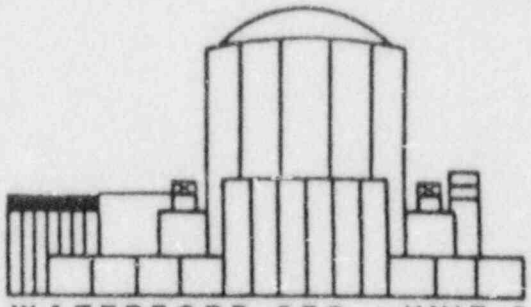
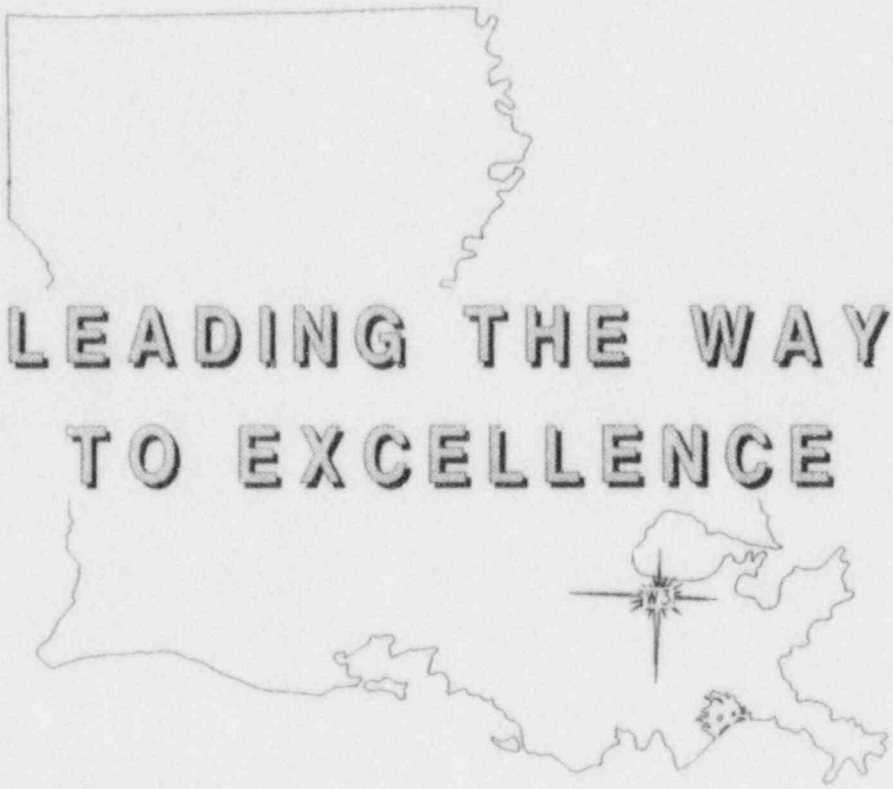
LOUISIANA

MIDDLE SOUTH
UTILITIES SYSTEM



WATERFORD SES - UNIT 3

# NUCLEAR OPERATIONS



## LEADING THE WAY TO EXCELLENCE

WATERFORD STEAM ELECTRIC STATION - UNIT No. 3

# 1987 SALP PROGRESS REPORT

UPDATED

JUNE 1988

Attachment to:
W3P88-1360

Louisiana Power & Light Company

WATERFORD STEAM ELECTRIC STATION - UNIT No. 3

# 1987 SALP PROGRESS REPORT

## UPDATED

## JUNE 1988

LOUISIANA POWER & LIGHT COMPANY
WATERFORD 3 1987 SALP PROGRESS REPORT
(UPDATED)

TABLE OF CONTENTS



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LOUISIANA POWER & LIGHT COMPANY
WATERFORD 3 1987 SALP PROGRESS REPORT
(UPDATED)

## INTRODUCTION

The 1987 SALP rating period saw Waterford 3 complete its transition from a startup oriented organization to an operations based organization. A number of positive changes were implemented over the past year directed towards building and maintaining a cohesive Nuclear Operations Group founded on operational excellence. In fact, the watchword adopted by our new Senior Vice President for Nuclear Operations during his first full year at Waterford 3 has been "excellence" - excellence in all aspects of the nuclear organization.

Our approach towards excellence in operations is perhaps best exemplified by plant performance. Waterford 3 Senior Management set a goal of achieving a capacity factor of at least 75% for 1987. This goal was particularly ambitious in that a refueling outage continued into February 1987. We exceeded our goal with a capacity factor of 78.9% for 1987. As a direct result, for the two years 1986-1987, Waterford 3 safely generated a total of 15,482,960 megawatt-hours of electricity - the top US nuclear generator for this period.

Excellence in regulatory affairs was a key goal last year and will remain one for the future. During the latter part of 1987, Waterford 3 management instituted a series of actions to assure that the information interchange between plant staff and the Resident Inspectors would be enhanced. These actions included instructing the supervisor for the Event Analysis & Reporting unit to provide a briefing for the Resident Inspectors following any significant events at Waterford and to provide periodic briefings on Potential Reportable Events and Licensee Event Reports. The expansion of the Event Analysis and Reporting organization in size and responsibility under the Vice President-Nuclear's Human Error Reduction Program is also expected to have a positive impact on the regulatory interface. The Plant Manager has instructed key plant personnel to provide the Residents with regular briefings on activities within their departments as well as discussing potentially significant events or conditions. The Plant Manager has also renewed efforts to discuss issues involving plant operation more frequently with the Resident Inspectors as well as to increase the frequency of communications with Regional Management. In fact, the NRC Resident Inspector periodically attends the plant Plan-of-the-Day meeting and is invited to address the staff assembled on any area of interest. The Licensing organization has continued its practice of frequent and detailed communications with NRR personnel. In the time these actions have been in effect, the communication process has improved considerably. We will continue to monitor this situation to assure the Resident Inspectors receive the information they require in a timely manner.

Waterford 3 has taken actions to improve radiation monitoring systems reliability. These actions include personnel enhancement in the affected areas, training enhancement, equipment replacement in some cases, analysis of failure history and trends on radiation monitors, providing solutions for recurring problems, and development of a tracking system for the radiation monitor system database and a basis for the numbers contained in the database.

Waterford 3 has continued actions to reduce the level of airborne radioactivity in the Reactor Auxiliary Building and intends to maintain a high visibility and priority for the effort to minimize both liquid and gaseous releases.

In late 1987 the Nuclear Operations organization within LP&L underwent an organizational restructuring to increase the efficiency of operation. In general, the restructuring includes the creation of a new position, entitled Nuclear Operations Management Systems Manager (this department will be responsible in part for Nuclear Operations management information systems), which reports to the Vice President-Nuclear; the Nuclear Safety & Regulatory Affairs Department now reports directly to the Senior Vice President-Nuclear Operations; the elevation of the Event Analysis and Reporting Engineer to the Event Analysis, Reporting, and Response Superintendent, who now reports to the Plant Manager-Nuclear rather than the Assistant Plant Manager-Technical Services (this change will also add additional responsibilities to this group such as trending, root cause analysis, and Part 21 evaluations); and, the repositioning of the Nuclear Operations Construction Manager, who now reports to the Nuclear Operations Engineering Manager rather than the Vice President-Nuclear.

Perhaps more important than organizational restructuring was the management rotation implemented at the same time. In order to broaden the experience base in Nuclear Operations, the majority of managers immediately below the senior level, including those reporting to the plant manager, were rotated into comparable positions of responsibility.

Two significant achievements in Nuclear Operations Training occurred in December 1987 with the accreditation of Waterford 3's 10 basic training courses and granting of full membership in the National Academy of Nuclear Training.

In January 1988, an INPO evaluation was completed with an overall INPO rating of "2". INPO identified 15 findings, 6 strengths, and 3 good practices. This compares to an overall rating of "3" with 25 findings, 3 strengths, and 3 good practices in the previous evaluation conducted in February 1987. In commenting on the evaluation, the INPO team leader was favorably impressed by the following: strong management assessment programs have contributed to improved personnel performance, housekeeping, and material condition; the station continued to have high availability and good plant thermal performance during the past year; efforts to reduce contaminated areas and radiation exposure are noteworthy; and, station personnel exhibit a strong desire to improve and achieve excellence in operation.

Although not a specific area of NRC SALP review, we feel that the frequency of lost time accidents is an important indicator of employee morale and employee dedication to achieving operational excellence. In this regard, we are proud to report that since May 1985 to date, Waterford 3 maintains a "zero" lost time accident rate. Over five and a half million hours have been worked during this period without a lost time accident.

The remainder of this report reviews, in detail, the accomplishments of Waterford 3 personnel for each SALP functional area since the previous SALP evaluation period ended on January 31, 1987. Selected highlights are summarized below:

A. Plant Operations

A Management Observation Program was implemented to improve the monitoring of routine activities by dividing responsibilities for touring and observing plant work amongst responsible plant supervisors and managers.

Key plant personnel have been assigned as Area Coordinators within the plant to improve the material condition of the plant.

An Operations Writers Guide based on human factors expertise has been developed and is being utilized to assist in the technical and human factors upgrade of normal and off-normal operating procedures.

A marked reduction in erroneous, misleading or unnecessary control room annunciations continued through the SALP review period as a result of the Annunciator Reduction Program.

Temporary alterations have been significantly reduced.

The role of the Shift Technical Advisor in support of emergency assessment has been re-emphasized, reducing the STA's administrative workload.

As part of the Human Error Reduction Program under the cognizance of the Vice President-Nuclear, the Event Analysis and Reporting organization is being upgraded and expanded to provide additional emphasis on root cause determination, trending of conditions adverse to quality and NRC communications.

Significant procedural and hardware improvements have been, or will shortly be, implemented to increase operator capability and flexibility in dealing with plant upsets during partially drained RCS conditions.

As part of the trip reduction effort, plant modifications have been implemented to further reduce the frequency of plant trips.

Due to concerted efforts directed towards retention of experienced operators, there was only one operator resignation since 1985.

B. Radiological Controls

Significant management and technical attention has been, and continues to be, directed towards reduction of radioactive leakage in liquid and gaseous systems.

Senior Health Physics staffing has been increased with the addition of experienced personnel chartered with direct oversight of radiation protection programs and additional in-plant presence.

A number of procedural and hardware changes have been implemented to minimize the potential for contaminated personnel to leave the site.

A hot particle control program has been implemented that includes increased surveys, specialized survey equipment, and placement of personnel contamination monitors inside the RCA.

LP&L representatives continued their leading role in the Central Interstate Low-Level Radioactive Waste Compact.

Extensive efforts have resulted in the reduction of contaminated areas in the plant from 22,800 square feet to less than 5,000 square feet - less than 5% of the total radiation controlled area outside the Reactor Containment Building.

C. Maintenance

The Station Information Management System (SIMS), a comprehensive computerized data base used in all aspects of corrective/preventive maintenance, surveillance tasks, inservice inspections, etc., became fully operational.

The Material Management Information System (MMIS), which includes approximately 70,000 material items, was implemented for Waterford 3 in late 1987 to automate and substantially enhance the information control for procurement and material functions.

Strong emphasis has been placed on SIMS and MMIS implementation. Responsibility for these management systems now lies with the newly formed Nuclear Operations Management Systems Department, which reports directly to the Vice President-Nuclear. Previously, these areas fell under the Nuclear Operations Support & Assessment group, reporting directly to the same officer. Both major management information systems were implemented during 1987.

The corrective maintenance backlog was reduced from 685 items in December 1986 to 461 items in June 1988.

The preventive maintenance backlog has been reduced from over 1000 tasks to less than 320.

Repetitive maintenance tasks were reduced from 20,700 in January 1987 to 15,259 by June 1988.

Containment work conditions were substantially improved by the installation of a containment air conditioning system for the refueling outage.

NRC questions and concerns about the Emergency Diesel Generators were resolved.

D. Surveillance

A task force has been created to evaluate and provide solutions to problems associated with the radiation monitoring system.

Five process radiation monitors were replaced during the second refueling outage with models of proven reliability.

The Waste Gas Holdup System Explosive Gas Monitoring System has been completely redesigned and, upon implementation, should greatly reduce the number of nonroutine surveillances.

E. Fire Protection

Management attention has been successful in maintaining fire impairments at or below the goals set. Consequently, routine fire watches have been significantly reduced.

The annulus fire detection system was replaced during the refueling outage to enhance access, operation and maintenance during all modes of operation. **Fire detection is now provided through the Annulus Negative Pressure System outside the containment.**

F. Emergency Preparedness

A siren feedback and monitoring system will shortly be implemented in the local parishes to allow continual remote monitoring of critical siren system functions.

Training programs for emergency response personnel are continuously upgraded based on drill performance, reviews of the training programs by management and Quality Assurance, NRC input, etc.

The Waterford 3 Simulator is being utilized to develop and conduct emergency preparedness drills.

The Alert Notification System has been tested and approved by FEMA - telephone surveys conducted by FEMA indicated that 91% of persons surveyed were directly alerted by the test, the highest rating for any plant in FEMA Region IV.

G. Security and Safeguards

In the most recent period for which statistics are available, random urinalysis tests showed less than ½ of 1% positive findings as a result of management attention to drug awareness education.

A large number of Security Department systems and programs have been, or are in the process of being upgraded, including the perimeter detection system, security computer system, and access control program.

Management continues to place emphasis on individual personnel responsibility for security through upgrades to training programs, meetings to acquaint personnel with new Security reporting requirements, informational postings and outage instructions.

The criminal history check requirements of 10CFR73.57 have been implemented.

Contract Security personnel and the Security Training Program are certified by the State of Louisiana.

The attrition rate of Security personnel was reduced from 20% in 1986 to 11% in 1987.

A complete redesign of the closed circuit television system which is currently in progress will greatly enhance the operation, performance and reliability of the system.

H. Outages

As with the successful first refueling outage, the planning, organization and training of outage personnel was begun well in advance of the second refueling outage.

The efficiency and coordination of equipment outages has been significantly improved through implementation of the Station Information Management System, consolidation of tasks and scheduling system improvements.

Refueling Outage No. 2 commenced on April 1, 1988 at 2330 hours when Waterford 3 was removed from the grid and was completed on May 31, 1988 at 2111 hours, a duration of 59 days 21 hours and 41 minutes. This relatively short duration for a second refueling outage illustrates successful application of pre-outage planning and continuous management involvement and control during the outage.

