Enclosure 1

SYSTEMATIC ASSESSMENT OF LICENSEE PERFORMANCE (SALP)

SEABROOK NUCLEAR POWER STATION

Report No. 50-443/97-99

I. BACKGROUND

The SALP Board convened on December 18, 1997, to assess the nuclear safety performance of the Seabrook Nuclear Power Station for the period from May 5, 1996, through December 6, 1997. The Board was conducted pursuant to NRC Management Directive (MD) 8.6 (see NRC Administrative Letter 93-20). The Board members were Charles W. Hehl (Board Chairman), Director, Division of Reactor Projects, Region I (RI), Larry E. Nicholson, Deputy Director, Division of Reactor Safety, RI, and John A. Zwolinski, Deputy Director, Division of Reactor Projects I/II, Office of Nuclear Reactor Regulation. The Board developed this assessment for the approval of the Region I Administrator.

The performance ratings and the functional areas used below are described in NRC MD 8.6, "Systematic Assessment of Licensee Performance (SALP)."

II. PERFORMANCE ANALYSIS - OPERATIONS

Overall the Station was operated safely throughout the period and operator performance was generally good. Several events occurred, however, that were attributed to weak operator assessment of plant parameters and control of complex evolutions. Deficiencies were noted involving the use and quality of procedures. Operators and station management were not consistently effective in ensuring the prompt resolution of degraded equipment conditions. The problem reporting system appears to have improved, however, weaknesses were noted involving the quality and depth of root cause analysis, and corrective actions. Licensed operator training continued to be effective.

Operators have been generally effective at identifying and ensuring the prompt resolution of plant equipment problems. However, a number of degraded equipment conditions were identified for which operations had not promptly pursued resolution. These conditions included a positive displacement charging pump oil leak, a low boron concentration in the refueling water storage tank, evidence of long term boric acid leakage on a safety injection pump mechanical seal, and several outstanding emergency diesel generator deficiencies. While individually some of these problems were minor in nature, collectively they raise questions regarding operators and Station Management resolve to promptly correct degraded plant conditions.

Operators were professional, performed well during shift turnovers, and were knowledgeable of plant conditions. Operator performance during routine and planned evolutions was good as demonstrated by a low number of plant events due to operator error. Refueling activities, drain down to and recovery from mid-loop operations, and a

Technical Specification required shutdown were planned and executed well. However, there were some weaknesses noted involving the assessment of plant parameters, and the coordination of outage activities. These operator performance weaknesses were highlighted by a preventable reactor trip that occurred during the shutdown for refueling, and three inadvertent feedwater isolation actuation events which occurred during outage surveillance testing.

The implementation of the revised problem identification and resolution process varied with some improvements noted. Problem identification has improved as evidenced by the low threshold and large number of issues identified. The root cause analysis and corrective actions for identified issues were generally good, however, in some cases generic concerns or contributing causes for adverse conditions were not adequately addressed. In particular actions to identify and address the underlying causes for human errors and discrepancies in the station tagging processes were not fully effective.

Some deficiencies were identified in procedure use and quality. For example, operators aligned the safety injection system in a configuration that was not specified by a procedure. Additionally, the plant was operated for eleven days without the correct boron injection concentrations being incorporated into an emergency operating procedure and an abnormal operating procedure.

Licensed operator training continued to be effective. The facility successfully prepared all five senior reactor candidates for initial licensing examinations. The licensed operator requalification training program was thorough and effective. Good performance was noted in the development and administration of requalification examinations.

Overall, the Management Review Team and safety review committees were effective in ensuring the quality of event evaluations.

The Operations area is rated **Category 2**.

