying backgrounds would provide a balance between hands-on experience and technical training.

Planning and assignment of priorities, in this and other areas, is aided by the weekly construction progress report which emphasizes areas requiring additional attention to support turnover of completed systems.

The construction team inspection found the licensee to be strong in quality trending and thorough in their approach to corrective actions in the equipment qualification program. The licensee is presently developing a computerized environmental qualification program status report. Revised environmental classifications established by 10 CFR 50.49 are being incorporated in the pertinent equipment specifications. For example, equipment for which the environmental qualification changed from "mild" to "harsh" was Westinghouse supplied pressure transmitters. These transmitters were not qualified for High Energy Line Break environments and were replaced by Rosemount transmitters which were so qualified.

In general, procedures were adequate and followed. However, the interface between Construction and Startup was found deficient during the construction team inspection, in that there was poor control room cleanliness related to instrument installation and neither Construction nor Startup acknowledged responsibility for this. The RCT inspection identified other deficiencies including a violation for failure to follow approved cable potting procedures. This resulted in replacement of two affected connectors. Overall, the licensee and his architect-engineer are considered to understand construction technical issues and to generally exhibit conservatism in the resolution of construction problems. This was particularly apparent in the licensee's timely identification and resolution of the CDRs concerning electrical terminations by System Controls and by Reliance. This involved major rework (not yet completed) on main control board termination lugs. Other corrective

actions have also been thorough, with one example being improvement in control room cleanliness and the assignment of specific overview responsiblity for that cleanliness to Plant Operations. The problems identified are not considered to represent serious lapses in construction management.

Overall, the licensee has shown management attention and involvement in this area, and the resources being applied are considered ample and effective.

Licensee performance in the I&C area is considered to have been high and consistent during this SALP period. However, since this evaluation is based on program quality more than on the effectiveness of its implementation, it would be premature for the NRC or licensee to reduce the attention being paid to this area.

3. Conclusion

Category 1, consistent.

4. Board Recommendation

Licensee: Apply the needed resources as activities increase in the I&C area.

NRC: Provide normal I&C inspection coverage.

reoperational Testing (14%)

1. Analysis

This area was not evaluated during the previous SALP period. (The preoperational test inspection program was started in April 1984).

During this SALP period, the NRC conducted region-based and resident inspections in this area. The licensee has established an acceptable program for the turnover of systems from Construction to Preoperational Testing. The latter group has been staffed with experienced personnel and senior management personnel from the licensee and the Architect Engineer. Interfaces, rework and responsibilities are addressed in established procedures. Licensee QA/QC overview emphasizes observation of ongoing activities using random monitoring/surveillance techniques.

The onsite QA/QC group is well staffed with appropriately experienced personnel. It was a normal practice for senior licensee corporate management personnel to visit the site on an almost weekly basis. Interface and status meetings by onsite groups were an almost daily occurrence.

The construction effort and system turnover support the preoperational and startup programs. The number of outstanding items in the turnover packages is of concern but licensee action to decrease the number of such items has been effective, reducing the typical number of open items in individual system turnover packages from over 200 to about 50.

The licensee has adequate administrative procedures in place to control plant maintenance, preventive maintenance, training of test personnel, and documents during preoperational testing. A computerized Production Maintenance Management System provides information on system status and is useful in determining test readiness of systems.

Parts of the construction hydrostatic testing program for system piping and components, Phase I testing of electrical components, and electric and mechanical testing of service water and turbine building component cooling water systems were observed and found acceptable.

Initial pre-operational test procedure reviews of the heating, ventilation, and air conditioning system indicated that the licensee needed to review test procedures to ensure compatibility with FSAR commitments. The licensee corrected specific deficiencies identified by the inspector. These deficiencies were not a significant concern for the relatively uncomplicated procedures available for review. Carry-over of corrective actions to other procedures has not been verified yet.

There was no enforcement action in this area. Improvement was identified in the number of outstanding items in turnover packages. In that the preoperational testing program was opened in April 1984, this SALP is primarily based on programmatic and staffing aspects. It is premature to assess the overall quality of the effectiveness of program implementation or the program trend at this time, and those aspects will be addressed during the next SALP.

2. Conclusion

Category 1, no trend established.

3. Board Recommendation

NRC: Maintain aggressive preoperational testing coverage consistent with testing schedule.