I. Quality Programs and Administrative Controls Affecting Quality

A number of hardware upgrades to the plant monitoring computer (PMC) are in progress or planned to increase the PMC reliability including upgrades to the static uninterruptible power supply and fixed incore detector signal cables, purchase of a more reliable software system for CPU 3 and installation of a hardware reset switch.

A human factors review of Operations and Maintenance procedure writing guidelines has been completed and the results will be used to upgrade procedures and reduce procedure violations due to human factors problems.

The remaining open items from the NRC's EQ Inspection have been addressed.

The station modification process has been upgraded to enhance plant configuration control.

The number of open station modification packages has been reduced by 619 over the period from March 1, 1987 through May 31, 1988.

An integrated Receipt Inspection Plan was implemented to consolidate the audit, receipt inspection and material issuance processes.

The Quality Trend Program was upgraded to provide more meaningful information to management and implement an improved root cause identification system.

J. Licensing Activities

The few remaining longstanding issues with the NRC were resolved during 1987 including details of the redesign of the Safety Parameter Display System, the Detailed Control Room Design Review, and the confirmatory analysis and monitoring program associated with the basemat cracks.

A high level of senior management involvement in licensing activities continued through implementation of periodic Nuclear Operations senior management meetings which regularly consider current regulatory issues.

Licensing actions necessary to support the second refueling outage and Cycle 3 were presented to the NRC well in advance of the scheduled outage resulting in no license based delays.

LP&L submitted a draft license amendment request effecting the transfer of management and operating responsibility of Waterford 3 to System Energy Resources, Inc., a wholly owned subsidiary of Middle South Utilities.

The Middle South Utilities System and Waterford 3 management in particular have adopted as a primary goal the achievement of regulatory excellence and have taken a number of steps in pursuit of that goal.

Licensing was reorganized to place increased emphasis on plant operations and site licensing support.

K. Training and Qualification Effectiveness

The Training Department has successfully accredited all 10 INPO training programs.

The Waterford 3 simulator is operational, has supported four cycles of operator requalification training and has proven useful in supporting other areas of plant operations such as procedural improvement.

Non-licensed personnel training programs have been given strong emphasis through the accreditation of INPO training programs and implementation of monthly systems training.

Through cooperation with the University of Maryland a Bachelor of Science Degree Program is being offered to nuclear plant operators and delivered locally.

## Performance Functional Area

## A. PLANT OPERATIONS

1986 SALP Category: 2
1985 SALP Category: 3

### Summary of NRC Recommended Licensee Actions

1. Continued efforts to clear illuminated annunciators, remove temporary plant alterations, and eliminate spurious ventilation actuations should be given priority.

2. Shift technical advisors should be removed from duties involving largely administrative functions so they can concentrate on the duties and responsibilities outlined in Technical Specifications.

3. Licensee management should ensure preparation, tracking, and closure of regulatory compliance issues are pursued with the same systematic approach normally taken in the licensing area.

### Current Status

The successful performance of Waterford 3 during the current SALP rating period was due in large measure to the professionalism and dedication of the Operations Department. During the year, a number of new and continuing initiatives contributed to our good record of safety and plant availability.

1. Continuing Management Involvement

   Appropriate management emphasis has been placed on correction of recurring plant problems.

   Advisory groups are being utilized in the maintenance, operations, technical support, and administrative areas. These groups, which include key members of each department, are tasked to identify and recommend solutions to station problems, and draw expertise from other groups when needed. Group meetings are usually held monthly or when significant plant events occur. Recommendations or requests for support are forwarded to the Plant Manager-Nuclear. The activities of these groups facilitate timely solutions to problems that affect the station. For instance, the Technical Services Advisory Group with assistance from the Operations Group investigated the root cause of the reactor trip which occurred on 1/1/88. Recommendations from this investigation resulted in guidelines for Axial Shape Index (ASI) monitoring during reactor startups being added to the operating procedure, additional training for Operations personnel on Core Protection

Calculator monitoring of ASI at low power, and stationing of a reactor engineer in the Control Room for consultation on reactor startup through the 20% power level.

The efforts of the advisory groups to prevent recurring plant problems are supplemented by the Management Observation Program, the Plant Improvement List, as well as a concerted effort by line management to identify and correct problems as they occur. In March 1987, a formal Management Observation Program was established to improve the monitoring of routine activities at Waterford 3. The program tracks the monitoring actions and divides responsibilities for touring and observing station work among supervisors and managers. During 1987, over 50 formal observation tours were conducted including observations in the areas of: Health Physics, Chemistry, Operations, Maintenance, Simulator, and Back Shift. Results to date indicate a positive impact in the areas observed.

Area coordinators are assigned to control housekeeping, to identify and monitor correction of nagging minor problems, and to ensure area cleanliness levels are satisfactory. Each area coordinator is given a check list of typical concerns to be monitored routinely in the area. In addition, management sponsors are assigned oversight responsibilities for designated area coordinators. The Assistant Plant Manager, Operations and Maintenance, along with a team of specialists from Industrial Safety, Health Physics, and Maintenance, conducts weekly walk-throughs of specific areas with the responsible area coordinator. This walk-through provides direct feedback to the area coordinator on the level of achievement in his area. Items that require correction are identified on a Condition Identification if they involve maintenance on plant equipment or on the Plant Improvement List if they are of a housekeeping or minor nature. The assignment of key personnel to collateral duties as area coordinators has done much to improve the material condition of the plant.

Plant Management utilizes the Nuclear Operations Support and Assessment Organization (NOSA) for detailed independent assessments of significant or recurring plant problems. For instance, during 1987 NOSA undertook, among other things, evaluations or assessments of Health Physics outage readiness, primary and secondary chemistry control, instrument and station air system performance, maintenance of dry cooling tower fan motors, and reactor coolant drain down operations. Operation Assessment & Information Dissemination, a subgroup of NOSA, also reviews industry operating experience (e.g., INPO SOERs) to provide Plant Management with recommendations for plant safety and performance improvement. The Quality Assurance organization is another resource available to Plant Management which can provide surveillances on request to ascertain quality levels and recommend improvements.

2. Plant Status Controls

Waterford 3 management recognizes the importance of maintaining accurate system status control.

The Operations Superintendent continues to emphasize to operations personnel the importance of using and updating administrative systems for plant status control. Additionally, the Operations Department reviews methods for improvements to administrative controls. Some actions taken include:

a. Periodic valve alignment checks.

b. Actions to control the Annunciator Status Log.

c. Actions to enhance control of Caution Tags.

d. A review of the overall Temporary Alteration Program was completed (see Item 6, below). In addition, the Control Room drawing program was reviewed in detail and strengthened considerably as a result. For example, the Control Room document distribution practices were expedited; drawings were converted to an aperture card file and an aperture card reader was provided. A further result of this review was a new practice to distribute the Temporary Alteration Request list periodically at the Plan-of-the-Day meetings for the information of supervisors and managers.

3. Identification of Plant Deficiencies

a. The Operations Superintendent has stressed the need to identify plant deficiencies through three interrelated techniques: (1) supervisors' meetings, (2) departmental all hands meetings, and (3) publication in the daily instructions. A vital part of the Management Observation Program has been surveillance of Operations Department personnel on shift with direct feedback to the personnel observed and reports to the Plant Manager. Also, the SIMS system (see item 5. of Section C. Maintenance) is now on-line and available for status of deficient plant conditions.

b. Administrative controls have been improved as follows:

1) Operations group administrative procedures have been reviewed and revised as necessary.

2) Procedures were approved to implement SIMS. As a result, Condition Identifications can be initiated or queried for status from approximately 130 terminals on-site, which includes key management and supervisor work areas.

3) The following sections have been added to and are regularly updated on management schedules:

a) Action Required Equipment Out-of-Service Schedule

b) Quality-Related Equipment Out-of-Service Schedule

c) Forced Outage List

d) Temporary Alterations

4) The weekly schedule is receiving increased management attention at Waterford 3 to ensure proper priorities are established.

c. Procedure OP-10-001, General Operating Procedure, has been changed to require a review of valve tagging along with periodic valve alignment checks.

In addition to the above actions, the Plant Improvement Program with its area accountability assignment (see Item 1 of Section C, Maintenance) further assists the operations staff in the identification and correction of deficient plant conditions.

4. Operations Procedures and Documentation

The Waterford 3 Operations Group is continuing to review and revise operating procedures. Guidelines for these revisions are delineated in the "Operations Writers Guide" which was developed based on human factors input by an industry expert (see Section I, Item 2 for further information). Selected procedures were revised to support the second refueling outage (e.g., OP-10-001, General Plant Operations; OP-1-003, RCS Drain Down; OP-9-005, Shutdown Cooling; and OP-901-046, Loss of Shutdown Cooling). In the future, operating procedures will receive a human factors and technical review during the normal biennial review process.

The Waterford 3 simulator was placed in service in 1987. Operator Team Training combined with Training Department feedback have resulted in significant improvements in some operating procedures.

5. Annunciator Reduction Program

The annunciator reduction program implemented at Waterford 3 was incorporated primarily to improve operating efficiency and reduce personnel errors by providing reliable and precise annunciation of potential problems. The goal of this program is to achieve a "black board" control room. Although achieving this goal is ambitious due to annunciations that are inherent to normal plant operation (i.e., transients), setting such a goal will eliminate erroneous, misleading, or unnecessary annunciations.

A maintenance engineer has been assigned the lead responsibility for this program, which, at present, involves the following:

a. Coordinating the implementation of work tasks involved in troubleshooting and correcting alarm concerns.

b. Providing technical assistance for all annunciator related jobs, tasks, or investigations.

c. Monitoring alarms for trends and providing steps needed to implement corrective actions if such are needed.

d. Providing status reports on a regular basis.

e. Initiating action when a station modification is needed.

f. Communicating closely with Operations personnel to uncover annunciator concerns and monitoring their "Annunciator Status Log Book".

Marked improvements have been made since the implementation of this program. The total number of annunciator problems has been reduced from 67 on February 19, 1987 to 39 on June 27, 1988, a 42% reduction. The number of annunciators taken out of service has been decreased from 42 to 21, a 50% reduction.

6. Temporary Alteration Requests (TARs)

Minimizing the number of temporary plant modifications has been an ongoing task and is proving to be successful. During critical operation in 1987 as many as 42 TARs were in effect. As of February 26, 1988, there were a total of 15 active TARs. Twenty-six TARs were added during Refueling Outage No. 2 and 29 were restored. There were 12 active TARs as of June 9, 1988.

7. Spurious Actuations of Control Room Ventilation System

a. Chlorine Detection System

The installation of new and improved detectors in the chlorine detection system represented substantial progress in improving the reliability of the control room ventilation system.

b. Broad Range Toxic Gas Detection System (BRTGDS)

Waterford 3 is located in the vicinity of chemical plants and also within proximity of industrial transportation corridors. Accordingly, LP&L has taken every prudent measure to assure that the Waterford 3 Control Room Operators are protected and are able to maintain control of the plant in the event of a toxic chemical release.

On July 21, 1987, the NRC issued a Safety Evaluation Report (SER) and Technical Specification (TS) governing operation of the Broad Range Toxic Gas Detection System (BRTGDS). The NRC's approval represented the closure of a longterm regulatory issue for Waterford 3.

The NRC requirement and LP&L's initiative for an operable BRTGDS represented technical and regulatory challenges. The system initially installed proved unreliable. A different replacement system was installed but required design modifications. Further, LP&L was required, without benefit of any historical or predictive performance data for this state-of-the-art technology and pursuant to an NRC license condition for Waterford 3, to propose a TS for the system prior to the startup following the first refueling. This posed another challenge because, typically, TSs for such a system require a numerical value for the alarm and actuation setpoint - information which is generally derived from performance and historical operating data.

On the basis of technical, regulatory, and operational justifications, LP&L proposed a TS based on a system performance objective - the lowest achievable gas concentration level of detectable toxic gases providing reliable operation. This approach was accepted by the NRC, and LP&L was able to perform a 6-month background measurement testing program to establish an optimum setpoint based on operating experience.

The NRC was formally apprised, on July 21, 1987 of the successful completion of testing for the BRTGDS setpoint and the completion of other support activities (maintenance calibration procedures, technician training, and the availability of spare parts). Since LP&L had kept the NRC apprised of the operational status of the system, and the NRC had completed its technical review, the technical specification and the SER were approved by the NRC that same day - a demonstrated effort of teamwork, perseverance, and creativity on a difficult regulatory and safety issue.

8. Utilization of Shift Technical Advisors (STAs)

Waterford 3 management has taken action to remove the administrative burden on the Shift Technical Advisors (STAs) so that they can concentrate on the duties and responsibilities outlined in the Technical Specifications. These actions include issuance of a Nuclear Operations Executive Directive (ED-28) which, in part, presents the established LP&L policy concerning the duties of the STA. This directive states that the STA is to have no specific operational duties which could preclude him from assessing overall nuclear safety during an emergency condition. Consistent with this policy, a revision to Administrative Procedure UNT-7-011, "Duties and Responsibilities of the Shift Technical Advisor", was issued and specifically points out that the STA's primary duties involve accident assessment. The STA is not to be assigned routine duties which divert him from his primary function. In addition, the STA has been removed from the administrative process of the temporary alteration request system.

Waterford 3 is continuing the effort to obtain senior reactor operator licenses for Shift Technical Advisors (STAs). At this time, there are six certified STAs at Waterford 3, two of which are licensed and one that is in the current license class.

9. Human Error Reduction Program

During the latter part of 1987, Waterford 3 conducted a review of plant practices and industry initiatives aimed at reducing the frequency and impact of human errors. Although certain elements of an effective program were in place, they were not well integrated and were not utilizing state of the art methodologies. Consequently, the Vice President-Nuclear directed implementation of a Human Error Reduction Program with the following key components:

a. Dedicated personnel trained in state of the art root cause determination methodologies.

b. Meaningful event and root cause trending based on the above methodologies.

c. A clearly defined and consistently applied disciplinary policy.

d. Provision for ensuring that internal and regulatory commitments are reasonable, properly implemented, and promptly closed.

