U.S. NUCLEAR REGULATORY COMMISSION

Region I

SYSTEMATIC ASSESSMENT OF LICENSEE PERFORMANCE

PUBLIC SERVICE COMPANY OF NEW HAMPSHIRE

SEABROOK STATION, Units 1 and 2

February 19,1985

TABLE OF CONTENTS

I. INTRODUCTION

1. Purpose and Overview

The Systematic Assessment of Licensee Performance (SALP) is an integrated NRC staff effort to collect the available observations and data on a periodic basis and to evaluate licensee performance based upon this information. SALP is supplemental to normal regulatory processes used to ensure compliance to NRC rules and regulations. SALP is intended to be sufficiently diagnostic to provide a rational basis for allocating NRC resources and to provide meaningful guidance to the licensee's management to promote quality and safety of plant construction and operation.

An NRC SALP Board, composed of the staff members listed below, met on February 19,1985 to review the collection of performance observations and data and to assess the licensee performance in accordance with the guidance in NRC Manual Chapter 0516, "Systematic Assessment of Licensee Performance." A summary of the guidance and evaluation criteria is provided in Section II of this report.

This report is the SALP Board's assessment of the licensee's performance at the Seabrook Station for the period July 1,1983 through December 31,1984.

2. SALP Board:

Chairman:

R. W. Starostecki, Director, Division of Reactor Projects (DRP)

Members:

L. H. Bettenhausen, Acting Director, Division of Reactor Safety (DRS)
S. J. Collins, Chief, Reactor Projects Branch 2, DRP
R. M. Gallo, Chief, Reactor Projects Section 2A, DRP
R. J. Bosnak, Chief, Mechanical Engineering Branch, NRR
V. Nerses, Project Manager, Licensing Branch 3, NRR
A. C. Cerne, Senior Resident Inspector

Other NRC Attendees:

C. J. Anderson, Chief, Plant Systems Section, DRS
J. P. Durr, Chief, Materials and Processes Section, DRS
H. M. Wescott, Resident Inspector
D. G. Ruscitto, Reactor Licesning Examiner, DRP
R. S. Barkley, Reactor Engineer, DRP

3. Background

Public Service Company of New Hampshire (PSNH) applied for a license to construct and operate the Seabrook Station (DNs 50-443 and 50-444) on July 9,1973, and was issued Construction Permits (CPPR-135 and CPPR-136) on July 7,1976. Each reactor is a Westinghouse four-loop, PWR rated at 1198 MWe and is housed in a reinforced concrete containment structure. The units are arranged using a "slide-along" concept with certain structures common to both units. PSNH has contracted with the Yankee Atomic Electric Company (YAEC) for services which include project administration, facility design control, construction coordination, quality assurance, and licensing. For the purpose of this report, these YAEC services are considered synonymous with PSNH activities.

On June 23,1984 the New Hampshire Yankee Division (NHY) of PSNH was created with the primary responsibility for construction of Seabrook Station. While some of the organizational interfaces and responsibilities between PSNH and YAEC have been restructured to accomodate the formation of NHY, at this time, PSNH continues to retain overall responsibility for all activities related to Seabrook, as is specified in the Construction Permits. Proposed organizational changes seeking to name the New Hampshire Yankee Electric Corporation (ie: NHY incorporated and separated from PSNH) as the new managing agent for Seabrook Station have not yet been effected. Thus, use of the generic term ("licensee") in this SALP currently constitutes recognition of not only the ultimate responsibility of PSNH, but also the specific duties of both NHY and YAEC.

a. Licensee Activities

At the beginning of this SALP assessment period, the Seabrook work force consisted of approximately 8,500 personnel, about 6,000 of whom were craft. In addition to UE&C (A/E & Construction Manager) and Westinghouse (NSSS supplier), sixteen different contractor organizations were on-site, collectively employing all the major craft disciplines and working in both Units 1 & 2. At that time, Fuel Load Dates (FLD) of September,1984 for Unit 1 and April,1987 for Unit 2 were projected.

Major changes in work activity for both units were experienced during this eighteen month period. This can best be illustrated by the following chronological listing of major milestones and events which have occurred since July 1,1983.

-- July,1983 - Containment enclosure building concrete operations are completed, finishing the major structural work associated with the containment and its enclosure building.

-- September,1983 - Unit 2 construction work is reduced to the "lowest feasible level" while still maintaining the unit as an active construction project.

-- November,1983 - Seabrook cooling water tunnels, connecting the station service water facilities to the ultimate heat sink of the Atlantic Ocean, are completed and allowed to fill with natural groundwater.

-- December,1983 - Electrical contractor's QC inspection personnel picket site during three-day strike.

-- March,1984 - New cost and schedule projections for Seabrook Station are announced with fuel load dates of December,1985 for Unit 1 and July,1990 for Unit 2.

-- March,1984 - Restructuring of the QA Program reporting lines has all contractor QA managers formally placed under the direction of the YAEC Construction QA Manager.

-- March,1984 - PSNH implements a major management reorganization as Mr.Derrickson assumes his position as Senior Vice President.

-- April,1984 - Emergency Diesel Generators are tested and synchronized such that the power output is loaded onto the grid.

-- April,1984 - Temporary suspension of Seabrook Station construction is announced.

-- May,1984 - Several contractors are released from Seabrook work as plans for completion of Unit 1 on a direct employment basis are formulated.

-- June 1984 - The New Hampshire Yankee (NHY) division of PSNH is created and charged with the responsibility for the construction of Seabrook Station.

-- July,1984 - Construction work on Unit 1 resumes on a limited level.

-- August,1984 - The NHY division of PSNH incorporates as the New Hampshire Yankee Electric Corporation with future plans to become the managing agent for the construction and operation of Seabrook Station.

-- September,1984 - PSNH financing for continued construction is conditionally approved by the New Hampshire PUC.

-- October,1984 - Construction work level increases with UE&C as the direct employment contractor for most of the disciplines. Pullman-Higgins remains the ASME piping contractor, but now under the direct construction management control of NHY, not UE&C.

-- November, 1984 - The Reactor Coolant System is completed. Component testing and ECCS pipe flushing commences.

-- December, 1984 - Authorization for increased construction expenditures is approved, allowing for plans to increase the construction work force by 1000 personnel.

By the end of the assessment period on December 31,1984, the Seabrook work force had increased, from its low point in the summer of 1984, back to 2500 personnel, 1400 of whom were craft. A FLD of April,1986 is being projected for Unit 1 while Unit 2 has been placed in an "indeterminate" status.

b. Inspection Activities

A total of twenty-nine (29) onsite NRC inspections of Seabrook Unit 1 activities were conducted during the assessment period. Fifteen of these were considered combined inspections of both units. Also, operator licensing examinations were held at Seabrook on September 17-21 and December 3-7,1984. A total of 5,480 inspector-hours were expended on Unit 1 and an additional 391 inspector-hours on Unit 2. The combined total of 5,871 inspector-hours represents ten resident inspections, eighteen regional based specialist inspections, one IE Construction Appraisal Team (CAT) inspection, and the operator licensing examinations. Two of the specialist inspections were considered special team inspections - one to follow up corrective action in the piping and NDE areas and the other to investigate multiple allegations. In addition to portions of the resident inspections being spent on preoperational testing activities, six of the specialist inspections were totally devoted to preoperational testing.

Not included in the total NRC inspection hours, but considered where appropriate in the performance analyses, were the following NRC activities:

-- IE Integrated Design Inspection (IDI), November 1 - December 21,1983 and reinspection at the A/E offices on November 7-9,1984: General conclusions reached from this inspection indicated that the findings did not appear to cross discipline boundaries and that the overall design appeared to be adequately controlled. While some of the IDI findings are not yet resolved, based upon the IDI results, it appears that further independent design verification (ie: an IDVP) will not be required for Seabrook.

-- IE Vendor Programs Branch (VPB) inspection (IR9990510/84-02) at Seabrook, November 26-30,1984: Issuance of the formal results is still pending.

-- INPO inspections at Seabrook, October 17-28,1983 and December 3-14,1984: The licensee has reviewed the INPO findings for construction deficiency reportability under 10CFR50.55(e). To date no CDRs have been reported as a result of INPO inspection.

