Entergy Operations, Inc.

Grand Gulf Nuclear Station

1993 Self Assessment

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INTRODUCTION

This report is intended to be a review of the strengths and weaknesses we have noted in our performance for the SALP period beginning on 8/23/92 and extending through February 26, 1994. The report covers the following areas:

- The initial section of the report provides an overview of major themes and activities during the SALP period.

- The next section summarizes our activities in response to challenges identified by the NRC. While the previous SALP report for Grand Gulf contained no recommendations, the NRC outlined several areas of challenge during the SALP exit meeting which we have aggressively pursued.

- The bulk of the report consists of a detailed performance review by SALP functional area: Operations, Maintenance, Engineering and Plant Support.

- Although we have not yet completed our post-outage critique, we have provided a summary of RF06 highlights in the Outage Scheduling section of the Engineering functional area.

- Finally, we have summarized Inspection Report findings, and provided information on LERs and violations by functional area.

GRAND GULF SALP PERIOD OVERVIEW

Grand Gulf entered the present SALP period with several years of good performance under our belts -- strong safety performance, excellent plant availability and a mature, experienced team of professionals. Yet, some nagging performance doubts remained, particularly our scram rate which was one of the worst in the country. We seemed to be verging on a reputation as an organization that couldn't quite break into the ranks of the top performers -- a reputation we were determined to overcome.

Were we successful?

With the SALP period drawing to a close we can confidently conclude that it has clearly been the most successful in Grand Gulf history. Achievements typical of this period included:

- A dramatic reduction in scram rate from 9 scrams in each of the two previous SALP periods to 1 scram during this period
- A BWR6 continuous run world record of 403 days
- The third consecutive SALP period without a significant safety event
- A third consecutive INPO '1' rating
- Entry, for the first and second time, to the NRC's "good performers" list.
- Over 12,000,000 hours without a lost time accident

Our extended period of operation this SALP period has served to highlight for us the benefits of strong performance. Without the resource drain associated with scrams and safety-significant events, our personnel have had the luxury of time to re-focus their attention on long-range priorities. As a result, backlogs reached unprecedented low levels in many areas. We were able to establish industry lead positions in such safety-significant areas as Maintenance Rule implementation, the MOV program, Appendix B and J reform, and shutdown risk management. Major strides were made in upgrading key programmatic and organizational elements such as the corrective action program, root cause analysis, system engineering functions, design standards, safety analysis deterministic and probabilistic tools, and a wide range of other improvements.

As a consequence, one of the major lessons we've learned this SALP period is that strong performance can lead to some slack resources which, if wisely invested, can fuel continuing performance improvements. Having experienced the advantages of a SALP period virtually free of scrams and safety-significant events, we may also have discovered one of our strongest arguments against complacency.

Consistent, strong performance is due to many different factors. However, there are several which we believe were fundamental to our success during this SALP period.

- Scram Reduction Program

  Grand Gulf's scram record is one of numerous seemingly unrelated hardware scrams. No other issue in the recent history of Grand Gulf has required as much time and effort, as well as management attention, to identify and address the root causes.

  In summary, dedicated teams were assigned to resolve this issue from both a hardware and management/process viewpoint. A comprehensive Integrated Site Action Plan (ISAP) was developed under the auspices of the Site Lead Team (discussed below) in order to maintain continued focus on scram reduction. Some of the more significant ISAP activities were:

  - Enhancements to feedwater and feedwater control systems
  - Numerous modifications to various monitoring and control systems to reduce lightning strike consequences
  - Increased management attention to trip-critical evolutions
  - Enhancements to the corrective action program
  - Reprioritization of reliability centered maintenance reviews to complete trip-critical/sensitive systems before other systems
  - Creation of a dedicated root cause analysis group
  - Creation of a centralized trending group focused on trip-critical applications

  ISAP's effectiveness is directly reflected in the significant reduction in scram rate over the last 18 months.

- Site Lead Team

  Competent management oversight is a cornerstone of consistent, continuous improvement in any organization. The scram reduction effort recognized the need for heightened management involvement and, in particular, the necessity to transition from a "crisis management" style of organization (which has always been a Grand Gulf strength) to an organization which focuses foremost on long-range process improvement. Therefore, an essential element of the Integrated Site Action Plan (ISAP) was to overhaul the management mindset through creation of the Site Lead Team.

  The Site Lead Team consists of the V.P., Nuclear Operations, the General Manager, Plant Operations, and their direct reports. In addition to normal production and business meetings, this core group of senior management meets periodically to concentrate their attention on the ISAP and other long range issues.

  Through teambuilding sessions, better understanding of root causes, and a focused emphasis on long-term process issues the Site Lead Team forum has been a major factor in not only resolving scram rate problems but in accelerating organizational maturity and largely eliminating short-term "bandaid" approaches to problems.

- Total Quality Improvement

  Entergy Operations is moving forward rapidly with implementation of a Total Quality Improvement (TQI) program. Grand Gulf is in its fourth year of this program which emphasizes such themes as personal responsibility, continuous process improvement and employee empowerment. One natural outgrowth of our TQI program is a concentrated focus on critical self-assessment activities, which every Grand Gulf department is expected to periodically conduct. Although difficult to quantify, we believe that programs such as TQI, if properly implemented, lead to fundamental and positive changes in organizational culture which facilitate further change such as occurred through the Integrated Site Action Plan.

PROGRESS SUMMARY OF SALP PERIOD CHALLENGES

The previous Grand Gulf SALP report contained no recommendations.

However, during the SALP exit, the NRC identified several challenges for each SALP functional area. We agreed that each of the identified challenges were sufficiently important to aggressively pursue. While the review of functional areas later in this report contains more detailed information, the following section summarizes Grand Gulf's activities to address the challenges for the current SALP period.

OPERATIONS

- Continue focus on inattention to detail

  Grand Gulf management and personnel provided a continued and renewed focus this SALP period on "inattention to detail "and other human performance events not only in the area of Operations but across all plant departments. The net effect has been a steady decline in adverse human performance events, particularly in the Operations area, when viewed over a several year period. For instance, LERs due to operator error have experienced a marked reduction over the last three SALP periods:

SALP Period	# of LERs
'89 - '91	12
'91 - '92	8
'92 - '94	6

  We recognize, however, the necessity to maintain vigilance in this area and do continue to experience localized peaks in human performance events (although increasingly lower peaks as time goes on). For this reason, we maintain Human Performance Incidents on our Top Ten Plant Problems list which ensures continued management attention. Other initiatives worthy of note this SALP period include:

  - Formation of a dedicated root cause group to provide focus and consistency in investigating and preventing human performance problems. Continued emphasis on human performance and near

misses has lowered the threshold for reporting and investigating these events, recognizing that the causes of major and minor events are the same.

- Conduct of first line supervisor training emphasizing supervisor skills that detect and intervene in cases of inattention to detail. Additional skills covered are those that reinforce personal responsibility and accountability of the work group.

  One of the weaknesses identified in some of the events of this cycle was the lack of recognition by the first line supervisor of his influence to mitigate and prevent events caused by inattention to detail and failure to return to task after an interruption by the employees who he was directing.

  This training was conducted by a staff of industrial psychologist specializing in supervisory skills and human behavior. This training for supervisors and superintendents, emphasized skills that reinforce personal responsibility and accountability. These skills are proactive and are in place before an event, as opposed to the skills of root cause and corrective action which are the focus after an event has occurred.

- The self-checking program was revised to the simpler Stop, Think, Act and Review (STAR) program, with a site-wide implementation and emphasis. Each discipline conducted continuing training on this program and the techniques used to self-check. Initial training programs were changed to include topics on self-checking.

- Senior manager meetings with employees covering topics that help align human performance goals with company goals, and challenge employees with high standards of human performance. These meetings entitled "Peak to Peak" were intended to raise the awareness level of "human performance" by demonstrating how choices, responsibility and consequences play an everyday role in our ability to meeting challenging goals in safety, operating and cost performance. Additional meetings are scheduled in early 1994 to reinforce and build on these concepts in an effort to continuously improve human performance at GGNS.

Our challenge will be to maintain future focus and attention in this area, to further reduce the number of LERs and human performance events.

- Housekeeping in inaccessible areas (i.e. RHR & RCIC Rooms)

  Significant improvement in this area has drawn comment during exits by external inspectors (NRC and others). Initiatives in improving contractor control have had an impact in this area, with increased focus on post-refueling outage cleanup. Increased supervision attention to end-of-job area inspections has also helped restore the plant to an acceptable level of cleanliness. Clearly defined duties and responsibilities for material control in and around the refueling and storage pools have improved housekeeping in these areas as well.

MAINTENANCE

- Procedural adequacy

  Procedural deficiencies and personnel errors continued to be monitored throughout the SALP period. During this period, plant management developed a workshop designed to avoid the complacency and let-down which sometimes follows extended periods of strong performance. Entitled "Peak-to-Peak" (implying elimination of the "valleys"), these workshops which were delivered to plant personnel and most site personnel focused in part on the importance of procedural compliance and adequacy, and the necessity of correcting inadequate procedures.

  Maintenance is also pursuing streamlining surveillance procedures and placing more direct control of these procedures in the department that has responsibility for performing the procedures. This will ensure a product that is high quality and user friendly. This effort will be a long term effort to streamline all maintenance procedures, thereby adding value to the process.

- Work backlog

  Through this SALP period up to RF06, we have experienced a reduction in work order backlog of approximately 50%. While this reduction is partially due to the uninterrupted plant run through most of the period, it is largely due to constant focus by maintenance management in concert with the operations department. Enhancements to the work order scheduling process have also been major contributors to backlog reduction.

- Continue focus on equipment failures contributing to events

  This is a major area of success for Grand Gulf. In the past, the vast majority of scrams have been due to equipment failures. Through management attention, an effective scram reduction program, introduction of a focused

oversight for trip-critical components and evaluations, and the continued attention of maintenance, operations and engineering personnel scrams due to equipment failures were limited to a single event during this SALP period. And, that scram (jet pump beam failure in a location not previously experienced in the industry) is not attributable to maintenance activities.

Other events due to equipment failures have been infrequent and of minor consequence. Such events are addressed through root cause analysis and effective corrective action.

During this SALP period Grand Gulf also took an industry lead role as a Maintenance Rule Verification and Validation plant. The engineering and maintenance departments worked together to gain valuable insight on equipment failures related to maintenance effectiveness. This effort, which has required the detailed review of over 100 systems, has resulted in the identification of four systems for increased management attention and will be a valuable program for maintaining focus and necessary attention on equipment failures.

- Control contract workers

Continued emphasis on training and briefing of contract workers paid big dividends during RF06. The enhancements that have been implemented during the past year and a half enabled the plant site to overcome the handicap of starting the refueling outage two weeks earlier than scheduled, and were a factor in minimizing contractor involvement in safety significant outage events.

ENGINEERING

Plant Engineering

- Maintaining System Engineers in preventative versus reactive mode

System Engineering has an excellent trending program that is effective in monitoring and predicting potential problems. Other initiatives put in place during this SALP period which have contributed to our ability to predict and prevent problems from occuring include:

- Maintenance of Rework Program
- Plant Data System Upgrade
- System Engineering Handbook
- System Engineer Weekly Walkdowns
- Development of a System Book, and

- Quarterly System Report

System Engineering management also invested significant resources in re-defining the role of the system engineer to more clearly focus limited resources on functions of importance such as predictive/preventative activities. These initiatives and others are discussed in detail under the Engineering Performance Analysis section of this report.

Nuclear Training

- Operator training

Operator training commanded serious management attention during this SALP period. Due to decreasing performance on initial and re-qualification operator examinations, a number of programmatic improvements were implemented. Based on early indications from the re-qualification program, we are cautiously optimistic that the combination of programmatic improvements, new leadership and focused management attention has resulted in a return to improved performance in the training area.

Improvements to the Licensed Operator Training Program outlined in the 1992 Pre-SALP Assessment were completed with good results. The latest NRC license examination was given the week of September 27th with a 100% pass rate. There were no generic weaknesses identified, and all violations and inspector follow-up items associated with the previous exam have been closed.

Design Engineering

- Reduction of scrams due to design related problems

Grand Gulf has a history of scrams caused by a trip signal generated by the APRM system during lightning storms. Through testing of a spare APRM panel, engineering identified a noise coupling path in the APRM system. Design changes eliminated this coupling path and other design changes have served to de-sensitive Grand Gulf to lightning strikes. GGNS has not experienced a scram from lightning induced APRM signal since implementation of this modification. We received a direct lightning strike to the plant site on August 2, 1993. Recorded data verified that lightning induced noise was being introduced to the LPRM signal cables, however, a trip signal was not generated. To further reduce our susceptibility to lightning scrams, Design Engineering has provided a design that will also protect the LPRM amplifiers from lightning induced noise signals.

Other Design Engineering activities have been instrumental in contributing to the low scram rate during this SALP period and will be essential to maintain the scram rate low in the future. For instance, extensive modifications were made to the feedwater and feedwater control systems during RF06. Also, modifications to the Generator Primary Water Level Detection System were implemented to reduce the probability of spurious trips.

PLANT SUPPORT

Radiological Controls

- Maintaining low dose for major work

This year, Grand Gulf set its site exposure goal to achieve industry upper quartile over a five year period. While these goals are aggressive and challenging, we still made our 1993 goal in face of an extended refueling outage. A 403 day run during this cycle meant fewer forced outages and more power entries, but all emergent work was tracked and planned in our forced work list. Power entries were made at reduced reactor power, and individual efforts were made to limit entry time.

We have taken an integrated approach to reducing personnel exposure. During this past refueling outage, several valves were replaced with cobalt free alloys, and we have begun replacing pins and rollers with cobalt free alloys for our replacement set of control blades. Increased shielding in drywell and RHR areas reduced the radiation fields of major work areas. Flush taps have been installed in the suppression pool cleanup piping to allow the introduction of a hydrolance, which will inexpensively remove the build-up of the inner crud layer in the pipe with very little waste generation. Zinc injection project development has begun with our design engineering department, and is linked as a project to chemical decontamination and iron reduction, two critical factors in determining the viability of zinc injection. Plans for chemical decontamination are being set for RF07, (our second decon) covering the RHR, RWCU and Recirc systems. Much of this integrated exposure reduction is also coordinated and linked directly to mitigation of BWR IGSCC problems. In an effort to provide the widest latitude for mitigation efforts, it is important to prepare for the potential side effects of hydrogen injection. This study is also included in the integrated exposure reduction plan and is currently in the engineering evaluation/study phase.

- Control personnel contamination events during major work

  A major contributor to personnel contamination events has been contamination received from laundered protective clothing. We determined that our laundry contractor had established automatic laundry monitor alarm setpoints without accounting for Y-90 activity. Reducing the alarm setpoint by 50% has resulted in a reduction in personnel contamination events. Also noteworthy is a large reduction in respirator use without any corresponding increase in contamination events.

Emergency Preparedness

- Maintaining timely EOF activation

  During the 1992 NRC graded exercise, the EOF was activated in 45 minutes - well within the 60 minute guidance. During the 1993 NRC graded exercise, the EOF was activated within 46 minutes. All periodic drills have demonstrated EOF activations well within the 60 minute guidance.

Security

- Equipment errors/age of system

  The South Perimeter Upgrade Project has been completed with the exception of minor clean-up and debugging activities. The installation of new intrusion detection equipment, additional cameras and the replacement of the security computer system have already proven to be an asset to security operations and surveillance capabilities, and are expected to result in a reduction in equipment errors.

SAFETY ASSESSMENT/QUALITY VERIFICATION

Nuclear Safety & Regulatory Affairs

- Continue management focus on prior planning

  Prior planning of regulatory submittals is a distinct advantage for Grand Gulf as well as the NRC as it allows early identification of problems, rational resource allocation and an overall lower dedication of resources. Except for minor submittals, we continue to provide the NRR Project Manager with advance notice of expected submittals. Extensive submittals and major new areas of regulatory workload are highlighted to NRC more broadly than the Project Manager. For instance, we provided an extensive briefing for NRC staff of our expected cost beneficial licensing actions several months in

advance of their submittal. And we participated in numerous meeting with the Staff to define the scope of our improved technical specifications request well in advance of its submittal.