As an outgrowth of this program, the Event Analysis and Reporting organization was upgraded to report to the Plant Manager. It was expanded in size and responsibility to include the functions of root cause evaluation and trending, compliance and various reporting responsibilities such as 10CFR21, in addition to their previous 10CFR50.72/73 responsibilities. The new Event Analysis Reporting and Response group is currently in an organization phase. Once the group is fully functional it is expected, in conjuction with the overall Human Error Reduction Program, to have a significant impact in reducing the frequency of personnel errors, and is also expected to provide other benefits such as improving the NRC Regional interface as discussed in the following section.

10. Preparation, Tracking and Closure of Region IV and I&E Issues

To enhance preparation, tracking, and closure of regulatory compliance issues, the Vice President-Nuclear directed that the following actions be taken during the latter part of 1987:

a. The Event Analysis and Reporting (EA&R) unit supervisor provides a briefing for the Resident Inspectors following significant events at Waterford 3.

b. The EA&R supervisor provides a briefing to the Resident Inspectors on Potentially Reportable Events and Licensee Event Reports periodically during the review and documentation process.

c. Key plant personnel provide the Resident Inspectors with regular briefings on their departmental activities as well as discussing potentially significant events or conditions.

The Plant Manager has also renewed efforts to discuss events/issues with the Resident Inspectors and to communicate more frequently with Regional Management.

Long-term improvement efforts that LP&L is taking in this area involve organizational changes that are aimed at strengthening the NRC interface. Three major organizational moves were made in this area:

a. The Nuclear Safety & Regulatory Affairs (NS&RA) Department has been separated from Nuclear Services and reports directly to the Senior Vice President-Nuclear Operations. Restructuring to elevate NS&RA to the group level provides increased emphasis on the NRC interface and safety review functions. The direct reporting relationship allows for additional Licensing input into major technical and policy decisions being made at the senior manager level.

b. The Event Analysis and Reporting organization formed early in 1987 has proven successful in increasing the quality and scope of event reviews. Experience to date has indicated a need to add staff to this organization due to the workload. In doing so, it was decided to also centralize trending activities and plant staff compliance efforts into this organization, as well as to elevate the reporting level. The new organization, entitled Event Analysis Reporting & Response, now reports to the Plant Manager. The newly structured organization is expected to bring the related areas of event analysis, reporting, trending, and NRC Resident Inspector interfacing into sharper focus and improve the communication process.

c. In May 1988, the Nuclear Licensing & Regulatory Affairs Group was reorganized to place additional emphasis on Licensing support of plant operations. This change, which is described in further detail in Section J - Licensing Activities, creates a new Site Licensing Support Unit with expanded responsibility and personnel.

During 1987 the Operational Licensing and Regulatory Compliance Units coordinated the closure of approximately 73% of the 92 Inspection Report (IR) items that were addressed to LP&L.

The new Site Licensing Support Unit and the Regulatory Compliance Unit of Nuclear Safety & Regulatory Affairs will serve as the focal points for coordinating and tracking, respectively, the response/closure of I&E items. The Regulatory Compliance Unit utilizes a computer system to assist in the tracking and closure of IR/I&E items. This system also provides the Site Licensing Support Unit with a centralized bank of information that the unit could use to coordinate/assist in the development of responses to IR and I&E items.

As the Event Analysis Reporting & Response organization is staffed up during 1988, it will become the focal point for providing information necessary for closing Region IV open items assigned to the plant staff, with the Site Licensing Support Unit providing a similar function for the remainder of Nuclear Operations and coordinating the overall process.

11. Practice of Transferring Experienced Licensed Operators to Training Department Continues

The Vice President-Nuclear and Plant Manager have emphasized a policy of providing experienced licensed operators to the Training Department. Transfers take place based on needs in the Training Department consistent with the completion of licensing of new ROs and SROs. Currently, six SROs and two ROs that were former Operations Department Control Room personnel are members of the Training Department's simulator and classroom instruction staff.

12. Efforts to Reduce Airborne Radioactivity in Reactor Auxiliary Building

Reduction of short-lived airborne radioactivity in the Reactor Auxiliary Building has been a management priority that has translated into an aggressive attitude toward leak reduction. Extensive efforts have been made in previous outages to repair/replace valves, fittings and flanges. Leak

reduction will continue to be one of the main objectives of future outages. Identification and timely correction of leaks during plant operation is also stressed. A discussion of leak reduction activities may be found in the Radiological Controls section of this report (Section B).

In-plant levels of airborne radioactivity are not recorded and, therefore, reduction of airborne radioactivity cannot be directly verified. However, a comparison of Semiannual Radioactive Effluent Release Reports indicates that the total quantity of fission and activation products released in 1987 was approximately half that released in 1986, indirectly demonstrating that efforts to reduce in-plant airborne radioactivity have been successful. The most significant single factor in reducing in-plant airborne radioactivity appears to be repairs made to the Gaseous Waste Management System during the first refueling outage. Valves were replaced, certain piping rerouted and, in general, leaks reduced so that the system can effectively contain gases collected for decay prior to release.

Progress has also been made in identifying sources of airborne radioactivity. Improvements in gaseous leak detection methods have improved the capability to detect smaller leaks, while improved operation of the area-wide radiation monitoring system has enabled plant staff to identify trends in increased radiation levels and to correlate the increases with particular activities which release airborne contaminants such as collecting reactor coolant system samples.

13. Part-Loop Operation

At the direction of Waterford 3 management, and in conjunction with Generic Letter 87-12, a multi-disciplinary task force conducted a review of plant operations during partially drained RCS conditions. This review resulted in significant improvements to the operating procedures necessary to drain the RCS and maintain level at the hot leg mid-plane. Improvements were also implemented to increase operator capability and flexibility in dealing with a plant upset during a partially drained condition. Changes ranged from a minor study to confirm RCS draindown levels for various maintenance activities to the installation of control room RCS level indication during the second refueling outage.

Of primary concern during the task force review was the capability of the Waterford 3 design to respond to a limiting loss of shutdown cooling event. In this regard, the task force was guided by the event postulated in Generic Letter 87-12 involving an opening in the RCS during mid-loop operation. Analyses by both Waterford 3 and the CE Owners Group confirmed the capability of the plant to successfully mitigate the limiting event and led to firmer administrative controls regarding HPSI pump operability, maintaining steam generator level and a secondary side steaming path.

As discussed more fully in Section H - Outages, the May 12, 1988 event in which a shutdown cooling pump cavitated, was promptly and professionally handled by plant operators. The operators' quick response to this event was largely due to the improved procedures and extensive training conducted in response to Generic Letter 87-12.

14. Correction of Discrepancies As System Lineups Are Performed

Operations has developed guidelines for system walkdowns. As part of procedure OP-10-001, General Plant Operations, operations personnel periodically perform alignment checks on systems while at power. During the walkdowns, operators ensure tags are attached and accurate, system lineups match P&IDs and plant procedures, and that housekeeping/cleanliness is adequate. The walkdowns identify problems which may exist with procedures, drawings, and system configuration. Once identified, problems are corrected.

15. Station Modifications to Reduce Trips

To reduce the number of reactor trips at Waterford 3, LP&L established a Reactor Trip/Root Cause Determination Program. As part of this effort several modifications were made or will shortly be implemented at Waterford 3 which include the following:

a. A Station Modification has been issued to reduce the frequency of feedwater pump trips due to High Drain Tank Level.

b. Control room indication and bypass control have been added to the Condensate Polishing System.

c. A new vibration monitoring system has been installed on the Turbine Generator.

d. A Steam Generator High Level Bypass switch was added to prevent reactor trips at low power levels.

e. A new Main Steam Isolation Valve Skid was installed which should help eliminate transients and trips resulting from spurious operation/failures.

16. Operator Retention - Incentive Program

Considering educational background, experience level and invested training, nuclear power plant operators are key assets at Waterford 3. In recognition of their value and to retain trained operators at Waterford 3, a plant operator Incentive Program, based on added compensation, was formulated in 1984. During 1987, the third full year of the program, 100 percent success was achieved. There was only one licensed operator loss due to resignation since 1985, which occurred in March 1988. The Incentive Program has been revised and reinstituted for another three year period through 1990.

LOUISIANA POWER & LIGHT COMPANY
WATERFORD 3 SALP PROGRESS REPORT

Performance Functional Area

B. RADIOLOGICAL CONTROLS

1986 SALP Category: 2
1985 SALP Category: 2

Summary of NRC Recommended Licensee Actions

1. Ensure appropriate action to reduce radioactive leakage from liquid and gaseous system to an acceptable level.

2. Ensure first-line health physics supervisors spend adequate time in the plant overseeing radiation protection work activities.

3. Ensure that stability is maintained with health physics professional staff.

4. Evaluate benefits of a permanent low-level radioactive waste storage facility.

Current Status

LP&L continues to make significant improvements in the area of Radiological Controls as exemplified by the following:

1. Occupational Radiation Safety Planning for the Second Refueling Outage

   Since the beginning of the year, contract personnel were added to augment the permanent radiation protection staff. Additional planners, radiation protection project coordinators and supervisors, dosimetry, ALARA and operational health physics technicians were phased in both to assist in outage planning and to receive appropriate training prior to the outage.

   Planning efforts included reviewing scheduled outage activities to develop radiation work permits, estimating exposures (person-rem) and setting exposure goals, and procuring the supplies (both consumables and hardware) necessary to support the outage activities. The Health Physics Department also assisted in mock-up training of craft personnel.

2. Improvements Regarding Better Control of Contaminated Workers Leaving the Site

   To improve control of contaminated workers leaving the site, a number of procedural and hardware changes were made, as well as strengthening enforcement of existing procedures. Workers exiting the Radiation Controlled Area (RCA) who alarm the Personnel Contamination Monitor (PCM-1) are observed by Health Physics personnel as they perform the whole body frisk.



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Personnel are not allowed to leave the RCA without being cleared by Health Physics. The procedure addressing release of items from the RCA has been made more specific regarding what can be released. Modifications to the portal monitors at the Primary Access Point (and associated procedures) ensure that proper monitoring of exiting personnel occurs during power interruptions. Also, the incident in which a contaminated worker was able to leave the site has been discussed with all personnel who work inside the Protected Area to minimize the potential for recurrence.

3. Actions Taken to Reduce Radioactive Leakage from Liquid and Gaseous Systems

The continuing plant inspection/area walkdown program (Plant Improvement List), in conjunction with the improved work control system, has provided Waterford 3 plant management with added assurance that fluid leaks are identified and corrected in a timely manner. Area walkdowns have been scheduled through the end of December 1988. An ownership approach has been implemented where supervisory personnel have been assigned as Area Coordinators for all areas in the plant. The responsibility of each Area Coordinator is to identify and correct deficient plant conditions in their respective areas. Management representatives have also been designated to provide additional support to the Area Coordinators.

In addition to this increased management attention, specific maintenance-related actions include coordinating outages of safety-related systems with the Operations Department to repair leaks during plant operation, when possible, rather than waiting until plant outages; tracking repairs on leaking components to identify chronic problems for part replacement rather than continued repair; utilizing improved materials and/or methods when repairing or replacing valve packing and flange constituents; and providing immediate response when notified of the necessity for adjustments to valve packing. There is also a program in place to repack all valves in the plant over the next few years. Approximately 600 valves were repacked during the first refueling outage and this effort continued during the second refueling outage.

Additional information on the reduction of airborne radioactivity in the Reactor Auxiliary Building is contained in Section A, Plant Operations, Item 11.

4. Health Physics Improvements

In May 1987, Radiation Protection group staffing was increased by the addition of two senior positions. The number of first line supervisor positions was also increased from two to four in order to enhance the observation of workers, correct poor radiological work practices, and to provide 24-hour LP&L supervision during outages. The new positions were filled with experienced candidates who were tasked to assess current deficiencies and recommend action plans and priorities for corrective actions to plant management. The resulting action plan reflected the extensive experience of the new supervisors. With the increased staffing, there is more direct supervisory oversight of the radiation protection program, providing additional manpower and expertise to implement and ensure adherence to programs and procedures. In addition to the Radiation Protection Group, the Nuclear Operations Support and Assessment Group

surveillances, Quality Assurance surveillances and the Management Observation Program have resulted in an increased frequency of observations of both worker and Health Physics technician performance.

Health Physics technicians have been instructed in the methods and techniques of worker observation and provided with a checklist to enable them to better identify and correct poor radiological work practices. This is now included in the cyclic training program for Health Physics technicians. Plant Staff supervisors have received training in observation techniques in the Safety Training Observation Program. In addition, Plant Staff supervisors have been provided a copy of the Health Physics checklist regarding radiological work practices to use in briefing their crews.

The revised Radiation Work Permit format and procedure were implemented in June 1987. Since that time, the procedure has been reviewed and revised to correct human factor deficiencies, and was implemented prior to the second refueling outage.

A new procedure, "Radiological Deficiencies", has replaced the Radiological Occurrence Report and Radiological Infraction Report Programs. This procedure strengthens the previous programs by addressing root causes and stressing personnel accountability.

5. Low-Level Waste Storage

At the present time, LP&L does not find a permanent on-site low-level radioactive waste storage facility necessary. Waste is not anticipated to routinely remain on site more than a few months prior to shipment offsite for disposal. The need for a storage facility is monitored on an ongoing basis, and as long as waste can be shipped offsite, LP&L does not anticipate having an on-site facility. However, LP&L has had a facility designed, and can have it constructed within 18 months, should conditions warrant.

6. Central Interstate Compact

In response to a federal mandate, the states of Arkansas, Kansas, Louisiana, Nebraska, and Oklahoma negotiated the Central Interstate Low-Level Radioactive Waste Compact. To ensure compliance with the federal mandates, the Compact created a commission composed of one voting member from each state. The Commission is tasked with establishing the framework for a cooperative effort between the member states in order to promote and develop a low-level radioactive waste disposal facility within the region. The development of a regional disposal facility has proved to be a long and difficult process.

Early on, Louisiana Power & Light recognized the need for waste generator involvement in the development of a regional disposal facility, and a decision was made to devote manpower and resources to this effort. Initially, LP&L followed the progress of the Compact Commission in the early stages of site development and the commissioning of an engineering group to perform a site suitability study in the Central States region. In 1984, LP&L, in conjunction with Arkansas Power & Light and Middle South Services,

organized the Central Interstate Regional Association for Low-Level Radioactive Waste Management. This group, consisting of institutional, industrial and nuclear power waste generators, functioned to provide information and support to the Compact Commission. LP&L was appointed to represent the Louisiana Waste Generators on the Louisiana Advisory Committee.