G. Engineering-Construction Interfaces (18%)

1. Analysis

This is the first SALP to separately address Engineering and Construction Interfaces. Earlier SALPs included this in the other functional areas. This assessment is based upon the observations of two resident inspectors and region-based inspectors and managers, and particularly on observations made by the Regional Construction Team (RCT).

The coordination between engineering and construction activities has, in general, been excellent. This is due, in part, to several notable strengths in the project organization. These include shortened management communication lines due to location of both the NUSCO Project Manager and the Vice President for Generation Construction onsite together with large segments of the engineering staff. The A/E, Stone & Webster, has also stationed a significant engineering staff onsite to address design and construction issues without routinely referring these to the Boston office. Both NUSCO and NNECO staffs appear to be compatible with their Stone & Webster counterparts, facilitating an atmosphere of cooperation. Overall staff size is clearly ample.

The RCT found the licensee to be stong in quality trending, in personnel training and qualification, in computerized management information, and in document control and audit. Weaknesses noted were over-reliance upon Joint Utilities Management Audits as the primary annual QA audit and not including all outstanding items in drawing changes. Violations were cited for not inspecting component cooling water pump flanges for proper positioning and for not identifying (circling) the changed portion of one drawing. Overall, the RCT found licensee performance to be high.

While the general degree of engineering and construction coordination is excellent, the inspectors noted that some difficult issues have remained unresolved. Two examples are the analysis of piping stresses where heavier than specified piping and fittings are installed and the choice of the proper Non-Destructive Examination (NDE) method for the inspection of containment electrical penetration end-plate welds. The heavy pipe and fitting concern is evaluated in Functional Area B, Piping Systems and Supports. For the containment electrical penetrations, the A/E had defined NDE requirements for the penetration end plate welds as liquid penetrant (PT) of the root and final weld passes. This examines only the outside and root pass surfaces. The A/E evaluation of the weld is that it is an ASME Category "C" non-butt weld. NRC staff considered the weld to be an integral backing strip butt weld requiring both PT and ultrasonic (UT) examination. NDE adequacy in the case of these electrical penetrations remained unresolved from November 1983 until October 1984. Although the resolution did not involve rework, this is an example of

slow resolution of an open item. (The justifying code case was issued in June 1982.)

The engineering/construction interface warrants increased attention because a considerable increase in the number of such items is normal as construction nears completion. The utility's overall performance in this area is high, with generally timely responses. Lapses identified by the preceding examples have been indicative of potential but unconfirmed equipment problems, and the level of performance during this SALP period is considered to have been generally unchanged.

2. Conclusion

Category 1, consistent.

3. Board Recommendation

NRC: Increased NRC inspection to address the normal increase in outstanding items being ready for closeout during this late phase of construction. (A construction appraisal team inspection has already been planned to start in February 1985.)

H. Licensing Activities

1. Analysis

This area was categorized as satisfactory (Category 2) during the previous SALP. Evaluation and monitoring of licensing activities included routine contact between the NRC and NNECO as well as conference calls, site visits, meetings and audits as required. The major licensing activities during this assessment period involved the continuation of the NRC staff review of the FSAR and ER, issuance of the Draft Environmental Statement and Draft and Final Safety Evaluation Report, and preparation for ACRS meetings. Also, the staff continued its review of the applicant's probabilistic safety study which was submitted in August of 1983.

The applicant continues to consistently demonstrate evidence of prior planning and assignment of priorities. He has well stated, controlled and explicit procedures for control of activities. This has been shown by the applicant's approach to resolving approximately 200 open items identified in the staff's draft safety evaluation report to support issuance of the final SER. The applicant established a program to identify and track status of each item and maintained internal schedules for resolving each open item. Generally, NNECO management assigned the necessary technical people to develop complete, high quality responses.

Responses were generally timely, thorough and technically sound. Some exceptions occurred during the mechanical engineering, auxiliary systems and radiological assessment portions of the safety review and review of the probabilistic safety study (PSS) for Millstone-3. In these cases several discussions and meetings with the applicant were necessary in order to obtain clarification and reach resolution. Although corporate management reviews and signs all submittals to NRR, it is felt that management involvement was lacking in efforts to resolve items in these significant areas. Further, NNECO management's position that the NRC staff must meet their scheduled milestones regardless of the quality or timeliness of the NNECO inputs was shown in their PSS and Draft Environmental Statement submittals, showing an inappropriate understanding of the licensing process.