Quality Programs

- Continue performance base audits

Grand Gulf's previous venture into performance-based audits was due to generally good site performance which resulted in increasingly less value being obtained from required compliance-based audits. Fortunately, during this SALP period overall site performance remained strong, allowing the Quality Programs department to continue their performance-based approach to audits in addition to addressing the required compliance-based subjects.

Unlike compliance-based audits, a performance-based approach continues to add value and drive further performance improvement. For this reason, we intend to expand the performance-based concept in the future to include selection of audit subjects. Quality Programs is currently pursuing the development of a performance based audit scheduling process. In conjunction with necessary changes to Section 6 of the Technical Specifications, we hope to be able to schedule audits based on recognized need rather than the rote audits currently required by Tech Specs.

Functional Area Regulatory Summary

OPERATIONS

(Plant Operations and Nuclear Training Operations Program)

Previous SALP Ratings:	**Previous SALP Recommendations:**
05/88 - 09/89: 1 **10/89 - 02/91: 1** **02/91 - 08/92: 1**	**None**

Event/Enforcement Comparison:

	Previous **SALP** (02/23/91 - 08/22/92)	Current **SALP** (08/23/92 - Present)
LERs	8	7
Violations*	1/8	8/9

*Level IV/Non-Cited Violations

Inspection History (other than Resident Inspector):

Inspection	Date	Notes*
93-301	10/26/93	s, w

* NV - no violations or deviations
V - violation identified
S - strength identified
W - weakness identified

OPERATIONS PERFORMANCE ANALYSIS

PLANT OPERATIONS

Strengths

Teamwork

- While hard to isolate a single cause for the record run this SALP period, teamwork is surely a candidate. Virtually everyone on site can feel they contributed: from the lightning induced scram task force design changes that led to surviving two direct lightning hits, and the trip critical concept implemented by operations, maintenance and system engineering, to the NS&RA efforts to reduce the number of half scram surveillances which directly affected our ability to survive three equipment failures. Combined with strong performance by the Operations department, these efforts and many others have reduced the scram rate of 9 scrams during each of the last two SALP periods to 1 scram this SALP period.

- The teamwork demonstrated through daily work planning and scheduling has resulted in many process improvements. Through the efforts of daily planning, work order backlogs have been consistently lower than any previous period. Participation by operations, maintenance, and engineering in system outage planning has resulted in smoother outages, better flow of paperwork, better impact statements, shorter system outage times, and better maintenance.

- Participation by operations, construction, maintenance, field engineering and system engineering in pre-construction walkdowns has resulted in better contractor control, better coordination through operations, and smoother paper flow during retesting and design change close-out.

- Operations has revised the shift rotation in order for the shift management to be available to participate in planning and scheduling meetings held the week before they are on day shift.

- Operations has introduced a computerized Shift Superintendent log that is distributed to site management for daily review as the first activity of the day. This aids in distributing plant and shift information to the cognizant superintendents prior to the first daily planning status meeting.

Attention to Detail

Grand Gulf management and personnel provided a continued and renewed focus this SALP period on "inattention to detail "and other human performance events not only in the area of Operations but across all plant departments. The net effect has been a steady decline in adverse human performance events, particularly in the Operations area, when viewed over a several year period. For instance, LERs due to operator error have experienced a marked reduction over the last three SALP periods:

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We recognize, however, the necessity to maintain vigilance in this area and do continue to experience localized peaks in human performance events (although increasingly lower peaks as time goes on). For instance, during the first half of 1993 we experienced repetitive control rod mispositioning events due, primarily, to human performance issues. While we make every effort to ensure localized peaks of human performance events do not occur, when they do we aggressively pursue them.

For this reason we maintain Human Performance Incidents on our Top Ten Plant Problems list which ensures continued management attention. Other initiatives worthy of note this SALP period include:

- Formation of a site root cause group to provide focus and consistency in investigating and preventing human performance problems. Continued emphasis on human performance and near misses have lowered the threshold for reporting and investigating these items, recognizing that the causes of major and minor events are the same.

- Presentation of first line supervisor training emphasizing supervisor skills that detect and intervene in cases of inattention to detail. Additional skills covered are those that reinforce personal responsibility and accountability of the work group.

- The site self-checking program was revised to the simpler Stop, Think, Act and Review (STAR) program, with a site-wide implementation and emphasis. Each discipline conducted continuing training on this program and the

techniques used to self-check. Initial training programs were changed to include topics on self-checking.

- Senior manager meetings with employees covering topics that help align human performance goals with company goals, and challenge employees with high standards of human performance. These meetings entitled "Peak to Peak" were intended to raise the awareness level of "human performance" by demonstrating how choices, responsibility and consequences play an everyday role in our ability to meeting challenging goals in safety, operating and cost performance. Additional meetings are scheduled in early 1994 to reinforce and build on these concepts in an effort to continuously improve human performance at GGNS.

Our challenge will be to maintain focus and attention in this area to further reduce the number of LERs and human performance events.

Ownership of Training

This is a good example of converting an identified weakness to a strength. Early in this SALP period we recognized that the Operations department did not demonstrate a sufficient level of responsibility and accountability for the operator training program. As a result we took aggressive steps to improve Operations' ownership of the training program, including the following.

- Operations management has instituted increased monitoring of training, both classroom and simulator, to spot weaknesses and recommend areas of improvement.

- Shift Superintendents have been trained on simulator critiquing skills to increase their effective participation in simulator training.

- Operations has provided additional direction to the training department for non-licensed in classroom training, plant training and on-shift training.

Appropriate Response to Plant Challenges

A key test of the quality and effectiveness of an Operations organization is its response to plant challenges and upset conditions. While we are fortunate in having few such challenges during this SALP period, those which we did experience demonstrated the continued competence of our Operations staff.

- When faced with low flow on the operating steam jet, the cause was rapidly analyzed to be the failure of the steam pressure control valve. Temporary repairs were quickly installed by an operator which averted a loss of vacuum scram.

- Through proper alarm response to low flow on the drywell chiller water system, a ruptured condenser was detected and isolated, allowing the chill water system to be recovered and drywell cooling rapidly restored. Prompt action limited the magnitude of the drywell temperature excursion and prevented a plant shutdown.

Plant Performance Trending/Monitoring

- As a result of tours behind the turbine bioshield during weekend downpowers, many steam leaks are found and repaired keeping radwaste leakage and contaminated floor space at a minimum. These tours also detected a significant through-wall failure of the feed pump min flow line back into the condenser in time to allow repair before failure.

- Through proper alarm response to a circulating water pump high vibration alarm, an abnormal seal leak was detected, evaluated and temporary adjustments rapidly made. The high confidence in the vibration system and the ability to trend the performance of the pump enabled the pump to be left on line the entire cycle, following the temporary repair.

- Using chemistry containment air samples, steam leaks are routinely found on the RWCU system sufficiently early to allow relatively easy repair.

Rotation/transfer of operators to other organizations strengthens the operational experience level across the site

- 3 SROs, 3 ROs and 2 non-licensed operators have been transferred to training.

- 1 SRO and 1 RO have been transferred to Outage Scheduling, with an additional SRO on temporary rotation 9 months before the outage.

- 1 SRO has been transferred to the Emergency Preparedness organization primarily to provide support for development of realistic emergency drill scenarios.

Management Oversight

This SALP period has seen a new Manager, Plant Operations and a new Operations Superintendent selected for these positions. Additionally, a new Techical Coordinator position has been created and filled by the previous Operations Superintendent. These changes have made Operations management more responsive to personnel matters as well as technical issues.

Numerous team building sessions have been held between Operations management and Operations personnel this period to foster further teamwork within the department and to address selected management issues. In addition to an improved sense of teamwork we have noted specific improvements in areas such as consistency in performance between shifts.

In order to provide fresh points of view, Operations management obtained the loaned services for the majority of this SALP period of an INPO manager with a strong background in the areas of operational experience, human performance and root cause analysis. While providing recommendations for day to day improvements in key Operations department processes, this individual was instrumental in honing the skills of our dedicated root cause analysis group through his participation in root cause investigations affecting the Operations department.

Safety Culture

- Both Operations and Operations Training have performed self-initiated assessments utilizing peers from other sites to critically search for improvement areas. These assessments spotted a weakness in Operations' ownership of the operator training program, poor communication of standards of performance of building operator tours and rounds, and degrading performance of control room repeat-backs and annunciator response.

- 5 Operations SROs have participated in operations assessments at other sites, giving added insight to what makes our successful programs work, not letting complacency set in and finding additional areas to improve after seeing successful programs at other sites.

- Active support of site visits by other operations crews (2 sites) and daily planning and scheduling (6 sites) provides additional opportunity to discuss relative strengths and weaknesses of the different sites and helps operators see work as a process that needs continuous improvements.

- Operations has continued to demonstrate conservative thinking when making operability determinations. Their insistence on integrating other departments into the process has made everyone more conscious of nuclear safety.

- Adherence to GGNS Techical Specification is a byword with Operations. Their consistent interpretation of the specifications has become the expected norm at GGNS. Operations' early recognition of problems made it possible for GGNS to process requests for discretionary enforcement this period. The

in-depth manner with which these request were developed was typical of the site safety culture.

- Operations has strongly supported and participated throughout the process of developing and reviewing GGNS' improved Technical Specification submittal.

Areas for Improvement

Control Room Operation

Both internal and external auditors have recognized that we have lagged behind the rest of the industry in the completeness, formality and consistency of annunciator response and the use of face-to-face repeat-backs in the control room. Our challenge is to communicate this management expectation to all control room operators and follow up to ensure these expectations are being met.

Control of Activities

A critical review of past events in Operations, shows a weakness in some aspects of how we control activities at the plant. Statements like "I assumed...", "I did not understand...", or "I thought..." that are made in the course of fact-finding interviews, show that more management attention is needed in this area. Better, more detailed pre-shift briefings, and pre-evolution briefings are needed for both routine and non-routine shift activities.

Shift Management Presence in the Plant

Only good things happen when shift SROs get out in the plant to monitor equipment and operator performance. Our own assessments have highlighted this area as needing more emphasis. Our challenge is to critically review the duties of the plant supervisor, and reinforce the expectation to monitor first-hand the performance of the plant and the operators.

Become More Proactive in Improving Human Performance

Our challenge is to develop and refine indicators and goals for levels of human performance that will challenge our employees and sustain the efforts that are in place now.

NUCLEAR OPERATIONS TRAINING PROGRAM

Strengths

- Improvements to the Licensed Operator Training (LOT) Program which we outlined in our 1992 Pre-SALP Assessment were completed with good results. The latest NRC license examination was given the week of September 27th with a 100% pass rate. There were no generic weaknesses identified, and all violations and inspector follow-up items associated with the previous exam have been closed. Corrective actions implemented to preclude deficiencies were effective.

- The Training department maintains a close interface with the operational experience group and other site organizations in order to stay on top of industry information which should be fed into the operator training program. For instance, Training provided quick response to the BWR level measurement issues this past SALP period to ensure our operators were aware of and could deal with level inaccuracy concerns associated with "degassing" of the reference legs on RPV water level instruments.

- Training plays a key role in the reinforcement of management expectations in areas such as command and control, reactivity management, communication and self-verification. The success of operations personnel in these areas is directly traceable to Training support.

- We've taken effective steps to address performance problems identified during plant operations. Examples include the difficulty shift management was having in determining Technical Specification "operability" of the PASS System and the D17 System. Training responded quickly and provided additional training in these areas which assisted in a reduction of problems dealing with these subjects.

- The practice of conducting independent assessments and self assessments continued throughout this SALP period. Five assessments were conducted with two focusing on Operations Training, one focusing on Technical Training, and two focusing on generic training processes applicable to all training programs. Assessment results continue to be factored into training program improvements.

- The simulator upgrade project continues to be on schedule for the early 1994 ready for training date. The new computers and back panels have been installed, and model development has progressed sufficiently to allow the start of acceptance testing.

- A Requalification Program Evaluation was conducted in July and August of 1993 resulting in a satisfactory program rating. Improvements noted by the NRC team include:

  - Improved scope and complexity of dynamic simulator scenarios

  - Strong performance by GGNS evaluators

  - Proactive response by GGNS staff to feedback from NRC examiners

- A revised Training Material Review (TMR) process has been implemented to allow better tracking of training materials requiring revision, review of industry experience effects on current training materials, and feedback incorporation from recent classes.

- Additional general and supervisory safety training was developed and presented to site personnel stressing personnel safety and attention to detail. Also, training on the STAR program of self verification has been developed and presented to all maintenance and operations personnel.

- We continuously check and adjust course content to provide updated material that is current with changing requirements and needs. Examples include:

  - Incorporation of revised 10CFR20

  - Complete rewrite of Mechanical, Electrical and I&C initial training lesson plans

  - Incorporation of hazardous materials training changes

  - Upgraded HP and Chemistry training programs to meet new INPO guidelines

- Successfully maintained INPO accreditation for Operations Department.

- Coordinated a very successful onsite college degree program. Five participants received their degree during this SALP cycle.

Areas for Improvement

- Additional improvement in the LOT Program needs to ensure that instant SRO candidates have had previous systems training prior to entering this program.

- Improvement in the consistency of instructor performance during simulator training sessions is required to provide the high quality instruction needed to ensure continuous improvement in operator performance. Additionally, simulator fidelity must be improved.

- Improve the time validation of the written examinations and the design of the alternative-path job performance measures.

Functional Area Regulatory Summary

MAINTENANCE

Previous SALP Ratings:	Previous SALP Recommendations:
05/88 - 09/89: 1 **10/89 - 02/91: 1** **02/91 - 08/92: 1**	None

Event/Enforcement Comparison:

	Previous **SALP** (02/23/91 - 08/22/02)	Current **SALP** (08/23/92 - Present)
LERs	14	8
Violations*	1/4.5	1/1

*Level IV/Non-Cited Violations

Inspection History (other than Resident Inspector):

Inspection	Date	Notes*
N/A		

* NV - no violations or deviations
V - violation identified
S - strength identified
W - weakness identified

MAINTENANCE PERFORMANCE ANALYSIS

Strengths

Work Process

- Work control and backlog reduction continue to be a main strength for the GGNS maintenance section. The backlog has steadily reduced over the past evaluation period due to the improved work process and increase focus by plant personnel. Going into RF06, the maintenance work order backlog had been reduced by 50% compared to the beginning of the SALP period.

Experience

- The maintenance work force continues to be very stable. The experience level of the Maintenance Section personnel continues to increase due to longevity and training.

Training

- Training as a core group i.e., Maintenance Technicians of different disciplines and Operations personnel training together on specific equipment or systems, is becoming a strength with a good return on investment. These groups while training together, highlight the different needs and viewpoints of the various disciplines in troubleshooting and problem solving. This results in increased efficiency and less "out-of-service time" for plant equipment.

Staff Upgrade

- Maintenance staff functions have been enhanced in two ways. Better definition and guidance have been given to the staff so that each member knows his or her role in supporting the critical functions (i.e., RCM program, budget tactical plan, etc.). This has eliminated duplication and has developed expertise of the individual staff members. An additional member was added to the staff to develop the Maintenance Rule implementation plan and work on improvements to the work order process. These efforts have led to identifying and developing ideas that will better streamline and improve the quality of the maintenance program.

Oldest MNCRs (Material Nonconformance Reports)

- Periodically the 10 oldest (non-outage) Material Nonconformance Reports (MNCRs) are published and reviewed. In addition, the outage MNCRs that

are most important to the plant are incorporated into the refueling outage schedule early in the cycle for the purpose of getting the necessary parts ordered and the work packages planned. These efforts are to ensure that the time and resources are applied to the most important systems in the plant (i.e., Safety-Related Systems, Trip Critical Systems and Control Room Annunciators.)

Management Oversight

Grand Gulf's management was instrumental in the implementation of the "Maintenance Rule" and "Work Order Process" to the Maintenance Program. Since the initial effort to launch the Maintenance Rule, noticeable recognition has been given to GGNS from outside industries and the NRC.

- During the last 18 months, Grand Gulf Nuclear Station has participated as a member of the NUMARC Ad Hoc Advisory Committee for validation and verification of the Maintenance Rule (NUMARC-93-01). Members of the plant engineering and maintenance departments helped develop the implementation guideline and made presentations at the two industry-wide workshops that were give in August of 1993. These efforts will assist the industry to implement in a cost effective and consistent manner. Grand Gulf also assisted other BWRs that visited the plant site to discuss and review the different aspects of implementation.