LP&L continued its leadership role during the site developer and the host state selection processes, and was instrumental in the formation of the Major Generators Group. As Technical Representative for this group, LP&L worked directly with the Compact Commission during the contract negotiations between the Compact and the selected developer, U.S. Ecology. In this capacity, LP&L was responsible for coordinating technical input and financial expertise from the generators to the Compact negotiators.

The disposal site development process has steadily progressed in a positive direction while ensuring the public's concerns for health, safety and economy are adequately addressed. On December 15, 1987, in a meeting held in New Orleans, the Compact Commission selected Nebraska as the host state for the siting area. Additionally, with the submittal of the disposal site development plan to the Department of Energy and Nebraska's acceptance of the host state's responsibilities, the Compact has achieved the January 1 1988 milestone established by the Waste Policy Act.

The Compact still must select the proper location, complete design of the facility, and license and construct the facility to meet our final goal.

7. ALARA Program

Strengthening of the ALARA Program has occurred by designating the Waterford 3 Plant Manager as chairman of the ALARA Committee (this committee reviews plant conditions and personnel suggestions and makes recommendations for maintaining exposures ALAPA). Waterford 3, with its 138 person-rem exposure for 1987, is placed in the top quartile of person-rem exposures for the U.S. commercial nuclear industry.

8. Contaminated Area Reduction

Significant successful efforts have been made in reducing the total square feet of contaminated area in the RCA at Waterford 3. These efforts (repairing leaks, surface decontamination and painting) have reduced the total previous RCA surface contamination from 22,800 square feet to less than 5,000 square feet, which is less than 5% of the total RCA outside the Reactor Containment Building.

9. Hot Particle Controls

A hot particle control program has been implemented that includes increased surveys, specialized survey equipment, and placement of personnel contamination monitors inside the RCA. Increased equipment sensitivity and other controls led to identifying hot particles during the second refueling outage, many of which would not have been located absent the hot particle control program. Also, during Refueling Outage No. 2, fuel inspection and reconstitution of leaking fuel rods was completed to remove leaking fuel from the reactor, which is a major contributor of hot particles.

## Performance Functional Area

## C. MAINTENANCE

1986 SALP Category: 2
1985 SALP Category: 3

### Summary of NRC Recommended Licensee Actions

1. Licensee management should work toward reduction of the outstanding routine maintenance backlog and implementation of programs such as SIMS.

2. Initiatives to improve the containment working environment should be considered.

### Current Status

Many maintenance improvement initiatives and other related activities occurred during the present SALP rating period, which include the following:

1. Continued Management Involvement

   Management and operations walkdowns have continued with additional emphasis placed on identifying and tagging equipment deficiencies and correcting them in a timely manner.

   The continuing plant inspection/area walkdown program (Plant Improvement List), in conjunction with the improved work control system, has provided Waterford 3 plant management with added assurance that plant problems such as fluid leaks are identified and corrected in a timely manner.

   As discussed more fully in Section A, Plant Operations, Item 1, Area Coordinators have been assigned for plant areas to maintain management oversight and instill a continuing sense of ownership.

2. Planning, Scheduling, and Backlog Management

   The ongoing efforts of the Condition Identification and Work Authorization Review Committee and implementation of the Station Information Management System (SIMS), during 1987, significantly improved the abilities of the staff to plan, schedule, and close work items.

   The procedure for prioritization, scheduling, and closeout of work tasks was reviewed and revised to provide additional guidance for effective priority control. Provisions for adjusting work task priority as task importance changes are included in the process. The effectiveness of work scheduling and prioritization will be periodically evaluated.

The Condition Identification/Work Authorization (CIWA) backlog was extensively reviewed twice since July 1987. The efforts of the CIWA Review Committee changed the priority of or closed out over 1000 CIWAs.

SIMS implementation and priority work control have been aided by the development and/or revision of the following procedures:

| | |
|---|---|
| UNT-5-002 | Condition Identification |
| UNT-5-015 | Work Authorization, Preparation and Implementation |
| PLG-9-007 | Routine Scheduling of Station Activities |
| MD-1-026 | Maintenance Department Work Center Planning |

In addition, an Integrated Planning/Implementation Scheduling data base has been developed for use in conjunction with SIMS scheduling. Schedule reviews are conducted by the Maintenance Superintendent to review justifications for schedule changes in order to enforce schedule accountability in the line organizations. The benefits of the integrated planning/implementation scheduling data base and usage of the SIMS continue to accrue; however, the full potential of the capabilities added to date will not be realized until sufficient historical data and experience is acquired.

3. Temporary Plant Alteration Control

Continuing audits by Control Room personnel, supervised by Plant Management provide assurance that Temporary Alterations are identified accurately to Operations Department personnel.

Technical reviews are now an integral part of the Temporary Alteration Program.

4. Program Revisions

Some major Maintenance-related programs were revised as follows:

Modification Projects - December, 1987

NOP-014, Design Changes is a new procedure establishing new definitions, responsibilities and improved work flow.

Trending - November, 1987

MD-01-016, Failure and Trend Analysis was revised to provide more direction in this area and to become better integrated with other departments which utilize trending and failure data to analyze plant problems and recommend enhancements or corrective action.

Independent Verification - December 1987

MD-01-025, Independent Verification Program was written to enhance the guidance provided to maintenance personnel.

Materials Procurement and Management - November 1987

Materials Management Information System (MMIS) implementation (see Item 8, below).

UNT-08-044, Requisition and Return of Items to Stores

Revised to reflect the MMIS implementation (see Item 8, below).

Conduct of Maintenance - December 1987

MD-01-014, Conduct of Maintenance was revised after the Phase II reorganization (permanent staff implementation), SIMS and MMIS implementation were completed.

The Maintenance Advisory Group was chartered in August to provide recommendations/resolutions to management for innovations, improvements, reduction of personnel errors, incorporation of "lessons learned" and provisions for long term corrective actions.

Repetitive Task Reduction - Maintenance Engineering evaluations of currently identified tasks were initiated to determine tasks that could be eliminated or for which the frequency of performance could be reduced. This effort resulted in a 24% reduction in repetitive tasks by the end of 1987.

Individual Training Plans have been developed for maintenance technicians in the Maintenance organization identifying specific training requirements for 1988.

5. Station Information Management System (SIMS)

On July 21, 1987, SIMS became operational, ahead of schedule. SIMS is a system which is used by all groups in Nuclear Operations to enhance the total operation of Waterford 3.

Briefly described, SIMS is a cross-discipline computerized program which is utilized in the total processing - from initiation through approval and monitoring to closure - of corrective and preventive maintenance, surveillance tasks, inservice inspections, station modifications, and commitments. There are approximately 130 display stations throughout the site which communicate through modems and controllers with the mainframe located at the Middle South Utilities Computer Center. SIMS provides rapid recall of design engineering, maintenance engineering, and historical data for 61,000 plant components.

To facilitate usage, general and specific training of site personnel has been successfully conducted, allowing the component data base to be used in the first refueling outage. With the information stored in it, SIMS will help the planner develop better work packages; the system engineer to perform timely and accurate analysis of equipment failures; the design engineer to develop better design packages; and the schedulers to better define system and subsystem outages.

6. Maintenance Backlog

Corrective maintenance items accounted for 5,910 completed activities (38.1%) of the total of 15,522 documented maintenance work activities completed in 1987.

In February 1987, the Maintenance Review Committee (MRC) was formed to review a backlog of open Condition Identification Work Authorizations. (This committee was also known as the Condition Identification and Work Authorization Review Committee - see Item 2, above.) The MRC met weekly and tracked actions required to close Work Authorizations greater than 3 months old. Because of the implementation of the previously mentioned programmatic improvements in planning, scheduling, and backlog management, the MRC now meets monthly and reviews Work Authorizations greater than 3 months old that are in work preparation or on hold. Actions of the MRC and the implementation of planned maintenance of a routine nature have been instrumental in reducing the backlog of corrective maintenance items. The corrective maintenance backlog was reduced from 685 items in December 1986, to **461 items in June 1988.**

Since the beginning of this SALP period, the Preventive Maintenance backlog has been reduced from over 1000 tasks to less than **320**. Currently, the majority of the preventive maintenance backlog items are past due instrument calibrations. Additional contract technicians have been brought on board to assist in reducing the backlog. Maintenance Engineering is also reviewing backlogged preventive maintenance tasks to determine if the tasks must be worked now or if they can be rescheduled at a latter date with no significant detrimental effects on the plant. This evaluation technique has been incorporated as a routine part of the backlog dispositioning process and has been included in procedure UNT-5-012 "Repetitive Task Identification".

The total number of repetitive maintenance tasks was significantly reduced by **5,441** tasks from 20,700 in January **1987** to 15,259 in **June 1988**, a **26%** decrease.

7. Containment Working Environment Improvements

Station Modification (SM-1960), Reactor Containment Building Air Conditioning, **was partially** installed for the 1988 Refueling Outage. This modification involves adding branch lines and isolation valves to the existing component cooling water supply and return lines such that chilled water can be supplied to the Containment Fan Coolers during outages to maintain a more desirable temperature inside containment. Temporary chillers **were** used to provide chilled water to the fans **during Refueling Outage No. 2. Permanent chillers are scheduled for future installation.**

8. Materials Management Information System (MMIS)

The implementation of the Material Management Information System (MMIS) was formally accomplished during December 1987.

In the late 1970's, by mutual agreement of the three MSS operating companies, AP&L, MP&L, and LP&L, with support from System Services Incorporated, the project was initiated to replace existing materials and stores systems. These companies banded together and designed the basic MMIS. By the fall of 1980, the specification for the system had been developed and a batch processing software system had been purchased. Subsequently, an on-line version of the system was obtained and the package was converted to an

information management system. A concentrated effort by all of the companies ensued over the next 4 years with activities ranging from data input/cleanup to system familiarization, testing and debugging. Approximately 70,000 material items are included in MMIS.

As the MMIS's were brought on-line in both fossil and nuclear operations within the various companies, acquired knowledge was shared throughout the system. These communication efforts allowed those who had not completed implementation to further refine their MMIS's to facilitate usage.

MMIS will automate and streamline the procurement and material functions and will substantially enhance the information control of material functions. The Waterford 3 MMIS accommodates the on-line material transactions in the areas of planned material requirements, procurement, purchasing, invoicing, accounting, receipt/inspection, and issues/returns. MMIS is capable of recommending what to buy, when to buy, and how much to buy. From planned maintenance and construction jobs and from stores issues, the system generates purchase requisitions and purchase orders based upon procurement lead times. Material is received at the warehouse, and, for quality items, the results of receipt inspections are recorded within the system.

From strategically placed terminals located throughout the plant, MMIS information can be accessed by both authorized users and by the general Nuclear Operations populace.

The organizations most affected by MMIS are Purchasing, Stores, and Accounts Payable. Their methods and procedures were revised and their activities more closely integrated. Their input of data to MMIS will provide timely status information on all material items. The significant benefits of MMIS are:

- Providing automatic notification of the need for recurring stock.
- Providing lists of qualified vendors and manufacturers and previous purchase order history.
- Monitoring vendor performance and generating vendor performance reports.
- Automating manual functions.
- Providing an up-to-date inventory status.
- Providing storeroom location and inspection requirements.
- Automating the matching of purchase orders, Receiving Reports, and invoices and creating exception notices.
- Providing timely and accurate information on total purchase order commitments and unpaid balances.

9. Emergency Diesel Generator Concerns Resolved

The NRC closed concerns dealing with the diesel generators after an April 6-8, 1988 inspection of Diesel Generator A and complimented Waterford 3 on its strong diesel maintenance program.

The April inspection was a second visit to gain full understanding of turbo charger lube oil trips on manual test start of EDG A. This was a follow-up to the Quality Verification Function Inspection performed in early February.

## Performance Functional Area

## D. Surveillance

1986 SALP Category: 1
1985 SALP Category: 2

### Summary of NRC Recommended Licensee Actions

1. The licensee should continue to pursue procedural as well as equipment changes needed to eliminate nonroutine surveillance problems.

2. Evaluate the long-term reliability of the Boron Management/Blowdown System radiation monitoring equipment.

3. Placement of the new hydrogen/oxygen analyzing system into routine operational service.

### Current Status

1. Radiation Monitoring Task Forces

   Waterford 3 formed a task force to evaluate failure history and trends on the radiation monitoring system and to provide recommended solutions to recurring problems. **The task force recently completed its evaluation and made recommendations which are being evaluated and are being prioritized for implementation.** Waterford 3 is also participating in a Middle South Utilities task force to assess problems with process radiation monitors at all of the MSU nuclear plants. The MSU task force will provide recommendations to the Middle South Nuclear Management Committee by July 1988.

2. Procedure Changes

   Procedure changes have been made to provide an independent review of non-routine surveillance results and also to confirm input data in SIMS to prevent rescheduling errors.

3. Radiation Monitoring Equipment

   The radiation monitors in the Boric Acid Condensate Discharge and Steam Generator Blowdown Lines **had** proven to be unreliable. Waterford 3 management **had** concluded, therefore, that these monitors should be replaced with monitors with a proven reliability record. **This modification was made during Refueling Outage No. 2. Similar monitors were also replaced in the Gaseous Waste Management System and the Liquid Waste Management System.**

4. Equipment Changes to Eliminate Non-Routine Surveillance Problem

Over the past two years several attempts have been made to repair the Waste Gas Holdup System Explosive Gas Monitoring System (hydrogen/oxygen analyzing system). Each attempt has proven to be unsuccessful. LP&L has, therefore, completely redesigned the system. The new design will allow automatic sampling of the Gas Decay Tanks. This will greatly reduce the number of nonroutine surveillances. Work on the station modification installing the new system has begun and is scheduled to be completed by July 1988.

## Performance Functional Area

## E. FIRE PROTECTION

1986 SALP Category: 1
1985 SALP Category: 2

### Summary of NRC Recommended Licensee Actions

Licensee management should continue to stress the reduction of the number of inoperable fire barriers and work toward the elimination of routine fire watches in areas containing safety-related equipment.

### Current Status

Fire protection activities since the last appraisal period have stressed good housekeeping to control transient combustibles, reduction of fire barrier impairments and fire watches, and improvements in fire protection system operation.