The construction resident inspection program has been in effect for the entire assessment period. A second NRC resident inspector was

assigned to the Seabrook resident office in October,1983. A region-based, specialist inspector has also been assigned to cover preoperational activities at Seabrook on an unannounced, visiting inspection basis. His first inspection at Seabrook was conducted in September,1983. Time devoted to the different areas of NRC inspection, construction and preoperational testing, is listed in Table 3.

Based upon the significantly larger number of inspection hours devoted to Unit 1 and the "indeterminate" status of Unit 2, the functional area analyses, while reflecting combined inspection percentages, are directed primarily toward Unit 1. Unit 2 activities are highlighted only where appropriate.

II. CRITERIA

The following criteria were used as applicable in evaluation of 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 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.

The SALP Board has also categorized the performance trend over the course of the SALP assessment period. The categorization describes the general or prevailing tendency (the performance gradient) during the SALP period. The performance trends are defined as follows:

Improving: Licensee performance has generally been improving over the course of the SALP assessment period.

Consistent: Licensee performance has remained essentially constant over the course of the SALP assessment period.

Declining: Licensee performance has generally been declining over the course of the SALP assessment period.

III. SUMMARY OF RESULTS

1. Overall Facility Evaluation

During this assessment period, the licensee's overall performance reflected a commitment to safety and quality construction. In addition to routine inspection activities, two Region I special team inspections and IE CAT, IDI and Vendor Programs Branch inspections were conducted. INPO also conducted two inspections during the assessment period. Thus, Seabrook was heavily inspected and evaluated with the overall results supporting the existence of quality hardware.

Significant improvement in the piping systems & supports area was countered by declining trends in the electrical and instrumentation areas. These latter two areas differ somewhat. The licensee appears to be totally aware of, and has initiated corrective measures for, the programmatic problems in the instrumentation area. The concerns raised in the electrical area, particularly those resulting from the CAT inspection, seemed to be of some surprise to the licensee. These electrical program weaknesses, coupled with a recurring problem leading to repetitive enforcement action and several electrical CDRs, suggest that licensee corrective action and management control of this area were sufficiently rigorous or broad enough in scope, particularly over the first half of the assessment period.

Another area where management attention can be focused to improve performance is the safety-related components area. Routine problems, like housekeeping, preventive maintenance, and designated QA coverage, appear to be adversely affecting quality, not to a severe degree, but enough to prevent evidence of an improving trend. Since these problems are known and preventable, licensee management should take positive action to address and correct the deficiencies.

The trend for performance in the areas related to personnel management appears to be positive. Management controls, preoperational testing and operator licensing were all assessed Category 1 ratings. This reflects evidence of not only a quality conscious philosophy, but also strong management initiative. The ability of management to retain key personnel and overcome morale problems during the temporary suspension of work was a significant contributing factor to the good performance in these areas. Also, licensee management support of QA continued at a sufficiently high level for the QA staff to exert a stabilizing influence on the project during the period of major organizational changes and program revisions.

The project restructuring and organizational realignment were positive steps taken by the licensee to eliminate some of the interface difficulties which have occurred over both past and the current SALP period. Rigorous controls continue to be needed in the design and design change area, which are the root causes of several of the identified problems. An additional caution is required as productivity and schedular goals provide the motivation for changes to ensure equal consideration is given to the impact upon the QA program. Management attention to this potential for future conflict is warranted to maintain the philosophy that the construction staff builds quality while the QA staff assures quality.

2. Facility Performance

Last SALP Period: July 1,1982 - June 30,1983
Current SALP Period: July 1,1983 - December 31,1984

Functional Area	Rating (Last Period)	Rating (Current Period)	Trend
1. Containment, Safety-Related Structures, & Major Steel Supports	1	1	Consistent
2. Piping Systems & Supports*	3	2	Improving
3. Safety-Related Components-Mechanical	2	2	Consistent
4. Auxiliary Systems	1	1	Consistent
5. Electrical Equipment & Cables	2	3	See Trend in Functional Area No.5
6. Instrumentation	1	2	See Trend in Functional Area No.6
7. Quality Programs & Management Controls	not assessed	1	Consistent
8. Preoperational Testing	not assessed	1	Consistent
9. Plant Licensing	2	2	Consistent
10. Operational Readiness (Operator Licensing)	not assessed	1	Improving

*Note: The Piping Systems & Supports area was also assessed a Category 3 rating during a special SALP conducted for the period July 1 - December 31,1983.

IV. PERFORMANCE ANALYSIS

1. Containment, Safety-Related Structures, & Major Steel Supports (15%)

Analysis

Routine NRC inspection of this functional area was reduced during this assessment period, based upon an increasing completion status, continued improvements, and recognition of the Category 1 rating given during the previous assessment. Ten separate NRC inspections were conducted of such items as repairs to concrete; reinforcing steel; structural steel erection, bolting and welding; containment liner work; expansion anchor installation; and the steel equipment supports for the major NSSS components. Also, from a design perspective, the IDI team inspected the structural adequacy of the Refueling Water Storage Tank and the Tank Farm structure enclosing it.

Previous NRC concerns regarding such issues as the control of loads attached to structural members, and seismic installation tolerances between structural members and other components appear to have been adequately addressed. The A/E "Beam Verification Program" has advanced to the state where construction management is now controlling certain loaded members such that further attachment is prohibited without engineering evaluation and authorization. Commitments made regarding programs to identify and preclude seismic clearance deficiencies have been carried forward thru efforts to not only establish realistic criteria for constructability, but also provide for engineering walkdowns to evaluate and correct existing problems.

Although some specific problems have been identified in this functional area, the overall number of NRC open items has been relatively low, particularly in contrast with previous SALP assessment periods. Two concerns, both identified during the CAT inspection, relate primarily to vendor problems - one regarding vendor rebar detailing errors and the other involving undersized vendor structural steel fillet welds. Another issue relative to undertensioned high-strength bolts remains under licensee evaluation to determine the cause of the bolt torque relaxation. An additional problem with regard to an FSAR commitment involved a failure to connect the leak chases for certain containment penetration liner welds into the vented system allowing for future testability. Corrective action included an FSAR revision, which clarified the existing commitments on leak chase testing over the life of the plant.

The undersized vendor weld problem was also reported by the licensee as a Construction Deficiency Report (CDR 84-00-17) in accordance with 10CFR50.55(e). Other CDRs, categorized in this functional area, include:

- -- 84-00-06 - component supports spanning structural steel expansion joints
- -- 84-00-14 - seismic qualification of the CRDM shroud as an intervening structural member

It is noted that these last two CDRs can be attributed to design errors and that all three of the CDRs were first identified as NRC findings. The design control and corrective action aspects of the analysis of these CDRs are better suited for discussion under the Quality Programs section (functional area no.7).

After the construction suspension and restart in July,1984, UE&C replaced Perini Power Constructors as the direct labor contractor responsible for structural work at Seabrook. Although the previous SALP assessment identified no major problems in the structural area, this organizational change may be viewed as an improvement to the interfacing relationship between the A/E, construction manager, and contractor, since all three functions now reside with UE&C. With continued implementation of the various verification programs, engineering walkdowns, and as-built reviews, licensee assurance of quality structural hardware is enhanced. These verification programs also provide the opportunity for increased licensee assurance that past design and interface problems, as discussed in previous SALPs and as evidenced in the CDRs listed above, have not adversely impacted structural construction.

Conclusion

Rating: Category 1

Trend: Consistent

Board Recommendations

Licensee: Continue verification efforts as necessary to assure the quality and engineering adequacy of completed construction. Also, refer to the Board Recommendation in Functional Area No.7.

NRC: Decrease routine inspection effort, but select structural components and criteria for further review during planned future team inspections.

2. Piping Systems & Supports (23%)

Analysis

During the previous routine SALP assessment period, this functional area was assessed as a Category 3 for the second year in a row. Based upon the board recommendation, a special SALP, covering the period July-December,1983, was conducted to further evaluate the effectiveness of licensee corrective actions. Although this special assessment noted both an improvement in performance and evidence that corrective measures were heading in the proper direction, the positive impact upon total program effectiveness was not yet fully realized. Hence, a Category 3 was again assessed.