Work Order Process

- GGNS conducted a Quality Action Team (QAT) for approximately three months early in 1993. Members from all site organizations participated in this effort to improve the work order process. This QAT has resulted in improvements to the planning of work orders and helped streamline the closeout review process. In addition, it has enabled the maintenance department to better focus attention to areas for needed improvement in 1994.

  The process was designated as one of the Entergy wide key processes for initial concentration as a means to help Entergy reach it's Benchmarking goal. As a result, a key process team was designated for determining the good practices from each site and for providing consistent meaningful measurement tools for this process.

- Preventive Maintenance Program

  A downward trend has resulted from the ongoing efforts of Quality Programs to trend tasks identified as Preventive Maintenance (PM). The Centralized

Trend Report incorporated PM trending to avoid potential plant problems. This process was implemented as a goal of the Scram Frequency Reduction Committee. The effectiveness of this process is indicated by the reduction in late PMs decreasing from 211 to 157 over a seven month period.

Technical/Process Enhancements

Process improvements have been made in four (4) key processes during this SALP period:

- Work process
- Material/parts availability
- Core business assessment
- Scram frequency reduction

These areas were chosen as key process areas by maintenance management and have been emphasized throughout this evaluation period to all levels of the maintenance organization.

Work Process

- The work process (particularly the "work order process") is being evaluated by a QAT (Quality Action Team) in an effort to streamline the process and reduce the administrative workload on technicians and supervisors which is in keeping with the maintenance management philosophy of focusing on the work location by first-line supervisors and section superintendents.

Material/Parts Availability

- GGNS participated in a MRP (Material Requirements Planning) group beginning in December, 1992 to identify and improve business inventories and parts availability. This was achieved through and by the work efforts of Maintenance, Engineering and the Materials Organizations at GGNS and in cooperation with the other Entergy sites in an effort to share up-to-date work plans and accurate material availability by interfacing various computer data bases. This feature will allow the planning and procurements of materials in advance of material need dates while at the same time updating the system when job delays and/or cancellations occur. This will ensure that parts are available for the maintenance section when required.

Core Business Assessment

- A core business assessment was initiated for the maintenance section earlier in 1993 to evaluate the job functions in maintenance in an effort to eliminate

unneeded functions and streamline the core functions required to meet customer needs in maintaining safety, availability and cost performance.

Scram Frequency Reduction (SFR)

- The main thrust in scram frequency reduction for the maintenance section has been active participation in the SFR Committee and in improving human performance. Human performance presentations called "Peak to Peak" were given this year to all GGNS maintenance personnel. These presentations outlined "Where GGNS Is", "Where We Want To Be", and "How To Get There in Human Performance Improvement".

Reliability Centered Maintenance (RCM)

- The reliability centered maintenance program continues to be a major initiative. This program is supported actively in both the Maintenance and Engineering departments. The resources invested in RCM pay a measurable dividend in manhours saved in plant PM activities and in the improved performance of plant systems.

  The Maintenance disciplines have supported the RCM program at the craft, supervisor, and maintenance specialist level. At times this support required that personnel be dedicated for extended periods of time for the analysis of specific systems. The maintenance personnel involved with RCM are recognized for their contribution to the development and continuous improvement in the program. They are a source of information and ideas that come from experience gained through the performance of the tasks that make up the PM program. Based on their experience, they have helped determine alternate test methods and establish correct maintenance intervals for the systems they have helped evaluate.

  Through the efforts of Maintenance and Engineering, eighteen systems have been evaluated through 1993. Additionally, Maintenance is assisting Engineering in the evaluation of other systems.

Safety Culture

The Maintenance department continued a strong tradition of conducting critical self-assessments during this SALP period , including the following:

- Maintenance Improvement Program Effectiveness Evaluation - October 5-9, 1992

- Evaluation of Maintenance processes for "Guidelines for Conduct of Maintenance at Nuclear Power Stations" - INPO 92-001 - May-December, 1992. This evaluation compared present practices at GGNS to the recommended actions from INPO

- Evaluation of Maintenance Processes for "Performance Objectives and Criteria for Operating and Near-Term Operating License Plants" - INPO 90-015 - September, 1992 - March, 1993. This evaluation compared Maintenance processes to INPO performance objectives

- "Core Business Functional Review" - April, 1992 - present.

Areas of Improvement

Human Performance

- While improvements have been made in Human Performance, i.e., personnel error related LERs, this improving trend requires continued vigilance. In an effort to further improve human performance, a QAT (Quality Action Team) was assembled which consisted of Maintenance and Operations technicians and first-line Supervisors to address the following challenge: What is the fundamental change needed at Grand Gulf that will strengthen our Human Performance thereby improving our nuclear culture? Results of the QAT will form the basis for future improvement initiatives.

  The outcome of the QAT resulted in a report titled "Peak to Peak". The concepts embodied by this report outlined a methodology which would steer our performance so that we could sustain a high level of human performance without having to slide back down into the valley. A series of meetings were conducted by Senior Managers which presented these results to the employees at Grand Gulf. The scope and content of these meetings are further described in the Operation's Challenges Section.

Paperwork Reduction

- During the last 8 months, key personnel from the Maintenance and Materials section have worked together on the Material Requirement Planning (MRP) project. This software programming will allow paper transactions to take place between the SIMS work order system and the Materials Management Information System (MMIS). Material in the warehouse will be electronically redispositioned by keying off the status of each work order that has a material list. The new electronic ties between the two systems will incorporate electronic need sheets for electronic ordering of out-of-stock or in-stocked material. When this change has been fully implemented in early

1994, it will reduce paperwork manhours presently required to update the system through manual data entry.

Functional Area Regulatory Summary

ENGINEERING

(System Engineering , Design Engineering, and Outage Scheduling)

Previous SALP Ratings:	**Previous SALP Recommendations:**
05/88 - 09/89: 1 **10/89 - 02/91: 1** **02/91 - 08/92: 2**	**None**

Event/Enforcement Comparison:

	Previous **SALP** (02/23/91 - 08/22/92)	Current **SALP** (08/23/92 - Present)
LERs	10	5
Violations*	0/2	2/2

*Level IV/Non-Cited Violations

Inspection History (other than Resident Inspector):

Inspection	Date	Notes*
92/19	09/04/92	NV,S

* NV - no violations or deviations
V - violation identified
S - strength identified
W - weakness identified

ENGINEERING PERFORMANCE ANALYSIS

SYSTEM ENGINEERING

Strengths

Trip Critical Program

A consecutive on-line run of 403 days illustrates the strength of the trip-critical program at GGNS. Some of the changes (many of which are fundamental changes in operating philosophy) that have contributed to the strength of the trip-critical program are as follows:

- Development of a trip-critical and trip-sensitive system list.
- Increased awareness and discussions concerning the operation, maintenance and modification activities on trip-critical and trip-sensitive systems.
- A new requirement that trip-critical work have field supervision.
- Walkdowns and evaluations performed on trip-critical systems prior to startup from an outage, as well as periodic walkdowns and evaluations by system engineers.
- Reliability Centered Maintenance reviews to be completed on all trip-critical systems by the end of 1993.

Improvements and initiatives discussed throughout this report combine to make the trip critical program a strength at GGNS.

Plant Data System Upgrade

- Plant Data System (PDS) was made available to plant staff outside the control room. Immediate access to current and historical plant data is now available to Radwaste, Control Room, Chemistry cold lab, Chemistry administrative offices, I&C shop, Maintenance, Planning and Scheduling, System Engineering, Engineering Support, and is now available to PC users on the site network.

- Maintenance Planning now uses the access to PDS to more closely describe instrument behaviors for I&C work orders and in some cases has rejected unnecessary work after reviewing historical data from PDS saving man-hours and reducing exposure.

- I&C uses PDS to monitor instrument behaviors both before and after work. Intermittent instrument behavior can be caught by PDS without installing recorders in the plant and without using anyone to monitor the instrument. This use of PDS has allowed I&C technicians to verify when an instrument has been repaired.

- The Chemistry and Radwaste departments monitors water chemistry conditions for changes after new filters are placed in service. As a result of this monitoring, they can more closely predict the effects on Rx water chemistry.

- System Engineering has made use of PDS for system monitoring and in determining location of failures. In the post trip period, when the source of HPCS injection was unknown, PDS historical data was used extensively to identify or reject possible sources of the trip.

- Operation has used the historical data available on PDS to identify the source of annunciators that occurred minutes or hours earlier.

- Operations turnover sheets have been added to PDS to allow current plant conditions to be saved with the log, thus providing a clearer picture of the shift turnover conditions. This information is then automatically placed in company Email to much of plant staff and management on a daily basis.

Vibration Monitoring

- The Vibration Monitoring Program continues to grow and improve and consists of both permanent and portable monitoring equipment. With 25 trains of permanently monitored equipment and over 125 components regularly monitored by a portable program is not only approaching state-of-the-art in the nuclear industry, but world class. It continues to be highly effective in tracking, trending, and diagnosing recirculation pump problems.

- The portable portion of the program is proving effective in identifying problems with other plant equipment. Detection of problems early in the failure mode is resulting in better scheduling and maintenance practices and yielding reduced maintenance cost and downtime. Current, previous, and baseline data on each machine in the portable program with comments about equipment condition are available to system engineers via the computer

network. New diagnostic software and data collectors are being integrated into the program to increase versatility and reliability.

- Plans are to continue support and involvement in the ASME Operation and Maintenance Committee as it addresses changes on OM-14, Vibration Monitoring of Rotating Equipment in Nuclear Power Plants and OM-24, Reactor Recirculation and Reactor Coolant Pump Vibration Monitoring.

MOVs

- Grand Gulf has maintained a proactive roll in responding to Generic Letter 89-10, expending considerable resources in management of the SMART (Systematic Motor Actuator Reliability Testing) program. A presentation on valve grouping and GL 89-10 closure philosophy was made to the NRC in April, 1993 and a submittal amending our GL 89-10 response was docketed in July, 1993. Based on industry and regulatory feedback, the GL 89-10 program at GGNS is considered an industry leader.

- We are continuing to support industry MOV organizations such as NUMARC, BWROG, and MUG and have conducted an independent assessment at another utility.

- GGNS has established and implemented an aggressive on-line differential pressure testing program.

System Ownership/Proactive Attitudes:

To establish a proactive mind-set and promote system expertise and ownership, revised guidelines and expectations were established for System Engineers during this SALP period. The following program changes were made:

- System Engineer Weekly Walkdowns - Each System Engineer is required to perform a weekly in-plant walkdown of at least one system. Similarly, supervisors must participate in at least one walkdown per month. The bottom-line goal is to improve system performance and ultimately plant performance, but the added benefits of these walkdowns are:

  - Increased system knowledge and expertise

  - Increased awareness of operating characteristics and status

  - Added assurance of compliance with plant and regulatory requirements, and

- A focused and elevated overview of a system, not normally seen by Operations or Maintenance.

- Development of a System Book - For each major system, the System Engineer is required to keep a system-specific book which provides important information and history about that system. This promotes the concept of system ownership, provides a reference during the System Engineer's absence, and provides a tool to aid in system turnover.

- Quarterly System Report - Each System Engineer is required to develop a quarterly report on their systems. This report requires the System Engineer to spend considerable time and effort determining and reporting on the health of their system(s). From the System Reports, a Quarterly System Engineering Report is generated, highlighting system status, trends, overall performance, problems solved, and pending problems. The Quarterly System Engineering Report is widely distributed throughout the Grand Gulf organization.

System Engineering Handbook

- Following an INPO assisted self-assessment in October 1992, revision 0 to the handbook was issued in December 1992. In April 1993, another self-assessment was conducted and needed enhancements/clarifications to the handbook were identified. As a result, revision 1 to the handbook was issued in September 1993. This "how to" handbook for System Engineers provides:

  - Goals
  - Expectations
  - Guidelines
  - Generic Forms, and
  - General information for a System Engineer

  The handbook is a tool that will help reach many of the plant goals and specifically the goal of better defining the role, duties, and expectations of a System Engineer.

Management Oversight

Issuance of Management Standard No. 19, "System Engineering Responsibilities" - As part of the effort to better define responsibilities, obtain

"buy-in", and communicate these responsibilities to other departments, Management Standard No. 19 was issued January 3, 1993. This standard provides a detailed list of duties and responsibilities for system engineers.

- Work load re-assignments - To focus efforts on systems important to safety and become proactive rather than reactive, work loads had to be re-assigned and re-prioritized. This was accomplished in part by implementing the following:

  - Re-assigned systems so that each System Engineer has a maximum of four "major" systems. The systems were first reviewed and each defined as either a major (includes systems important to safety) or contingency system.

  - The contingency systems or non-critical systems that did not require constant attention were re-assigned. One System Engineer was removed from regular system responsibilities to handle problems, evaluations, etc. on an "as-needed" basis for the contingency systems.

  - A procedure group was developed to handle all procedure revisions and TCN incorporations. This allows more focus of System Engineer time on system duties.

  - A Root Cause Analysis group was developed to handle all root cause evaluations on significant items, again allowing more focus of System Engineer time toward their systems.

Reactivity Management

The purpose of any Reactivity Management Program is to promote safe operation of the plant by maintaining adequate protection of the nuclear fuel. In order to more effectively promote and convey management's expectations in this area, Management Standard No. 18 "Reactivity Management Program" was developed and issued in the last quarter of 1992. This management standard highlights management expectations and personnel responsibilities in the area of reactivity management. Procedures were revised and strengthened in responding to and reporting reactivity events (e.g. control rod misposition). A detailed benchmarking of GGNS' overall reactivity program to the BWR Owners Group Reactivity Controls - Guideline for Excellence and other industry good practices is underway. A self-assessment of the reactivity program is currently planned for 1994.

Safety Culture

- Recirculation Pump Shaft Inspection

  GGNS has recently completed inspection of the recirculation pump shafts. Dye Penetrant examinations gave no indications of cracking in the "B" shaft or in the heat exchanger, which had also experienced cracking. Ultrasonic testing gave no indications of cracking in either "A" or "B" shafts. The thermal sleeve for the "B" pump shaft contained two axial cracks approximately 0.17 inches deep. This cracking, which was expected and will be self-arresting, demonstrated the sleeves are successful in absorbing the thermal stresses and preventing the thermally induced cracking previously experienced in recirculation pump shafts at GGNS.

Technical/Process Enhancements

System Engineering Improvement Program

In 1992, in order to bring a fresh approach to both departments, the managers of the Maintenance department and the Performance and System Engineering (P&SE) department rotated positions. Along with other organizational changes, P&SE re-focused its efforts on improving the performance/concept of System Engineering. A series of "Face to Face" meetings were conducted between the new manager and the engineers to solicit input on problems/concerns.

As a result, major initiatives began to be developed and implemented in July of 1992. Between July and the end of December 1992, the division of responsibility (DOR) was revised and issued, a System Engineering Handbook was issued, and internal reorganizations began in the System Engineering department. Following a full year of program development efforts in January 1993, System Engineering implemented the System Engineering Improvement Program. The program is designed to focus efforts on improving System Engineering efficiency and performance, and ultimately improve plant performance.

- Goals of the program include:
  - "Healthy" Systems
    - Improved system reliability
    - Minimum system down time
    - Efficient and cost effective system operation
    - Increased System Engineer attention to assigned systems
  - Good Customer Relations

- Meet the needs of all our customers, focusing primarily on Operations, Maintenance, PM&C and Design Engineering
- Improve efficiency - doing what's important first
- Provide expert system support
- Provide system history and continuity of concern about systems

- High Departmental Morale

  - Develop clearly defined roles, duties, expectations and attainable goals
  - Provide job satisfaction by creating system ownership, experience and expertise
  - Improve System Engineering image and credibility

- Changes made to accomplish these goals include:

  - System Engineering Handbook - Following the INPO Assisted Self-Assessment in October 1992, revision 0 to the handbook was issued in December 1992. In April 1993, another self-assessment was conducted and needed enhancements/clarifications to the handbook were identified. As a result, revision 1 to the handbook was issued in September 1993. This "how to" handbook for System Engineers provides:

    - Goals
    - Expectations
    - Guidelines
    - Generic Forms, and
    - General information for a System Engineer

    The handbook is a tool that will help reach many of the plant goals and specifically the goal of better defining the role, duties, and expectations of a System Engineer.