III. PERFORMANCE ANALYSIS - MAINTENANCE

Maintenance activities were effective as evidenced by reliable safety-system performance. Overall, the identification of and response to equipment deficiencies was good. Station management provided good direction and support of maintenance backlog reduction efforts and progress was made late in the period. However, some maintenance planning and procedure weaknesses were observed that adversely impacted on availability of safety related equipment. Personnel performance and supervisory oversight were good, however, recent events indicate some weakness in maintenance work practices. The quality and control of on-line maintenance activities improved over the period. Surveillance testing was performed well, and was effective in identifying degraded equipment conditions. Assessment and correction of maintenance deficiencies was very good.

In general, maintenance and surveillance activities were conducted well. The on-line maintenance program was effectively restructured early in the period and recent on-line maintenance performance was good. Assessment and correction of maintenance deficiencies was noted to be very good overall. For example the licensee responded well to a hot leg temperature instrument failure. In addition, the foreign material exclusion

program was considered excellent. Also, it was noted that the "fix-it-now" team was fully implemented toward the end of the SALP period. While too early to assess its overall effectiveness, this effort was viewed as a positive initiative.

Maintenance personnel performance and supervisory oversight were noted to be generally good throughout the assessment period. Examples included good coordination and oversight during the conduct of troubleshooting and repairs for the emergency diesel generators and the planning for a temporary leak seal repair of a main steam valve packing leak. Further, it was noted that there were no plant trips during the assessment period attributed to maintenance or surveillance performance. However, several recent problems indicated that some human performance weaknesses exist. For example improper pressure-rated tubing used to vent a flow transmitter failed resulting in the unnecessary release of contamination within the primary auxiliary building (fourth such occurrence during the period), in another example maintenance technicians were observed to be improperly handling safety-related bolts. Additionally, the environmental qualification of an emergency feedwater system steam admission valve was challenged when a limit switch connector was not properly tightened during an outage maintenance activity.

Maintenance rule implementation was considered to have a number of strengths including: incorporation of Probabilistic Safety Assessment (PRA) insights into planned maintenance activities; and, utilization of industry operating experience into maintenance practices and planning. Further, the NRC concluded that the overall safety-related equipment reliability was generally maintained in a high state of readiness. However, we noted some maintenance planning and procedural weaknesses were evident during the assessment period. For example procedural deficiencies resulted in the improper installation of a turbine driven emergency feedwater pump seal, unclear work package instructions complicated the repair of a seal table leak, and positive measures were not implemented to ensure that a preventive maintenance activity would not impact emergency diesel generator surveillance test results. The improper seal installation was subsequently determined to be a risk significant failure.

Surveillance testing showed sound performance. Test conduct was performed well and was noted to be effective at identifying degraded equipment conditions. For example, the licensee's staff identified and resolved problems associated with uncontrolled unloading of a diesel generator. The equipment monitoring programs were considered strong, as evidenced by the identification and correction of an adverse trend in the emergency diesel generator start times.

The Maintenance area was rated **Category 2**.

IV. PERFORMANCE ANALYSIS - ENGINEERING

Engineering management oversight and involvement in plant activities generally good. Support to operations and maintenance was normally effective but, in some instances, engineering failed to adequately address problems such as long-standing control building air conditioning compressor deficiencies. Although design change and modification work was performed well, some design changes were adversely impacted by the quality of design

change packages. The 10 CFR 50.54(f) effort was very good with a detailed plan that included numerous vertical slices of systems. Extensive effort to evaluate the causes of the failed fuel rods was particularly noteworthy.

Engineering support to operations and maintenance was mixed. System engineers were experienced and demonstrated good knowledge of their systems. Problems with the main feed pump control circuit and uncontrolled loading of the emergency diesel generator were effectively resolved. Engineering work to evaluate potentially high primary component cooling water temperatures during post-accident conditions was good. In contrast, previous engineering efforts to resolve control building air conditioning compressor problems were not effective. Late in the period, it was identified that engineering had failed to promptly evaluate and initiate corrective actions for a longstanding degraded condition concerning a through wall pipe leak in the residual heat removal system. In addition, a poor engineering evaluation of a replacement valve spring resulted in an unauthorized modification of a safety injection valve.