Northeast Nuclear Energy Company generally demonstrated a clear understanding of issues during meetings and discussions with the NRC staff and in its submittals to the staff. NNECO generally exhibits conservatism where the potential for safety significance exists. Its approach to resolution of technical issues are viable and generally sound and thorough. The applicant was willing to perform additional studies as necessary to resolve technical issues. He performed detailed analytical technical work in a timely manner to support the SER schedule. Generally, when the staff and the applicant held differing technical positions, the applicant provided

a sound basis for his position. Some exceptions occurred concerning the mechanical engineering, auxiliary systems, materials engineering and radiological assessment portions of the safety review, and review of the PSS. In these cases the applicant did not demonstrate a clear understanding of the issues. Viable approaches to resolution were generally proposed but were lacking in thoroughness and depth. In some areas where the plant design deviated from standard design practice, the applicant did not provide adequate technical basis for the deviation.

In a majority of cases the applicant provided timely responses to open issues. The applicant was very responsive to a majority of the staff concerns, took the initiative to resolve issues by requesting conference calls and meetings, and promptly followed up with submittals of responses. Responses were generally technically sound, concise, and addressed the staff's concerns in a professional manner. The applicant failed to properly address LOCA loads and load combinations at this late stage of construction, but otherwise the applicant provided very effective licensing liaison with NRR.

The applicant is responsive to issues outside of the scope of licensing for Millstone 3 as well. He has commented on proposed rules and generic letters not requiring responses from the utility.

Positions within the applicant's organization are identified and authorities and responsibilities are well defined. NNECO licensing and engineering groups appear to be well staffed as indicated by representatives who have attended numerous review meetings. Generally, sufficient technical staff have participated in review meetings to effect timely resolution of open items. NNECO licensing staff have been very effective. However, it is felt that management involvement in resolution of significant issues failed to prevent the need for additional staff effort to obtain resolution and prevent schedule delays.

The applicant's performance improved significantly during this SALP period, with noteworthy examples being the initiative to resolve open DSER items and the viable, timely, and thorough responses received in most cases. On the other hand, matters such as late input on LOCA loads and load combinations, and such as the posture that the NRC schedule is independent of the quality of licensee inputs, are not indicative of a high level of performance. Overall, our conclusion is that the licensee's performance in this area has been adequate and reasonably effective in addressing nuclear safety considerations.

2. Conclusion

Category 2, improving.

3. Board Recommendation

Licensee: Continue to take the initiative in resolving items in support of fuel load, and provide appropriate management involvement in significant review areas.

V. SUPPORTING DATA AND SUMMARIES

A. Construction Deficiency Reports (CDRs)

The applicant submitted 17 reports of potentially significant deficiencies during the assessment period. Subsequently, 2 were evaluated as not to be reportable by the licensee. One of these has been concurred in by the Senior Resident Inspector. Two were closed with acceptable corrective action; 14 remain open pending resolution of questions. The CDRs are shown in Table 1.

B. Investigation Activities

There were no investigation activities during this SALP period.

C. Escalated Enforcement Action

No escalated enforcement actions were taken during this SALP period.

D. Management Meetings

A meeting was held on October 17, 1983 at the Millstone site to discuss NRC concerns regarding cable installation pull tension. Functional Area E of this SALP describes this concern.

A SALP management meeting was held on November 29, 1983 at the corporate offices in Berlin, Connecticut to discuss the results of the prior SALP for the period from September 1, 1982 to August 31, 1983.

The Second Corporate Management Meeting was held on April 3, 1984 at the Millstone site. Construction status and the planned NRC Region I activities during the pre-operational and startup phases of plant testing were discussed. At the request of the NRC, the applicant explained the use of his Management Information Project System as the basic corporate tool to control the project.

TABLE 1

CONSTRUCTION DEFICIENCY REPORTS

(September 1, 1983 - August 31, 1984)