During the current SALP assessment period, (January 1 - December 31,1984 only for piping & supports) performance and program effectiveness have been evaluated in this functional area. During this time, eleven separate inspections of piping systems and supports have been conducted, including a special team inspection investigating allegations, heavily concentrated in the piping area, and a CAT inspection. Also, the IDI team inspection became heavily involved in the design activities affecting this functional area, since the inspection focused on the Containment Building Spray System.

The findings of the team inspection (See Section V.2) are noteworthy not only because of the large NRC effort (349 inspector-hours), but also because independent measurements utilizing the NRC/Region I NDE van were taken and management control of quality in areas involving non-nuclear safety-related piping and supports was examined and evaluated. While one concern was identified for inadequate corrective measures for a piping nonconformance documenting an unauthorized signature, this problem was not related to the allegations. The NRC team also determined that while two of the specific allegations were substantiated, identification and appropriate corrective action had already been implemented by the licensee. In summary of the special team inspection results, it was concluded that in the areas investigated, the licensee had an effective organization that exhibited active management involvement and control of both nuclear and non-nuclear construction activities.

Two other specific concerns, raised in this functional area since January,1984, were identified during the CAT inspection. One involved a design problem in the apparent failure to consider concurrent design loading conditions on a dual pipe support/whip restraint, while the other involved the improper use of informal methods to resolve nonconforming pipe and support conditions.

This last problem is of specific interest since it resulted from follow-up of the corrective action of an issue highlighted as a problem during the previous special SALP, ie: as-built inspection of pipe supports had resulted in a large reject rate for installed conditions outside the design tolerances. The CAT report noted as a program weakness the continued evidence of pipe support problems and therefore questioned the

effectiveness of past licensee corrective measures. The timeliness of final QC inspections for completed piping and supports was also questioned. It is noted, however, that with regard to completed and finally inspected hardware, very few problems were identified. In fact, in the welding and NDE areas, independent examinations by NRC inspectors revealed generally high quality work and effective licensee overview of the final radiographic film packages.

Routine NRC inspection in this area has resulted in additional open items and concerns regarding such issues as the generic application of upgraded QA criteria to B31.1 piping and supports; the reduction in formal QA programmatic controls over certain in-process piping and support activities (eg: hold points); in-process welding material controls; and the control of as-built records and their interface with design changes. These issues are programmatic in nature and the related concerns have not, to date, resulted in major hardware problems. As an example, the licensee eliminated as a mandatory hold point the fit-up and tack operation in the welding process of pipe supports. While the licensee has referenced Code Case N-302 as the basis for eliminating the mandatory hold point and has implemented a surveillance program to assure adequate quality controls, the past history of problems with pipe supports at Seabrook heightens the concern for any reduction of programmatic QA controls. Also, this particular usage of N-302 appears to constitute an interpretation beyond the original intent of the Code Case. The program weakness involving pipe supports, identified in the CAT Report, and the questioned effectiveness of corrective action on the pipe support reject rate, discussed in the special piping and supports SALP are generic issues. They both tend to suggest that the elimination of the subject hold points was driven primarily by the desire to increase production with the belief that construction quality would not be adversely affected. Such a position is acceptable, only if the licensee demonstrates strict surveillance and audit controls to confirm craft cognizance of their responsibility in this area.

In the above example, even though the mandatory hold point has been removed from the fit-up and tack operation, a large percentage of ASME pipe support welds still receive QC inspection at the fit-up stage. As is the case for most of the recent revisions to the piping/supports program, the changes represent management emphasis on efficiency with total program impact not yet demonstrated. Thus, the results of such program revisions (ie: a track record) are not yet available to confirm the adequacy of the current controls.

Notwithstanding the above concerns, other program changes initiated by the licensee have been recognized as beneficial to quality construction in this functional area. These include:

-- restructuring the reporting line from the piping contractor's site QA manager more directly to the licensee Construction QA manager.

-- reassigning the construction management contractual authority over the piping contractor from UE&C, directly to New Hampshire Yankee.

-- reducing the scope of work of the piping contractor to ASME installations (UE&C has taken over the B31.1 work).

Thus, it appears that overall, licensee corrective measures to effect improvements in the piping systems and supports area have produced positive results. Upper management is attentive and responsive to NRC concerns in this area. QA trending appears to be providing indicators of problems before they escalate. The NRC has identified few significant hardware deficiencies and the licensee appears to have adequate control over their self-identified construction problems. While some concerns over process controls and program implementation and revision remain, significant improvement in this functional area has been achieved. The continuing changes in the programmatic controls affecting this functional area merit continued upper management attention until enough inspection, surveillance, and audit results are available to establish the effectiveness of such changes.

Conclusion

Rating: Category 2

Trend: Improving

Board Recommendations

Licensee: Strive for continued improvement in the area of process controls. Also, refer to the Board Recommendation in Functional Area No.7.

NRC: Reduce the augmented level of NRC inspection effort, but maintain inspection resources consistent with the system completion activities. Devote additional inspection resources to the turnover phase for testing activities, where flushing, hydrostatic testing, and design changes are anticipated to require additional licensee efforts in the piping and supports area.

3. Safety-Related Components - Mechanical (14%)

Analysis

Evaluation of this functional area during the last assessment period resulted in the identification of problems with component cleanliness and with the adequacy of QA coverage for certain safety-related systems. During this assessment period, thirteen separate inspections were conducted of various mechanical components and their supports. Included were the major NSSS components (RPV & internals, steam generators, reactor coolant pumps, pressurizer) for both Units 1 & 2, and other pumps, valves and heat exchangers for Unit 1 alone. The IDI team also examined the design, procurement, and performance criteria for several components, particularly those associated with the Containment Building Spray System, to include inspection visits to selected vendor shops. Two concerns relating to design errors were identified. One error was noted on the ASME Code pressure boundary welding criteria for the recirculation piping encapsulation tanks and the other on adequacy of foundation bolting material for the primary component cooling water pumps. The first item requires welding rework, while the latter item, CAT identified, required only recalculation to justify the adequacy of the existing bolts.

Another minor concern was raised with regard to record deficiencies on the steam generator lateral supports and was easily corrected by licensee action. Two other issues, however, appear to relate to problems identified in previous SALP periods and indicate somewhat of a trend which requires positive licensee action to correct. The first of these, identified as inadequate QA acceptance criteria for the installation of certain safety-related components, was caused by a FSAR/specification conflict which resulted in implementing procedural errors. It is noted that the last SALP also identified a "lack of requisite QA coverage on certain safety-related systems". At that time the SALP report indicated that, "licensee commitments to treat these systems as safety-related were erroneously not translated into the procedural requirements and erection activities of the fabrication and installation contractors". It therefore appears that licensee corrective measures on this issue were not sufficiently comprehensive. While an engineering review of systems and components to identify and apply the appropriate QA coverage (eg: upgrade B31.1, NNS-seismic category 1, Regulatory Guide 1.97 instruments) is currently in progress, further management attention to this recurrent problem area appears warranted.

The second recurrent concern involved the inadequate storage and preservation of NSSS components in Unit 2. As noted in the previous SALP, where physical protection of certain equipment was identified as a problem, such maintenance, housekeeping, and cleanliness deficiencies require continual licensee emphasis, worker indoctrination, and cross-disciplinary program interfaces. Under a management conversion plan implemented in March,1984, UE&C assumed a more direct management role in the construction of Unit 2. Since Unit 2 has been placed in an "indeterminate" status, this role has been reduced to the preservation and protection of equipment and existing construction. Likewise, in Unit 1, under the current budgetary constraints, active work has been suspended in certain areas

of the plant. This situation leads to the potential for maintenance and housekeeping activities being relegated to a lower priority than would be otherwise under a full construction status. As in the case of the issue regarding adequate QA coverage, increased management attention to this area is necessary.

Another regional inspection issue of note involved a problem experienced during the repair to the RPV safe end to nozzle welds. Despite licensee preplanning efforts, the actual repair work was delayed because of confusion in relocating the defects. The cause of the confusion was the different nozzle identification/marking systems used by the RPV fabricator (CE), the NSSS supplier (Westinghouse), the A/E, and the PSI service contractor. The licensee has since established a matrix which correlates the different identification/markings with their originator and which will preclude future similar problems. While NRC inspection of this activity raised some questions regarding the adequacy of preplanning, the licensee did demonstrate both proper restraint and good judgement in not initiating any repair operations until the affected nozzles were clearly identified with certainty.

