ENCLOSURE 1

U.S. NUCLEAR REGULATORY COMMISSION

REGION I

SYSTEMATIC ASSESSMENT OF LICENSEE PERFORMANCE (SALP)

INITIAL SALP REPORT 50-271/91-99

VERMONT YANKEE NUCLEAR POWER STATION

MARCH 17, 1991 TO AUGUST 1, 1992

BOARD MEETING DATE: SEPTEMBER 14, 1992

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1. INTRODUCTION

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

The NRC SALP Board, composed of the staff members listed below, met on September 14, 1992 to review the observations and data on performance, and to assess licensee performance in accordance with the guidelines in NRC Manual Chapter NRC 0516, "Systematic Assessment of Licensee Performance," dated September 28, 1990. The SALP Evaluation Criteria utilized by the Board are attached.

This report is an assessment for Vermont Yankee Nuclear Power Station for the 16-month period of March 17, 1991 through August 1, 1992.

CHAIRMAN:

C. W. Hehl, Director, Division of Reactor Projects (DRP)

MEMBERS:

W. Hodges, Director, Division of Reactor Safety (DRS)
R. Cooper, Director, Division of Radiation Safety and Safeguards (DRSS)
J. Linville, Chief, Projects Branch No. 3, DRP
H. Eichenholz, Senior Resident Inspector
W. Butler, Director, Project Directorate (PD) I-3, Office of Nuclear Reactor Regulation (NRR)
P. Sears, Project Manager, PD I-3, NRR

OTHERS IN ATTENDANCE:

E. Kelly, Chief, Reactor Projects Section 3A, DRP
P. Harris, Resident Inspector
J. Durr, Chief, Engineering Branch, DRS
H. Gray, Chief, Materials Section, DRS
R. Keimig, Chief, Safeguards Section, DRSS
E. McCabe, Chief, Emergency Preparedness Section, DRSS
S. Chaudhary, Senior Reactor Engineer, DRS
A. Lohmeier, Senior Reactor Engineer, DRS
R. Albert, Physical Security Inspector, DRSS
L. Eckert, Emergency Preparedness Specialist, DRSS
L. Peluso, Radiation Specialist, DRSS
D. Chawaga, Radiation Specialist, DRSS
D. Dorman, Project Engineer, NRR
R. Lorson, Reactor Engineer, DRP

II. SUMMARY OF RESULTS

II.A Overview

Overall, the plant activities were conducted in a safe manner. Continued superior performance was noted in the areas of plant operations, maintenance/surveillance and emergency preparedness. Radiological controls were observed to be good and improving. However, performance in the security, engineering/technical support, and safety assessment/quality verification areas declined.

Superior performance in plant operations and maintenance/surveillance was attributed to management involvement and oversight. The ability to correct material deficiencies in a timely manner, very good plant material condition, and sustained superior performance by control room operators contributed to safe and reliable plant operation. Although programmatic weaknesses in operator training and EOPs were identified, corrective actions have been effective and resulted in improvements and in the restoration of the licensed operator requalification (LOR) program to a satisfactory rating.

Noteworthy emergency preparedness performance was attributed to strong management support, prompt resolution of discrepancies, upgraded equipment, and responses to non-emergency events. Some minor reporting and interface problems detracted from the otherwise excellent performance.

The radiological control program performance was determined to be good with an improving trend noted. Program improvements were noted in quality assurance, staffing, and in the packaging and transporting of radioactive materials. Strengths included very good ALARA performance, particularly during the last outage, and management support and supervisory presence in the plant.

In contrast, the security program was assessed as adequate, a drop in performance rating since the last SALP. Despite plant and security management's increased attention to and oversight of the security program, programmatic weaknesses persisted throughout the period. Moreover, audits did not identify programmatic weaknesses and potential regulatory issues were not properly addressed.

The quality of engineering support provided by onsite and offsite engineering was good. Planning and engineering work for design changes and modifications, root cause analysis, and recommended corrective actions were usually of high quality. Some weaknesses were identified which contributed to a decline in performance in this area. These weaknesses included: technical problems noted with 10 CFR 50.59 reviews; weak motor operated valve (MOV) program implementation; and, poor technical evaluations of plant and material conditions.

Safety assessment/quality verification was good. However, performance declines in individual assessment areas were attributed to the failure of self-assessment programs to effectively identify fundamental issues in major program areas.

II.B **Facility Performance Analysis Summary**

Functional Area	Rating, Trend Last Period	Rating, Trend This Period
1. Plant Operations	1	1
2. Radiological Controls	2	2, Improving
3. Maintenance/Surveillance	1	1
4. Emergency Preparedness	1	1
5. Security	2	3
6. Engineering and Technical Support	1	2
7. Safety Assessment/Quality Verification	1	2

Previous Assessment Period: 10/1/89 - 3/16/91

Present Assessment Period: 3/17/91 - 8/1/92

III. PERFORMANCE ANALYSIS

III.A Plant Operations

III.A.1 Analysis

Plant Operations was previously rated as Category 1. Management involvement and the operational organization's conduct of scheduling, planning and oversight were noted strengths and served to ensure the continued high quality of day-to-day operations. The role of Operations Planning was a valuable management asset. The operational experience of senior control room operators remained high. The licensed operator requalification (LOR) program was evaluated as unsatisfactory. Corrective actions were effective as demonstrated during subsequent operator evaluations conducted by the NRC.

Management involvement and oversight at the station and corporate levels continued to be a licensee strength. Management involvement in plant activities was evident in the day-to-day conduct of plant operations, and contributed to good plant and personnel performance. A clear and strong safety orientation was routinely communicated to the plant staff, and management appropriately focused the organization's response to off-normal circumstances and significant issues. Conservative management of plant operations was exemplified by: delaying the progress of a reactor start-up to repair equipment leaks that did not exceed technical specification limits in the drywell; the recovery from a loss of off-site power event and effective resolution of near term switchyard and service water related issues. Senior corporate and plant management routinely appraised operating crew and training personnel performance at the simulator throughout the LOR cycle. The issuance of a number of operationally-oriented guidelines involving operability, command and control, communications, and the conduct of on-shift training clarified management's expectations. The use of plant managers as Duty and Call Officers was effective in providing direction to the operating staff during back-shift operating periods.