A management goal was set to maintain fire barrier impairments during non-outage periods at 10 or less. This initiative has resulted in timely repair of impairments and a significant reduction in the amount of time spent conducting fire watches. **Design changes have eliminated the smoke detectors within the annulus and provide detection through the Annulus Negative Pressure System outside the containment.** This change not only significantly reduced fire watch patrols and interruptions in the operation of the Annulus Negative Pressure System, but also provided ALARA and personnel safety benefits. **The NRC was consulted early in the design process so as to be assured that all concerns were addressed.**

Consultation with the NRC on fire protection issues has occurred frequently, as questions have arisen as to interpretation of fire protection requirements, particularly, whether certain instances may be handled under the evaluation criteria of Operating License Condition 2.C.9.c or require NRC notification. **Of particular note during this review period is the completion of Appendix R commitments and related fire protection modifications including the containment charcoal filter deluge fire protection systems.**

LP&L's goal to maintain the number of fire impairments at or below 10, except during outages, is a management priority, and is being largely met. **In fact, this goal was maintained coming out of Refueling Outage No. 2 prior to full power operation.** The Fire Protection and Safety **Department** tracks the impairments and apprises plant management of the status, at least weekly. Should the number of impairments exceed the goal,

management is immediately notified, the individual impairments are evaluated for closure, and the status is reported on a daily basis until returning to the target level.

## Performance Functional Area

## F. EMERGENCY PREPAREDNESS

1986 SALP Category: 2
1985 SALP Category: 2

### Summary of NRC Recommended Licensee Actions

1. Upper management attention to resolving NRC identified items in inspections and exercises should be increased.

2. Management should evaluate emergency preparedness training programs for all emergency response personnel.

### Current Status

LP&L management goes to great efforts to ensure proper response to NRC identified items. Such items are reviewed by both the Emergency Planning Department and the affected discipline (i.e., Health Physics, Training, etc.). Items are then reviewed by Licensing and receive the appropriate management reviews prior to final approval of a course of action to resolve the item, and submittal of the course of action to the NRC. NRC identified items are tracked both by the Licensing Commitments Management System and the Emergency Planning Action Item Tracking System to final resolution and determination of adequacy of the corrective action. For example, the NRC identified deficiency to improve command and control in the Emergency Operations Facility (EOF) from the 1986 Exercise was immediately acted upon by LP&L by adoption of a 3-part corrective action plan. This corrective action plan consisted of facility modifications, emergency response organization changes and training emphasis on command and control. The success of LP&L's methods for ensuring proper response to NRC identified items was exhibited by the closure of this deficiency by the NRC in the 1987 Exercise noting that command and control were improved by the LP&L changes that were made.

In regard to the still unresolved item involving Technical Support Center (TSC) size, it should be noted that no action is being taken by LP&L to increase the size of the TSC. LP&L feels that the current size is adequate and lends optimum efficiency to TSC activities. It is anticipated that this topic will be closed at the NRC Emergency Response Facility Appraisal scheduled for October 1988.

LP&L management is continuously attuned to emergency preparedness training requirements and ensures that any problems encountered with these activities are appropriately corrected. Upgrading of emergency preparedness training is an ongoing effort. Problems are identified by performance of emergency preparedness team participants during LP&L conducted drills and

call-outs, NRC annual exercises, review and evaluation of the training program by LP&L Quality Assurance and LP&L management and results of NRC inspections. The most recent NRC inspection involving emergency preparedness training at Waterford 3 occurred during the period December 14-18, 1987. The results of the inspection (Inspection Report 50-382/87-27, dated January 5, 1988) indicate that personnel designated to the emergency organization had been provided with appropriate training.

1. Emergency Planning Enhancements

Some other significant areas/items of enhancement accomplished in the Emergency Planning program during 1987 and 1988 to date are:

a. The Alert Notification System has been approved by FEMA.

b. LP&L recently awarded a contract for the implementation of a siren feedback and monitoring system.

c. The Waterford 3 Simulator is now being used for the development and conduct of emergency preparedness drills.

d. The Emergency Action Level (EAL) Procedure is being revised to ensure accurate and prompt classification decision-making.

e. Emergency response facility changes, emergency response organization changes and additional training have been implemented to improve command and control in the EOF.

f. An independent review of exercise scenario packages has been implemented to ensure accuracy and consistency of scenario events and data.

g. The use of duty rosters and pager activation has been implemented for the offsite emergency response organization (Corporate Command Center and Emergency News Center) to enhance response to an emergency.

h. State and Parish Representatives now respond to the LP&L Emergency News Center to more effectively coordinate the release of information to the public.

i. The Operational Support Center (OSC) has been expanded to enhance emergency operations.

j. Seminars have been held for the EOF, TSC and OSC personnel to improve activation of these organizations. **Additional seminars are planned in 1988 for Health Physics and Operations personnel to address lessons learned from actual declared events, drills, and the 1987 exercise deficiencies.**

k. Additional health physics equipment has been provided in the OSC and TSC to improve habitability monitoring.

l. A program consisting of periodic emergency first aid training will be established to enhance the response to medical emergencies.

m. The emergency plan training program has been upgraded to address the NRC identified deficiencies from the 1987 Exercise.

n. Presentations were given at the December 1987 Safety Meetings held with plant personnel to emphasize the health physics concerns identified from the 1987 Exercise.

2. Siren Feedback and Monitoring System

LP&L recently awarded a contract for the implementation of a siren feedback and monitoring system. This system is expected to be in place by September 1988 and allows LP&L in conjunction with St. Charles and St. John the Baptist Parishes to continually monitor critical siren system functions such as power and electronic component availability or unwanted intrusion. When the sirens are sounded or tested, the monitoring and feedback system will provide a report within a few minutes on the status of the activation. The system will utilize computer generated mapping to give a visual display of siren activation for a specific geographic region. The siren monitoring and feedback system represents a significant upgrade to the Waterford 3 alert/notification system. Up to the time this system is implemented, sirens in the system are tested at approximately two week intervals. The monitoring and feedback system is capable of providing an instantaneous report on siren problems. Sound and silent tests are presently verified by the technician visiting each of 62 siren sites to verify activation and availability within the ten mile emergency planning zone. The new system allows monitoring from a central location. Finally, this system will give the risk parishes the capability of knowing the availability status of each siren in the system prior to activation in an emergency. This allows the parish time to dispatch alert teams to a siren site for manual siren activation or to conduct routine alerting so that no time is lost in alerting the public to the need for protective action.

3. FEMA Alert/Notification System Test

The FEMA 44 CFR 350 review process requires that a complete alert/notification system test be conducted with a survey of the public in the area around a nuclear power plant prior to final FEMA approval of offsite emergency plans. This test for Waterford 3 was conducted by FEMA representatives on April 15, 1987. At that time, all elements of the alert/notification system were tested including fixed sirens, mobile sirens, industrial alerting methods, cable television override and Emergency Broadcast System messages. The helicopter alerting system was not included in this test, but it was tested by FEMA later in 1987.

The FEMA telephone survey following the test indicated that 91% of persons surveyed were directly alerted by the test. This was the highest system rating for any nuclear plant in FEMA Region VI.

FEMA representatives tested the helicopter alerting component of the system in November 1987. This test included testing the sound propagation equipment used along with establishing the times needed to alert the remote areas within the 10 mile emergency planning zone. The FEMA evaluation

indicated that the system sound propagation met or exceeded the standards established for this type of equipment. In addition, the testing of the alert routes showed that all areas around the plant could be alerted within the times established in Federal guidance.

**In separate letters dated April 8, 1988 to the NRC Executive Director for Operations and to the Governor of Louisiana, the Federal Emergency Management Agency confirmed that the Waterford 3 alert/notification system satisfies federal criteria. Additionally, the caveat addressing alert/notification system approval contained in the conditional 44 CFR 350 FEMA approval issued on July 15, 1985 has been removed.**

4. Siren System Availability

The Waterford 3 siren system is tested twice per month in accordance with Federal guidance. An audible test is conducted at the beginning of the month with a silent test performed at mid-month. Information from the tests is recorded by LP&L siren maintenance personnel and test reports are shared with Parish and State officials. This information is then compiled and submitted to FEMA as part of annual certification of the siren system.

FEMA has established a formula for determining the rate of siren system availability based on a straight arithmetic average dividing sirens available by the number of sirens tested. For the past two years that the FEMA reporting requirements have been in place, Waterford 3 has maintained a very high rate of siren availability. The siren availability rate for calendar year 1986 was 99.3%. For 1987 this rate was 98.9%.

5. Waterford 3 Simulator Used for Emergency Preparedness Activities

In an effort to improve the Waterford 3 emergency preparedness drill program, the Waterford 3 simulator is now being used for the development and conduct of drills and exercises. The simulator was initially used for the 1st Quarter Site Drill. It provided a more effective test of the operational response to an emergency. Its use for the development of drill packages should allow for more realistic scenarios and improve the Operator response. The use of the simulator, and the independent scenario review that has been implemented, should also increase the accuracy of the data presented to the drill/exercise participants.

6. EAL Procedure Revision

The EAL procedure has received an intensive review by several Waterford 3 departments. The comments received by these groups are being incorporated into a major procedure revision. This revision should eliminate some previously identified inaccuracies and improve the emergency classification decision-making.

7. Lessons Learned Seminars

Seminars were held with emergency response personnel to address "lessons learned" from EOF and TSC/OSC callout drills. The seminars emphasized the importance of prompt activation of the facilities in an emergency situation. As a result of these seminars, we are implementing a pager

activation program for the EOF personnel to improve response. In addition, seminars are scheduled to be conducted in 1988 with Health Physics and Operations personnel to address lessons learned from actual declared events, drills, and the 1987 exercise.

8. Emergency First Aid Team Mini-Drills

Beginning in December 1987, a series of mini-drills were conducted for the Emergency First Aid Team qualified personnel. The drills emphasized prompt medical care and the importance of obtaining assistance from offsite medical facilities. LP&L has initiated a program to provide this additional training on a periodic basis to enhance the treatment of Waterford 3 injured personnel.

9. Additional Rumor Control Operators Trained

In April of 1988, 65 additional Rumor Control Operators who work out of Orleans Division (City of New Orleans) were trained on the Waterford 3 emergency plan and specific methods for handling calls in an emergency. This brings the number of operators trained to handle rumor calls to 142.

10. Corporate Command Center (CCC) Relocated

The LP&L Corporate Command Center was moved from 142 Delaronde Street to 317 Baronne Street, New Orleans. This new facility, which was tested for the first time during the March 9, 1988 site drill, creates a number of efficiencies. It is a convenience for the majority of the CCC staff officers who are domiciled at 317 Baronne Street. It also places the CCC in close proximity to the Emergency News Center. This allows for efficiency in the LP&L news bulletin approval process.

11. March 1988 Inspection (88-07)

As a result of NRC observations made during Inspection 88-07 in March of 1988, emergency lighting and a clock were provided in the Backup EOF. These items were identified during the inspection and corrective action completed the week following.

In addition, in response to a violation identified in this inspection, LP&L performed a complete review of all Emergency Management Resources Books for the Backup EOF, Corporate Command Center and Emergency News Center (ENC). Seminars were held for all Emergency Management Resources Book document updaters as well as all CCC and ENC emergency responders to ensure familiarity with procedural requirements regarding controlled documents and the Emergency Management Resources Book in particular. LP&L is in the process of taking additional corrective action by marking the Emergency Management Resources Book document with a special label identifying it as a controlled document and instructing personnel to contact the Emergency Planning Department for any alterations that are necessary.

## Performance Functional Area

## G. SECURITY AND SAFEGUARDS

1986 SALP Category: 2
1985 SALP Category: 1

### Summary of NRC Recommended Licensee Actions

1. The licensee should continue to enhance the security training of non-security personnel in order to prevent recurrence of physical barrier violations.

2. Licensee management should ensure the evaluation of the closed circuit television system is complete and appropriate modifications are made.

### Current Status

Waterford 3 management continues to apply a high level of attention to the security program including the implementation of safeguards requirements, the selection and training of security personnel, the training of non-security personnel regarding the security program, the Fitness for Duty Program, and physical improvements to the security systems.

Waterford 3 management has long supported a drug awareness education program within Nuclear Operations. Our education efforts coupled with random drug testing have resulted in very low positive urinalysis findings. Of 462 random urinalysis tests recently conducted (June 1987 to June 1988) less than ½ of 1% had positive findings.

Some other significant areas/items of improvement accomplished in the security program during 1987 and 1988 to date include:

1. Changes within the Security Department:

   a. The perimeter detection system is being upgraded.

   b. The Security Computer System upgrade was completed on May 31, 1987. The upgrade included installing new disk drives to increase Security Computer System reliability that provides:

      1) 366 days of history on disk.

      2) Increased throughput of the system (e.g., processing access request via card readers).

3) Increased availability of the system. Since installation of the new disk drives, the system has not been off line for preventive maintenance or adjustments due to the drives.

c. The access control program upgrade is continuing. On May 23 and 24, 1988, Sygnetron installed a new software package, which includes the access control programs, on the Security I&C Lab computer. The new Security/I&C Lab software allows the Security Department to train certified Central Alarm Station (CAS)/Secondary Alarm Station (SAS) operators with the software before installation on the plant Security Computer System. Software is tentatively scheduled to be installed on the plant Security Computer System during 1988 after completion of training, revising procedures and passing a factory acceptance test.

d. 10CFR73.57 (Requirements for criminal history checks of individuals granted unescorted access to a nuclear power facility or access to Safeguards Information by power reactor licensees) has been implemented.

e. Contract Security Personnel are State certified.

f. The Security Training Program is State certified.

g. The Security Training Program has been upgraded to include a physical training complex for practicing contingency scenarios.

h. Weapons training has been upgraded.

i. Security equipment has been upgraded to include special weapons and an increased number of response vehicles.

j. Select Security personnel have received specialized training by offsite agencies.

k. The assessment aids system upgrade is continuing. All the new camera foundations have been completed. After final approval and acceptance, the final installation of the assessment aides system upgrades should start in October 1988.

l. The attrition rate of Security Personnel was reduced from 20% in 1986 to 11% in 1987.