The design problem on the encapsulation tank welding, discussed above, led to the licensee reporting of a CDR on a similar seal weld problem for the fuel transfer tube design. The other CDRs related to this area represent various vendor deficiencies and component failure problems. It is noted that CDR 84-00-09 lists several Limitorque valve operator workmanship and fabrication deficiencies and is the second such CDR based upon Limitorque problems. While these items remain open, licensee corrective action, based upon a relubrication program for the Limitorque operators, appears to be oriented to the adequate resolution of the hardware deficiencies.

In summary of the overall NRC inspection of this functional area, the component installations have been generally found to be acceptable. Licensee responsiveness to problem areas (eg: Limitorque) has been good. However, some design and procedural errors have led to NRC findings which could have been prevented by better control of the interfaces between the A/E design and contractor implementation and by more attention to the detail of FSAR commitments.

Conclusion

Rating: Category 2

Trend: Consistent

Board Recommendations

Licensee: Direct further management attention to the adequacy of QA coverage for nonsafety components that are related to safety applications by either system function or FSAR commitment. Increase emphasis upon housekeeping/preventive maintenance activities, particularly where safety-related components may be in field storage or affected by work activities.

NRC: Maintain routine NRC inspection level. Follow-up generic licensee corrective action on the issue involving the adequacy of QA coverage.

4. Auxiliary Systems (4%)

Analysis

The last assessment of this functional area, listed then as "Support Systems", revealed no hardware deficiencies and adequate control of the miscellaneous support system contractors. Although eight different inspections of various auxiliary systems and supporting services were conducted during this assessment, this represents about only half the inspection effort devoted to this functional area during the previous SALP period. This is because these auxiliary system activities have been conducted at much lower priority and work level since the temporary suspension of construction in April,1984. Specifically examined were HVAC erection, cooling tower equipment erection, turbine building components, coating applications, calibration activities, PreService Inspection (PSI), penetration sealant criteria, and specialty item procurement (eg: orifice plates). Also reviewed separately by Region I, IDI, and CAT inspectors were various contract testing services provided to the Seabrook site to resolve engineering and metallurgical problems which crossed disciplinary boundaries.

No major problems were identified. One CDR regarding deficient workmanship in the mechanical draft cooling tower fan installation was reported and remains open. NRC inspection has generally resulted in acceptable findings with two issues currently remaining unresolved - one on the completeness of the PSI manual ultrasonic examination (UT) procedures and the other on inconsistencies in the design criteria for the penetration sealant materials.

Resident, CAT, and special team (ie: investigating allegations) inspections of turbine building equipment and work identified the implementation of quality standards and good licensee control of work activities, even though they were non-nuclear safety-related. In response to an NRC unresolved item concerning the use of specific sizes of welding rod for certain applications, a test program at Lehigh Testing was contracted. NRC review of the test program and results revealed excellent licensee response to, and satisfactory resolution of, the specific technical questions. Also, the licensee has contracted for some independent NDE services of completed component shop and field welding, which not only has been utilized to check and confirm the adequacy of ongoing work activities, but also has identified some work of marginal quality which the licensee has shown good initiative in the decision to repair.

Since the resumption of work after the temporary suspension, UE&C has taken over much of the miscellaneous contract work falling under this functional area. While a separate contractor, to date, has continued work in the fire protection installation area and PSI of the RPV internal surfaces was completed by a specialty contractor, UE&C has not only been given direct labor construction management of the other auxiliary activities, but also has been awarded separate contracts to finish the construction work in certain specific areas (eg: the mechanical draft cooling tower). With the proper programmatic controls and adequate craft training and indoctrination, this overall effort to

consolidate such miscellaneous work activities under one organization, which also happens to be the A/E and author of the relevant specifications, is viewed as a positive step in eliminating the various interface problems which have caused concern not only in this, but other functional areas, as well, in the past.

Conclusion

Rating: Category 1

Trend: Consistent

Board Recommendations

Licensee: Continue to control, surveil, and audit activities in the various auxiliary disciplines to assure quality work and adequate management overview.

NRC: Reduce overall inspection effort, but continue random checks of the various systems, particularly where new contractor programs are established for specialty work (eg: penetration sealant work).

5. Electrical Equipment & Cables (15%)

Analysis

During the last SALP assessment period, two specific problems were identified and a general concern was noted in the licensee's application of design criteria and commitments in this functional area. The SALP Board recommended a management meeting to discuss these concerns and one was held on October 5,1983 (Reference: Section V.4.b). At that time, discussions centered around the Seabrook associated cable design, installation and inspection concepts with satisfactory resolution of the immediate NRC questions.

Twelve inspections were conducted during the current assessment period. In addition to the routine regional and resident inspections, and the CAT inspection, both the IDI and an onsite Vendor Programs Branch inspection (Reference: Section V.1), devoted inspection resources to the electrical area. Licensee reanalyses of potentially adverse electrical interactions appear to be resolving IDI questions in this area, while the vendor inspection concerns lie more directly with the activities of ITE Gould as the primary supplier of circuit breakers to the Seabrook site. The other inspections have identified several areas of concern, as discussed below.

CAT inspection findings documented some apparent examples of inadequate corrective action in the areas of improper separation between cables from redundant trains, and known duplication of cable footage markings. Another CAT concern regarding a lack of documented evidence to assure constructed cable tray support conformance to design criteria was raised both as a specific technical issue and as an example of a program weakness resulting from ineffective communications between the licensee's engineering and construction staffs. Extensive reinspection of existing installations is required as part of the corrective measures committed by the licensee to address these concerns.

Routine inspection results, also, have identified several items of concerns relative to existing electrical installations. A recurrent example of a problem noted in the previous SALP was found in the failure to install cable tray supports to the correct seismic design details. In this example, licensee/contractor rework had failed to check all the electrical strut assemblies affected by the original deficiency and therefore missed some improper installations. Other deficiencies were identified in the areas of improper workmanship on electrical terminations in the main control board, nonconformance of installed wiring harnesses to design criteria, and the failure to adequately consider vibration conditions in the installation of the diesel generator nonsegregated phase, bus duct. Like the CAT findings, these items appear to result from a combination of inadequate interfaces between engineering and construction, coupled with inadequate inspection criteria.

There were eight CDRs reported by the licensee in this functional area with five of these deficiencies involving components supplied by ITE Gould. As indicated above, the IE Vendor Programs Branch is pursuing any generic implications involving this supplier, particularly with regard to circuit breakers. It is noted that the Seabrook preoperational test program identified

several of the electrical component deficiencies thru detailed test plan implementation. Preoperational test personnel have been equally responsive to the need for additional testing or rework to satisfactorily resolve the identified problems.

In addition to the concerns and potential for rework raised by the licensee identified CDRs, several NRC open items remain unresolved in this functional area. NRC inspections have raised questions on such issues as the engineering justification for using cable trays as longitudinal support bracing, the need to retrain cables to lower raceway fill below the siderails, the adequacy of QC inspection criteria for cable tie mounts inside equipment, and cable separation, which is controlled by a UE&C cable routing, computer program, named CASP. While satisfactory technical resolution of these issues is ultimately anticipated, their relationship to past SALP concerns and more recent IDI and CAT issues merits further analysis. For example, while the associated cable concept being implemented at Seabrook has been reviewed and found acceptable, such a system places emphasis upon total train independence. IDI findings of system interaction, CAT items on cable separation, and regional issues on cable identification, node markings, and CASP errors are viewed with greater significance because of their potential impact upon the electrical train redundancy and independence. Even a common workmanship problem like maintaining the cables below the tray siderails becomes a higher priority to preclude situations where an event could initiate a common mode failure.

The NRC concerns discussed in this section relate, for the most part, to problems identified prior to the temporary suspension of work in April, 1984. Corrective measures are not yet complete and this, along with several of the licensee reported construction deficiencies, have resulted in the fact that most of the currently open NRC items reside in the electrical area. Since several of these issues require retrofit activities on the part of the licensee, their satisfactory resolution and closure depends heavily upon adequate interfacing and communication among the responsible licensee organizations.