Performance during this period was generally very good in the areas of operator professionalism, conduct of control room operations, and response to off-normal plant conditions. Operational errors were infrequent, caused no reactor scrams, and resulted in only two inadvertent engineered safety features actuations. Operational assessments appropriately characterized emergency or off-normal situations during events, and Emergency Preparedness, Event Response and Emergency Operating Procedures (EOPs) were effectively implemented. Associated actions taken by control room and auxiliary operators were timely, and appropriate operator decisions were made. Some detractions from otherwise superior operator performance occurred, such as: operator error that resulted in a reactor core isolation cooling system turbine trip during the loss of offsite power event; communication weaknesses with the regional power control authority, which delayed the restoration of off-site power; and, the improper restoration of reactor water level instruments which caused an emergency core cooling initiation (and injection) while the reactor head was removed. The licensee addressed each of these performance issues in a comprehensive manner.

The licensee safely and professionally conducted outages. Excellent outage performance was characterized by effective planning and scheduling, and frequent presence of managers and supervisors in the field ensured the prompt resolution of safety issues. Good consideration of shutdown risk resulted in reliable decay heat removal during the refueling outage. Good coordination of outage and non-outage activities was demonstrated by the Outage Planning Group. Daily plant status meetings were effective in scheduling and prioritizing maintenance to promptly resolve equipment and safety concerns. An example of poor coordination between operations and management occurred when contaminated fluid, found weeping from cracks in the drywell concrete pedestal, was not promptly brought to management's attention.

The performance and effectiveness of operations training programs were good and contributed to the safe operation of the plant; however, early in the period, deficiencies in the operator training program were noted. Weaknesses involved: not providing sufficient resources to maintain a systems approach to training (SAT) program; deficiencies in four of five critical elements required for a satisfactory SAT program; inadequate controls regarding the on-shift training of plant operators, which could potentially have detracted from the monitoring of plant parameters; and, a self-identified lack of management awareness of training issues. Subsequent to identification, program deficiencies were corrected and the operator requalification training program was determined by the NRC to be satisfactory. All fourteen operators who took the requalification exam passed. Significant improvements in job performance measures, simulator scenarios, and exam questions were noted.

Licensed and non-licensed staffing levels and experience remained good. Three of the six shift crews' staffing levels exceeded the technical specifications requirements by the addition of a spare auxiliary operator. During this period, a spare Shift Supervisor was maintained on the day shift to enhance staffing capabilities and to conduct special projects for the operations department. Overtime was controlled and within administrative limits. Support for ample availability of senior licensed individuals was evident in providing four reactor operators for the current Senior Reactor Operator (SRO) upgrade class, and in the recent re-alignment of the shift crews.

The EOP program was generally well implemented; however, the maintenance of EOPs was weak. Deficiencies involving the quality of EOP appendices and support procedures, and the failure to ensure that all required materials were available to fully implement support procedures, were identified. In response to these problems, the licensee performed an acceptable root cause assessment and their initial response to the weaknesses was good. This assessment occurred late in the SALP period and the NRC's evaluation of corrective actions is pending.

Housekeeping and the plant material condition remained very good, even during refueling and maintenance outages. A fire protection inspection conducted this assessment period indicated that the fire protection activities were effectively implemented. Cleanliness and personnel hazards identified in the drywell during the refueling outage were corrected by aggressive management involvement. Notable initiatives included the following: establishing the fire protection coordinator as a full time position; development of the Basis for Maintaining Operability

Guideline, which represents a disciplined approach to resolving operability issues and aids in identifying timely corrective actions; implementation of an expanded housekeeping inspection program; and, an irradiated hardware disposal program.

In summary, the licensee continued to operate Vermont Yankee with a high regard for safety. Effective management involvement and oversight continued to be evident in plant operations and was particularly noteworthy during the refueling outage. Operator experience, knowledge, and professionalism resulted in safe operation of the plant, despite some programmatic weaknesses in training and EOPs. Effective corrective actions and program improvements in response to identified weaknesses were observed during the period, as demonstrated by the restoration of the operator requalification program to satisfactory. Overall, strong conservative plant operations and very good plant material conditions remained a licensee strength.

III.A.2 **Performance Rating**: Category 1

III.B Radiological Controls

III.B.1 Analysis

The previous SALP report rated this functional area as Category 2. Management involvement in assuring quality and staffing of the Radiation Protection (RP) organization was determined to be adequate. However, staffing weaknesses occurred during the outage. Radiation safety training program for both general employees and RP technicians was good. Resolution of technical issues from a safety standpoint was determined to be good. The ALARA program was considered a licensee strength. A broad-based radiological enhancement plan was implemented late in the period. The Radiological Environmental Monitoring Program (REMP) and radiological effluent control programs were effective. The program for the packaging and transportation of radioactive materials was adequate.

Radiological Protection

Radiological safety at the plant has been improved through performance-based self-assessment, staffing improvements, reorganization, better utilization of personnel, and improved monitoring and control of radiological activities. The assurance of quality in radiological protection programs was considered good and improving in some areas. Plant tours by RP supervisors and field observations by RP technicians during the refueling outage reflected a good effort to assure and improve the quality of radiological safety. Continued efforts, which stress attention-to-detail and target improvement in radiation work practices and RP procedure compliance, have been supported by management, although some events involving procedural noncompliance, personnel error, or inadequate control of radiological work in the field continued to occur. The implementation of the radiological enhancement program has resulted in improved radiological

postings and field controls. This program, in part, contributed to the very good radiological housekeeping observed throughout the period. Efforts to minimize contaminated areas and control dose rates have contributed to efficient maintenance and operation of the plant.