2. Other areas of improvement:

a. The Behavioral Reliability Training Program has been updated to include drug and alcohol abuse, and in addition, the retraining of supervisory personnel was initiated.

b. There is now a plant administrative procedure on penetrating physical barriers.

c. Additional information signs have been placed on potential access portals to vital areas to decrease the potential for vital area barrier violations.

d. The General Employee Training (GET 1) has been updated to include physical barrier violation information.

e. Verbal and written information has been disseminated regarding the new Security reporting requirements, 10CFR73.71.

f. There is a mandatory retraining class for personnel who violate security programs.

**g. An alcohol abuse testing program is being developed for regular random testing.**

3. Enhanced Training of Non-Security Personnel

Much has been done to make onsite personnel more aware of their security responsibilities. Meetings were held with onsite Nuclear Operations Personnel to acquaint them with the new Security reporting requirements covered by 10CFR73.71 and Regulatory Guide 5.62. Applicable procedures were updated to reflect the new guidelines. The Security portion of the General Employee Training class has been updated to cover the personal security responsibility of each individual. Personnel who have not complied with the Security program are required to attend a Security Retraining Class which includes the Security portion of the General Employee Training Class. Personnel have been made more aware of the LP&L Drug and Alcohol Program by having the month of February designated Drug and Alcohol Awareness Month, such that the monthly on-site Safety Meeting is on Drug and Alcohol Abuse. The Behavioral Reliability Training Program has been updated to include drug and alcohol abuse. Security requirements are also outlined in the Outage Manual which is applicable to personnel granted unescorted access to the plant.

A plant administrative procedure has been developed on penetrating physical barriers (UNT-04-036, Security for Penetrating PA&VA Barriers). A further deterrent for accidental penetration of physical barriers is an increased number of information signs on potential access portals to vital areas. Additionally, the GET 1 class has been updated to include physical barrier violation information.

4. Enhancements to Closed Circuit Television System

A station modification program is in progress that will greatly enhance the operation, performance, and reliability of the closed circuit television (CCTV) system. This project involves a complete revamp of the system, including replacement of major video equipment in the Central Alarm Station (CAS) and Secondary Alarm Station (SAS). Relocation of exterior cameras will provide improved coverage of the committed areas as well as elimination of undesirable obstacles. The existing cameras will be replaced with a solid state type, providing improvements in ease of maintenance, reliability, and quality of video. Replacement of video equipment in the CAS and SAS will provide expanded alarm assessment capabilities such as "preshot" positions for the pan-tilt-zoom cameras. Completion is scheduled for the latter part of 1988.

## Performance Functional Area

## H. OUTAGES

1986 SALP Category: 1
1985 SALP Category: Not Assessed

### Summary of NRC Recommended Licensee Actions

1. Licensee management should continue with aggressive involvement in outages.

2. Some improvement could be made in scheduling of equipment testing/inspection so that multiple equipment outages are avoided.

3. Progress of the revision of the RWP procedures should be monitored so that the revised program is in place and functioning before the next scheduled outage.

### Current Status

1. **Management Involvement and Control**

Refueling Outage No. 2 commenced on April 1, 1988 at 2330 hours when Waterford 3 was removed from grid.

The refueling outage preparation organization made an orderly transition into the outage. A month prior to the outage the Plant Manager assumed responsibility as the Outage Manager. The Refueling Preparation Manager who had reported to the Vice President - Nuclear on overall outage readiness resumed direct reporting to the Plant Manager as the Outage Supervisor. The Refueling Director, who developed the plans for refueling and other containment activities and services, and the other key coordinators/project leads assumed their respective outage management roles. Thus, the Plant Manager was provided with direct control, supported by experienced and knowledgeable individuals.

The outage was completed on May 31, 1988 at 2111 hours, a duration of 59 days 21 hours and 41 minutes. This relatively short duration for a second refueling outage illustrates the successful application of pre-outage detailed planning by the outage preparation organization as well as continuous management involvement and control during the outage.

Several improvements based on recommendations from Refueling Outage No. 1 critiques were used to ensure management involvement and control of outage activities:

a. Assignment of a backshift Duty Outage Manager, usually one of the Assistant Plant Managers, who provided management direction and decision making capability on backshifts.

b. Assignment of a backshift Duty Maintenance Superintendent, one of the Maintenance Assistant Superintendents, to provide improved coordination and direction to plant maintenance personnel.

c. Establishment of a formal Plan of the Night meeting, chaired by the Duty Outage Supervisor, to formally communicate and coordinate priorities among the various work groups.

d. Continuous monitoring and adjustment of goals by the Outage Manager and his staff maintained priority work in a highly visible state while emphasizing safe and efficient accomplishment of those goals.

e. Management again focused on the orientation of temporary and existing employees prior to the outage stressing compliance to site procedures, work rules safety, security and radiation protection practices.

f. Durin[illegible]age, efforts were made to ensure widespread awareness of the out[illegible]rogress and upcoming goals.

g. Use of an integrated service agreement placed the majority of the containment activities under direct operations control.

h. Temporary reporting of other experienced Nuclear Operations personnel supplemented the plant staff.

As emergent work was identified during the outage, management continually reviewed and prioritized the work. Superintendents and managers reporting directly to the Outage Managers were routinely assigned responsibility for providing coordination and action plans to expeditiously resolve conditions identified as having potential outage impact.

The Comprehensive Outage Network schedule was used as a baseline model and provided capability to quickly and effectively integrate emergent work to quantify its outage impact. Management overview was routinely accomplished by the early identification of potential impacts to the schedule by the Outage Manager and his staff allowing prompt action for resolution.

The outage facility program enabled optimum use of site areas and ensured conflicts between erection and demobilization of temporary facilities were minimized.

Assignment of a Retest Coordinator dedicated to coordinating retests of maintenance work provided close coordination between Operations and Maintenance in completing necessary retesting of components. The efforts of the Retest Coordinator contributed significantly to an improvement in the ease of the plant startup Mode changes Specific guidelines used in Refueling Outage No. 2 for control of retest activities will be codified in the Refueling Outage No. 3 Outage Manual.

2. Scheduling Equipment Outages

We are currently implementing several programs to improve coordination between work groups and equipment outages to ensure maximum effectiveness of maintenance activities. Among these enhancements are:

a. Implementation of a long range component outage schedule to allow scheduling of maintenance repair work within time frames necessary to complete repetitive maintenance.

b. Use of the Station Information Management System (SIMS) to review and coordinate corrective maintenance work with repetitive task work, such as ensuring a calibration task is performed in conjunction with corrective maintenance work on a transmitter. SIMS has also enabled a wider and more comprehensive review of related work involved in component or system outages.

c. The Maintenance Department has continued to work toward consolidating related tasks on individual components with a single task.

d. The scheduling format and process used during Refueling Outage No. 2 was essentially that used during normal operations. As a result of maintaining a consistent scheduling system, overall understanding and control of maintenance work were enhanced. Guidance on the changes to routine scheduling methodology used during outages will be incorporated into the Refueling Outage No. 3 Outage Manual.

3. Revisions to Radiation Work Permit Procedure

During Refueling Outage No. 2 the use of the new radiation work permit procedure, HP-01-110, Radiation Work Permit (RWP), in conjunction with close coordination between the Scheduling and Health Physics Staffs, resulted in far fewer schedule/RWP conflicts. Further refinements in the SIMS scheduling and RWP request process should assist in minimizing any future impacts.

4. Refueling Outage No. 2 Major Activities/Events

Some of the more significant activities/events that occurred during Refueling Outage No. 2 are discussed below:

a. Main Steam Isolation Valve Guide Rail Failure

Waterford 3 personnel on April 9, 1988 found a broken guide rail piece from a Main Steam Isolation Valve (MSIV) lodged in the strainer of the turbine throttle valve. Waterford 3 management implemented comprehensive investigations, analyses, tests, and evaluations in order to determine the scope of the problem, root cause, corrective actions and safety implications.

It was determined that both Main Steam Isolation Valves were affected by the failure mechanisms. One MSIV guide rail came loose from the skirt and was broken in two pieces, one piece becoming lodged in the turbine throttle valve strainer, the other piece found upstream of the

steam chest in the main steam piping. The second guide rail to the same seat skirt was found inside the MSIV valve body below the gate. The other two guides on the opposite seat were still attached to the seat skirts, but several of the bolt heads were found broken. The guide rails on the other MSIV remained attached to the skirt but several of the bolts on both guide assemblies were broken. There were varying degrees of galling found on the top and bottom of the Lev-R-Loc arm shoes and the guide rails where contact was made. The main steam piping was visually inspected, and there was no visible damage to the piping. There was no damage to any other plant component or system, except for the turbine throttle valve strainer which was slightly deformed from the impact and lodging of the broken guide rail piece.

The root cause of the MSIV gate guide rail failure was determined to be due to material galling and the localized geometry of the contact surfaces of the Lev-R-Loc shoe and guide rail chamfer. The galling and shoe/guide rail contact geometry resulted in severe forces being applied to the guide rails and transmitted to the bolts fastening the guide rails to the skirt plates. The results of the scanning microscopy and optical microscopy indicated that the ultimate failure mode of the bolts was shear overload. The following factors contributed to the failure of the bolts:

- Misalignment of the bolts fastening the guide rails to the skirt plates, and

- Galvanic type corrosion of the bolts fastening the guide rails to the skirt plates.

The metallurgical evaluation revealed no evidence of quench cracking of the bolts or other material defects occurring from the fabrication process.

A number of design enhancements and corrective actions have been implemented to provide assurance that the guide rails will not be susceptible to the same failure mechanisms. The design enhancements and corrective actions are the following:

- Changing the contact angle on the guide rails from 45 degrees to 30 degrees. This change dramatically changes the maximum impact force on the guide rail from about 31 kips to about 5 kips for a coefficient of friction of about 0.67.

- Stelliting the contact angles on the guide rails and the circumference of the Lev-R-Loc shoes with a Stellite 6 overlay, smoothly merging flat surfaces with 5/8 inch radii. This change will prevent galling to the Lev-R-Loc shoe and guide rail interface.

- Changing the material for the bolts fastening the guide rails and the skirt plate to 17-4PH. This change will prevent galvanic type corrosion of the bolts due to material incompatibility between the bolts and the guide rails.

- Performing NDE for all new bolts. This preventive measure will provide assurance that the bolts have no surface flaws.

- Verifying alignment of the bolts fastening the guide rails and skirt plates. This preventive measure will assure that stresses are not generated from misalignment of the bolts.

- Verifying the proper torquing of the bolts. This preventive measure will assure that the bolts are not overstressed due to overtorquing.

Waterford 3 evaluated the safety implications of the failure of the MSIV guide rails. The evaluations demonstrate that the MSIV would close within the required time, that loose guide rails or loose parts from the guide rail would not prevent closure of the valve, and that loose parts generated by a broken guide rail would not affect safety components or systems.

b. Reactor Vessel Hot Leg Nozzle Indications

An ultrasonic examination was performed on the reactor vessel welds and flange ligaments in accordance with the Waterford 3 Ten Year Inservice Inspection Program and Section XI of the ASME Code.

During the inservice ultrasonic examination of the hot leg nozzle to shell weld located at 0 degree vessel axis, three recordable indications were noted. In an effort to further characterize these indications, supplemental examinations were performed using the Dynacon Ultrasonic Data Recording and Processing System (UDRPS).

UDRPS allows for more extensive recording of data, better visualization of examination data through the use of color-coded images, more flexible manipulation of data, and more consistent examination quality and archival retrieval of past examinations for comparison purposes. With UDRPS, the indications appeared to be rounded, volumetric-type reflectors, most probably deposited during the fabrication process. These indications were determined to exceed the acceptance standards in Table IWB-3512-1 of the ASME Section XI, 1980 Edition through the 1981 Winter Addenda.

Accordingly, a fracture mechanics analysis, using the rules of IWB-3600 and the guidelines of Appendix A, Section XI, 1980 Edition through Winter 198 Addenda, was performed for the three indications. The indications have been determined to be acceptable by fracture mechanics analysis. In accordance with IWB-2420(b), the indications will be re-examined during the next three inspection periods.

c. Steam Generator Tube Plugs

In August 1985, 596 mechanical plugs were installed in Waterford 3 steam generator tubes in the batwing area as a precaution against tube leakage in this area. As a result of field experience, Combustion Engineering later advised LP&L that rerolling these plugs would give further assurance against water entrapment between the plugs which could result in plugs being expelled from the tubes. In December 1986 (during the first refueling outage), five of these plugs were found missing from the #1 steam generator at the time the rerolling operation was being performed. The five missing plugs were replaced with Westinghouse mechanical plugs. Of the five missing plugs, one was recovered and removed from the Reactor Coolant System (RCS). A safety evaluation was performed to determine if the missing loose plugs in the steam generator would create a safety hazard or have a deleterious effect on reactor performance. In summary, the safety evaluation stated that operating with 4 loose plugs inside the RCS would not create significant concerns as long as the plugs would remain intact and did not fragment into small pieces. Tube plug fragmenting was a remote possibility in that the plug material is too ductile to fragment under the conditions they would be subjected to in the RCS.

During the Waterford 3 second refueling outage, visual inspection of the Waterford 3 steam generators revealed that no plugs were missing from their tubes, which indicates the rerolling process that took place in December 1986, remedied the potential adverse effects of water entrapment. In addition, two complete and one partial plug of the original four missing plugs were recovered from the RCS.

Intact steam generator tube plugs are approximately 5" long. The recovered partial plug which was approximately 2" long had been sheared, rather than fragmented, at some point in the RCS. The only place that shearing could have occurred would be in one of the Reactor Coolant Pumps. There appeared to be no evidence that the plug was sheared into pieces small enough to pass through the most restrictive core internal orifice. The remaining unrecovered partial plug is approximately 3" long and too large to reach any area of concern near the fuel assemblies.

d. Integrated Leakage Rate Test

The first periodic integrated leakage rate test (ILRT) on the Waterford 3 containment was successfully completed on May 23, 1988. Acceptance criteria specified in the test procedure were satisfied. Test results and acceptance criteria are listed below.

| Parameter | Result | Acceptance Limit(s) |
|---|---|---|
| 95% upper confidence limit (UCL) on total time leakage rate (including additions) | 0.116 wt%/day | <0.37wt%/day |
| Total time leakage rate trend extrapolated to 24 hours | <0.051 | <0.375 |
| Mean of the measured leakage rates over the final 5 hours | <0.16 | <0.500 |
| Verification leakage rate | 0.534 | 0.440-0.690 |
| As found 95% UCL (test result plus minimum pathway improvements) | 0.123 | <0.375 |

Containment pressurization started at about 0210 hours on May 22, 1988 and was stopped at about 1350 hours on the same day when containment pressure had reached 46 psig. Containment atmosphere mean temperature met the stability criteria within the four hour mandatory stabilization period. The start of the eight hour (minimum) test period was declared at 1800 hours. The test was ended at 0215 hours on May 23 and the verification leakage was imposed. The verification test was started at 0345 hours, following a mandatory one hour stabilization period, and ended at 0800 hours. Containment pressure stayed between 46 and 44 psig throughout the stabilization, test and verification phases.