One common factor in the history of electrical problems appears to be, as was mentioned above as a CAT identified program weakness, a possible communication problem between the licensee's various management, engineering and construction groups. Licensee recognition of this concern has been noted in the project reorganization which commenced in March, 1984. Since then UE&C has taken over the electrical installation work under direct labor contract. Efforts to consolidate procedural criteria and directions and eliminate superfluous documents have been underway. Restructuring of the licensee organization has consolidated the responsibility and authority for engineering, construction, and testing decisions onsite. While such positive management initiatives are certain to improve past interfacing problems, it must be recognized that a new organization with new procedures is likely to experience learning-curve difficulties. Also, the project status of electrical items, with the high volume of turnovers and turnbacks of equipment between the construction and preoperational staffs, dictates a clear delineation of the authority, responsibility, and interfacing relationship between the various organizations. The new licensee "project team" approach provides the potential for improvement in this area. However,

the reinspection and rework, which are required in this functional area as a result of NRC findings and concerns, appear to involve a substantial licensee effort. Since the resumption of construction at Seabrook after the temporary suspension, electrical construction has been somewhat limited and directed to specific milestone activities. Thus, the results of licensee corrective actions to reverse the declining trend in performance over the first half of this assessment period are not yet available to substantiate total program effectiveness in this area.

Conclusion

Rating: Category 3

Trend: While licensee corrective measures have been implemented and plans for the required retrofit programs have been formulated, limited work activities in this area over the last half of the assessment period preclude an overall trend rating.

Board Recommendations

Licensee: Review the adequacy of engineering criteria (eg: CASP & the Design Notes & Details) to assure that conflicting guidance, particularly with regard to design changes, is not issued for construction. Develop a schedule to coincide with the plan for conduct of all committed retrofit inspections and rework (eg: cable tray supports, strut seismic slip joints, cable retraining, cable separation, et al). Monitor organizational interfaces for communications problems.

NRC: Increase inspection resources, as required by the increasing electrical workload and commensurate with licensee corrective actions, to check the status of rework and to evaluate electrical components as the volume of turnover for preoperational testing increases.

6. Instrumentation (8%)

Analysis

During the previous assessment of this functional area, instrumentation and control (I&C) activities, while increasing, had not yet reached a significant level of completion. While no major problems were identified, the SALP Board recommended an increase in NRC inspection of this area in anticipation of the projected increase in the level and scope of work.

During the current assessment, eleven separate inspections, including the CAT, were conducted. The IDI also examined I&C design, component procurement criteria, and circuitry logic. The CAT inspection identified one specific problem with the way instrument tubing slope criteria were being revised. Despite the design significance of these criteria, an improper blanket authorization had been given the construction manager to change the slope without any further design review or required verification. This issue exemplifies the same concern for engineering/construction interfacing which was a major subject of analysis in the electrical area. Likewise, the housekeeping concerns discussed in the analysis of safety-related components functional area appear to have had some similar impact in this area as routine NRC inspection has identified cleanliness problems in the proximity of I&C component installations.

Other routine inspection activities of tubing, tray, and support installation; in-core instrument paths and seal table work; I&C cable terminations at components; I&C procedures and records; and corrective actions on identified I&C deficiencies, have raised some NRC questions on the adequacy of in-process controls. One such issue questioned the craft's access to the pertinent drawings and procedures, since the inspection/fabrication packages were not located at the work stations. Other issues include the downgrade of the code classification of tubing tapping into ASME piping, but running to non-Class 1E instruments and the adequacy of QA controls for such non-1E instruments having significance under the guidance of USNRC Regulatory Guide 1.97.

A region-based inspector's review of the licensee's own audits of the I&C area revealed several deficient and nonconforming conditions for which corrective action had neither been timely, nor yet totally effective. A licensee QA "Immediate Action Request" was issued to the I&C contractor, Johnson Controls (JCI) to correct existing and preclude future recurrent deficiencies. While some improvements in I&C controls and procedural implementation were noted, the relationship between the licensee and JCI deteriorated to the point where in March,1984, JCI was replaced by UE&C as the I&C contractor at Seabrook. The stated reason for this organizational change was production and not quality related.

Since UE&C has had control of I&C installation activities, NRC inspections have identified some minor procedural problems, which might be expected with the establishment of a new program and which were readily corrected by the licensee. Of more significance is the licensee's identification, thru their QA surveillance program, of continued problems and deficiencies with I&C installations under UE&C control. The large number of deficiencies and lack of overall corrective action prompted issuance of a QA "Management Action

Request" followed by several licensee management meetings late in 1984 to attempt to resolve the concerns. In addition to these problems, the turnover of JCI records on partially completed I&C work to UE&C has not gone as smoothly as anticipated since the JCI installation/ fabrication planner packages did not lend themselves to conversion to another record tracking system.

In summary, the apparent lack of effectiveness of corrective measures taken over the past eighteen months for known problems in the I&C area raises an additional concern for future work activities. The same high quality of workmanship that was noted in past SALP assessments appears to be lacking during this period as NRC inspections have noted a multitude of partially completed assemblies, hold tags, and open inspection reports. These problems have been countered by an aggressive attempt by management, particularly QA, to correct known deficiencies and resolve program inadequacies. As the workload of safety-related I&C erection activities increases, the effectiveness of the corrective actions must be proven to reestablish both a positive trend and a high confidence level of quality work in the I&C area.

Conclusion

Rating: Category 2

Trend: Limited work activities over the last half of the assessment period and the lack of results of recent licensee corrective measures preclude effective determination of an overall trend at this time.

Board Recommendations

Licensee: Trend future deficiencies for identification of common root causes, monitor the adequacy of ongoing corrective actions, and increase attention to the status and control of partially completed field assemblies.

NRC: Increase inspection activity to check the effectiveness of licensee corrective measures as the I&C workload increases.

7. Quality Programs & Management Controls (13%)

Analysis

This area was not specifically evaluated during the last assessment period. During this assessment, fourteen separate inspections were conducted of such activities as design and design change control; surveillance and audit functions; the site training program; follow-up of INPO self-initiated inspection findings; organizational changes; QA program changes to include 10CFR50.55(f) evaluations; CDR issuance and IE Bulletin/Circular/Info Notice follow-up; and management responsiveness and corrective actions to NRC enforcement actions.

As recognized in previous SALP reports, a strong and stabilizing QA program exerted a positive influence upon project and construction controls at Seabrook Station. This positive impact was in even more evidence during the current assessment with the temporary suspension of work and the major organizational changes that have been implemented. Management support of QA was best exemplified during the work suspension period when budgetary constraints were being strictly enforced. During that time, QA and QC were given high priority, which allowed for the retention of several key QA personnel and sufficient preparation and planning for an orderly return and reindoctrination of other personnel as the suspension was lifted and work resumed.

While management attention to QA concerns remains high, equal attention to project efficiency appears to be the motivating force behind the major project reorganization. The project restructuring is summarized not only by the establishment of New Hampshire Yankee, but also by the change from a construction manager/contractor concept to a direct labor force and by a shift in work direction from area construction to scheduled milestone activities. Design authority and staffing has been primarily consolidated onsite. An integrated project team of managers and staffs has been formed with a clearer delineation of responsibilities and authority.

The reorganization of the engineering staff has been complemented by a new design change philosophy. "On-the-Spot" Engineering Change Authorizations (ECA), which were the subject of NRC concern and a management meeting (reference: Section V.4.c) with both Region I and the Vendor Programs Branch, have been eliminated in favor of ECAs which require design verification before they are issued. The increased management attention to the design change area appears to have been warranted, since five Construction Deficiency Reports, as well as several enforcement findings identified during this assessment period, can be causally traced to design and design change control errors. The CAT inspection noted as a program weakness the problems caused by continual design changes and their impact upon hardware being or already installed. On the other hand, the IDI concluded that the overall design appeared to be adequately controlled. Thus, while the IDI results can be interpreted as an indicator of no major design problems, the individual technical issues and deficiencies, having a common design error denominator, illustrate the need for continued licensee assurance of a properly controlled and regularly audited design and design change control program.