During the previous assessment period, ntract RP Technician staffing problems contributed to some examples of weak performance in the field. To resolve this issue, station management mounted an aggressive campaign, to attract and retain adequate numbers of qualified contract RP Technicians. These efforts were successful and performance during this 1992 Refueling Outage was much improved. Two qualified technicians were added to the permanent plant staff, which resulted in improved implementation of in-plant radiological control measures. The person who had been filling the Plant Health Physicist position was rotated to the Training Department which added a significant amount of plant experience to the qualifications of that group. The Plant Health Physicist position was temporarily filled by well-qualified individuals until a permanent assignment was made late in the period. Overall, staffing and qualifications were improved during the period.

As previously noted, RP performance during the 1992 refueling outage was very good. Technicians were assigned to satellite control points located near major work locations within the plant. By physically locating groups of well equipped RP Technicians near work areas, the licensee improved its ability to direct, assess and coordinate radiological efforts in the field. RP Technicians remained well informed on changing radiological conditions resulting from maintenance and plant operations. The use of satellite control points also removed some of the congestion and confusion from the main control point area. In addition, redesign of the main control point resulted in improved contamination control and communication with plant workers. ALARA estimates were, in general, accurate. Following the outage, RP personnel performed a detailed ALARA assessment which reviewed and explained dose expenditures and identified areas for improvement. ALARA performance was considered very good.

Licensee resolution of technical issues was generally determined to be sound and thorough. When the staff was challenged by events involving personnel errors or inadequate radiological controls, investigations of events were timely, technically accurate and appropriately biased toward greater personnel safety. Corrective actions for incidents generally reflected a clear understanding of safety issues.

The training program continued to be effective, although, some weaknesses were noted in the area of respirator maintenance and testing. Plant systems training was provided to RP Technicians in a series of interactive performance-based sessions that incorporated lessons learned from plant events. RP personnel were technically competent and well aware of their duties and responsibilities. In addition, mock-up training was effectively used on jobs such as the recirculation pump seal replacement.

Environmental Monitoring

The licensee has conducted an effective Radiological Environmental Monitoring Program (REMP). Procedures were detailed and well written to effectively implement the REMP. The licensee implemented a very good quality control program to ensure the validity of the analytical measurements for the REMP samples. The instrumentation and equipment of the meteorological monitoring program were operable, properly calibrated and well maintained.

Effective radioactive liquid and airborne (gaseous and particulate) effluent monitoring and control programs were in place. Procedures were detailed and well written to effectively implement the effluent control program. Very good calibration techniques were implemented for the effluent radiation monitors. The licensee had a generally effective program to perform the surveillance tests on filter trains for the Standby Gas Treatment System (SBGTS).

During this period, the licensee established appropriate monitoring of the turbine building roof vents pathway and committed to duct the roof exhaust to the main stack during refueling outage 17. The dose assessment and engineering evaluation were technically sound and thorough and indicated that radiation exposure to the public will be reduced. Appropriate revisions to the Offsite Dose Calculation Manual were implemented.

Based on confirmatory measurements, the licensee had in place an effective program for measuring radioactivity concentrations in process and effluent samples. Procedures were detailed and provided the necessary control of analytical performance through interlaboratory and intralaboratory QC programs.

The Quality Assurance Audits performed by the QA Department were thorough and of good technical depth to assess the programmatic performance of the effluent, environmental and radiochemistry programs. Audit-identified findings and recommendations were appropriately resolved in a timely manner.

Radioactive Waste and Transportation

The licensee's program for processing and transporting radioactive material was observed to be good and improving during the period. The installation and use of a new resin processing system, and decontamination efforts in the radwaste truck bay, and disposal of radioactive material from the spent fuel pool were noteworthy achievements. In addition, a large decontamination booth was put into service which provided many methods for efficient and radiologically safe decontamination of plant equipment. Turnover of licensee personnel may have contributed to some weaknesses in the radwaste training and quality assurance programs. Overall, the station implemented a safe and effective program for radioactive waste processing and transportation of radioactive material and waste.

In summary, the radiological control program performance was determined to be good and improvements were noted in many areas. Improvements were noted in quality assurance and staffing of the RP organization for both outage and non-outage periods. Training programs were generally effective and performance based. Technical issues were well managed from a safety perspective. The REMP and radiological effluent control programs were effectively implemented. The program for packaging and transporting radioactive materials remained good and showed some improvement since the last period.

III.B.2 **Performance Rating**: Category 2, Improving

III.C **Maintenance/Surveillance**

III.C.1 **Analysis**

The previous assessment for this functional area was rated Category 1. Both the maintenance and surveillance programs were well implemented and reflected the involvement of experienced and highly dedicated personnel. Management involvement ensured comprehensive procedure reviews, technically sound and thorough surveillances, and well planned maintenance. Maintenance strengths noted during the last SALP period continued throughout this assessment period.

During this period, there was consistent evidence that the maintenance and surveillance performed at VY contributed to safe plant operation. Few significant operational events were attributed to conditions under the licensee's control. Response to component failures was effective as indicated by timely repair and lack of repetitive events. The success of the maintenance and test programs was reflected in high equipment availability.

Managers frequently made field observations to discuss failure mechanisms and to independently assess the status of repair. Emergent maintenance was discussed in detail at Plant Operational Review Committee (PORC) meetings and at daily operational planning meetings, and personnel and equipment resources were made available. Communications were effective between vendors and engineering staff during maintenance activities such as Emergency Diesel Generator (EDG) overhauls, recirculation pump seal replacement, and the integrated emergency core cooling system test. Good quality control during receipt of equipment and the conduct of performance-based audits and receipt inspections contributed to successful maintenance.

Organizational changes in the Maintenance Department resulted in better definition of responsibilities and improved responsiveness to equipment problems. Good coordination with vendors and other plant departments was observed during plant response to off-normal conditions. The plant's staff consistently demonstrated technical expertise and a proper safety perspective. Permanent plant staffing in the electrical and mechanical engineering support of

maintenance increased and reliance upon contractors was reduced. Overall, Maintenance Department staffing was sufficient to meet the challenges present during outages and responded well to equipment failures.