  - System Ownership/Proactive Attitudes - To establish a proactive mind-set and promote system expertise and ownership, guidelines and expectations were established for System Engineers. The following program changes were made:

    - System Engineer Weekly Walkdowns - Each System Engineer is required to perform a weekly in-plant walkdown of at least one system. Similarly, supervisors must participate in at least one walkdown per month. The bottom-line goal is to improve system performance and ultimately plant performance, but the added benefits of these walkdowns are:

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Root Cause Analysis Group

A Root Cause Analysis Group, composed of personnel with diverse backgrounds in operational assessment, engineering, maintenance, plant modifications, and quality auditing, was created to provide consistent, comprehensive, and objective root cause investigations. The priority of the Root Cause Analysis Group is the investigation and analysis of significant plant problems as defined by plant policies and procedures, with emphasis on scram prevention and reduction related to human performance. The members of this group have received training in industry-recognized root cause analysis techniques to improve their expertise in problem review and analysis. Currently this group is performing the majority of the root cause investigations at GGNS and as a result, the root cause investigations are more thorough and consistent. As this group refines its expertise in root cause determinations, they will facilitate effective root cause analyses performed by other plant departments.

Feedwater Task Force

In late 1991, it was recognized that the feedwater systems were a major contributor to the excessive scram rate at GGNS. In early 1992, a Feedwater Task Force was organized and composed of representatives from P&SE, Operations, Maintenance, NPE, NP&RA, Training, OAS, and PM&C. The primary function of the task force was to develop corrective actions which would reduce the number of feedwater related scrams. The task force reviewed past Post Trip Analyses Reports, LERs, and power reductions and determined that approximately 75% of the scrams were feedwater related. It was also determined that failures in the following three areas contributed to the majority of the problems:

- Failure of the minimum flow valves of the Condensate, Condensate Booster and Feedwater pumps due to vibration of the valves causing instrumentation malfunctions. In order to minimize these failures, three corrective actions were developed:

  - Remove instrumentation location from the valve (point of vibration) to a remote location.

  - Reduce valve vibration by having the vendor inspect valve overhauls and perform modifications to the valve internals.

  - Revise Startup and Shutdown IOIs and PMs to require additional functional checks of the valves to assure readiness. Some of these modifications were completed in RF05 and the remainder were completed in RF06.

- Numerous failures of the governor on the turbine driven feedpumps due to complicated maintenance calibrations, operator interfaces and obsolete parts. In order to minimize these failures, modifications were completed in RF06 to retrofit the governor system with a micro-processor driven EHC System.

- Loss of feedwater due to the trip logic associated with the Condensate and Condensate Booster Pumps. Trip logic calls for all pumps to trip simultaneously versus staggered trips. Numerous single failures exist in the logic and failure of one of several power supplies which will cause a loss of feedwater; in addition there are numerous obsolete parts. In order to minimize the scrams associated with this trip logic, modifications were scheduled for RF06. These modifications will change out the logic with a fully redundant microprocessor logic which includes staggered trips and minimizes single failures.

In order to ensure these panels were fully tested and site personnel were capable of maintaining them, the panels were delivered, set-up, and placed in service at a temporary site location, three months prior to the outage. During this period, a slight software problem was identified and could not be fully resolved and still leave adequate time for verification testing prior to the outage; therefore, this modification was postponed to RF07.

Thermal Performance

- GGNS has improved significantly since the last SALP period on the thermal performance monitoring program. A Plant Data System (PDS) has been developed which allows easy trending and display of all BOP computer points and system diagrams. In addition, approximately 400 thermal performance related points are electronically collected to form databases which can be readily transferred to a PC area network for use. The same set of data can also be collected at any time for diagnosis or special tests.

- In the area of evaluation techniques, the program evaluation covers major thermal performance related equipment in the plant including the cooling tower, main condenser, circulating water system, NSSS, and turbine cycle. Major performance indicators calculated by the program can be trended. Also, more than 90 thermocouples have been installed on drain or dump lines to help detect leaking valves. The results of the evaluations, which include a MWe accounting, are used to initiate cost-effective corrective actions or design improvements.

- To improve the plant thermal efficiency, several requests have been initiated to obtain funding for design modifications. This should prove effective in increasing our competitiveness following the deregulation of electrical power transmission. To improve coordination among departments in prioritizing and carrying out the corrective actions and design improvements, a Thermal Performance Improvement Group (TPIG) has been formed. To further improve the overall thermal performance monitoring program, a self-assessment was performed in August 1993 with the assistance of INPO and two nuclear plants with good features in their thermal performance monitoring programs. Action plans have been developed to implement improvement opportunities.

- The strength of the current GGNS thermal performance monitoring program has resulted in timely identification of problems and execution of corrective actions, accurate assessment of problems/MWe losses, and cost-effective implementation of design modifications. All these are critical to the ultimate objective of efficient and safe operation of the plant.

Oil Analysis Program

Oil analysis continues to be an effective predictive maintenance tool in the industry. GGNS recognizes the potential of a good Oil Analysis Program and has dedicated resources to improve the program such that full benefit can be achieved. The Oil Analysis Engineer attended an EPRI sponsored Lubrication Workshop. As a result, the oil analysis program has improved in four areas:

- The use and evaluation of laboratory oil analyses has resulted in early detection of motor, diesel engine, and compressor problems, which if left undetected could have resulted in a component failure.

- The initial use of "sensory tests" on oil samples from the field and use of new in-house oil analysis equipment has aided in reducing or pinpointing some types of off-site oil analysis tests.

- Based on recent industry experience, GGNS has elected to strengthen the existing oil control program by revising procedures and vendor manuals to strictly control oil inventory and use.

- Training for engineers and journeymen has been provided on the basic principles of lubrication.

- **Summary of Scram Reduction Program**

  The GGNS Scram Frequency Reduction Committee was originally organized to address scrams at Grand Gulf. This group is represented by Operations, Maintenance, Performance and System Engineering, Nuclear Plant Engineering, and Nuclear Safety and Regulatory Affairs. The primary enhancement to this process in 1993 was the incorporation of potential and near-miss philosophy for proactive evaluation and applicability to Grand Gulf. The Scram Frequency Reduction Committee makes recommendations for design changes, preventive maintenance, and corrective actions for all scrams and potential/near-miss scrams. These enhancements have aided in the reduction of scrams at GGNS. There were eight corrective actions implemented from the SFRC punchlist during the RF06 refueling outage. GGNS also participates as a member of the BWROG Scram Frequency Reduction Committee. The owner's group aids in identifying potential scrams which are reviewed for their applicability at GGNS.

Work Control Group (WCG)

The P&SE Work Control Group began issuing a monthly report that allows management to easily review the status of major processes controlled by P&SE. The report contains colored annunciator windows for each of the categories management determined should be monitored to depict P&SE performance. The report not only displays the present status but also a trend of the monitored

parameter. Since the monitoring of these parameters began, there have been reductions in P&SE backlogs. By reducing backlog work, P&SE is better able to respond to customer needs. Also, in order to meet the demands of the customer, the WCG reassigned responsibilities within the department. This has allowed a much better focus on the design change process. Design changes are processed more efficiently while at the same time more concentrated efforts are allowed on the close-out cycle. With this realignment of responsibilities also came the ability to better schedule and status design changes with both PM&C and the Maintenance Department.

Reliability Centered Maintenance Program

GGNS uses Reliability Centered Maintenances as one of the tools to improve and maintain a high level of system reliability, plant availability, and safety. Reliability Centered Maintenance is an assessment of a system to provide reliable operation through optimization of the preventive maintenance program. Reliability Centered Maintenance promotes predictive maintenance and focuses on maintenance of critical components. The focus in 1993 has been on trip-critical systems and improvements in the RCM process. RCM on all trip-critical systems was completed by the end of 1993. Process improvements include prompt implementation, a revised division of responsibility, streamlining, an improved measurement process, system selection process, and detailed weekly status reports. The results have been an overall reduction in preventive maintenance costs with an increase in system availability. Eighteen systems (including all trip-critical systems) were implemented by the end of 1993 and all trip-sensitive and risk significant systems are scheduled to have their evaluation performed prior to July 10, 1996.

Self-Initiated Assessment

To hedge against both rising cost and complacency, Performance and System Engineering recognizes, not only the need, but the requirement to perform self-assessments. In an effort to become more proactive, more efficient, more effective and reduce scrams, P&SE has conducted numerous self-assessments during the present SALP period. By joining people together from inside P&SE with people from outside both P&SE and GGNS, the inward look at the way P&SE functions has proven to be beneficial. Not only are areas for improvement identified and actions developed, but due to self involvement, a "buy-in" of the improvement plan is achieved. Another benefit to conducting self-assessments is that management's expectations are made clearer. To aid in achieving the desired results, a temporary position of Assistant Manager of Performance & System Engineering was created. This position was filled with a reverse loan employee from INPO. For 15 months, this employee was able to share with P&SE his assessment techniques, thus helping P&SE establish an effective self-assessment process.

Formal self-assessments were conducted and improvement plans developed in the following areas:

- Performance & System Engineering Department - October, 1992
- System Engineering Group - April, 1993
- Thermal Performance Monitoring - August, 1993
- Motor Operated Valve Program - August, 1993
- Root Cause Analysis Group - September, 1993

Members of the assessment teams were typically composed of cognizant personnel from P&SE, Quality Programs, Sister Nuclear Plants, INPO or a highly rated INPO plant in the assessed area. A typical assessment includes three full days of investigation/assessment, one day for preparing the report based on findings and a formal exit with management on the fifth day.

The formal self-assessments performed have identified and strengthened the assessed areas, but have also set the tone for self-evaluations within the P&SE Department. Although additional formal self-assessments are scheduled to be performed, the mind-set of continuously evaluating ourselves for ways to improve will play a vital role in the success of the Performance and System Engineering Department.

Initiatives

Maintenance Rule

- Since August of 1992, the Engineering Support Section and Maintenance Department at GGNS has sponsored a team dedicated to implementation of 10CFR50.65, Requirements for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants. This team has been a part of an effort to develop an industry guidance document and to test this document through a verification and validation (V&V) program. The team along with representatives from seven other plants, NUMARC, and the NRC formed the Ad Hoc Advisory Committee that worked together to develop the guidance for the first performance-based regulation for the industry. The efforts of this group will set the standard for future performance-based regulation.

- The team from GGNS met with the V&V Ad hoc Advisory Committee (AHAC) in Washington D.C. seven times for the purpose of developing and reviewing the NUMARC 93-01 guideline. These meetings were used to review the

results and lessons learned as each member utility put the guideline to a limited test at their plant. The experiences of the V&V participants were instrumental in shaping the final revision of the guidance document.

- Subsequent to the V&V effort, the team from GGNS joined with the other AHAC members, the NRC, and NUMARC to present two industry workshops. The workshops were structured so that the V&V members acted as the panelists and lecturers during the workshop sessions that dealt with their specific NSSS type. By using this approach, the industry was able to benefit from the experiences of the V&V members.

- Through participation in the V&V process, the team from GGNS gained valuable experience in the application of the 93-01 guideline and Rule implementation. From the efforts of the V&V, the team was able to move from the testing phase to a practical application of the guideline. The scoping determinations were performed leading to the identification of the risk significant and trip sensitive systems.

Trip-Critical Program

A Trip-Critical Program is being formally developed into a procedure (01-S-17-42) that:

- Defines and lists trip-critical and trip-sensitive systems.

- Increases awareness of operation, maintenance, and modification activities on trip-critical and trip-sensitive systems.

- Identifies system evaluation requirements for trip-critical systems to be performed before plant startup from extended outages.

- Delineates operational, maintenance, and modification requirements for trip-critical and trip-sensitive systems during normal operation. This procedure will require a Trip Evaluation Data (TED) Sheet to be completed on trip critical/sensitive systems prior to work and close supervision in the field of trip-critical work.

  Many of the philosophies and requirements of this procedure are being implemented at the present time and have aided in the reduction of scrams and contributed to the record run at GGNS.

Maintenance Monitoring

During this SALP period, GGNS has significantly improved the Maintenance Monitoring Program to better provide a means of identifying components, which

have a high repetitive maintenance work history. The revised program allows potential repetitive maintenance to be identified in the planning stage of a corrective maintenance work order if the same problem/failure has occurred within 12 months. This heightens the planner's awareness in planning the work package. The craft supervision and journeymen are also aware that potential repetitive maintenance exists because the work package is clearly coded. After completion of the work, if the work order still meets the criteria of a repetitive failure, the system engineer performs an evaluation of the work order to determine appropriate corrective action to reduce or eliminate the repetitive work. The percentage of repetitive maintenance is monitored on a weekly basis and is currently at approximately three percent. Additionally, a quarterly report depicts the details of each repetitive failure and corrective actions. Grand Gulf's improved Maintenance Monitoring Program utilizes on-going evaluations coupled with pro-action problem resolution to enhance our overall maintenance effectiveness.

Thermography Program

In an effort to improve the Predictive Maintenance Program at GGNS, extensive resources have been applied to the Thermography Program this SALP period. State-of-the-art thermography equipment was purchased and numerous industry training courses were obtained by the Thermography Engineer. As a result, the Thermography Program has become an established predictive maintenance tool at GGNS. By using a thermography schedule to survey selected equipment and its resulting reports, engineering and maintenance have begun asking for additional infrared support. In addition, infrared imaging is used by the system engineer in plant system walkdowns. Motors, piping insulation, switch gear, fuses, electronic circuits, and pumps are examples of surveyed equipment.

DESIGN ENGINEERING

STRENGTHS

Peer Groups

- Valve Issues

  A valve peer group has been formed for the purpose of utilizing engineering expertise to address emerging valve issues. Accomplishments include the development of a procedure for evaluating Generic Letter 89-10 test results and the development of a program plan for testing of AOVs. Additionally, technical position papers have been developed by the peer group and consolidated into the Design Engineering Administrative Manual (DEAM). GGNS has lead the industry in the development of a valve grouping methodology to verify the acceptable performance of valves that are not flow tested. This methodology provides a technical basis for predicting valve performance while minimizing risk and cost associated with dynamic testing. An internal assessment was conducted on the MOV program to ensure phase II inspection requirements were being met. The results showed that all design program requirements were being satisfactorily implemented.

- ISI, IST, ASME Section XI Repair and Replacement

  Peer groups have been established to address the ISI, IST, and ASME XI Repair and Replacement programs. Efforts have focused on development of consolidated programs using expertise from across the Entergy Operations system. Benefits have already been realized due to the sharing of information. The new programs will be controlled by a central specification contained in the DEAM. Overall quality improvements are expected to result from the utilization of shared resources in this area.

Daily Interface with Plant Operations

- A Design Engineering representative attends daily Operation department meetings to assure timely response to plant issues. The content of these meetings is transmitted to all supervisors within NPE via electronic mail to further heighten awareness of the design organization to immediate plant needs.

Management Oversight

Communications

During this assessment period, Design Engineering has become increasingly aware of the impact and importance of communications (both internal and external) to the design organization in providing a quality, timely, product accomplished with the most efficient use of resources. Along with this realization, however, Design Engineering has taken the actions necessary to incorporate the philosophies of total quality and personal empowerment into the everyday work life of its employees. We have taken steps to assure that employees are appropriately informed of departmental business and have provided multiple avenues for individuals to provide feedback to management relative to any subject or concern they may have. Likewise, we have improved in keeping plant management informed of design resource restraints so as to assure the most efficient use of plant resources. The following means have been used to realize these improvements:

- Biweekly Schedule Meetings
  Design Engineering supervisors meet biweekly to discuss project schedules and action item backlogs. These meetings were held in the past, but had mainly involved the design managers in concert with the Director, Design Engineering. The new format allows for better communications derived from a deeper insight into the mechanics of producing the product and a greater familiarity with the resource capabilities. Supervisors are also more cognizant of their responsibilities and of the impact of their personal decisions on the overall design product. Design managers are informed of problem areas (roadblocks) that are identified during the discussions such that they in turn can help expedite any solution that would require manager level authorization.