Another significant management change occurred in March,1984 when the reporting lines for each contractor site QA organization were directed to the YAEC Construction QA Manager. This move appeared to be related to previous NRC concerns regarding the ability of licensee management to effect adequate corrective action at the contractor level. With the further reorganization replacing several contractors with a UE&C direct labor force, the authority of the licensee's Construction QA Manager has been even better consolidated. As discussed in certain of the other functional areas, the utilization of "Immediate Action Requests" and "Management Action Requests" by the QA staff has elevated certain problems which appear to have generic implications to a level of management where corrective action will receive higher attention. Another analytical tool recently initiated by QA management has been the use of computer trending of deficiencies. Correlation of recent INPO inspection findings to corrective measures already in place because of the trending program illustrated the initial success of this new program.

Besides the innovative revisions to the QA program, the licensee has also established an Independent Review Team (IRT) on site. This group, comprised of separate contractor consultants, reviews construction programs and makes recommendations for quality improvements. With regard to one NRC concern involving the program for identifying and resolving seismic and other clearance violations between structures and components from different disciplines, IRT review has supported and made significant contributions to redefining the program scope, based upon UE&C Technical Procedure-8.

Another new program, the Allegation Resolution Program, has recently been established by management to investigate, track and respond to allegations/ concerns brought to the licensee's attention. Initial NRC interface with this program has proven beneficial in the initiation of licensee actions to satisfactorily resolve NRC concerns.

While an overview of the major changes, organizationally and programmatic, which have taken place is considered favorable, certain further improvements appear warranted. In specific cases, licensee responses to NRC enforcement actions and licensee reports of construction deficiencies have been found to be incomplete. These situations have required clarifying correspondence to be issued by licensee management. Also, certain corrective action retrofit and rework activities for both CDRs and NRC findings have been delayed because of budgetary constraints. This places an added emphasis, and possibly an undue burden on the final inspection process since the engineering walkdown and as-built processes are already heavily backend-loaded because of other confirmatory action programs (eg: TP-8, beam verification, embed verification, et al).

Additionally, licensee management efforts to streamline procedures must be viewed with caution. An attempt to eliminate an existing weld monitoring procedure and program was made without apparent consideration that an NRC inspection had recently closed an open item on weld material control problems, based upon the continued implementation of the weld monitoring program. To their credit, the licensee QA staff prevented elimination of what the NRC believes is a still needed program.

As discussed in other functional areas of this SALP, licensee management has implemented programmatic changes, both organizational and procedural,

which strive to increase productivity, but which also impact the way quality is controlled and assured. The elimination of the fit-up and tack hold point discussed in the piping area is one example. While the NRC recognizes the licensee management prerogative to improve efficiency, the effect of such actions on quality and the possible need for compensatory measures must also be considered.

Conclusion

Rating: Category 1

Trend: Consistent. While the high level of performance has been maintained in this area throughout an assessment period marked by significant events and changes, it is anticipated that the full impact of the licensee's self-initiated changes will not be registered until the next assessment period. Thus, the future trend of quality program effectiveness merits continual management attention.

Board Recommendations

Licensee: Continue audit and monitoring activities of the design and design change control program. Assure future program reductions affecting quality are rigorously reviewed by all affected organizations. Establish both a programmatic scope and a schedule for the several verification, reinspections, and retrofit efforts that are required to assure construction quality. Maintain an awareness of and react accordingly to the potential for future conflicts between construction productivity and quality controls. Direct a higher priority of effort to corrective action and closure of both NRC and licensee self-identified open items (eg: CDRs).

NRC: Continue to monitor the effectiveness of the quality programs and management controls as the workload increases and the licensee initiated changes produce substantive results.

8. Preoperational Testing (4%)

Analysis

This area was not evaluated during the previous assessment period. Eleven separate inspections of preoperational test activities, to include six inspections dedicated totally to this area by the assigned region-based specialist, were conducted during the current assessment period. The inspections encompassed test program reviews, flushing, diesel generator runs, RPV fill and flush, uncoupled reactor coolant pump motor runs, lifted lead and jumper controls, work request activities and records, hydrostatic tests, and system turnovers from construction to the Startup Test Department (STD).

To date, approximately 95 percent of the required preoperational (PT) and acceptance test (AT) procedures have been written with about 50 percent finally approved for test performance. Approximately 45 percent of the plant system boundary identification packages (BIP) have been turned over to the STD with a lesser percentage considered in partial turnover status. Only minor problems have been noted with regard to the PTs; the most significant one being that all tests required by NRC Regulatory Guide 1.68 were not addressed as preoperational tests, but were instead listed as acceptance tests. The licensee has since modified the ATs to fulfill the more stringent requirements of the PTs.

Inspection of work done on some valve operators under STD jurisdiction and governed by a Test Program for Work Requests (WR) revealed inadequate controls in that work done on one valve exceeded the authorization of the WR and the work done on the other valve was accomplished without the issuance of any WR. Furthermore, the Incomplete Items List (IIL) failed to list the proper status of the subject valves. The licensee took immediate corrective action by revising and clarifying the test program instructions governing work requests and reworking the valve operators to their correct status. It is noted that licensee QA identification of a similar problem involving removal of some flanged valves from their position in the constructed piping without proper authorization was satisfactorily handled by a QA "Management Action Request" to the STD. Other inspections of the IIL, work requests, and lifted lead and jumper logs have revealed up-to-date information with components listed under a correct status.

Some recent concerns regarding unauthorized work activities on completed construction which has not yet been turned over to the STD have been raised. Not only has licensee attention to correct this problem been timely, but also the final equipment quality would be assured by further general test procedure checks of the affected components. The STD, thru the routine testing program, have identified several vendor problems involving electrical components (eg: ITE Gould Circuit breakers and motor starters, Limitorque valve motor operators). CDRs have been reported based upon certain of these STD findings (Reference: Table 1) and in specific cases, the preoperational testing activities have been found to compensate for inadequate testing by the particular component suppliers.

The Seabrook preoperational test program is well defined with the appropriate procedures contained in the Startup Manual. QA/QC involvement in the

program,as well as the system turnover process, appears to be well planned and implemented. Sufficient QA/QC independence is provided by YAEC control of the quality control, surveillance, and audit personnel and activities. Licensee response to the NRC and internally identified problems has been both timely and technically adequate. Resolution of the problems encountered during testing, to date, has been sound.

Conclusion

Rating: Category 1

Trend: Consistent. To date, the noted high level of performance in this area is based upon limited NRC effort, to include preoperational program reviews, and the inspection of system turnover activities and Phase 1 testing.

Board Recommendations

Licensee: Continue the sustained level of QA/QC coverage for the increasing preoperational testing activities. Monitor the turnover process to assure that work is authorized and controlled under the appropriate program's jurisdiction.

NRC: Increase inspection of procedures, test witness, and test results review to match the growing level of preoperational testing activity.

9. Licensing Activities

Analysis

During the last assessment period, the licensee's overall performance in the plant licensing area was considered satisfactory. However, further licensee effort and support to resolve several open and confirmatory action issues was solicited.

The evaluation of this functional area during the current assessment is based primarily on the following attributes:

- Management involvement
- Approach to resolution of technical issues
- Responsiveness to NRC initiatives
- Staffing

The basis for this analysis was the licensee's performance in support of the following licensing actions, which were either completed or active during the current assesement period:

- containment high range monitor location
- plant shielding for radiation protection
- in-plant iodine instrumentation
- ultimate heat sink mechanical draft cooling
- spent fuel pool cooling and clean-up system
- applicable code cases
- gaseous waste management system
- process and effluent monitoring
- post accident sampling
- scour protection
- flood protection revetment
- control room design
- safe shutdown earthquake

Over the first year (July,1983 - July,1984) of this assessment, licensing action on the part of the licensee proceeded very slowly as active management involvement appeared minimal. This situation appeared in part to be related to the temporary suspension of work, the reorganization, and other financial considerations. During a management meeting in August,1984, licensee management was made aware of the lack of sufficient licensing activity to close out the SER outstanding items. Since that meeting the licensee has consistently demonstrated management involvement on licensing actions. Management has been accessible and available to assure that necessary corporate decisions are arrived at in a reasonable time to bring about resolution of NRC staff concerns. Of particular note, a licensee office has been established in Bethesda, Maryland to provide ready attention to staff concerns. Licensing actions, as a result, have become timely. The licensee is establishing a program to identify and track status of each item and is establishing internal schedules for resolving each open item.