Maintenance packages were properly prioritized and adequately described technical requirements. High reliance on worker knowledge and vendor expertise has resulted in excellent maintenance and "ownership" of equipment. Some isolated occasions of workers not fully understanding maintenance requirements and test attributes resulted because the procedures did not contain sufficiently detailed instructions. Delays caused by the unavailability of quality documentation for parts for the alternate cooling tower fan, and unspecified test attributes and boundaries for emergency diesel generator jacket cooling, demonstrated poor preparation for preventive maintenance.

The administrative controls for the performance of preventive maintenance during power operations using technical specification limiting conditions for operations (LCO) was adequate. An LCO-Maintenance Guideline adequately incorporated the qualitative safety principles discussed in NRC Inspection Manual technical guidance. Some weaknesses regarding documentation, justification, and the level of engineering review of the work packages were identified during work on the emergency diesel generators and alternate cooling towers. Notwithstanding these problems, the maintenance performed was good.

Successful completion of major maintenance activities ("B" EDG overhaul, recirculation pump seal replacements, on-line steam piping repairs, and refueling outage emergent work activities) illustrated effective planning and scheduling. Strong coordination between departments contributed to well-planned and timely corrective maintenance and ensured the incorporation of inservice inspection and post-maintenance test requirements. Management involvement, the communication of expectations regarding timeliness and personnel safety, and the implementation of conservative repair efforts were evident. During the outage, the licensee responded well to scheduling challenges due to rework on motor-operated valves, reactor vessel reassembly, and the high pressure turbine system. The maintenance backlog was also well managed, such that corrective maintenance on safety-related equipment was promptly completed and component failures as a result of inadequate maintenance were relatively few.

Predictive maintenance programs such as thermography, vibration analysis, oil analysis, and erosion/corrosion inspections have generally proven effective as exemplified by the identification of degraded conditions in feedwater heaters, the main transformer, and service water pumps and valves. However, occasionally components, such as the diesel driven fire pump, recirculation pump seals, and the "A" service water pump, were repaired after performance had already degraded, indicating that the prediction of eminent failure or end-of-useful life had not been fully successful. Increased attention to preventive and predictive maintenance by engineers and plant management was predominantly reactive in response to three consecutive failures of the "A" EDG, the inability to maintain high diesel availability, and end-of-life issues associated with governors, relays, and instrumentation devices. A Task Force assessment of the EDG maintenance program was instituted near the end of the assessment period.

Several initiatives were undertaken to strengthen maintenance processes and equipment reliability. These included: the acquisition of equipment to improve the handling and rebuilding of control rod drive mechanisms (CRDM) and the installation of main steam line plugs; the installation of analog differential pressure transmitters and trip units for the primary containment isolation system; and, efforts to improve snubber, CRDM, and motor operated valve reliability and performance. In addition, the licensee has effectively begun use of a Maintenance Planning and Control system and continued their effort to implement a computerized scheduling and tracking program for surveillances.

Maintenance and surveillance caused few challenges to safety systems this period. One plant transient resulted from switchyard activities while connecting a battery to its DC power source, due to inadequate maintenance on the switchyard battery chargers and the failure to recognize the consequences of operating a DC bus without a connected battery bank. During shutdown operations, three engineered safety feature actuations occurred as a result of human errors, inadequate control, or procedural inadequacies. These events were few in number and of minor safety significance.

The surveillance program was well controlled and continued to confirm the operability of safety-related equipment. Personnel demonstrated a high level of attention-to-detail, procedural compliance, and system knowledge during surveillance testing. Management contributed to quality during testing by being actively involved in the performance of the test and review of results. Technicians improved test procedures by initiating recommendations for procedural changes to clarify surveillance steps, improve calibration techniques, and better define test requirements. In addition, the biennial procedure review program incorporated content and format improvements and aided in the adherence to technical specification requirements. As a result, the number of missed surveillances decreased from the previous period. Still, a few missed surveillances occurred because of weak administration or inadequate review of technical requirements, but these occurrences were self-identified and resulted in improved management of the surveillance program.

In summary, the maintenance and surveillance programs effectively contributed to the safe operation of the plant. Excellent equipment performance following maintenance and troubleshooting has led, with few exceptions, to high equipment reliability and availability. Nonetheless, the predictive maintenance programs were not fully effective in identifying end-of-life component issues and concerns prior to equipment performance degradation. Management attention has been focused on resolution of EDG performance problems. Successful completion of several major activities illustrated the licensee's excellent ability to marshal the appropriate resources to correct material conditions and component failures. The skill, experience, and training of the maintenance staff continued to be a licensee strength.

III.C.2 **Performance Rating**: Category 1

III.D Emergency Preparedness

III.D.1 Analysis

The previous EP SALP rating was Category 1. That was based on effective management involvement, ample Emergency Response Organization (ERO) staffing, effective ERO training, proficient exercise performance, and a good relationship with the States of Vermont and New Hampshire, the Commonwealth of Massachusetts, and the surrounding towns.

Two Unusual Events (UEs) occurred during the SALP period. Site management demonstrated safety-consciousness in responding to these events, although some relatively minor reporting problems occurred. Subsequent procedure changes and training comprehensively addressed this matter. A loss of off-site power due to a lightning strike was properly evaluated by the licensee as not requiring an emergency declaration. Also, effective response to an off-site event was demonstrated when a truck carrying unirradiated fuel collided with another vehicle. Timely licensee communications with the Commonwealth of Massachusetts and the fuel vendor contributed to effective response to this event. The nature of those events was properly communicated to the NRC.