The ILRT was conducted in accordance with procedure PE-5-001, Containment Integrated Leakage Rate Test, which incorporated the requirements of FSAR 3.8.2.7 and 6.2.6, the Technical Specifications 4.6, Appendix J to 10CFR50, and BN-TOP-1. ANSI/ANS 56.8, Containment System Leakage Testing Requirements, on piping systems penetrating containment were aligned as specified in the FSAR, with the exception of those on the shutdown cooling lines. Although the isolation valve to the RCP deluge system was closed during the test, fire protection continued by use of hose stations.

A structural examination of the exterior and interior surfaces of the shield building was performed in conjunction with the ILRT as required by technical specification. No evidence of degradation was found.

e. Drop Time Testing

Waterford 3 tests the Control Element Drive Mechanism Control System/ Plant Protection System (CEDMCS/PPS) subsequent to each refueling outage to confirm assumptions made in the SAR and comply with Technical Specification 4.1.3.4. The test determines the time required for each full length Control Element Assembly (CEA) to become 90 percent inserted after power is removed from the holding coil.

The drop time test utilized software loaded onto one of the CEA Calculators (CEAC). The software initiated a trip via the Core Protection Calculators (CPC) and recorded the time each rod required to accumulate 1100 counts on the CEAC (90 percent inserted) via the reed switch position indicators.

The maximum time allowed by Technical Specification 3.1.3.4 was 3000 msec. The longest drop time during the test on May 28, 1988, was one CEA for 2998 msec. The procedure was executed without incident. The 91 CEA average drop time was 2852 ± 90 msec. Waterford 3 will pursue a Technical Specification change to require measurement of the average drop time in the future.

f. CEA Uncoupling From Upper Guide Structure

The Upper Guide Structure (UGS) is designed to provide lateral support for the upper ends of the fuel bundles, hold down the fuel bundles, maintain CEA spacing, and shield withdrawn CEAs from reactor coolant cross-flow. The CEA extension shaft connects the spider assembly of borated rods to the Control Element Drive Mechanism (CEDM). Before removing the UGS, the extension shaft must be uncoupled from the socket on top of the CEA, leaving the CEAs in the core during refueling.

The extension shaft has spring loaded fingers at the very bottom end. Those spring loaded fingers expand and contract via a plunger inside of the extension shaft. To disengage the top of the spider from the bottom of the extension shaft, the plunger is raised with a tool. To confirm a disengagement the extension shaft is "weighed" after the disconnect (it should be much lighter without the CEA connected; 140 lbs vs. 225 lbs). After "weighing", the extension shaft is put back down with the expanded fingers resting on top of the CEA spider hub. The plunger is pinned in a position to keep the extension shaft fingers properly expanded.

On April 24, 1988, while hoisting the UGS from the reactor vessel, CEA No. 55 came out with the structure. This is not a common occurrence, but it is not unusual. Because the UGS lift weight was about 75 tons, the added burden of the stuck CEA was not detectable until the bottom of the UGS cleared the reactor vessel and the CEA became visible.

With the use of a mini-sub containing a video camera, it was determined which CEA was involved and partially withdrew it with the extension shaft handling tool into the UGS so the lift could continue. The CEA was raised to its maximum length of travel where it was clamped in place with approximately 15 inches of the CEA extending below the UGS because five fingered CEAs cannot be raised completely into the shroud. After the UGS was placed in the deep end of the refueling canal, the CEA was lowered to the refueling canal floor and uncoupled. While holding the CEA with a nylon rope, the UGS was raised until the CEA cleared the UGS. The CEA then sank slowly until it was horizontal on the floor.

Subsequent investigation of the extension shaft for CEA 55 found that the expansion (collet) fingers that fit in the socket on top of the CEA did not move properly during the final disengaging process. Tapping the expansion shaft during the investigation caused the fingers to move to the proper position.

g. Containment Cooling Fans

On May 28, 1988, Waterford 3 was in the process of entering mode 2 to perform Low Power Physics Testing. At approximately 1400 hours plant personnel discovered that the 'C' Containment Cooling Fan was inoperable due to the sudden failure of the fan motor windings. Technical Specification 3.6.2.2 requires two independent groups of Containment Cooling Fans be operable with two fan systems in each group for modes 1, 2, 3, and 4 with Technical Specification 3.0.4 applicable. If this condition is not satisfied, the inoperable group of cooling fans must be returned to an operable status within 72 hours or be in hot standby in the next six hours and cold shutdown in the following 78 hours.

Upon discovery, LP&L contacted vendors and utilities throughout the country, as well as Canada, for a fan motor which would meet the design requirements for this particular application. This initial effort proved fruitless, therefore, LP&L was faced with two options. The first was to rework the motor windings and the second was to effect a design change, if possible, which would accommodate an acceptable available fan motor. In any case, each option would require Waterford 3 to maintain cold shutdown conditions for an extended interval.

On May 30, 1988, LP&L submitted a letter to the NRC requesting enforcement discretion which would allow Waterford 3 to operate at or below $10^{-1}$% power until completion of Low Power Physics Testing.

LP&L and Ebasco engineers began an analysis to determine whether a Technical Specification change to allow operation with one cooling fan in each group would be feasible. This analysis was completed on May 31, 1988 and a request for a Temporary Waiver of Compliance and an Emergency Technical Specification change was submitted to the NRC. On June 2, 1988, LP&L received approval of the Technical Specification change request resulting in minimal impact on the outage.

h. Fuel Inspection and Reconstitution

During Refueling Outage No. 2, an ultrasonic failed-fuel-rod detection system offered by BBC Brown Boveri Nuclear Services, Inc. was used for fuel inspection. This ultrasonic inspection method was selected based on a reported accuracy rate of 99.9% in detecting failed fuel rods.

On April 21, 1988, the inspection began of the 92 fuel assemblies which were discharged at the end of operating Cycle 1 and which were stored in the spent fuel pool. Those fuel rods were inspected to determine which ones could be considered candidates for recaging for use in future operating cycles.

Next came off-loading the core. As they were transferred to the spent fuel pool, each of the 133 fuel assemblies, which were to be used in operating Cycle 3, were inspected. Eight leaking fuel rods in five assemblies were identified. Each of the five assemblies was reconstituted by a team from Combustion Engineering. In four of the assemblies, the leaking rods were replaced with solid stainless steel rods. Since the leaking rod in the fifth assembly broke during removal, the assembly was recaged. The parts of the broken rod were retrieved and placed in a special encapsulation tube. Combustion Engineering is evaluating the cause of the rod failures.

Inspection and reconstitution of the fuel assemblies were completed in the fifth week of Refueling Outage No. 2.

i. Shutdown Cooling (SDC) Pump Cavitation

On May 12, 1988, while at mid-loop operation, inaccurate RCS level indication resulted in draining the RCS to a level that allowed vortexing in the RCS Hot Leg at the suction of the running SDC pump. The vortexing entrained air which caused the "A" LPSI pump flow to oscillate and some amount of cavitation to occur. The operators took appropriate corrective actions in accordance with training and plant procedures to correct the situation with the result that at no time was the shutdown cooling heat removal capability ever lost.

The circumstances that led to these conditions involved inadequate control in the transition from construction to operation of the new Refueling Water Level Indicating System. Corrective actions are currently being taken to prevent recurrence of these unacceptable circumstances.

j. Reactor Coolant Pump Seals

During the second refueling outage, reactor coolant pump seals of a new design were installed on the four reactor coolant pumps at Waterford 3. The new seals are expected to be more reliable than those being replaced. There are many improved features associated with these seals which include improved control bleedoff flow characteristics, internal orientation of pressure breakdown coils, an improved spring assembly design, improved rotational stability, smaller number of metal to metal interface points, and improved resistance to de-staging due to temperature and pressure transients. Collectively, these improved features should increase the life time of the seals. As we gain experience, it is expected that the new design seals could last as long as two refueling cycles before replacement.

5. Future Plans

Waterford 3 is currently conducting post-outage critiques as a basis for the Outage Report which is expected to be issued by September 1988. This Outage Report and its attendant action items will be used as a basis for further improvements in pre-outage scheduling and performance during Refueling Outage No. 3. Future plans include improved productivity monitoring by using SIMS and cost-work order accountability.

LOUISIANA POWER & LIGHT COMPANY
WATERFORD 3 SALP PROGRESS REPORT

Performance Functional Area

## I. QUALITY PROGRAMS AND ADMINISTRATIVE CONTROLS AFFECTING QUALITY

1986 SALP Category: 2
1985 SALP Category: 2

Summary of NRC Recommended Licensee Actions

1. Resolve the lingering problems associated with the plant computer system,

2. Perform additional reviews of plant procedures to eliminate the practice of using informational notes as procedural requirements,

3. Monitor the follow-up of the concerns identified in the NRC EQ Inspection to ensure continued compliance, and

4. Monitor the station modification program so that continued progress is made in reducing the number of outstanding station modifications in the review cycle.

Current Status

Waterford 3 management recognizes the importance of plant programs and controls designed to ensure quality.

In November 1987, the procurement control process was significantly strengthened through the implementation of a computerized Materials Management Information System (MMIS). MMIS was developed as an enhancement to the existing Nuclear Spare Parts Inventory System which was only utilized for inventory control. In addition to the inventory control provision, MMIS can be utilized to generate/process purchase requisitions and orders and to acquire the application information or generic requirement for a particular part and its end use. MMIS is discussed in more detail in Section C, Maintenance, Item 8.

The control of design changes has been enhanced to allow better coordination of the change process from initiation of a change to its closure. Nuclear Operations Engineering Procedures have been developed and/or upgraded in efforts to refine each phase of the modification process. Based on a high level of attention and a more refined scheduling system, significant progress has been made in closing station modifications.

The Operations and Maintenance Departments have developed comprehensive procedure writing guidelines in efforts to eliminate procedural deficiencies. These guidelines will be used to develop, revise or upgrade operating procedures which should aid in improving procedural compliance. Significant improvements in operational procedures should also be realized through training on the Waterford 3 simulator which was placed in service in 1987.

The Waterford 3 equipment qualification program continues to be responsive to and in compliance with the applicable regulatory programs and requirements.

Other areas of improvement in this category include:

1. Plant Monitoring Computer (PMC)

External problems which have resulted in PMC outages have been identified and corrections are being implemented. Problems such as the Static Uninterruptible Power Supply and the Fixed Incore Detector signal cables are being addressed by station modifications. It is expected that these modifications will result in improved PMC reliability.

Other PMC reliability problems are being addressed by the computer engineering staff. Areas such as operating system improvement, input relay cards and communication failures have been examined and corrective action is either in progress or planned. These improvement initiatives include:

a) A more reliable CPU 3 software operating system has been purchased and should be installed by August 1988.

b) A station modification was made to replace the relay input cards with more reliable solid state cards. The changeout of these cards occurred in May 1988 during the second refueling outage.

c) A station modification to install a hardware reset switch is in the planning stage. It is expected that this reset ability will reduce PMC outages caused by a loss of communication between the multiplexers and PMC CPU 1.

Waterford 3 has requested and received a technical specification change (NPF-38-68) which will minimize the impact of the loss of the PMC on plant operations (i.e., reduce the need for power reductions) due to COLSS/CPC monitoring requirements.

2. Procedural Related Deficiencies

A human factors review of Operations and Maintenance department procedures and procedure writing guidelines was performed by an industry expert for the purpose of making recommendations for enhancements. Subsequently, these recommendations were used as input to establish enhanced procedure writing guidelines. These guidelines will then be used as necessary to upgrade procedures as they are reviewed during the biennial review cycle.

To date, comprehensive writer's guides for operating procedures and maintenance procedure have been developed. This effort should significantly reduce procedural human factors problems which could lead to procedure violations.

In addition to the above, a series of meetings was conducted by the Plant Manager to improve procedural awareness and attention to detail. These meetings were attended by members of Plant Staff and supporting organizations. Feedback on management efforts to improve procedural awareness and

attention to detail is being solicited from Plant Advisory Groups. This feedback will be used to initiate action by management to ensure that station personnel are aware of the importance of procedural compliance from both a human factors and a technical standpoint.

3. EQ Inspection Concerns

The specific concerns that were identified in the LP&L QA Program included:

a) No records to demonstrate qualification for equipment subject to submergence under design basis accident conditions,

b) improper temperature lag analysis, and

c) inadequate schedules for replacement of components susceptible to aging effects at elevated service temperatures.

Evaluations of the above concerns have been performed and the results reflect continued compliance with the NRC regulations. Specific responses to each of these concerns are as follows:

a) EQ equipment has been evaluated for submergence during DBA conditions. There were no pieces of EQ equipment identified that must perform a safety function after becoming submerged.

b) LP&L has evaluated the thermal lag analysis for cable and transmitters and has determined that the calculations contain sufficient margin to meet NRC requirements.

c) Components susceptible to aging degradation have been evaluated and replacement/maintenance schedules have been outlined in the EQ Files. Environmental conditions (normal, elevated and accident) have been accounted for when determining replacement/maintenance schedules.

4. Station Modifications

In order to improve the retrieval of documents associated with Station Modification (SM) packages, a policy of a single work authorization per SM package was implemented. This policy enhanced both tracking and retrieval of the work package documentation. Implementation of the SIMS System, part of which provides for the scheduling and tracking of individual condition identifications with a blanket work authorization for SM packages, supplements this policy.

Processing of station modifications has been enhanced by developing and implementing new methodology under a Nuclear Operations Procedure. The new procedure better delineates the steps and controls necessary to maintain positive control of plant configuration. The new logic is also being incorporated into enhanced scheduling and tracking techniques.