The licensee has generally demonstrated a clear understanding of issues during meetings and discussions with the NRC staff and in its submittals to the staff. The licensee generally exhibits conservatism in its technical

position on issues where the potential for safety significance exists. Their approach to resolution of technical issues is viable and generally sound and thorough and additional studies have been performed as necessary to resolve technical issues. Generally, in the cases of differing technical positions, the licensee has provided a sound basis for their position. Some exceptions were noted in the auxiliary systems and control room design portion of the safety review. In these cases, a clear understanding of the issues was not readily demonstrated for some period of time, after which, however, the licensee submitted acceptable responses to the NRC staff.

The licensee has become very responsive to the majority of staff concerns and has taken the initiative to resolve issues by requesting conference calls and meetings and has followed up with responsive submittals. Responses have generally been technically sound, concise and have addressed the staff concerns in a professional manner. The licensee is providing effective licensing liaison between his technical staff and NRR. The only problem occurred in the mechanical engineering and auxiliary systems portions of the safety review, where the licensee was not very timely in developing an understanding and responding to staff questions.

With regard to staffing, positions within the licensee's organization are identified and authorities and responsibilities are defined. The licensing and engineering groups appear to be adequately staffed as indicated by the number and qualifications of the representatives who have attended numerous NRC review meetings. Generally, sufficient technical staff appear to be participating in review meetings to effect timely resolution of open items.

Conclusion

Rating: Category 2

Trend: Improving

Board Recommendations

Licensee: Continue efforts to review and provide sufficient information to effect timely resolution of open and confirmatory action items.

NRC: Periodically meet with licensee management to discuss the resolution of outstanding issues. Continually assess both licensee performance and timeliness in providing their input to the satisfactory resolution.

10. Operational Readiness (Operator Licensing) (4%)

Analysis

During 1984, two sets of initial Reactor Operator and Senior Reactor Operator licensing examinations were administered. Of the twenty candidates examined, eighteen passed all areas of the examination which included evaluation on the Seabrook Simulator which has been in operation throughout the assessment period. This success rate indicates a high degree of preparation on the part of the individuals examined. The 90% passing rate is significantly above the regional average of 67% over the last four years for initial licensing examinations. The overall knowledge and performance was above average. It is apparent that the licensee has placed a high priority on recruiting and retaining highly qualified individuals as evidenced by the high percentage of initial license candidates who had been previously licensed at other facilities.

The training staff is a technically competent and professional group, which responds rapidly to suggestions in an effort to improve training. The simulator instructors have made several modifications in both equipment and scenarios which have led to more realistic training.

Since radiation monitoring instruments are not yet fully installed in either the plant or the simulator and Radiation Work Permit (RWP) procedures have not yet been written, training and testing in these areas require further development and future implementation. The licensee training staff has committed to appropriate training and effective examination of the operators on these subjects. The NRC will monitor the adequacy of such implementation as part of the regional inspection program.

The facility has one final group of initial license candidates scheduled for examination in March of 1985 and an additional group of instructors to be certified in September, 1985.

Conclusion

Rating: Category 1

Trend: Improving. The quality of the simulator training has shown steady improvement since the first indoctrination visit by NRC examiners in August,1984.

Board Recommendations

Licensee: Submit revised FSAR Section 13.2 regarding licensed operator requalification program requirements to the NRC Licensee Qualifications Branch via FSAR amendment in the near future. Continue interim requalification program for initial licensed operators until the final class completes the licensing process. Implement revised requalification program upon finalization of shift crew complement.

NRC: Monitor the adequacy of continued training by timely review and approval of the requalification program. Evaluate the conduct of future training in the areas of radiation monitoring and RWP use.

V. SUPPORTING DATA AND SUMMARIES

1. Construction Deficiency Reports (CDRs)

Twenty-two (22) CDRs were reported by the licensee during the assessment period. These deficiencies are listed in Table 1 and were evaluated and discussed as part of the analysis of the appropriate functional area.

While analysis of the listed CDRs for causal linkage has identified no unacceptable chains per statistical acceptance criteria, the following common factors have been noted relative to certain CDRs:

-- Sixteen (16) of the deficiencies relate to vendor supplied component defects or problems. Of these, eight (8) apply to the electrical discipline and five (5) of these involve electrical components supplied by ITE Gould.

-- Five (5) of the deficiencies relate to licensee (A/E) design errors.

-- Six (6) of the deficiencies were reported after having been first brought to the attention of the licensee by NRC inspection activity.

In the case of the Gould electrical component deficiencies, it is noted that an NRC Vendor Programs Branch inspection (reference: IR99900510/84-02) was conducted at Seabrook on November 26-30,1984. During that time the vendor inspectors evaluated certain of the construction deficiencies associated with Gould equipment at Seabrook. The findings from that inspection, as well as any generic conclusions regarding ITE Gould, have not yet been issued.

With regard to the design deficiencies and those CDRs directly resulting from NRC inspection activity, neither the final licensee corrective action, nor NRC evaluation of the corrective measures have yet been completed.

2. Investigation Activities

While the results of any formal NRC investigations regarding activities conducted at Seabrook Station are still pending, it is noted that the U.S.Department of Labor did conduct investigations into certain "Whistleblower Complaints" during the assessment period. The technical allegations associated with these complaints have been followed-up by NRC inspection with negative findings, to date.

An NRC special, unannounced team inspection was also conducted in August 1984 in the areas of piping, welding, valves, steam generators, concrete walls, storage and nonconformance controls, as a result of a set of multiple allegations submitted by an anonymous alleger. While the allegations were substantiated in two specific areas, inspection revealed that licensee corrective actions had already been initiated. No violations, relating to the specific allegations, were identified.

Additionally, during the course of the assessment period, several inquiries into allegations/concerns were initiated and inspections were conducted and documented, as appropriate. To date, no substantive negative findings have resulted from NRC follow-up of the stated concerns.

It is also noted that the licensee has recently established an "Allegation Resolution Program" at Seabrook Station to investigate, track, and respond to allegations/concerns brought to their attention. NRC interface with new licensee program has been initiated and inspection follow-up will be conducted, as necessary.

3. Escalated Enforcement Action

None

4. Management Conferences

a. August 22,1983 - a special, announced management meeting at NRC request to discuss the results of the Region I SALP board convened to evaluate licensee performance from July 1,1982 through June 30,1983.

b. October 5,1983 - a special, announced management meeting upon mutual NRC/Licensee agreement to discuss the status of NRC findings in the electrical area. This meeting served to comply with the SALP board recommendation of August 8,1983 for a meeting on issues identified in the electrical area.

c. November 29,1983 - a special, announced management meeting upon mutual NRC/Licensee agreement to discuss changes in the Design Change Control program at Seabrook. NRC attendees included personnel from Region I, the Region IV Vendor Programs Branch (VPB) and IE Headquarters. Past NRC design control concerns and Region I and VPB open items were discussed, as were the licensee results from the Independent Project Review and Owner's Construction Management Group studies.

d. December 19,1983 - a special, announced management meeting at licensee request to discuss the status of emergency preparedness and response facilities for Seabrook Station. Telecommunications needs for NRC personnel in the Emergency Response Facilities were discussed.

e. December 21,1983 - a special, announced management meeting at NRC request to discuss the preliminary findings resulting from the Integrated Design Inspection (IDI) of Seabrook from November 1 - December 21,1983.

f. January 5,1984 - a special, announced management meeting upon mutual NRC/Licensee agreement to discuss the operator licensing program and the schedule for the cold license operator examinations at Seabrook Station.

g. March 9,1984 - a special, announced management meeting at NRC request to discuss the results of the Region I SALP board convened to evaluate licensee performance in the Piping Systems and Supports area from July 1 through December 31,1983.

h. May 25,1984 - a special, announced management meeting at NRC request to discuss the preliminary findings from the Construction Assessment Team (CAT) inspection of Seabrook from April 23 - May 4,1984 and May 14-25,1984

i. July 12,1984 - a special, announced management meeting at NRC request to discuss the status of construction and quality assurance activities since the temporary suspension of Seabrook construction on April 18,1984. Licensee plans for implementing an integrated project organization, manpower requirements, and schedular goals were presented.

j. August 9,1984 - a special, announced management meeting upon mutual NRC/Licensee agreement to discuss the status of Seabrook Unit 1 engineering, construction, licensing, start-up, operations and quality assurance. The licensee also presented their plans for transferring the responsibility for construction and operation of Unit 1 to a managing agent.

k. November 8,1984 - a special, announced management meeting at NRC request to discuss the status of construction and corrective actions directed toward an improvement of licensee performance in the piping and pipe supports area. Licensee management presented an overview of the Seabrook management reorganization, the piping and pipe support program status, and their newly proposed Allegation Resolution Program.

l. November 9,1984 - a special, announced management meeting at NRC request to discuss open item closure and other findings resulting from the IDI follow-up inspection conducted at the UE&C Offices in Philadelphia from November 7-9,1984.