The November 1991 full-participation emergency exercise benefitted from timely classifications, effective Technical Support Center (TSC) task prioritization, effective Emergency Operations Facility (EOF) command and control, excellent performance by the EOF dose assessment staff, and excellent provision of information to the States. Correction of prior concerns was evident. There was, however, an exercise weakness concerning a failure to promptly take action to restore reactor water level, although the condition was recognized by the ERO and eventually self-corrected (by makeup flow). Licensee corrective action led to appropriate additional training, to revision of an Emergency Operating Procedure, and to closure of this concern.

Administration of the drill/exercise program was good. Two station drill/exercises involving all Emergency Response Facilities (ERFs) were conducted in 1991. Key ERO members (Site Recovery Managers, EOF Coordinators, TSC Coordinators, OSC Coordinators and Dose Assessment staff) participated in walk-through training on an annual basis as a player or observer. The November 1991 exercise was challenging, but significant changes to the September 1992 scenario were needed to properly test the Emergency Response Facilities and Media Center.

ERO positions were filled at least three deep. Classroom training was conducted throughout the year. The training program was well-defined. Lesson plans were properly controlled, accurate and detailed. ERO personnel received training augmented by walk-through drills; these drills were a program strength.

The Director, External Affairs maintained close interface with the Emergency Preparedness Coordinator (EPC) and was kept apprised of program status. Strong management support of EP was noted. Examples included system enhancements for the Emergency Response Data System

(ERDS), Safety Parameter Display System (SPDS), and Emergency Response Facility Information System (ERFIS). Also, station and corporate management maintained emergency response qualifications, reviewed and approved emergency plan and procedure changes, participated in drills and exercises, and interfaced effectively with State and local agencies.

The licensee's EP audit program was effective. The Technical Specification audit was combined with the 10 CFR 50.54(t) review. Annual audits were appropriate in scope, thorough, and received wide management distribution. Individuals with EP experience from other utilities were used to audit the technical aspects of EP. The audit reports were appropriately provided to State and Commonwealth officials. Audit team walk-through drills for Shift Supervisors were assessed as an audit program strength. The 1991 audit indicated that the corrective action process was not meeting expectations for correcting previously identified exercise areas for improvement; the EPC changed the tracking of these items and thereby established a control system that achieved timely resolution of these exercise areas for improvement.

EP program administration was good. Emergency Plan Implementing Procedures (EPIPs) were generally well-stated and were properly reviewed, approved, and distributed. Emergency response facilities, equipment, and supplies were well maintained. Licensee ERF surveillance reports were effective and discrepancies were resolved promptly. A modification allowed the control room simulator to drive ERFIS and thereby provided real-time operational data to the TSC and EOF staffs; this was a significant program enhancement. The EP program was administered by the EPC, who was supported by a full-time staff member with the responsibility for community relations and off-site training. Some coordination problems occurred in the licensing and security interfaces with EP. A procedure change did not adequately address an ERDS equipment modification and the EPC was not aware that, due to a conflict with weapons training, annual EP training for the majority of the Security Department had not been held for 15 months.

In summary, the licensee's EP program was well implemented. Strengths included strong management support, prompt resolution of discrepancies, EP equipment upgrading, effective audits, maintenance of ERFs, excellent State and local interfaces, and responses to non-emergency events. Exercise performance, training, and program administration were noteworthy. Responses to Unusual Events were good, with some minor exceptions.

III.D.2 **Performance Rating:** Category 1

III.E Security

III.E.1 Analysis

The previous performance rating for this area was Category 2. This rating was based on improvements in security effectiveness due to increased management attention to and support for the security program. Some progress was made in effecting improvements, however program weaknesses were still apparent, particularly in the areas of access authorization, NRC reporting requirements and documentation of events.

During this period, corporate management continued to provide resources to improve the program, for example: the assessment system and alarm stations were upgraded; the main access control center was extensively modified; and funding was also provided for contractor assistance in preparation for an NRC Operational Safeguards Response Evaluation (OSRE) and specialized tactical training for selected security personnel. The OSRE resulted in the identification of weaknesses in the licensee's contingency response capabilities. The licensee's corrective actions led to improvements in contingency response and weapons deployment, as well as in the purchase of upgraded weapons.

Plant management demonstrated a more active role in program oversight during this period. For example, plant management's coordination and oversight resulted in minimum impact on station activities, both during modifications to the main access control center and after it was returned to service. To strengthen the security organization, the Chief of the contract security force was removed from the line position and assigned to assist the licensee's security supervisor midway through the period. Additionally, later in the period, an individual with extensive experience in providing training to law enforcement officers was hired by the contractor to administer the training program. The contractor's training program was sound, with generally good lesson plans and adequate training aids. Its effectiveness was demonstrated by relatively few personnel errors that could be attributed to inadequate training. Personnel errors that occurred during the period were performance related. Additionally, an organizational change was effected late in the period which created a new position for a security manager. The change resulted in the security program being the direct and sole responsibility of a line manager equivalent to with managers of other station programs. The position was filled by an individual who had former military security experience and who was an auditor in the operational Quality Assurance Department of the Yankee Nuclear Services Division. The impact of these changes has not yet been assessed.

Despite plant and security management's increased attention to and oversight of the security program, program weaknesses persisted throughout the period. For example, the licensee's security contractor identified an event early in the period that involved adverse performance on the part of several security force members. Subsequent concerns with the licensee's handling of the event, particularly, the licensee's lack of prompt and aggressive followup and failure to report the event to the NRC, were viewed as a significant breakdown in a safeguards system and a lack of management attention to licensed responsibilities. Other examples throughout the period included: (1) nine individuals who were improperly granted unescorted access to the

station; (2) failure to implement proper compensatory measures for an intrusion detection system problem; (3) inappropriate reading material at duty stations; (4) poor search practices for personnel and vehicles; (5) inadequate protection of safeguards information; and (6) inadequate assessment of potential security events. Several of these weaknesses appeared to be programmatic and at least two were similar in nature to previously identified weaknesses. The licensee failed to demonstrate aggressiveness and expertise in resolving these problems.