Design change and modification work was performed well. Safety evaluations were generally of adequate scope and of good quality. The primary component cooling water heat exchangers were replaced to address a longstanding problem with tube erosion. Engineering developed an innovative solution to resolve the degraded field weld joints in the 24-inch service water piping. However, several deficiencies were noted during modification of the turbine driven emergency feedwater pump steam admission valve. Examples included specifying an incorrect switch and problems in the circuit wiring connection design, field installation, materials selection and the testing package. Corrective actions were being formulated to address an adverse trend with the quality of design change packages.

Strong performance was noted associated with the engineering activities directed toward maintaining the design and licensing basis of the plant. An extensive engineering review was conducted pursuant to the NRC 10 CFR 50.54(f) letter. The findings from this review were incorporated into the corrective action program and appropriately prioritized for resolution. For example, a single failure vulnerability was identified and resolved regarding the absence of automatic initiation of the emergency feedwater system during certain accident conditions. The lessons and experience gained from this review were used to facilitate continued improvement of the Seabrook design basis.

The Engineering area is rated **Category 2**.

V. PERFORMANCE ANALYSIS - PLANT SUPPORT

Performance in the plant support functional area continued to effectively support safe plant operation. Overall performance in the various programs under the radiological controls area continued to be strong. The licensee continued to maintain a good emergency preparedness program. The security program was determined to be effective.

Overall performance in radiological controls was excellent as evidenced by extensive planning and effective implementation of radiological controls for outage work including

strong radiological worker performance. The station staff successfully met a significant radiation protection challenge with the unexpected quantity of fuel defects identified when the plant shutdown for refueling. Strong performance was evident in the handling of the resultant elevated in-plant airborne radioactivity levels. Health physics controls for most key outage activities were excellent, including: pre-job briefings, radiation work permit controls, and communications. Excellent ALARA planning was implemented for removal of a Reactor Vessel Stud and installation of temporary shielding in the containment. Radioactive waste and transportation programs were effectively implemented. The volume of low level radioactive dry active waste was significantly reduced. Also, an excellent radwaste technician training program was implemented.

The radiological environmental monitoring and effluent control programs continued to exhibit excellent performance, and were effective in ensuring that the impact on public health and safety and the environment was minimal.

The security program was very effective and continued to exhibit high quality performance. Upgrades to the security communications system, weapons armory, and intrusion detection systems, and the completion of the specifications for a new access control system demonstrated management's commitment to the security function. Security personnel were knowledgeable of their duties and responsibilities. Security personnel properly responded to alarm conditions and demonstrated positive access control. Controls for identifying, resolving and preventing security program problems were effective.

The emergency preparedness program continued to be strong. The 10 CFR 50.54(t) audit process was upgraded using emergency preparedness specialists from other utilities. Emergency preparedness facilities were maintained in a good state of readiness. The emergency preparedness staff was maintained qualified and training was effective. Drill and exercise performance were noted to be very good.

The fire protection program was effectively implemented and housekeeping was generally good.

The Plant Support area was rated a **Category 1**.

Enclosure 2

SEABROOK SALP 12 MONTH
INSPECTION PLAN

INSPECTION	TITLE/PROGRAM AREA	PLANNED DATES	TYPE INSPECTION COMMENTS
IP 92903	Engineering Follow up on M&TE Issues	1/21/98	Regional Initiative
IP 82301	Emergency Preparedness Exercise	6/1/98	Core inspection
IP 81700-01	Physical Security Program	7/13/98	Core inspection
IP 83750-01	Occupational Radiation Exposure - Non-outage	7/1/98	Core inspection
IP 86750-01	Solid Radioactive Waste Management and Transportation of Radioactive Materials	12/1/98	Core inspection
IP 64704	Fire Protection Program Review	TBD	Core inspection

Legend: IP - Inspection Procedure
TI - Temporary Instruction
Core Inspection - Minimum NRC Inspection Program (mandatory at all plants)
Regional Initiative - Additional Inspection Effort Planned by Region I