MILLSTONE NUCLEAR POWER STATION, UNIT 3

CDR NO.	DEFICIENCY	STATUS	CAUSE CODE
83-00-11	Incorrectly Crimped Lugs on Main Control Board Terminations	Open	B
83-00-12	Improper Mounting of Brown Boveri 480V Load Centers	Open	B
83-00-13	Improper Cooling of Flakt-Bahnson Air Handling Units	Open	B
83-00-14	Potential Failure of EDG Load Sequencers	Open	B
83-00-15	Cracks in Pacific Scientific Size 1 and 3 Mechanical Snubber Capstan Springs	Closed	E
83-00-16	HVAC Duct Welds - Symbol Misinterpretation	Licensee Determined To Be Not Reportable	A
83-00-17	Inadequate Termination of Main Control Board Terminal Lugs	Open	B
83-00-18	Charging Springs of Brown-Boveri 480 V Switchgear Damaged Leads	Closed	B
84-00-01	Breaker Extension Tabs Excessive Flexibility	Open	B
84-00-02	Operating Lever of NAMCO Valve Limit Switches Not Adequately Secured	Open	B
84-00-03	Deformation and Leaks of Service Water Piping At Trunions Attachments	Open	B
84-00-04	Improper Size and Method of Crimping Electrical Termination Lugs	Open	B

CDR NO.	DEFICIENCY	STATUS	CAUSE CODE
84-00-05	Improper Clearance in ITT Grinnel Struts	Licensee Determined To Be Not Reportable	F
84-00-06	Improperly Manufactured GE Circut Breakers (AK-25, AKR-30, and AKR-50)	Open	B
84-00-07	Radiography, Discrepancy with Code Requirements	Open	A
84-00-08	Two Potential Safety Issues (High Energy Line Break Inside Containment and No. of RCP's Operating in Mode 3)	Open	D
84-00-09	Potential Overpressure Condition of Component Cooling System	Open	B

Cause Codes

A - Personnel Error

B - Design/Fabrication Error

C - External Cause

D - Defective Procedure

E - Component Failure

F - Site Construction Error

TABLE 2

INSPECTION HOURS SUMMARY (9/1/83 - 8/31/84)

MILLSTONE NUCLEAR POWER STATION, UNIT 3

	Functional Area	Hours	% of Time
A.	Containment and Other Safety Related Structures	198	8
B.	Piping Systems and Supports	420	17
C.	Safety Related Components	335	14
D.	Support Systems (Including HVAC)	258	11
E.	Electrical Power, Instrumentation, and Controls	445	18
F.	Pre-Operational Testing	340	14
G.	Engineering-Construction Interfaces	450	18
H.	Licensing	____	___
	TOTAL	2446	100

TABLE 3

INSPECTION ACTIVITIES

MILLSTONE NUCLEAR POWER STATION, UNIT 3

Inspection Report Nos.and Dates	Inspector/ Hours	Areas Inspected
83-16 8/1-9/17/83	Resident 128 Hours	Preservice inspection; craft drawings, main control board electrical terminations; radiographic film interpretation; probabilistic safety study meeting, near site radiation inquiry and construction design dispositions.
83-17 9/18-10/29/83	Resident 92 Hours	Seismic analysis of piping systems with overweight fittings, electrical cable pulls, Category I electrical cable splices, potential significant deficiencies (10 CFR 50.55(e)); construction design dispositions, and case load study review.
83-18 9/26-29/83	Specialist 34 Hours	Installation of electrical safety-related equipment.
83-19 10/17/83	Specialist 5 Hours	Meeting between licensee and two region-based NRC personnel to discuss cable installation.
83-20 10/30-12/10/83	Resident 117 Hours	Potential significant deficiencies, containment liner fire damage repairs; turbine building component cooling water pipe hangers, licensee pre-operational audits, pre-operational startup group meeting, observation of electrical cable pulls, flushing procedure review, construction design dispositions.
83-21 11/28-12/2/83	Specialist 107 Hours	Safety-Related piping; structural steel and supports for equipment outside the containment including installation, quality records, and verification of completed work.

Inspection Report No. and Dates	Inspector Hours	Areas Inspected
83-22 12/11-1/21/84	Resident 112 Hours	Potential significant deficiencies, fuel building concrete void repair, service water hydostatic test, observation of electric cable pull, construction design dispositions, and spent fuel racks.
84-01 1/16/20/84	Specialist 98 Hours	QA for the Bahnson Company (HVAC supplier) for a sample of material suppliers, installed HVAC equipment.
84-02 1/22-3/3/84	Resident 145 Hours	Action on Information Notices, observation of service water hydrostatic test; observation of electrical cable pull; construction design dispositions, spent fuel rack anomalies observation, steam generator tube repairs, Phase I Testing; radiological area review, observation of NDE on feedwater thermocouples, NRR concerns about shutdown from outside the control room and simulator training, and evacuation siren testing.
84-03 3/4-4/14/84	Resident/ Specialist 205 Hours	HVAC, pre-operational testing, potential significant deficiencies, third party inspection, flushing program turnover work control, spent fuel racks, communication o employee concerns, optical tooling, Licensee Qualification Branch onsite review; construction design dispositions, and control of core boring.
84-04 (RCTI) 3/5-3/16/84	Specialist 729 Hours	Design control, quality assurance, and constuction control as divided into electrical, mechanical, and civil/structural disciplines.
84-05 4/3/84	Management Meeting	Meeting with NUSCo corporate staff to discuss status of construction, system turn-overs and corporate management of pre-operational, operational and startup activities.