Security management continued to exhibit good interface with station operations, which resulted in a refueling outage without any interface problems. An improved attitude was also displayed by plant employees toward the security program, primarily due to increased attention from plant management. This was also an indication of management attention to the program.

Security force staffing was marginal, as evidenced by the persistent reliance on overtime to meet routine operational needs. This situation was exacerbated during the refueling outage when the need for compensatory measures, which are manpower intensive, increased. While the licensee identified the need for additional manpower to its contractor prior to the outage, the licensee was not aggressive in ensuring that the contractor met that need. Two licensee over-hire positions were created and filled during the period to alleviate the routine staffing problem, but these were subsequently lost through attrition. Despite the substantial overtime, members of the security force exhibited a professional demeanor and generally good morale throughout the period.

Although the annual program audit was more comprehensive, in-depth and performance-oriented than during previous periods, it did not identify programmatic weakness and two findings, which involved the modified access control center and were identified by the audit team as potential regulatory issues, were not considered significant by the licensee and, therefore, were not properly pursued. One of these matters has since been corrected and the other remains under review by the NRC. These are indicative of possible problems in the licensee's auditing process.

Except for a failure to administer a complete for-cause Fitness-For-Duty (FFD) test to two individuals, the licensee maintained a generally effective FFD program. Corrective actions taken by the licensee to resolve potential program weaknesses identified during the initial FFD program review were prompt and effective, indicating appropriate management attention. Members of the security force in-plant access control duty posts were alert in identifying potential FFD program violators.

The administrative procedure for reporting events to the NRC was clear and consistent with NRC reporting requirements. However, the licensee continued to have difficulty in evaluating events and in determining which events needed to be reported promptly. The licensee experienced four such events; two were reported correctly, one was tardy, and one was not reported at all. Loggable events were properly documented, but corrective action was not initiated in several cases involving the protection of safeguards information. This indicated a problem in the

licensee's system of tracking and analyzing loggable events. The problem addressed in the previous SALP concerning the lack of details in documentation of loggable events was not observed during this period.

During this assessment period, the licensee submitted seven revisions to its security program plans under the provisions of 10 CFR 50.54(p). With one exception, which was corrected, the revisions were of good quality and technically sound.

In summary, the licensee maintained an adequate security program. Corporate management provided resources to improve the program and plant management demonstrated better oversight, solicited corporate support, created a security manager's position, and made other organizational changes to strengthen the program. However, programmatic weaknesses persisted. Despite an improved audit program, programmatic weaknesses were not identified and potential regulatory issues that were identified were not properly addressed. Plant employees demonstrated increased attention to security and management's commitment to the FFD program was evident. Although staffing was marginal and the use of overtime was routine, the security force maintained a professional demeanor and performed their duties with relatively few personnel errors.

III.E.2 **Performance Rating**: Category 3

III.E.3 **Board Comments**

Programmatic problems which occurred during this period, despite increased management attention, suggest weaknesses that have escaped detection thus far. The licensee should conduct a comprehensive and independent assessment of the security program and its implementation to identify root cause(s) of the continuing program weaknesses. The results of the assessment should be discussed with the NRC.

III.F **Engineering and Technical Support**

III.F.1 **Analysis**

The previous SALP rated performance in this area as Category 1, with an overall conclusion that the licensee continued to have a high quality engineering program. Support from onsite and offsite engineering was excellent. Engineering programs continued to be updated and improved. Engineering outage planning and design were effective and timely. A problem with 10 CFR 50.59 safety evaluations for "changes, tests and experiments" was identified which appeared to be attributable to past practices or isolated cases. During this period, the quality of engineering (generic issues, long-term safety improvements, modifications, outage planning, and engineering analyses and evaluations) activities of the licensee's onsite and offsite engineering organizations continued to be of generally high quality.

The engineering effort emphasized plant safety and reliability. For example, the licensee's response was good to a potentially unanalyzed high energy line break in the reactor building. Although this specific condition was not applicable to Vermont Yankee, a potential equipment qualification concern, based on a similar event in the steam tunnel, was identified. The licensee performed a comprehensive analysis to resolve this concern and demonstrated a strong emphasis on obtaining accurate design basis information. Other examples of good performance included upgrading earthquake response procedures and equipment, and installation of a remote video surveillance system inside the drywell.

Day-to-day engineering support by site, corporate, and Yankee Nuclear Services Division (YNSD) was good. The location of the Engineering Director on-site, and the delegated authority of the Technical Superintendent to authorize the use of engineering resources on an immediate basis assured quick responses to safety concerns; the conduct of failure analyses and investigations; and supporting operability determinations. An example was the use of YNSD metallurgical engineering expertise in responding to the "A" emergency diesel generator (EDG) cylinder liner failures.

Good programs were established for resolution of longer term equipment issues. These included: an extensive erosion/corrosion program that identified the need for, and timely accomplishment of, feedwater heater and steam piping replacements; an ongoing examination and repair program for condensate storage tank erosion, including the conduct of metallurgical and inservice inspection (ISI) evaluations; and the development of a comprehensive roof repair and upgrade program for facility buildings, including the EDG rooms. The resolution of the condensate storage tank corrosion issue was of particularly high technical quality.

Engineering and technical support personnel are knowledgeable and provided keen technical insights for addressing reactor mode switch reliability, chemistry lab drain line corrosion, and enhancements to emergency response facility (ERF) information system capability. The engineering department is fully staffed and has experienced a relatively low turnover rate. Procedural adherence was very good, and personnel errors were infrequent. The design basis database, although only partially complete, provided ready access to design information in the event of a need for engineering and/or operational response. The system's utility was evident in the quick resolution of a standby liquid control pump net positive suction head problem.