- System and Design Engineering Monthly Meetings
  This provides a forum for supervisors in Design Engineering to discuss priorities of various issues with their counterparts in the Performance and System Engineering department. The purpose of the meeting is to discuss design activities in progress, material non-conformance resolutions and other issues that heighten Design Engineering's awareness of routine plant issues as well as critical plant needs. It has further assisted in eliminating the "we-they" mind-set that often develops in such organizational arrangements.

Technical Process Enhancements

Safety Analysis Group

- In December of 1991, a new safety analysis group was established within the onsite design engineering organization. This group was formed to better control the sometimes complicated interdependencies between the plant design and safety analyses and to provide an improved focus of appropriate resources to safety analysis challenges and the evolving PRA issues. As a result, this group has completed the GGNS IPE in response to Generic Letter 88-20, a series of containment and various compartment (e.g., control room) heat-up analyses in response to additional station blackout requirements, numerous compartment thermal analyses for improved assessments of equipment performance, new accident dose and site atmospheric dispersion analyses resulting from various plant events and various thermal-hydraulic and accident analyses to better assess plant performance. The site safety analysis group is now controlling the reload analysis activities and is providing a much more direct level of support for all safety analysis needs.

Flow Accelerated Corrosion

- Mechanical Standard MS-41 was developed to provide the following:
  - Details of how the corrosion program is to be implemented
  - A definition of the responsibilities of all plant organizations
  - Criteria for the repair and replacement of components with less than acceptable wall thicknesses
  - A ranking of all components in the CHECMATE models per subsystem
  - A listing of components inspected, when they should be re-inspected, and a listing of new components
- A Design Engineering administrative procedure was issued to provide a checklist to review DCPs, MCPs, MNCRs and other documents for potential impact on piping integrity programs.
- An as-built operation review was developed that provides actual plant data (i.e., pressures and temperatures). This program was developed so the engineer responsible for flow acclerated corrosion could ensure that the data used in the CHECMATE models is accurate and also assist in the identification of any leaking valves.

- Mechanical Standard MS-46 was developed to monitor and track erosion problems identified in moderate energy systems due to high velocity.

MNCR Process

- Significant improvements in the processing of nonconformances by Design Engineering have been implemented in 1993. The processing procedure has been strengthened to include enhancements such as prioritization based on safety significance and trip-criticality, guidance for performing generic issue evaluations, guidance for timely screening and scoping of nonconformances, and guidance for engineering evaluations used in operability determinations.

Design Standard for Temporary Rigging

- As a part of Design Engineering's strong commitment to enhance the quality of design activities in support of plant operation, a design standard has been issued for temporary rigging of non-significant loads utilizing industry experience and codes to sustain a higher design standard.

Seismic Qualification

- Design Engineering's Seismic Qualification Central File (SQCF) and SQCF Index has been significantly enhanced to provide qualification packages for both active and passive seismically qualified components in the plant as well as provide a listing for all subcomponents in panels. These packages contain summaries of the qualification and usually copies of the test reports, calculations, and drawings and allow for faster turnaround on design change packages, nonconformance resolutions, and responses to plant inquiries.

Operability Standard for Pipe Supports

- During the past SALP period, Design Engineering has provided technical guidance for the performance of operability evaluations with an engineering standard. Criteria and corresponding allowables have been defined for use when design basis stress limits are exceeded.

Procurement Engineering

- The procurement process at GGNS has been strengthened by the continuing emphasis on procurement engineering. Engineering involvement has increased significantly in all areas of the procurement process. Design Engineering is continuing to establish engineering guidance for key procurement processes such as the development of acceptance criteria. The engineering evaluations for the dedication of commercial grade items and

alternate replacement items continue to be critically evaluated so as to achieve on-going process improvements.

Elimination of Lightning Induced Scrams

- Grand Gulf has a history of scrams caused by an inadvertent trip signal generated by the APRM system during lightning storms. Through testing of a spare APRM panel, engineering identified a noise coupling path in the APRM system. Design changes eliminated this coupling path. GGNS has not experienced a scram from an inadvertent lightning induced APRM signal since implementation of this modification. Grand Gulf received a lightning strike to the plant site on August 2, 1993. Recorded data verified that lightning induced noise was being introduced to the LPRM signal cables, however, an inadvertent trip signal was not generated. As a defense indepth approach to further reduce GGNS' susceptibility to such scrams, NPE has provided a design that will also protect the LPRM amplifiers from these lightning induced noise signals.

Reactor Water Level/Non-Condensable Gas Issue

- Design Engineering has aggressively participated in the BWR Owners Group emphasizing the sensitive regulatory aspects of this issue and the need to provide hardware solutions as soon as possible. Entergy was the first utility to recognize the value of the core range modification to the fuel zone level instruments as an aid to having the backfill system out of service. Consequently, during RF06, Grand Gulf installed both a continuous backfill system similar to that used at Millstone and a core zone monitor to support operability of the reactor water level instrumentation.

Core Stability

- Design Engineering personnel have assumed a key role in the BWR Owners Group on Core Stability by reviving and enhancing Option 1A through General Electric. This option modifies the existing flow biased flux scram to provide protection against instability and is expected to provide protection at a fraction of the cost of the other alternatives considered with far less risk of unnecessary scrams. Concurrently, Design Engineering has continued to actively support the Owners Group work for conforming the hardware specifications for Options III and IIIA which will require major modifications to the existing neutron system but may still be preferred by some utilities.

Pressure Locking and Thermal Binding of Valves

- GGNS has been aggressive in responding to new concerns related to pressure locking and thermal binding originally addressed in SOER 84-7. A

re-evaluation of the original response to SOER 84-7 has been initiated to ensure adequate consideration has been given to all valves identified susceptible to pressure locking or thermal binding. In addition, an innovative calculation methodology has been developed by Design Engineering to evaluate valve performance under pressure locking conditions. Extensive offsite testing in simulated pressure locking conditions was used to validate the calculation approach. This methodology has been shared with other utilities.

Self-Initiated Assessment

Change Notice Process

- A Change Notice (CN) task force consisting of Design Engineering and Plant Staff personnel was formed to review CN drivers and to make recommendations to reduce the number of those being initiated. The recommendations of the task force were those that would enhance the quality of design documents issued for construction thereby mitigating the need for CNs. The recommendations have resulted in the implementation of both pre-design and post-design joint walkdowns, modification kick-off meetings, enhancements to the design verification process, improved material selections, better communications between plant personnel and design engineers, and CN tracking and trending for continuous improvement in the design product.

INITIATIVES

Development of GGNS Master Tracking System

- Design Engineering has taken the lead in the development of the site-wide Master Tracking System (MTS). Previously all engineering documents were maintained in a database within Design Engineering while all interfacing departments maintained a separate tracking system for documents applicable to their function. The development of the MTS has not only reduced the manpower required to maintain the information but has significantly improved plant communications and provided a valuable tool to be used for interdepartmental work status meetings.

Areas For Improvement

Flow Accelerated Corrosion (FAC)

- System susceptibility analysis was started to document which systems or portions of systems are susceptible to FAC and to provide a basis for the identification of systems that were not susceptible.

- The Small-Bore FAC program was initiated to identify systems/locations that need to be included in the FAC program. In addition to identifying all susceptible safety related piping, systems/locations will be identified that:

  - May adversely affect personnel safety

  - Experienced previous problems at GGNS

  - Experienced problems at other plants

  - Cannot be isolated or may cause a plant shutdown

Engineering Standard for Prevention of Potentially Hazardous Loose Items

- An engineering standard is being prepared for the prevention of potentially hazardous loose items in the plant. This standard can be used for the safe handling and temporary storage of equipment and tools without imposing any risk to the operation of safety related components during design basis events such as earthquake and hydrodynamic loads due to a LOCA and SRV actuation.

Penetration Program

- Currently Design Engineering is developing a Penetration Design Standard that will contain the requirements and references for each type of boundary such as air-tight, water-tight, pressure, fire, safety related, and radiation. This document will help standardize the design process and in turn, will expedite the return of penetration requests between design disciplines.

- Design Engineering has evaluated their penetration design process and has produced several recommendations. Primarily they address the need to develop and publish guidelines on the preliminary information required for penetration design and to provide training on the penetration design process.

Design Engineering Training Program

- Continued enhancement of the knowledge of design personnel especially as it relates to plant operations is of high priority to Design Engineering. Design Engineering has committed the resources (approximately 18,000 hours) necessary to complete by 1995 the requirements of the Engineering Support Personnel training program as outlined in INPO document ACAD 91-017.

Additionally, Design Engineering is sharing resources across the Entergy Operations system to provide training on such subjects as Pumps and Valves, Seismic Qualification, Environmental Qualification, etc. Design Engineering continues to emphasize the benefits of operations training and during this assessment period had two more individuals successfully complete the SRO certification program.

Seismic Qualification Reporting and Testing

- Design Engineering is presently participating in the Seismic Qualification Reporting and Testing Standardization program, a joint utility and EPRI group that is pursuing the standardization of seismic testing in order to reduce associated costs. The group is testing equipment to limits that will be generically usable by member utilities and organizing a data library for existing test reports owned by those utilities.

Design Basis Document Program

- Design Engineering is currently developing comprehensive design basis documents (i.e., accident and transient thermal-hydraulic, containment, radiological, etc.). These analysis basis documents also establish and control the criteria, requirements, commitments, and design/analysis interdependencies for the plant safety analyses.

Configuration Management Standard

- A configuration management standard is presently being developed to provide an overview of the program at GGNS and the responsibilities of the various organizations with respect to maintaining plant configuration consistent with plant design.

Source Term Reduction

- Grand Gulf has initiated an extensive source term and exposure reduction program. This effort has resulted in the identification and characterization of significant source term contributors, a thorough evaluation of alternative materials, revisions to key purchase specifications to provide for the procurement and use of appropriate alternative materials, design provisions for aggressive system decontamination and shielding, changes in maintenance work practices, and many other efforts that have begun to result in lower operating doses.

OUTAGE SCHEDULING

PERFORMANCE ANALYSIS:

All of the strengths and processes that were recognized in our previous Pre-SALP Assessment continue to be practiced at Grand Gulf and improved upon when the opportunity presents itself.

One area that has received increased attention is utilization of contractor resources. Where previously all departments provided their own contingency contractor resources, without regard to what was available in other locations, during RF06, contractor resources were [illegible] centralized resulting in increased work efficiency and significant cost reduction.

Strengths

- Effective use of Operations personnel in key positions during outage schedule development and implementation.
- Effective multi-department involvement and buy-in to the schedule.
- Performance of pre-outage qualitative and quantitative assessments of the outage schedule.

Safety Culture

- RF06 Outage Schedule

  A safety assessment of the RF06 Outage schedule was performed by NS&RA's Safety Assessment section to identify high risk factors involved in performing the scheduled outage.

  The RF06 Outage Schedule Assessment was performed using NUMARC 91-06, Guidelines for Industry Actions to Assess Shutdown Management and other applicable industry documents as guides.

  The assessment team used the concept of single failure to determine High Risk. If a single failure would result in the loss of a required system or function, then a high risk classification was assigned for the appropriate time frame.

The assessment team performed a review of the key safety functions for Decay Heat Removal, Reactivity Control, Vessel Inventory Control, and Electrical Power and also included a review of UFSAR events applicable to outage conditions.

The assessment identified three recommended changes to the RF06 outage schedule which were considered by the Outage Scheduling Group. The recommended changes were:

- Maintain a reactor recirculation pump in operation during times when the shutdown cooling suction is from the spent fuel pool

- Maintain ADHRS in operation until HPCS can be made functional

- Maintain LPCS, HPCS, and RHR C functional ability without room cooling

The Safety Assessment Group recommended that the RF06 outage schedule be changed to ensure that a reactor recirculation pump was available and running October 18-21 to ensure proper temperature indication was available.

The Safety Assessment Group recommended that the RF06 outage schedule be changed to ensure that ADHRS remained in service until such time that HPCS could be made operable/functional to allow for an alternate decay heat removal method in the event of a sustained loss of Bus 16AB. No scheduled changes were necessary providing LPCS, HPCS, or RHR A can be made functional on that date.

The Safety Assessment Group recommended that an analysis be performed to determine the approximate length of time that an ECCS pump could be run without room cooling prior to the pump becoming inoperable. This information was determined prior to the start of RF06 so that scheduled changes could be made if appropriate and was also included in contingency plans as supplemental information where necessary.

These changes were input into the ORAM-TIP model (see below) for confirmation on high risk conditions.

- Outage Risk & Assessment Management - Technical Integration Package (ORAM-TIP)

The ORAM-TIP software (a probabilistic risk model for shutdown conditions) was used as a tool in planning for GGNS RF06. In May, prior to the refueling outage in October, the core downage frequency (CDF) for the early RF06

schedule was determined to be 8.4E-6 events per year. Using the ORAM-TIP models, high risk activities were identified and rescheduled, if possible, to periods in the outage when risk were lower. An example of this was moving RHR B relief valve testing from a period of low reactor vessel inventory to a time after the cavity was flooded, thus reducing the CDF associated with this activity. Contingency plans were developed for those activities that could not be rescheduled. By taking these actions the CDF was reduced to 5.3E-7 by August. Continued monitoring of outage risk prior to and during RF06 further reduced the CDF. ORAM-TIP was used to assess the risk associated with each day of outage activity.

Some examples of outage activities monitored and evaluated using the ORAM-TIP software are:

- Isolation and draindown of the "A" loop recirculation system for maintenance of the B33-F067A valve.

- SDC isolation impact, i.e., impact associated with opening SDC isolation valve breakers to prevent spurious isolations during battery load testing.

- Significant RF06 Modifications

Even though a displaced jet pump mixer forced us into an early outage, we were able to adjust the existing schedule to minimize delays. The jet pump beam replacement completed during plant shutdown provided assurance that we would not have another failure during this operating cycle.

During this refueling outage, a temporary diesel generator was available to support work being performed on the division 1 Standby Service Water basin. This provided added assurance that nuclear safety would be maintained. Also, several activities were carefully scheduled to reduce risk of inadvertent heatup of the reactor coolant and the potential to drain the vessel.

Prior to the outage, drywell temperatures were averaging 127 to 128 degrees. The Technical Specification limit is 135 degrees and the administrative limit is 130 degrees. In order to ensure adequate margin between operating temperatures and specified limits, cooling coils for the drywell coolers were replaced. As a result, drywell temperatures now average less than 110 degrees which allows additional reaction time in the event of the failure of an operating drywell chiller skid.

There were several significant modifications that were implemented during this outage to increase plant safety and reliability. The implementation of the vessel water level modification was successfully performed and retested to meet regulatory concerns that were addressed in NRC Bulletin 93-03. NRC review confirmed that

the implementation was well planned with the appropriate levels of engineering and technical support for the design and implementation.

In September 1992, GGNS identified a potential for pressure locking to occur on low pressure ECCS injection valves. A plan was implemented that required plant personnel to periodically monitor valve temperatures to ensure conditions that would lead to pressure locking did not exist at the valve. During this outage, modifications were made to each low pressure injection valve that introduced a vent path to relieve pressure that may occur between the valve discs.

Fifteen main steam line safety relief valve accumulators were replaced. The original accumulators were made from carbon steel. The replacements were made of stainless steel. This increases the service life and reliability of the system. Prior to this outage, operations personnel had to manipulate twenty divisional handswitches to bypass the actuation logic for the individual SRVs during several maintenance surveillances. During this outage, an enhancement was made by placing one handswitch in the control logic to bypass the divisional actuation logic for the twenty SRVs. This modification decreases the potential for personnel error during the performance of these surveillances.

Modification are continually being performed to reduce the plant susceptibility to lightning induced transients. Currently, reactor power is decreased to approximately eighty percent during lightning storms. Progress has been made in reducing the effects of lightning on several susceptible components that were identified during past incidents.

- A lightning induced voltage spike was recorded on 8/2/93 across the input of a mocked up LPRM channel. Subsequent investigation identified noise shunting diodes across the input of the LPRM amplifier that have a forward recovery voltage of 5V. These diodes were replaced with diodes that will limit the forward recovery voltage to .8V.

- The inherent ground loop formed by the LPRM signal cables has been eliminated. This will eliminate the potential of ground loop currents from inducing noise onto the LPRM signal cables.