Inspection Report No. and Dates	Inspector/ Hours	Areas Inspected
84-06 4/15-5/19/84	Resident 96 Hours	Structural settlement monitoring, potentially significant deficiencies, potentially generic items, fire protection, and Safety Evaluation Report responses.
84-07 4/23-26/84	Specialist 4 Hours	Quality Assurance
84-08 5/20-7/7/84	Resident 146 Hours	Pre-operational testing and operational preparedness including plant maintenance, document control, training of test personnel, observation of testing; plant tours, and review of unauthorized ventilation duct modifications and cut electrical cables.
84-09 6/4-8/84	Specialist/ Resident 110 Hours	System turnovers, quality assurance staffing and training, and construction deficiencies.
84-10 7/8-8/18/84	Resident 144 Hours	Plant tours, pre-operational testing, followup of construction deficiencies, Information Notices, and Bulletins.
84-11 5/14-18/84	Specialist 70 Hours	Installation and testing of safety-related instrumentation and Heating, Ventilating, and Air Conditioning (HVAC) systems.
84-12 8/7-17/84	Specialist 36 Hours	Open items.
84-13 8/20-24/84	Specialist 38 Hours	Pre-operational test procedures, plans, and organization.
84-14 8/19-9/29/84	Resident	Report period falls outside SALP period.
84-15 8/28-31/84	Specialist 30 Hours	Preservice inspection of reactor vessel.

TABLE 4

ENFORCEMENT DATA

(September 1, 1983 - August 31, 1984)

MILLSTONE NUCLEAR POWER STATION, UNIT 3

A. Number and Severity Level of Violations and Deviations

1. Severity Level

Severity Level I	0
Severity Level II	0
Severity Level III	0
Severity Level IV	4
Severity Level V	3
Deviations	1
TOTAL	8

B. Violations and Deviations vs. Functional Area

	Functional Area	Severity Level IV	Severity Level V	Deviations
A.	Containment and Other Safety-Related Structures	2	0	0
B.	Piping Systems and Supports	0	2	0
C.	Safety-Related Components	0	0	0
D.	Support Systems (Including HVAC)	0	0	0
E.	Electrical Power Supply and Distribution	0	0	1
F.	Instrumentation and Control Systems	1	1	0
G.	System Turnover and Pre-Operational Testing	0	0	0
H.	Engineering-Construction Interfaces	1	0	0
I.	Licensing Activities	0	0	0
	TOTAL	4	3	1

C. Listing of Violations and Deviations

REPORT	DATES	SUBJECT	REFERENCE	SEVERITY LEVEL	FUNCTIONAL AREA
83-18	9/26-29/83	Cable Splices Made in Cable Raceways	FSAR (Sect. 8, p 8.3-43)	Dev	Electrical Power & Distribution
84-02	1/23-3/3/84	Steam Generator Primary Side Foreign Material Exclusion Not Maintained	App. B, Crit. XIII	IV	Cont. & Safety Related Structures
84-04	3/5-16/84	Main Control Board Cleanliness and Protection	App. B, Crit. XIII	V	Instrumentation & Controls
84-04	3/5-16/84	Failure to Conduct Cable Potting Operations in Accordance with Instructions	App. B, Crit. V	IV	Instrumentation & Controls
84-04	3/5-16/84	Failure to Properly Install a Piping Strut Support	App. B, Crit. V	V	Piping Systems & Supports
84-04	3/5-16/84	Failure to Properly Install Structural Steel Beams	App. B, Crit. V	IV	Cont. & Safety-Related Structures
84-04	3/5-16/84	Failure to Properly Identify Design Drawing Changes	App. B, Crit. VI	IV	Engineering-Construction Interfaces
84-04	3/5-16/84	Failure to Provide Piping-Pump Flange Alignment Criteria	App. B, Crit. V	V	Piping Systems & Supports