Efforts begun prior to March 1991 to strengthen the design change program were continued under the licensee's "Commitment to Excellence Program (CEP)." The improvements have included: upgrading of the "scoping memo" process; more realistic scheduling of modifications; and a more intensive review and approval process. The effectiveness of the above improvements was evident by the absence of significant field changes during installation of modifications during the 1992 outage, and accomplishment of all scheduled modifications for this outage. Enhancements to the safety parameters display system and the ERF information system were technically sound and reflected detailed engineering analysis which led to appropriate emergency plan implementing procedure (EPIP) modifications. However, less than adequate technical

review of an emergency response display system (ERDS) upgrade resulted in this system being made operational before appropriate modifications were made to the EPIPs. Subsequent licensee corrective actions were appropriate.

Despite the licensee's excellent performance in traditional engineering areas, the technical support to operational problems, in some cases, was inadequate. Examples included: actions in response to Generic Letter (GL) 89-10 regarding motor operated valves (MOVs) and inconsistent safety evaluations conducted under 10 CFR 50.59.

Safety evaluations did not consistently reflect good quality or comprehensive engineering efforts. Plant operational or material conditions that were not systematically evaluated included: (a) the reviews relating to the seepage of contaminated water from cracks in the concrete drywell support pedestal were initially too narrowly focused, and demonstrated a lack of understanding of the issue; (b) the initial response to the identification of reactor head and vessel cladding ISI indications lacked a comprehensive basis that the indications did not penetrate into the base metal; (c) poor maintenance engineering performance in developing guidance for switchyard battery work resulted in a loss of off-site power; and, (d) the review involving the redirection of the service water flowpath resulted in reduced flow to the EDGs. To eliminate these weaknesses and strengthen the program, the licensee implemented a revised procedure and initiated a training program to enhance the quality of safety evaluations. More recent evaluations have been of higher quality and indicate the licensee's emphasis on improving this area.

The lack of a coordinated MOV program policy and poor evaluations caused an inaccurate response (i.e. the wrong bypass settings for torque switches) to be submitted to the NRC. Following, and in response to the NRC's MOV inspection conducted in May 1991, a senior engineer was assigned to and has been effective in the project management oversight of concerns in the MOV GL 89-10 program. Effective engineering involvement was noted during the refueling outage when the licensee created a significant emergent work issue to resolve industry results of validation testing of motor-operated valve diagnostic equipment. A number of valves were identified as outside the 95% confidence limits and were re-evaluated. This emergent work had a significant impact on the outage schedule; but, demonstrated a good safety orientation. Engineering communication on this matter with the NRC was also good.

Equipment issues have also received appropriate attention. The licensee's emphasis on these issues indicates a proper concern for plant safety and reliability. The engineering efforts to resolve these issues were high quality. Some of the examples were as follows: 1) replacement of the main transformer; 2) replacement of feedwater heaters 3A and 3B; and 3) metallurgical expertise provided to emergency diesel generator "A" cylinder liner issues. One-for-one component replacements evaluations were generally effective, as were the material upgrade and dedication evaluation (MAUDE) process. The Failed Fuel Action Plan continued to be administered in an effective manner; engineering information reports continue to be widely distributed and efforts to minimize steam leaks were aggressive.

Licensee Event Reports (LERs) were usually well written and contained adequate descriptions of the event. Generally, root cause analyses were technically correct, and satisfactory corrective actions were recommended. Where broader or in-depth analysis was needed, problems were referred to YNSD.

Corrective actions were generally satisfactorily developed for reactive issues; however, switchyard-related equipment was identified as requiring further engineering attention under a licensee program. A review of several LERs detected instances where engineering analyses and evaluations were not always sufficiently comprehensive or properly focused. Examples included: main generator regulator fidelity during on-line coastdown not identified as a long-term corrective action; and, a reactor scram caused by an inadequate maintenance guideline. A primary containment system actuation occurred due to a failed relay coil but could have been prevented by an established energized relay service life program. The lack of such a program could have been identified by a critical self-assessment of the engineering organization. The on-site engineering organization is primarily responsible for reportability decisions and LER generation. Failures to report, late reporting, and required information being incorrect or omitted were noted during this SALP period.

In summary, the quality of engineering support provided by the onsite and offsite engineering groups was good. Planning and engineering work for design changes and modifications, root cause analysis, and recommended corrective actions were usually of high quality. The efficiency of modification implementation was indicative of a competent, well trained staff. Communications were effective among various plant, corporate, and offsite organizations. However, the safety assessment process had some weaknesses. Although the licensee implemented a comprehensive corrective action plan, there was insufficient data to make a definitive assessment because this program was implemented late in the SALP cycle. Also, a number of issues were identified by the NRC that involved failure to report, late reporting, and/or missing information. Lack of attention in the technical depth of analysis in the initial response to NRC Generic Letter 89-10 was also noted.

III.F.2 **Performance Rating:** Category 2

III.G Safety Assessment/Quality Verification

III.G.1 Analysis

The previous SALP rated this area Category 1. The licensee had improved an already strong area in licensing and in resolving technical issues. Submittals were timely, responsive to safety issues and of high technical quality. Quality verification programs were a strong area but had again improved since the previous period, especially in the area of corrective action programs. Strong management involvement continued to be noted. The Board had commented that the licensee should evaluate the effectiveness of their program for dealing with employee concerns.

During this period the licensee instituted an effective program for dealing with employee concerns, including: (1) team building efforts; (2) management training to focus supervisors on work-place environment issues and necessary communication skills; and, (3) ensuring that contractors were aware of the program elements and management's philosophy on addressing employee concerns. Senior management was committed to the establishment of a positive atmosphere for the resolution of employee safety concerns, and supervisors have responded in an appropriate manner to address such concerns. However, the licensee's evaluation of the Employee Improvement Suggestion and Safety Concern Program was not thorough in assessing their employees' understanding of the anonymity aspects of the program. Executive management ensured that corrective actions were put into effect to address this issue. Regarding the contractor oversight concern of the previous SALP, the licensee has successfully caused its principal on-site contractor to restructure its organization to provide QA/QC independence. Efforts to improve oversight and proper interface with the contractor were appropriate.