- An additional dissipation array system has been installed on the Control Building and the Unit 2 Containment to increase the dissipation capability of the existing site dissipation array system.

Technical/Process Enhancement

Self-Initiated Assessments

During this SALP period, an internal assessment of the Outage Scheduling Department core business was completed. This assessment documented all the processes during an outage planning cycle to produce the safest and most efficient schedule possible. The assessment identified 6 processes and 7 sub-processes used by the department to accomplish its core business. These processes were than evaluated. Process flow diagrams were developed, then customers and suppliers were interviewed. The processes were analyzed with the goal of identifying any methods that would improve the processes. The results were that fifty-eight improvements were identified with an estimated 800 manhours of time saved over a planning cycle.

Initiatives

During this planning cycle, processes have been put in place to help control and improve utilization of resources. They include:

- A method by which different departments can share resources, particularly for contingencies.
- Better control of scope through more detailed planning and establishment of criteria for evaluating emergent work in the outage.
- Creating a position, (Contractor Coordinator) who is responsible for this process.
- Setting goals for total number of contractors and contractor costs.
- Setting of work hours to 6 twelve hours days with Sunday off.

We foresee that this process of improving resource utilization will make refueling outages at Grand Gulf more efficient, less costly and safer.

The process used to integrate the outage schedule was taken to new heights thanks in part to earlier completion of the detailed schedule and also to an assessment performed on the process of integration. The initial schedule was completed approximately 8 months prior to the outage. This allowed the integration to take place in more detail, with the proper personnel and time available to make the schedule changes as necessary. Each system was covered in detail at least twice with the purpose of reviewing the associated work scope, available window, logic requirements, limiting conditions for operation, resources required and retests or surveillances. Attendees of these integration meetings included schedulers, an Operations Shift Supervisor, Discipline Coordinator (Electrical, Mechanical, and I&C), Plant Modification personnel, System Engineers and project or task Coordinators. This process has resulted

in numerous schedule changes improving shutdown safety and has resulted in RF06 being the shortest scheduled outage to date at Grand Gulf.

ORAM-TIP, a software program developed by EPRI and ERIN Engineering is used to perform a quantitative assessment of the shutdown risk involved in each outage. This software is manpower intensive and must be manually manipulated to reflect any changes to this schedule. Outage Scheduling developed the necessary interface software that will allow Project-2, the scheduling software to update the ORAM-TIP software electronically and on demand. This will provide an accessible, usable tool for outage management to assess what-if scenarios to help in the decision-making process.

PC-based software has been tested and selected for use during the next planning cycle. This will save computing time and dollars on the mainframe and allow more time for detailed scheduling, integration and provide a simple method for evaluating what-if scenarios.

Areas for Improvement

- Implement the PC-based software into the planning and scheduling cycle of RF07.

- Expand the role of the shutdown protection plan such that it will provide operations with a quick reference for determining the conditions of the outage at any time, and those systems and components that are available for use as methods of maintaining the key safety functions.

Functional Area Regulatory Summary

PLANT SUPPORT

(Radiological Controls, Security & Fitness For Duty, Emergency Preparedness, Fire Protection, Nuclear Safety & Regulatory Affairs, Quality Programs)

Previous SALP Ratings:	Previous SALP Recommendations:
05/88 - 09/89: 1 10/89 - 02/91: 1 02/91 - 08/92: 1	None

Event/Enforcement Comparison:

	Previous SALP (02/23/91 - 08/22/92)	Current SALP (08/23/92 - Present)
LERs	0	0
Violations*	2/2.5	2/1

*Level IV/Non-Cited Violations

Inspection History (other than Resident Inspector):

Inspection	Date	Notes*
92-23	12/10/92	W, S
92-24	11/12/92	V, S
92-25	11/12/92	NV, S
93-01	02/02/93	NV, S
93-05	04/23/93	NV
93-06	05/20/93	NV
93-08	06/24/93	NV, S
93-10	07/07/93	NV
93-13	Pending	NV

* NV - no violations or deviations
V - violation identified
S - strength identified
W - weakness identified

PLANT SUPPORT PERFORMANCE ANALYSIS

RADIOLOGICAL CONTROLS - CHEMISTRY

Liquid Radioactive Effluent

	1992	1993 Jan-Jun
Whole Body (mrem)	5.18 E-2	1.35 E-2
Organ (mrem)	1.95 E-1	2.28 E-2
Discharge Volume (gal)	7.29 E6	2.58 E6

Liquid effluent doses exhibited a downward trend in part due to reduced discharge volume. In addition, higher doses during the first half of 1992, due to three leaking fuel bundles, were offset by removal of the leaking fuel during RF05 reducing doses overall for 1992. The small leak which developed in late 1992 did not significantly affect doses. Radwaste discharge volume has been reduced by continuing efforts to reuse processed floor drain water. 1992 volume was reduced significantly compared to the previous SALP cycle.

Gaseous Radioactive Effluent

	1992	1993 Jan-Jun
Total Body (mrad)	2.9 E-2	2.33 E-3
Skin (mrad)	4.21 E-2	2.46 E-3
Organ (mrem)	3.56 E 0	1.62 E-2

1992 doses increased due to the leaking fuel. Removal of the leaking fuel significantly reduced doses during the second half of 1992.

Reactor Water Chemistry

	1992	1993 Jan-Jul
Avg. conductivity	0.151	0.147
Avg. sulfate(ppb)	2.6	2.4
Avg. chloride (ppb)	0.3	0.4

Reactor conductivity was elevated following startup from RF05 primarily due to resin intrusion and RWCU unavailability. Conductivity exhibited a downtrend for the remainder of 1992. Conductivity increased in June and July 1993 due to RWCU unavailability, elevated hotwell temperatures and a large amount of condensate demineralizer resin movement including the replacement of two beds. Resin fines from the condensate and rad waste systems are contributors to the elevated conductivity.

Strengths

- **Auxiliary System Chemical Control**
  Auxiliary steam chemical control was very good. Beginning in 1992 all systems to which corrosion inhibitor is added were tracked for out of specification low inhibitor concentration. Percentage time out of specification was 0.5% for 1992 and 0.1 for 1993 through July. The majority of the 1992 hours were associated with maintenance drains while recovering from RF05. 1993 hours are due to one maintenance drain and one valve leak.

- **Laboratory Cross Check Program**
  1992 cold chemistry and radiochemical inter-laboratory results were 100%. Year to date, 1993 results have been 99% acceptable for cold chemistry and 100% acceptable for radiochemistry.

- **Confirmatory Measurements Program**
  During the inspection from September 21-24, 1992, non-radiological water chemistry standards were provided by the inspector for analysis. Three samples each of 10 different analytes were analyzed. GGNS obtained "agreement" (within two standard deviations) on all but five samples; those five obtained "qualified agreement" (within three standard deviations). Radiological cross-check samples for the current SALP cycle have been received and are in the process of being analyzed.

- **Service and Cooling Water Chemistry Control**
  Implementation of an improved microbiological control program on Plant Service water has resulted in greatly reduced heat exchanger fouling. This improvement has not only reduced the number of manual heat exchanger cleanings, but has eliminated the need to perform high-risk steam jet air ejector swaps due to biological fouling of the intercondenser.

  Improvements in Circulating Water chemistry control has reduced cooling tower fill fouling. Full scale implementation of an alternate treatment scheme

was implemented during this SALP cycle with positive results. Condenser cleanliness factors continue to verify excellent chemistry control.

Standby Service Water chemistry and biological control continues to be very good. Use of new chemical injection lines has reduced chemical usage. Solids removal from the SSW basin using divers has reduced the contribution of solids in the system to flow restriction and corrosion.

- **On-Line Chemistry Monitoring**
  The acquisition of plant BOP computer terminals with trending functions has greatly improved the monitoring of important chemistry parameters. Use of the system allows rapid identification of system chemistry transients and aids in determination of the source of impurity ingress.

Technical /Process Enhancements

Reactor Water Chemistry Control
Sintered metal septa have been installed in the remaining two condensate cleanup system precoat filters. All three precoats should be available for startup following RF06 with the new septa minimizing resin leakage.

A task force has been formed to address RWCU performance problems including system reliability. Efforts so far have identified an electronic noise source in the system that was responsible for at least two filter losses and has been removed. Future efforts include determining the need for septa replacement, evaluating the valve maintenance program and reevaluating the precoat media.

The source of sulfate contamination in the reactor has been identified as resin fines coming from the radwaste and condensate systems. Removal of the fines from the radwaste stream is being investigated. Methods of reducing the fines in condensate are also being evaluated including a different resin cleaning system, and revising the resin purchase specification. An improved method of ultrasonically cleaning the resin has been implemented that produces visibly cleaner resin.

Optimum Water Chemistry/Source Term Reduction
A Quality Action Team has completed study and recommended initiatives to achieve long term exposure goals and ensure plant component integrity through improved chemistry control. A Project Team will coordinate the following activities:

- Iron Reduction: Reduction of feedwater iron through component replacement or improved filtration is being investigated. Lower corrosion product transport relates directly to lower shutdown dose rates and enables cost effective implementation of zinc injection.

- Zinc Injection: Installation of a zinc injection system is also being investigated. Zinc injection has been shown to reduce shutdown dose rates on piping and components in BWRs.

- Hydrogen Water Chemistry (HWC): A study of the susceptibility of the Grand Gulf reactor vessel internals to stress corrosion cracking is planned for 1994. Results of the study will lead to a decision on the possible implementation of HWC.

Service and Cooling Water Chemistry Control

A Task Force is continuing to investigate methods to eliminate cooling tower fill fouling. Potential improvements being investigated include chemical cleaning, oxidizing biocide treatment and fouling resistant fill material. Hydrogen peroxide cleaning of the tower fill will be implemented during RF06.

The PSW Task Force continues to investigate alternatives to the current service water chemical treatment program. A project will be completed by the end of 1993 to test the feasibility of a non-chemical treatment method for PSW microbiological control.

Areas for Improvement

Reactor Water Chemistry

Impurities introduced into reactor water from all sources must be identified and minimized in order to ensure long term component integrity and achieve dose reduction goals.

RADIOLOGICAL CONTROLS - HEALTH PHYSICS

Strengths

Average operating exposure has declined due to increased worker and management awareness:

- 1988 average monthly exposure 10.7R
- 1989 average monthly exposure 8.3R
- 1990 average monthly exposure 6.9R
- 1991 average monthly exposure 6.8R
- 1992 average monthly exposure 11.7R
- 1993 average monthly exposure 4.4R (to date, pre RF06)

Contamination areas are maintained low due to continued management attention, more aggressive decontamination efforts, and contamination area tracking.

- 12/86 6.3% of RCA (31,166 sq. ft.)
- 04/88 3.1% of RCA (19,125 sq. ft.)
- 09/89 1.6% of RCA (7,796 sq. ft.)
- 12/90 10.4% of RCA (51,532 sq. ft.)
- 02/91 3.4% of RCA (17,000 sq. ft.)
- 04/92 4.3% of RCA (21,938 sq. ft.)
- 08/93 3.0% of RCA (15,137 sq, ft.)

Personnel contaminations

	Year	# of Contaminations	Per 1000 RWP-hours
(Outage Year)	1987	156	2.201
(Non-Outage Year)	1988	80	2.369
(Outage Year)	1989	304	2.298
(Outage Year)	1990	144	0.228
(Non-Outage Year)	1991	56	0.167
(Outage Year)	1992	175	0.206
(Outage Year) (to date)	1993	32	0.169

Personnel contaminations are minimized through:

- Aggressive identification and cleanup of contaminated areas
- Use of whole body friskers at all RCA exits
- Use of a detailed, practical factors portion of Radworker training which requires trainees to simulate dressing for and exiting contaminated areas
- Increased supervisory and management attention to radiological work practices when performing plant tours
- Inclusion of "radiological work practices" as an evaluation criteria on annual HP personnel appraisals and in contracts as incentives

One senior health physicist attended SRO training class and participates in the work planning process providing the HP department with operationally oriented input in the weekly and down-power job planning meetings. As a result of preparatory training and site support of the NRRPT examination program, 21 of 29 technicians and supervisors in the field operations group, are certified by the National Registry of Radiation Protection Technologists.

Technical/Process Enhancements

Radiation Protection program initiatives during the assessment period were effective:

- Purchased the INDOS software system and conducted training for HP personnel to implement ICRP 30 internal dose calculations
- Purchased the HIS-20 software system for implementation of the revised 10CFR20 dosimetry record keeping requirements
- Began an aggressive program to reduce respirator use resulting in a 57% decrease in the number of respirators issued to date in 1993
- Installed fiber optic communication lines to improve the operational reliability of the real-time electronic dosimetry system
- Converted to a quarterly TLD processing period
- Constructed a holding area for radioactive material shipments awaiting final clearance for transport providing control during transition between packaging and final certification
- Established a segregation protocol for highly contaminated decon material to avoid increased contamination of PCs staged for laundering
- Chartered a Waste Reduction Quality Team to pursue initiatives in reducing the amount of radioactive, hazardous, and general industrial wastes generated at GGNS
- Developed an Integrated Exposure Reduction Action Plan that combines soure term reduction efforts with optimized water chemistry and traditional ALARA techniques to develop long range exposure reduction strategies
- Alternate materials for cobalt based alloys have been evaluated and qualified for GGNS; procurement documents are being revised so that no replacement parts with high cobalt alloys are ordered without extensive justification
- Upgraded the surrogate video tour system to allow in-house updates of component and plant layout via a digital imaging system
- Development of Hot Spot, Steam Leak, and Catch Basin tracking programs for more aggressive contamination control and improved down-power work planning

- Instituted an Industry Event file for HP Supervisor's use for enhanced RWP pre-job briefings

Collective dose decreased from 553 person-rem during the previous assessment period to 377 (estimate) person-rem this assessment period.

Radwaste discharge controls were effective in that no unmonitored radwaste discharges occurred during this SALP period.

The dosimetry processing laboratory completed NVLAP accreditation renewal with superior results.

Areas for Improvement

One violation was received in the Radiological Control area with a Severity Level IV violation of 49 CFR 172.604(a). This Department of Transportation regulation requires, in part, that a person who offers a hazardous material for transport must provide a 24-hour emergency response telephone number for use in the event of an emergency involving the material and that the telephone number must be monitored at all times by a person who is either knowledgeable of the hazardous material being shipped and has comprehensive emergency response and incident mitigation information for that material, or has immediate access to a person who possesses such knowledge or information.

Corrective steps which have been taken include:

- Control Room supervisory personnel have received Hazardous Material - Incident Commander level training per 29 CFR 1910.120(q)(6)(v)

- Radwaste Procedure 08-S-05-2 "Shipping Radioactive Material" rev. 13 requires a copy of the Emergency Response Instructions and pertinent information be provided to the Shift Superintendent whenever there is a shipment in transit

Although GGNS used tele-dosimetry devices in limited applications, at present only a limited capability exists for remote monitoring of workers. Remote health physics monitoring capabilities, along with robotics and the ability to accomplish maintenance, operations, and inspection tasks without actually entering (high) radiation areas remains a largely untapped source of exposure reduction. Source term reduction efforts will continue to be aggressively pursued, but some lower threshold of source term will inevitably remain. This will require that further exposure reduction be accomplished via other means. Remote monitoring/robotics offers considerable promise within existing technology.

SECURITY

Strengths

- Two members of the Wackenhut Security Force attended a Smith & Wesson Semi-Automatic Armorer Course at Sevierville, TN. The successful completion of the course by these individuals gives us the expertise to repair our 9MM weapons in-house.

- All Wackenhut Security Trainers and a Shift Captain attended a "Train the Trainer" course sponsored by the Wackenhut Corporation. This course provided an insight on new methods of presenting information and allowed for an exchange of training techniques utilized by other Wackenhut Instructors.

- Certified all unarmed officers to carry firearms. All officers on the force are now qualified to perform armed security functions.

- 42 security personnel successfully completed an On-the Job Trainer/Evaluator course, which was provided by the Nuclear Training Department. These personnel are now qualified to evaluate on-the-job-training (initial and requalification) of the security officers.

- All Wackenhut supervisors and field training officers attended a two day workshop titled "Quality Improvement Program". This workshop was provided by the Wackenhut Corporation.