TABLE 1

CONSTRUCTION DEFICIENCY REPORTS
(7/1/83 - 12/31/84)

SEABROOK STATION

CDR NUMBER	DEFICIENCY	CAUSE CODE
83-00-16	Defective Flexible Hose Assemblies (Titeflex)	B
83-00-17	Cracked Capstan Springs in Pacific Scientific Mechanical Shock Arrestors	B
83-00-18	Sticking of Gould Multi Pole Circuit Breakers	E
84-00-01	Bolt, Nut & Washer Problems in the Cooling Tower Fan Assemblies	F
84-00-02	Problems with Gould Combination Reversing Motor Starters	B
84-00-03	Inadvertent Closure of Brown Boveri 5Kv Circuit Breakers	E
84-00-04	Broken Puffer Piston Rods in Brown Boveri 5Kv Circuit Breakers	B
84-00-05	Error in the Weld Design for the Fuel Transfer Tube	G
84-00-06	Additional Stresses Caused by Components and Component Supports Spanning Structural Expansion Joints	G
84-00-07	Defective Westinghouse Differential Relays	B
84-00-08	Weld Deficiencies on Fisher Controls Valve Operator Brackets	A
84-00-09	Fabrication Deficiencies with Limitorque Motor Operators	B
84-00-10*	Gould Molded Case Circuit Breaker Instantaneous Overcurrent Trip Test Failures	E
84-00-11	Linear Indications on Instrument Valve Manifold Bodies	B
84-00-12	Diesel Generator Exhaust Silencer Pedestal Cracking	G

CDR NUMBER	DEFICIENCY	CAUSE CODE
84-00-13	Voltage Drop Calculations not Considered in Control Circuit Cable Design	G
84-00-14	Seismic Qualification of the Control Rod Drive Mechanism Shroud	G
84-00-15	Restricted Flow thru Velan Stop Check Valves	B
84-00-16	Ferroresonant Transformer Deficiencies in Westinghouse Inverters	B
84-00-17	Insufficient Fillet Weld Size in Coped Area of Structural Members	A
84-00-18	Control Rod Drive Mechanism Rod Assembly Failures	A
84-00-19	Crosby Main Steam Safety Valve Ring Setting Deficiency	B

Cause Codes

A - Personnel Error

B - Design/Fabrication Error (Vendor)

C - External Cause

D - Defective Procedure

E - Component Failure

F - Site Construction Error

G - Design Error (A/E)

*Reported by the licensee as a potential Construction Deficiency Report and subsequently cancelled

TABLE 2

ENFORCEMENT DATA
(7/1/83 - 12/31/84)

SEABROOK STATION

a. Number and Severity Level of Violations

	Unit 1	Unit 2
Severity Level I		
Severity Level II		
Severity Level III		
Severity Level IV	12	1
Severity Level V	4	
Deviations	4	2
TOTALS*:	20	3

b. Violations vs. Functional Area

	IV	V	DEV.
1. Containment, Safety-Related Structures & Major Steel Supports	2	-	1
2. Piping Systems & Supports	4	-	-
3. Safety-Related Components - Mechanical	2	2	1
4. Auxiliary Systems	-	-	-
5. Electrical Equipment & Cables	5	1	1
6. Instrumentation	2	-	-
7. Quality Programs & Management Controls	2	1	1
8. Preoperational Testing	1	-	-
9. Licensing Activities	-	-	-
TOTALS*:	18	4	4

*NOTE: Totals from subparagraphs a & b above do not match because of multiple violations resulting from CAT findings; ie: two of the Severity Level IV violations issued from IR 443/84-07 (see subparagraph c which follows) were considered as seven separate items when analyzed in the affected functional areas.

TABLE 2 (Cont'd)

c. Listing of Violations

REPORT	SUBJECT	SEV.LVL.	FUNC.AREA
443/83-12	Conduct of ultrasonic examination (UT) of fillet welds with an unqualified UT procedure.	IV	2
443/83-13	Failure to follow procedures in the control and implementation of a design change.	V	7
443/83-14	Failure to properly inspect electrical terminations of small gauge conductors.	V	5
443/83-15	Failure to review design changes for the adequacy of welding process controls.	IV	7
443/83-17 & 444/83-13	Deviation from FSAR commitment on the containment leak chase system testability.	DEV.	1
443/83-17	Deviation from FSAR commitment on the diesel generator bus duct vibration damping.	DEV.	5
443/83-17	Deviation from FSAR commitment on the design criteria for recirculation piping encapsulation tanks.	DEV.	3
443/83-20	Failure to properly install wiring harnesses in electrical equipment per drawing requirements.	IV	5
443/83-22	Failure to conduct rework on electrical support nonconformances per design details.	IV*	5
443/83-22	Failure to adequately control rework done under the preoperational test program jurisdiction.	IV	8
443/84-04	Inadequate design and inspection of the diesel generator exhaust silencer pedestals.	IV	7
443/84-07	Failure to assure that cable tray support installations are in accordance with design.	IV	5
443/84-07	Inadequate procedures and QA acceptance criteria for the installation of safety-related equipment.	V	3

*Recurrent Severity Level IV Violation.

REPORT	SUBJECT	SEV.LVL.	FUNC.AREA
443/84-07	Multiple examples of inadequate design control:	IV	
	(1) unauthorized deviation from tubing slope criteria.	-	6
	(2) failure to check the adequacy of pump foundation bolting material.	-	3
	(3) inadequate drawing review failed to identify vendor rebar detailing errors.	-	1
	(4) failure to consider concurrent design loading conditions on a dual pipe support/whip restraint.	-	2
443/84-07	Failure of the inspection programs to detect undertensioned high-strength bolt connections and undersized structural steel shop fillet welds.	IV	1
443/84-07	Multiple examples of inadequate corrective action:	IV	
	(1) cable installations violating redundant train separation criteria.	-	5
	(2) nonconforming piping and support conditions improperly resolved via informal or incorrect methods.	-	2
	(3) inadequate corrective measures for known cable identification problems.	-	5
444/84-03	Inadequate storage and preservation of NSSS components.	IV	3
443/84-12	Inadequate corrective measures for a nonconformance documenting an unauthorized signature.	IV	2
443/84-13	Inadequate records for the steam generator lateral support installations.	V	3
443/84-17 & 444/84-07	Failure to adequately control ASME Code Case usage in the design and implementation processes.	DEV.	7
443/84-18	Failure to correct housekeeping problems in the proximity of I&C component installations.	IV	6

NOTE: Where specific violations/deviations are related to generic causes such as design, inspection, or corrective action problems, the functional area cited is the technical discipline which has been adversely impacted. Where the problem generally applies to more than one discipline, it is considered a management/QA problem and has been cited in functional area no.7.

TABLE 3

INSPECTION HOURS SUMMARY
(7/1/83 - 12/31/84)

SEABROOK STATION

Functional Area	Unit 1 Hours	Unit 2 Hours	% of Time
1. Containment, Safety-Related Structures, & Major Steel Supports	828	45	15
2. Piping Systems & Supports	1236	88	23
3. Safety-Related Components - Mechanical	690	112	14
4. Auxiliary Systems	215	29	4
5. Electrical Equipment & Cables	891	9	15
6. Instrumentation	473	23	8
7. Quality Programs & Management Controls	693	85	13
8. Preoperational Testing	238	-	4
9. Licensing Activities	-	-	-
10. Operational Readiness (Operator Licensing)	216	-	4
TOTALS	5480	391	100%

NOTE: Summary includes hours expended during the CAT inspection, but not the IDI or Vendor Programs Branch inspections.