The licensee's self-assessment programs have not been fully effective in identifying fundamental issues in program areas. Specifically, the NRC reviews for training, EOP and MOV programs identified significant weaknesses early in the assessment period. Programmatic weaknesses in security also persisted. These individual program assessments are discussed in applicable sections of this report. Program improvements were noted in the latter part of the assessment period, demonstrating that the licensee's corrective action process for these areas has been effective. Some improvements in the security program have been accomplished, but deficiencies were still being found in the areas of Operational Safeguards Response Evaluation issues, organizational and personnel performance, and staffing.

Corrective action processes continue to be improved and further enhancements have begun. A new guideline was developed to describe staff use of the corrective action program and how various processes are integrated into the overall program. Trending and corrective action effectiveness reviews are being conducted. This program has been effective in correcting substandard or anomalous performance, once identified. Examples were switchyard and service water issues, missed surveillance tests, the failure of a residual heat removal valve to close due to a broken torque key, and quality related concerns caused by deficiencies in the performance of a contractor.

The leadership of the PORC and the members' probing discussions contributed significantly to the safe operation of the plant. The refueling outage pre-startup PORC meetings utilized a comprehensive strategy to encourage the identification (and resolution) of issues involving readiness to startup. The Nuclear and Safety Audit Review Committee also provided effective oversight. Root cause analyses tended to be of high quality and reflected good effort by both on-site and off-site engineering groups. As noted in Section III.F, failures to properly evaluate changes under the provisions of 10 CFR 50.59 to important plant systems were identified. Program enhancements were on-going, with good performance noted towards the end of the assessment period.

The monitoring of plant performance and the identification of precursors of potential problems have been effective. Strong performance by the Operations Planning Coordinator, the Outage Planning Group and by PORC was noted as part of day-to-day monitoring functions. The aggressive use of the Emergency Response Facility Information System by department managers and shift personnel continues to be an important tool for identifying anomalous plant and equipment performance. The shift engineers and plant operators effectively monitored selected systems, particularly in the areas of failed fuel, drywell leakage, turbine vibrations, coolant system conductivity anomalies, recirculation pump seal performance and erosion/corrosion.

Licensing submittals were generally adequate, although weaknesses were noted in some of the evaluations and timeliness of responses. Specifically, the requests were returned due to inadequate justification for an exemption to the Alternate Rod Injection diversity issue and non-specific information regarding the request for a change in PORC composition. Further, on one occasion, the reply to a request for additional information regarding the station blackout rule was not timely in that it took approximately five months. Responses to generic letters and issues have been good.

In summary, the licensee has a good SA/QV program in place at Vermont Yankee. Quality and timeliness of licensing submittals have been adequate, with some noted exceptions. Responses to generic letters and generic issues have been good. PORC oversight has been excellent and the monitoring of plant performance and the identification of precursors of potential problems have been effective. Resolution of problems has not always been effective as evidenced by the persistence of programmatic security issues. Performance concerns were identified in several areas: poor maintenance engineering which resulted in the loss of offsite power; and, safety evaluations that did not consistently reflect good quality or comprehensive engineering. Based on the major program reviews conducted by the NRC this period, the licensee's self-assessment programs have not consistently been effective at identifying fundamental problems. Overall, management involvement was observed in all areas of SA/QV during this SALP period.

III.G.2 **Performance Rating**: Category 2

IV. SUPPORTING DATA AND SUMMARIES

IV.A Licensee Activities

Vermont Yankee operated safely this assessment period. Equipment and system availability and reliability remained high although the overall performance of the "A" emergency diesel generator degraded due to component failures. The plant was shutdown on September 8, 1991 to replace the reactor recirculation pump seals due to end-of-life degradation, and on March 7, 1992 to enter Refueling Outage XVI. The plant experienced three reactor trips: (1) April 23, 1991, a loss of offsite power caused by maintenance in the switchyard resulted in a plant trip from 100 percent power; (2) June 15, 1991, a loss of 345 kV power due to a severe electrical storm caused a plant trip and loss of offsite power; and (3) March 7, 1992, during the plant shutdown for Refueling Outage XVI, at less than one percent of rated power, a reactor scram occurred due to contacts in the reactor mode switch not fully engaging.

IV.B NRC Inspection and Review Activities

Two NRC Resident Inspectors were assigned to Vermont Yankee for the assessment period. NRC team inspections were conducted in the following areas:

-- Augmented Inspection Team: April 25-29, 1991 with followup on August 6-22, 1991, that reviewed a loss of offsite power event which was caused by maintenance in the switchyard.

-- Training Program Evaluation: October 21-25, 1991.

-- Motor-Operated Valve Inspection: May 20-25, 1992.

-- Emergency Operating Procedures Inspection: February 24-28, 1992.

-- Electrical Distribution System Functional Inspection, First Week: July 20-24, 1992.

ATTACHMENT

SALP EVALUATION CRITERIA

Licensee performance is assessed in selected functional areas significant to nuclear safety and the environment. Some functional areas may not be assessed because of little or no licensee activities or lack of meaningful observations. Special areas may be added to highlight significant observations.

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

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

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

3. Enforcement history;

4. Operational events (including response, analyses, reporting and corrective actions);

5. Staffing (including management);

6. Training and qualification.

Based upon the SALP Board assessment, each functional area evaluated is classified into one of three performance categories. The definitions of these performance categories are:

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

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

Category 3. Licensee management attention or involvement in nuclear safety or safeguards activities resulted in acceptable performance. Performance at this level is of concern to the NRC because a decrease in performance will approach or reach an unacceptable level. The NRC will consider increased levels of discretionary inspection. (If the NRC was to conclude that there was not an adequate level of safety performance, prompt and appropriate action would be taken separately from, and on a more urgent schedule than, the SALP process.)

The SALP report may include an appraisal of the performance trend in a functional area for use as a predictive indicator. Licensee performance during the assessment period is examined to determine whether a trend exists. Normally, this performance trend would only be used if both a definite trend is discernable and continuation of the trend would result in a change in performance rating.

The trend, if used, is defined as:

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

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