- A Wackenhut employee attended a Computer Aided Lighting Analysis (CALA) applications course in Columbus OH. Completion of this course allowed us to purchase CALA software package for use to resolve lighting problems.

Technical/Process Enhancements

Process Improvements Initiated and Results

- Reorganized the Security Department which resulted in several position and title changes. The reorganization placed the security training program under the management of the Security Superintendent. This change has proven to be beneficial as it is more responsive to our training needs.

- Concurrent with the placement of the security training program under the Security Superintendent, the entire program was revamped to include:

  - A total rewrite of the Training and Qualification Plan to reflect crucial tasks actually performed by security officers. This reduced the amount of cumbersome paperwork previously required for initial qualification of security personnel,

  - A total rewrite of all Lesson Plans to delete obsolete material and incorporate topics not previously covered,

  - Creation of a computerized Security Training Records system to provide immediate access to records and reduce to a fraction the amount of paper and space previously required to maintain a "hard copy" system, and

  - Modification of the training schedule and format to obtain more efficient use of time and facilities. This resulted in a reduction of training related overtime.

- Renovated the weapons range, including the classroom so that all security training could be conducted at the range. Training materials, tables, chairs, projectors, film, etc. were purchased to provide the necessary tools for training. This enhanced the training environment tremendously.

- The Security Island was completely renovated. A new ceiling, improved lighting, new key card storage racks and cabinets were installed to improve customer service and provide better working conditions for Security personnel. A dais, with cabinets was erected and security equipment relocated to provide flexibility for the Access Control Supervisor.

- Renovated the Security Shift Specialists office, purchased and installed new furniture to provide a better working environment.

- Built a 3-dimensional scale model of Grand Gulf Nuclear Station to facilitate table top drills in preparation of the O.S.R.E.

- Completed work required by DCP 89/0034, Lighting Upgrade. The lighting upgrade provides a standardized lighting system which meets or exceeds the 0.2 foot candle requirement. Upgraded features included:

  - Replacement of eight masts with high sodium (HPS) luminaries,

  - Relocation of one mast from the exterior to the interior of the Protected Area, and

- Redirection of a ballpark light to provide increased lighting in the area of reactor and diesel generator buildings.

Self-Initiated Assessments Conducted

- The Security Department has a Security Compliance Program designed to conduct continuous audits/assessments of the security organization's performance and compliance with licensing commitments.

Initiatives

- GGNS Security Department continues to promote liaison with off-site agencies through an exchange of information programs designed to develop a better understanding of committed support for overall protection of the facility. We provided range facilities and assisted the Claiborne County Sheriff's Department and Auxiliary Deputies with weapons training and qualification.

- GGNS Security is sponsoring a joint Region II/IV conference and pistol match at Waterford III Nuclear Plant. The conferees will exchange information on security requirements and discuss differences between the two regions while the pistol teams compete for marksmanship awards.

- Aggressively pursue funding for the Vital Area Expansion Program and replacement of the outdated card reader system presently in existence at GGNS.

- Actively support the ALARA program in order to achieve both regulatory and ALARA goals during RFO6.

The onsite Corporate Security section (Investigations, Fitness for Duty, Medical) has implemented the following initiatives during this SALP period:

- Outage process flow was improved by remodeling and combining the medical and FFD into one central operation.

- Addition of two additional TDX drug testing machines reduced drug testing time to approximately 4 hour turn around time.

- Planning and training of personnel on outage processing has improved the flow process and reduced processing time by several hours.

- Index system was implemented to retrieve clearance, medical, training and Health Physics data on temporary workers to expedite in processing for routine and outages.

- New medical contract was implemented that resulted in an annual savings of approximately $46,000.00.

Areas for Improvement

- Safeguards Reportable Events - The reduction of Safeguards Reportable Events of nonsecure doors is on-going. The Vital Area Expansion Program scheduled for completion in 1994 will reduce vital areas by 33 percent and the number of monitored doors by 55 percent. Once completed, our problem doors will be become non-monitored doors. Also, this program has been amended to include the replacement of card readers which should contribute to the reduction of Safeguards Reportable Events.

EMERGENCY PREPAREDNESS

Strengths

- **Continuation of EP Training Review Group** - Incorporation of the Core Damage Assessment Procedure from a Chemistry Section Level Instruction to Emergency Plan Implementing Procedure. Also, incorporation of the Mesorem Dose Assessment Procedure into 10-S-01-12.

- **Emergency Notification Form** - Human factored the format to simplify data entry and enhance the accuracy of information.

- **Annual NRC-Graded Exercises** - The 1992 and 1993 NRC-Graded Exercises were characterized as fully successful and all objectives were met.

- **Continuation of Quarterly Site Drills** - In addition to the Annual Exercise, Quarterly Site Drills are conducted to activate and demonstrate all on-site emergency response capabilities. This allows participation by most emergency response organization personnel at least once per year.

- **Emergency Plan Maps** - All maps have been computerized which enhances consistency between different map scales.

- **Increase Sector Sign Location** - Additional sign locations have increased the number of sample area locations which enhances accuracy of sampling locations for the Offsite Monitoring Teams.

- **EP Staff Location** - The EP Staff move has increased visibility, accessibility and overall exposure to plant staff. This has resulted in much closer interface with plant staff and management.

Technical/Process Enhancements

Process Improvements Initiated and Results

- **EOF Activation** - During the 1992 NRC graded exercise, the EOF was activated within 45 minutes; well within the 60 minute requirement. During the 1993 NRC graded exercise, the EOF was activated within 46 minutes. All periodic drills have demonstrated EOF activations well within the 60 minute requirement.

- **Backup Emergency Operations Facility (BEOF)** - During the 1992 NRC graded exercise, the activation of the BEOF was successfully demonstrated. The BEOF is located approximately 20 miles from GGNS at Baxter Wilson Steam Electric Station (BWSES) near Vicksburg, MS. The relocation and activation of the BEOF was completed in 1 hour and 5 minutes.

- **Relocation of the Emergency Information Center (EIC)** - The EIC was relocated from Jackson to the Media Center near Port Gibson in June, 1993. This move enhances the timely resolution of rumors that may develop during an emergency by locating the EIC in closer proximity to the company spokesperson.

- **News Media Center Upgrade** - Remodeled the center by adding carpet and noise reducing furniture. Established the company spokesperson as the single point of contact. Moved the Media Monitor to the ENMC from Jackson. Provided Spokesperson Specialized Training. Developed a computerized news bulletin to enhance the efficiency and timeliness of news bulletin development.

- **Addition of Offsite Monitoring Team (OMT) Radio Frequency** - Added a sole use (dedicated) radio frequency for OMT use during an emergency. This eliminates the distinct possibility of interference on regular plant radio channels during emergency conditions.

Self-Initiated Assessments

- **Annual Exercise Critique and Quarterly Site Drill Critique** - Areas identified as area of concern are related to Offsite Monitoring Team (OMT) personnel; resulting in addition of Health Physics trained personnel to OMT. They replaced less experienced Labor Decon personnel.

Initiatives

- **Drill/Exercise Simulation Reduction** - Although great strides have been made in this area, additional work is necessary to eliminate all simulation (except where practical) during drills and exercises.

- **TSC Arrangement** - Modify TSC physical layout to enhance the efficiency of TSC functions.

Areas for Improvement

- **Timely Notification of Offsite Agencies** - Need to evaluate the notification process in order to reduce time taken to notify state and local agencies.

FIRE PROTECTION

Strengths

- The fire protection group is knowledgeable and effective. For the current evaluation period, plant staff's two fire protection personnel have more than 40 years of combined fire protection experience. The fire brigade consists of only operations personnel. The Shift Fire Chief and the Fire Brigade Leader are SRO license holders.

- Resolution of fire protection issues is quick and efficient and does not compromise the program. Questions or conflicts from the other groups (maintenance, health physics, contractors, etc.) are addressed and resolved in a timely manner because fire protection is integrated into essentially every organization at Grand Gulf.

- There have been no fires reported during this SALP period.

Areas for Improvement

Continued enhancement of the overall fire protection program.

- Continue to review the fire brigade training program to better address Appendix R exemption areas. Include and address specific safe shut-down features in fire training modules. Schedule and perform fire drills in specific exemption areas.

- Continue to assess fire prevention controls to enhance procedural effectiveness in sensitive areas. Determine more effective methods of coordinating transient combustibles, hot work activities, and required safe shut-down equipment.

QUALITY PROGRAMS

Strengths

- The Quality Programs Department is staffed with a technically knowledgeable and diverse cross section of personnel. This diverse experience includes Health Physics, Chemistry, Operations, Civil, Welding, Maintenance, Design Engineering, Quality Assurance, Quality Control, Nondestructive Testing, Materials, Engineering, Quality Engineering, and Mechanical Engineering.

- Quality Programs is a member of the Region IV Technical Specialist Exchange Program supporting audits. We support requests from other utility members by providing personnel with expertise in the area requested. Plant Management is supportive of this exchange and has provided participants in several exchanges in 1993. Our Audit Group obtains technical specialists from Region IV members, Entergy Operations plants, and from other outside sources. In 1993, GGNS participated in ten exchanges. Technical Specialists have participated in security, fitness for duty, emergency preparedness, fire protection, software control, and design audits. We plan to continue using this valuable resource to supplement audits.

- Forty-two standard audit plans have been developed. These plans incorporate lessons learned and minimize unnecessary overlap between audit activities.

- A continued emphasis on resolving deficiencies in a timely manner.

  - An "annunciation windows" concept has been initiated for Quality Deficiency Reports.

    - Emphasizes timely disposition and completion of corrective action

    - De-emphasizes the number of deficiencies assigned to a department

- Quality Programs participates in the site Tactical Planning Nucleus Team which develops methods for GGNS process improvements.

- Quality Programs has established a department improvement team that identifies potential process improvements, both internal and external to the department.

- Receipt inspectors communicate directly with vendors when paper problems are found. This allows the people most familiar with the problem to deal with each other and reduces the time material is held up pending problem resolution.

- Inspection equipment is shared between Entergy facilities. This practice provides a wider range of state-of-the-art equipment while reducing overall costs.

- Quality Programs continues to perform activity monitoring in addition to witness/hold QC points. This process has been expanded to include activities in potential problem areas which have no witness/hold point assignments.

- Backshift monitoring and audits continue to be conducted. This provides management with an insight into activities occurring after normal working hours.

- Specialized NDE resources are shared within the Company. This reduces contract costs and keeps Entergy personnel more proficient in performing specialized tasks.

- Implemented new Construction Materials Testing program with in-house inspection personnel. This reduces dependence on contract support.

- Deficiencies are evaluated using current "real-time" data. Adverse results are promptly reported to management so that attention can be directed to potential weak areas.

Management Oversight

- Routine weekly focus meetings with Maintenance management and Quality Programs Inspection Group are held to provide a forum for exchange of information and help establish priorities for maintenance monitoring and inspection activities.

- Management meets regularly to review MNCRs greater than 1 year old to assure appropriate resources are being applied to timely resolution.

Technical/Process Enhancements

Process Improvements Initiated and Results

- Trend reporting has been centralized as a result of recommendations made by the Scram Reduction Task Force. The objective is to trend selected data points, such as Condition Identifiers, Work Orders, Deficiency Reports, etc. to better correlate that data to Trip Critical and Trip Sensitive systems and components.

- Program violations are now trended to provide management with indicators of the effectiveness and weaknesses of the various programs.

- To support the continuing emphasis on resolving deficiencies in a timely manner, several improvements have been initiated:

  - An "annunciator windows" concept has been initiated for Quality Deficiency Reports. The emphasis of this concept is on timely completion of dispositions and corrective actions by departments instead of counting numbers of deficiencies assigned to each department.

  - The annunciator windows concept will be implemented for Material Nonconformance Reports (MNCR) and Deficient Material Reports in 1994.

  - Management meets regularly to review MNCRs that are greater than one year old to ensure appropriate use of resources to effect timely resolution.

- Quality Programs is a participating member of a Company Key Process Team chartered to review corrective action processes used at Entergy's nuclear sites. The goal is to identify company strengths and areas for process improvements that may be shared between sites. (Corrective Action/Root Cause Analysis Key Process Team)

- Quality Programs participated in a task force effort to evaluate GGNS's excessive scrams Three major changes as a result are:

  - Established a three-man Root Cause Analysis Group.

  - Established a trip-critical concept to help prioritize equipment problems.

  - Established a centralized trending process.

- Quality Programs has established a department tactical planning team that identifies potential process improvements both internal and external to the department.

- Quality Programs continues to perform activity monitorings in addition to witness/hold QC points. This process has been expanded to include activities in potential problem areas which have no witness/hold point assignments.

- Implemented new Construction Material Testing program with in-house inspection personnel. This eliminates dependence on contract support.

- Quality Programs is currently pursuing the development of a performance based audit scheduling process. Audits will be scheduled based on recognized need to audit versus the current process of meeting established frequencies.

- The NDE contractor screening process has been standardized between Entergy facilities. This provides more consistency in contractor certifications and expedites the movement of contract support between facilities during outage years.

Self-Initiated Assessments Conducted

- During this SALP period, the Quality Programs Department was requested to assist various departments with independent assessments of the effectiveness and overall implementation of plant programs. These audits/assessments were accomplished by performing field observations, interviews with cognizant personnel, and by reviewing plant records and procedures. Identified below is a sample of the areas assessed:

  - Assessment of Operator Rounds - This assessment was performed at the request of Operations management. The assessment verified operator entry into required areas.

  - Assessment of INPO Guidelines Implementation - This assessment was requested by Plant management to assess effective compliance to INPO guidelines on Shift Supervisor training, qualification, and professional development.

  - Investigate Allegations and Employee Quality Concerns - Quality Programs has a documented process for investigating and resolving allegations and employee quality concerns. This provides an avenue for problem resolution where anonymity is desired.

- A Safety System Functional Assessment (SSFA) was performed on the Reactor Core Isolation Cooling and Low Pressure Core Spray Systems. SSFAs are vertical slice system evaluations similar to NRC Safety System

Functional Inspections. Grand Gulf has performed previous SSFAs on the Standby Liquid Control, Fuel Pool Cooling and Cleanup, and High Pressure Core Spray.

- Joint Utility Management Audits are performed annually on Quality programs' activities. These audits are purely performance based and staffed by highly experienced Quality Assurance management personnel from other utilities.

- Company Headquarters Quality Assurance audits are performed annually on Quality Programs' activities. These audits evaluate programmatic compliance and effective implementation of procedures and instructions.

Initiatives

- Receipt inspectors communicate directly with vendors when paper problems are found. This allows people most familiar with the problem to deal with each other and reduce the time material is held up pending problem resolution.

- Specialized NDE resources are shared within the Company. This reduces contract costs and keeps Entergy personnel more proficient in performing specialized tasks.

- Implemented new CMT program with in-house inspection personnel. This reduces cost and dependence on contract support.

- Quality Programs is developing justification to obtain relief from audits which provide little to no payback, i.e., have no safety or reliability significance and do not contribute to process improvement. This will permit more performance based activities in problem areas.

- Quality Programs is currently pursuing the development of a performance based audit scheduling process. Audits will be scheduled based on recognized need to audit versus the current process of meeting established frequencies.

- The trending program has expanded trending techniques to include trends sorted by procedures and key work phrases.

Areas for Improvement

- Improvements in the Trending Process are being considered to enhance process performance data collection and analysis.

- Quality Programs will continue to on-the-job train and diversify personnel to strengthen the technical knowledge base of our staff.

NUCLEAR SAFETY & REGULATORY AFFAIRS

Strengths

- Outage Risk Assessment

  - The NS&RA department conducts risk assessments of outage schedules and recommends schedule changes or contingency plans to ensure that an acceptable degree of defense-in-depth and risk associated with the outage is established. The assessments are performed using the shutdown management guidelines of NUMARC 91-06 as well as other risk assessment tools.

  - During the present SALP assessment period, NS&RA installed and evaluated the Outage Risk Assessment and Management - Technical Integration Package (ORAM-TIP) software developed by EPRI. This software provides a tool for assessing relative defense-in-depth as well as a quantitative assessment of core damage risk and reactor coolant boiling risk. The ORAM-TIP software at GGNS allows outage schedule data, such as key plant activities and equipment availabilities, to be downloaded directly from the scheduling software. This feature significantly reduces the turnaround time for assessments.

  - In addition to pre-outage assessments, NS&RA personnel provided 24 hour risk assessment support during the early higher risk periods of RF06. A computer, on a real time basis, with the ORAM-TIP program was installed in the outage management center to assist in the assessments of schedule changes.

- Improved 10CFR50.59 reviews and support

  - Revised the safety evaluation procedure to incorporate a requirement to transmit appropriate safety evaluations to Plant Licensing to ensure the safety evaluation is reviewed for correct implementation.

  - Improved the efficiency of the safety evaluation tracking process by reducing the number of tracking systems from three to one. This also serves to simplify the certification of the annual report by consolidating all pertinent information in one location.

- Began distributing a safety evaluation program and procedures. Also, issues and industry events concerning 10CFR50.59 are included in the newsletter.

- Support for Technical Specifications

  - The increased and candid communication with NRC Staff on regulatory issues continues. Technical Specification change requests continue to be well-developed and clearly-written, requiring few requests for additional information from the NRC. This allows TS changes to be approved in a timely manner. The GGNS Project Manager and the GGNS staff communicate regularly and work together to resolve issues and to share information and resources on various projects. We believe this relationship will continue.

  - The Grand Gulf improved Technical Specification submitted was docketed in October, 1993. This was the culmination of a significant industry/NRC effort expected to pay dividends in increased safety and reduced operational burden.

- Internal Assessments

  The independent safety engineering function has refocused its efforts to this SALP period on safety - and risk - significant topics. Typical assessments include:

  - IPE/PRA review - Reviewed process and methodology used in assessing risk at GGNS. This assessment provided feedback to Design Engineering as well as understanding to the Safety Assessment group.

  - Erosion/Corrosion - Review of Design Engineering program for monitoring erosion/corrosion. Made recommendations to improve interface between Operations and Design Engineering.

  - Suppression Pool Foreign Material - A review of GGNS status in relationship to the Barsebck event. Used as a starting point for the evaluation of the Perry event.

  - RF06 Safety Assessment - This is the second assessment done on an outage schedule. Improvements were made in the assessment process to reduce the time required for performance as well as recommendations to reduce risk during the outage.

- Regulatory Burden Reduction

  Grand Gulf has taken a lead industry role in the NRC's Cost Beneficial Licensing Actions pilot program. Through innovative, technically strong proposals submitted under the CBLA program, we expect to receive significant safety and cost benefit in a broad range of areas such as Appendix B, Appendix J, Security and our ISI/IST programs.

Technical/Process Enhancement

- Significant work was done on the report data base. The report data base was cleaned up by reviewing all recommendations and closing completed items or reissuing old recommendations. Additionally, the data base was consolidated into one format to allow tracking and trending of reports and recommendations.

- The selection criteria for assessments topics has also been redone. Guidelines containing data bases suitable for review as well as criteria, such as repeat events, safety significance, risk significance, etc., have been established to aid in the appropriate and timely selection of topics.

Areas for Improvement

- Timeliness of recommendations still may be improved. While Safety Assessment has improved their working relationship with other groups, both internal and external, continued effort needs to be made to ensure recommendations are completed in a reasonable time in all cases.

SIGNIFICANT NRC INSPECTION REPORT AND COMMENTS

From August 23, 1992 until present, GGNS has received 29 NRC inspections resulting in 12 Non-Cited Violations, 10 level IVs and 1 pending violations. During this SALP period, several areas of strengths and areas needing improvements were acknowledged and summarized in NRC Inspection Reports.

Strengths

- **92-19** **Engineering Modification Inspection** - 09/04/92 Conducted 07/27 thru 31

  - The engineering staff appears knowledgeable and aggressive in resolving technical issues.

  - GGNS takes initiative in identifying and implementing modifications that will contribute to reactor reliability and safe operation.

  - Management uses good reasoning in determining the priorities for plant design changes and modification in the budgeting of expenditures.

- **92-20** **Systematic Assessment of Licensee Performance** - 11/05/92 Evaluated 02/24/91 - 08/22/92. 6 (1 rating) and 1 (2 rating). Overall the performance of Grand Gulf was superior.

- **92-23** **Emergency Preparedness Exercise** - 12/10/92 Conducted 10/19 thru 23/92.

  - In the OSC, Health Physics controls and support of teams in the field were a strength especially during the changing radiological conditions described in the exercise scenario. Radiation Protection Manager (RPM) was proactive in directing and providing guidance to the HP staff in the ERO. The RPM exercised strong command and control of the required radiological monitoring and protection functions to include the dispatching of Field Radiation Monitoring Teams and the coordination of HP activities required to support maintenance activities.

- In the area of Emergency Communications, players did a good job of transmitting drill messages and identifying the messages as drill messages.

- The Simulator Control Room staff exhibited a very professional attitude towards operating the simulator as the plant. Overall, operations personnel adequately assessed the problems faced during the exercise and their responses were timely and appropriate. Operators were very aggressive in pursuing equipment repairs and restorations, and supervisors maintained a strong command and control of the plant. EOPs were implemented in a timely manner. Operations Staff worked well as a team. Shift Superintendent demonstrated excellent command and control throughout the exercise.

- Command and control in the SCR, EOF and BEOF were excellent.

- The Offsite Emergency Coordinator ordered relocation of the EOF to the BEOF and transferred EOF emergency organization responsibilities.

• 92-24 **Organization of Chemistry Department and Radwaste Shipping Unit** - 11/12/92 Conducted 9/21 thru 09/24/92

- Radiological Controls has established a good Count Room and Chemistry Laboratory analysis and radiological measurements program. The programs had adequate technical personnel and a thorough QA program.

- Proficiency was demonstrated in the calibration and maintenance of effluent monitoring instrumentation in the Laboratory and Count Room.

- Procedures 06-CH-1D17-A-0021 and 06-CH-1321-V-0004 were reviewed by inspector. The procedure is performed once per year for each of the monitors of this type. The technicians were competent in the execution of this difficult calibration and were proficient in all aspects involved in the procedure. The inspector concluded the monitor calibration was good allowing even difficult calibrations to be performed routinely.

- **92-25** **Inspection of the Radiation Protection Program** - 11/12/92 Conducted 10/05 thru 10/09/92

  - Audits reviewed were found to be of good depth and the noncompliances resolved in a timely manner.

  - GGNS aggressive in posting, identifying, documenting and resolving problems and area needing improvement in Radiological Controls.
  - GGNS' system of radiation work permits was one of the most comprehensive and well developed regarding special instructions for job performance. To improve the system, GGNS developed a data bank or reverence file with industry events or Operating Experience Reports (OER).

  - Good practices include quantitative fit testing and bar-coding of mask sizes to prevent an individual from being issued a mask of the wrong size.

  - Inspector considered efforts to reduce overall personnel dose as a strength to the radiological controls program.

- **93-01** **Security Inspection** - 02/02/93 Conducted 01/11 thru 01/15/93

  The inspector found the following areas more than adequate:

  - Personnel access control

  - Protected area upgrade program

  - Duty performance of security personnel

- **93-04** **Routine Inspection** - 05/07/93 Conducted 03/14 thru 04/1793

  - Maintenance work order backlog has been reduced significantly.

- **93-08** **Occupational Radiation Safety** - 06/24/93 Conducted 05/24 thru 05/28/93

  - Radiation Control technician and GET programs were conducted in accordance with approved procedures and the RC technician staff appeared knowledgeable and well trained.

- Continual effective implementation of internal and external exposure program with all exposures less than 10CFR Part 20 limits.

- Audit and appraisal program was very effective in identifying potential issues and was considered a program strength.

- **93-11** **Monthly Inspection** - 08/16/93 Conducted 06/20 thru 07/11

  - Early notification that required maintenance and testing which would place the plant in a technical specification maintenance action statement which would result in a required shutdown demonstrated good management practice.

  - Inspector had several good comments concerning Maintenance and Operations emergent issues.

  - Inspector commented that the maintenance on Div. II EDG output breaker was well done and the workers were knowledgeable. Also, good interchange between procedure readers and actual workers.

- **93-13** **Emergency Preparedness Exercise** - 09/24/93 Conducted 08/24 thru 08/27/93

  - Exercise strength included the proactive response of the Technical Support Center staff and the Dose Assessment functional area of the Emergency Response Facility.

- **93-14** **Monthly Resident Inspection** - 10/8/93 Conducted 08/15 thru 09/18/93

  - Inspector was very impressed with the knowledge level of the I & C technicians performing the survillances.

- **93-301** **Nuclear Training Examination Inspection** - 10/26/93 Conducted 9/7 thru 10/1/93

  - The simulator support staff worked around the clock to troubleshoot and repair the simualator while keeping it functioning enough to support JPMs on Tuesday and

Wednesday. The examiners identified the dedication and technical knowledge of the simulator support as a strength.

Weaknesses/Areas for Improvement

- **92-22** **Monthly Routine Inspection** - 10/27/92 Conducted 08/23/92 thru 09/30/92

  - Weakness noticed in 06-EL-1E12-M-002, Rev. 26 procedure on Containment Spray Time Delay Calibration and Functional Test.

- **92-23** **Emergency Preparedness Exercise** - 12/10/92 Conducted 10/19 thru 10/23/92

  - Communications between the TSC and the OSC and SCR were weak. The sound powered phones between the facilities operated intermittently during the exercise.

  - Weakness in simulation resulting in insufficient information being reported to the Shift Superintendent who then properly classifed, with the information provided, the emergency as an Unusual Event. As a result, the Lead Controller in the Control Room had to provide a contingency message to the Shift Superintendent to classify the event as an Alert, which noticeably disturbed the Shift Superintendent's train of thought for several minutes thereafter.

  - 93-23-01 Exercise weakness demonstrated failure to provide clear and accurate Emergency Notification messages to the State and local agencies.

- **93-03** **Monthly Resident Inspection** - 03/23/93 Conducted 02/14 thru 03/13/93.

  - Weaknesses associated with work control practices on radiation monitors were observed.

- **93-04** **Routine Inspection** - 05/07/93 Conducted 03/14 thru 04/1793

  - Failure to follow procedures during control rod movements

  - Failure to maintain a Security log

- 4-Hour 50.72 notification completed 1 hour late

- **93-11** **Monthly Inspection** - 08/16/93 Conducted 06/20 thru 07/11/93

  - Failure to follow proper control rod movement during Scram Time Testing

- **93-13** **Emergency Preparedness Exercise** - 09/24/93 Conducted 08/23 thru 08/27/93.

  - Failure to provide clear and accurate Emergency Notification messages to transmit to the State and local agencies remain to be an area needing improvement. (Formerly identified as Exercise Weakness 92-23-01)

  - Offsite notifications and a clarification needed for the Notification of Unusual Event (NOUE) emergency action level for loss of meteorological instrumentation.

- **93-22** **Radioactive Waste Processing and Disposal** - 12/12/93 Conducted 11/22 thru 11/23/93

  - Failure to comply with state and disposal site requirements for free standing liquid in resins shipped to the disposal site.

- **93-301** **Nuclear Training Examination Inspection** - 10/26/93 Conducted 9/7 thru 10/1/93

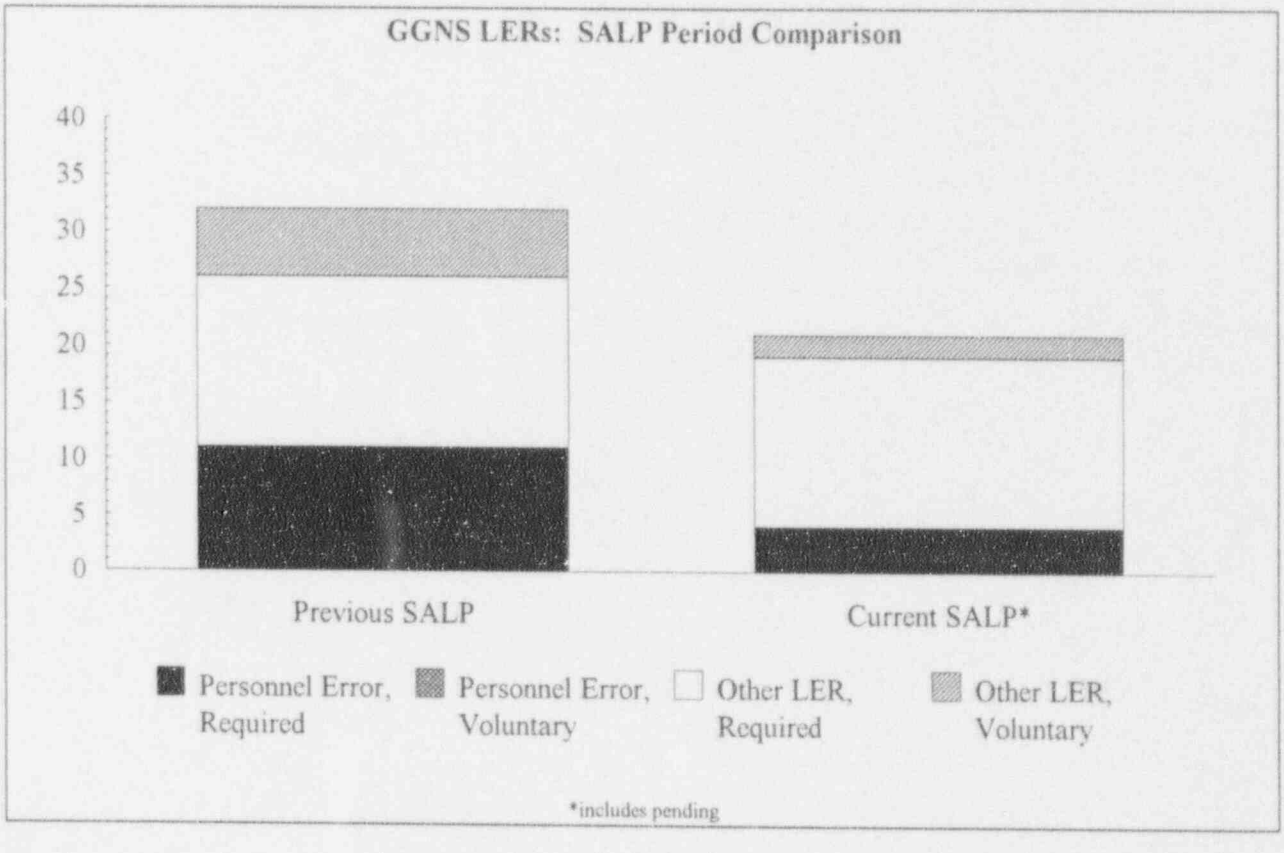
  - Simulator limitations significantly restricted examiners during examination preparation and affected the content of the operating portion of the examinations.

LERs: SALP Period Comparison By Functional Area		
Functional Area	Previous SALP Period (18 Months - 02/23/91 to 8/22/92)	Current SALP Period (16 Months - 8/23/92 through December)
Operations*	8	7
Plant Support**	0	0
Maintenance	14	8
Engineering	8	5
Other	2	1
Total(Includes Pending)	**32**	**21**

* Operations includes Plant Operations and Safety Assessment/Quality Verification areas from former reports

**Plant Support includes Security, Emergency Preparedness and Radiological Control areas from former reports

SALP Period Comparison By LER Cause		
CAUSE	Previous SALP Period (18 Months - 02/23/91 to 8/22/92)	Current SALP Period (16 Months - 8/23/92 through December)
Personnel Error	11	4
Maintenance Problem	0	0
Design	15	3
Construction/Installation	2	0
Equipment Failure	2	8
Other	2	6
Total(Includes Pending)	**32**	**21**



Violations: SALP Period Comparison By Functional Area				
	Previous SALP Period (18 Months - 02/23/91 to 8/22/92)		Current SALP Period (16 Months - 8/23/92 through December)	
Functional Area*	NCV	Level IV	NCV	Level IV
Operations**	1	8	8.	6
Plant Support***	2	2.5	1	2
Maintenance	1	4.5	1	1
Engineering		2	2	2
Other				
Total (includes pending)	**4**	**17**	**12**	**11**

* No Level I, II, or III violations

** Operations includes Plant Operations and Safety Assessment/Quality Verification areas from former reports

***Plant Support includes Security, Emergency Preparedness and Radiological Control areas from former reports