The effort to reduce SM backlogs has resulted in closing 619 modification packages over the period from March 1, 1987 through May 31, 1988.

5. Quality Assurance

In line with the teamwork philosophy adopted by LP&L management, the QA organization has incorporated several changes in the QA Program to facilitate the integration of QA support within plant operations activities:

a. An integrated Receipt Inspection Plan was developed and implemented, which consolidated the audit process, the receipt inspection process, and material issuance. This integrated approach should provide:

   - A performance history of suppliers based on receipt inspection activities

   - An increased interface between the audit process and the inspection process enabling a more rapid response to issues raised.

   - An increased confidence level in the quality of parts/materials used in plant operations.

b. Supplier Quality Assurance continued their involvement in the Joint Suppliers Audit Program (JSAP) which allows sharing of audit information and auditing processes with the member companies of Middle South Utilities (SERI and AP&L). The JSAP forum provides for an increased awareness of utility issues and results in recommended improvements in day-to-day operations.

c. Enhancements to the Quality Trend Program were made by revising the trend categories to provide more meaningful data to operations management and to maintain consistency with the categories established and evaluated by the NRC. LP&L visited other utilities in its effort to develop one of the industry's leading Trend Programs. The completed program was presented at the 1987 Annual American Nuclear Society Conference held in California. **Further improvements to address NRC suggestions during the early 1988 Quality Verification Inspection are under consideration.** The entire trending program has now been shifted to the Event Analysis Reporting and Response organization, which reports to the Plant Manager. The QA organization will continue to provide expertise during the transition.

d. The QA organization conducted an extensive review of quality related records sent to the Waterford 3 Record Center during the operating phases of Waterford 3. The review team was comprised of four contract personnel and one LP&L coordinator for approximately nine months. The results of the review determined that the quality of the documentation was acceptable and minor deficiencies were able to be programmatically addressed. The originating organizations were involved in the necessary document corrections and subsequent procedure development or revisions.

e. The integration of the QA Inspection organization into the Operations QA Section has enhanced the effectiveness of the QA verification process through cross-training and better personnel utilization. During the second refueling outage, a functional organization fully integrated audit/surveillance and inspection personnel to maintain coverage around the clock, seven days a week.

f. Operations QA is taking a more proactive approach to the quality verification function by concentrating on the performance of surveillances of on-going day-to-day activities and factoring the results of these surveillances into the audit process.

g. The following is a tabulation of QA support activities for 1987:

| | |
|---|---|
| Operations Audits | 38 |
| Operations Surveillances | 85 |
| Supplier Audits | 71 |
| Supplier Surveillances | 19 |

In addition to audits and surveillances, involvement by Quality Assurance in daily plant activities continues through attendance at daily planning meetings, NRC entrance and exit meetings, refuel planning meetings, validations of NRC responses, procedure reviews, station modification package reviews, inspections, nondestructive testing, procurement document reviews, and maintenance of a Qualified Supplier List.

## Performance Functional Area

## J. LICENSING ACTIVITIES

1986 SALP Category: 1
1985 SALP Category: 2

### Summary of NRC Recommended Licensee Actions

1. Licensee should continue to maintain a high level of management involvement to assure continued improvement.

2. Continued emphasis should be placed to assure supporting analyses continue to be thorough, complete and timely.

3. Focus on expeditious resolution of the SPDS issues to achieve acceptable design and operation.

### Current Status

The licensing activity in 1987 concentrated on the resolution of the few remaining longstanding issues with the NRC, while at the same time assuring that significant progress was made in the licensing functional areas. Examples of outstanding issues which were resolved include licensing of the Broad Range Toxic Gas Detection System (see Section A, Plant Operations, Item 7b), the redesign of the Safety Parameter Display System (SPDS), human factors improvements required as a result of the Detailed Control Room Design Review (DCRDR), and the confirmatory analysis and monitoring program associated with the basemat cracks. Progress continued in standard licensing functional areas such as technical specification enhancements, resolutions of issues, responses to NRC inspections, closure of commitments, and the Cycle 3 reload.

Management continued its direction of, and active participation in all aspects of regulatory activities. A particularly successful action in this regard was instituted in late 1986. The Senior Vice President-Nuclear Operations chairs regularly scheduled meetings of his senior staff to review current Waterford 3 performance and provide management guidance and direction for the future course of plant activities. Of prime importance to the senior management group is plant safety and, consequently, the resolution of regulatory issues. As a standard practice, significant licensing issues are presented to the senior managers for their initial direction; thereafter, briefings are presented as needed through final resolution of the issue to ensure management intent is adhered to.

Significant Licensing Issues

1. SPDS

As directed by the Vice President-Nuclear, in February 1987, an LP&I task force comprised of personnel from Operations, Plant and Support Engineering, Reactor Engineering and Performance, Licensing and Nuclear Engineering was established with a goal of resolving the outstanding concerns and noted deficiencies with the present SPDS design for Waterford 3. The task force implemented intensive work efforts via group meetings, discussions with the NRC, correspondence and executive management interfaces aimed at developing an SPDS Enhancement Program that would accomplish this goal.

By June 1987, a functional design specification for the SPDS Enhancement Program was developed. The specification consisted of a list of modifications to the existing SPDS software and hardware that will be implemented not only to address NRC concerns, but to provide Operations personnel with a more efficient and useful system for rapidly and reliably determining the safety status of the plant. An added advantage to the enhanced design is the integration of the SPDS with the Waterford 3 Emergency Operating Procedures which were unavailable during the development of the original design.

In order to provide the NRC with an opportunity to examine the present design, view the proposed display prototypes and discuss the draft functional design specification, a meeting with the NRC was held at Waterford 3 in June 1987. Based on the positive feedback that was provided by the NRC at the exit meeting, the specification was finalized and subsequently transmitted to the NRC. The enhanced SPDS design will be installed, functionally tested and operational with approved procedures by October 17, 1988, and validation testing on the Waterford 3 simulator will be completed and the results evaluated by February 20, 1989.

In August 1987, the NRC issued an SER providing approval for the Waterford 3 SPDS Enhancement Program. The NRC concluded in the SER that the enhanced design contains no serious safety questions, implementation may continue and the schedule for completing and installing the redesign is acceptable. Confirmation that the installation and performance are in accordance with the functional specification will be assessed by the NRC once implementation has been completed.

2. DCRDR

The Detailed Control Room Design Review (DRCDR) has been ongoing at Waterford 3 since the early 1980s. Entering 1987, only a few technical issues remained to be resolved. Following the same approach as taken with the SPDS, a plan for the resolution of DCRDR technical concerns was formulated and a final meeting and plant walk-through was held with the NRC technical personnel in June, 1987. The meeting was successful, and the basis was established for the resolution of all outstanding technical issues. Followup documentation was provided to the NRC in July 1987. It

is our understanding that a DCRDR SER will be issued shortly and will conclude that the Waterford 3 DCRDR satisfies all requirements of NUREG-0737, Supplement 1.

3. Basemat

The integrity of the Nuclear Island Basemat was another longstanding technical issue with the NRC. During June and July, 1987 LP&L submitted to the NRC the surveillance program and the results of the confirmatory analysis program. The Safety Evaluation Report on the basemat was issued in October 1987. The NRC concluded in the SER that LP&L had satisfactorily implemented a confirmatory analyses program demonstrating the adequacy of the basemat and had instituted an acceptable basemat surveillance program, as required by License Condition 2.C.17 of the Waterford 3 operating license.

4. License Amendments

Twenty license amendments were submitted to the NRC in 1987. These license amendments were aimed for the most part at improving nuclear safety and reliability.

On June 1, 1988, LP&L submitted a draft license amendment request effecting the transfer of management and operating responsibility for Waterford 3 to System Energy Resources, Inc. (SERI), a wholly owned subsidiary of Middle South Utilities. SERI currently owns and operates Grand Gulf Unit 1. Under the provisions of the proposed transfer, LP&L will retain ownership of Waterford 3, however, a contractural agreement will be entered into with SERI to provide management and operation of the unit. Thus, it is proposed that SERI will become a joint licensee of Waterford 3. A similar draft license amendment request effecting the transfer of management and operating responsibility for Arkansas Nuclear One Units 1 and 2 from Arkansas Power & Light (AP&L) to SERI was forwarded by AP&L. The final license amendment request will be submitted to the NRC in early July 1988, requesting implementation in December 1988.

5. Other Licensing Activities

The following examples are typical of the many and varied licensing activities also conducted during 1987:

a. Control Systems Single Failure Study: This study was submitted to the NRC in 1986. The study involved a detailed and comprehensive failure and effect analysis of the functional loss of a power supply sensor, or impulse line and the postulated effect on control systems. Comprehensive questions were generated by the NRC during 1987. LP&L provided acceptable answers to these questions in April and July, 1987. The NRC is expected to issue a Safety Evaluation Report shortly, documenting the resolution of this issue.

b. Boraflex Surveillance Program: Based on industry experience LP&L determined that the commitments for boraflex surveillance needed to be revised to improve the technical basis and to incorporate new developments in the industry. Detailed technical evaluations were submitted

to the NRC in September and November 1987 to support a modified boraflex surveillance program. The NRC, in December 1987, issued a Safety Evaluation Report concurring with LP&L's proposed program.

c. FSAR Annual Update: Pursuant to 10CFR50.71(e), LP&L must update the FSAR annually to reflect recent changes in design and operation of Waterford 3. Numerous documents were reviewed including station modifications, new analyses, license document change requests, and correspondence to the NRC resulting in over 150 changes to the FSAR. The annual FSAR Update was transmitted to the NRC in December 1987.

6. Cycle 3 Reload

As with the Cycle 2 reload, LP&L has taken the initiative to assure that reload activities that require regulatory review are defined and planned well in advance. In keeping with this philosophy, the Vice President-Nuclear, Plant Manager-Nuclear, Nuclear Safety & Regulatory Affairs Manager and the Licensing Programs Manager met with NRC management in October 1987 to review the expected Cycle 3 reload activities. As a result, licensing actions required to support the Cycle 3 reload were largely approved by the NRC before the outage. An emergency technical specification change request was submitted to the NRC during the outage, which is described in detail in the Outage Section under Containment Cooling Fans (K.4.g).

7. Regulatory Excellence

The Middle South Utilities System and Waterford 3 have, as a system objective, the achievement of regulatory excellence. The Senior Vice President-Nuclear Operations issued, on December 18, 1987, the LP&L Nuclear Operations Executive Directive, ED-049, for excellence in regulatory affairs.

To support the concept of regulatory excellence, Nuclear Operations management has emphasized a pro-active approach to safety, regulatory compliance, nuclear operations enhancement, and increased Nuclear Operations Senior Management communications with the NRC (i.e., the Vice President-Nuclear and Nuclear Safety & Regulatory Affairs Manager's trip to NRR to meet the New NRC Project Manager). This perspective is rooted in the understanding that safety, regulatory compliance, nuclear operations enhancement, and enhanced communications are not disjointed concepts but different aspects of the same goal. The Vice President-Nuclear along with other Senior Managers attended the NRC/Utility Interface Meeting in Orange County. Upon returning, the Vice President-Nuclear directed actions to be taken to improve the understanding of the regulatory process, to be more open in communications with the NRC, to improve the professional conduct and interpersonal relationships between the NRC and the Nuclear Operations Department's staff, and to communicate on a more regular basis with NRC inspection personnel to better gauge and understand the impact of NRC inspection activities.

We trust that our approach to regulatory excellence has already borne fruit in more open communication. We solicit further input as necessary to continue improving as needed.

8. Licensing Group Reorganization

On May 16, 1988, the Nuclear Licensing & Regulatory Affairs group was reorganized. This change recognized the changing regulatory climate which places increasing emphasis on plant operations. As long-standing technical issues are resolved and fewer plants remain to be licensed, the NRC is redirecting its resources to reviewing the management, programs and day-to-day activities of operating nuclear plants. While this increased scrutiny can only serve to strengthen our operations, additional Licensing support to the Plant, Engineering and Quality Assurance organizations is essential to the continued smooth operation of Waterford 3. The Licensing reorganization is intended to place site support uppermost in the short- and long-term goals of the Licensing organization.

In implementing the reorganization, a new Site Licensing Support Unit and a new Senior Licensing Specialists Unit have been created. The Regulatory Compliance Unit remains unchanged, except for an additional responsibility for the FSAR update process.

With the exception of the Regulatory Compliance Unit responsibilities for FSAR changes and commitments management, most Licensing support and interfaces with the rest of Nuclear Operations will be handled by the Site Licensing Support Unit. The Unit is dedicated to providing assistance in areas as diverse as Technical Specification and Operating License changes, safety analyses, regulatory interpretation, NRC inspection support - i.e., virtually any issue touched upon by regulatory requirements. The Senior Licensing Specialists will provide services in unique areas such as environmental licensing or decommissioning, while continuing to coordinate the resolution of long-term regulatory issues, support external organizations such as NUMARC, and handle special projects.

LOUISIANA POWER & LIGHT COMPANY
WATERFORD 3 SALP PROGRESS REPORT

Performance Functional Area

## K. TRAINING AND QUALIFICATION EFFECTIVENESS

1986 SALP Category: 1
1985 SALP Category: 2

Summary of NRC Recommended Licensee Actions

1. Management should focus on simulator delivery and making simulator fully functional.

2. Emphasis should be placed on training nonlicensed personnel.

3. Corrections should be made of identified deficiencies in training program administration/documentation and ensure periodic reviews are performed to identify future problems.

Current Status

During 1987, the Nuclear Operations Training Department made significant strides towards improving the training programs. These included:

- Successful accreditation of all 10 INPO programs, eight of which involve non-licensed personnel training.

- Successful acceptance and installation of the Waterford 3 Plant Referenced Simulator.

- Successful integration of the Waterford 3 Plant Referenced Simulator into the Licensed Operator Requalification Program.

- Continued transfer of experienced plant personnel, including licensed personnel, into open training positions to maintain a high level of technical knowledge on the training staff.

- Promotion of experienced training staff members into plant positions. The Vice President-Nuclear has always stressed the importance of maintaining experienced operations and maintenance personnel in the Training Department as well as in Plant Operations.

- Delivery of training on maintenance items to licensed operators during annual requalification utilizing the Skills Training Center Labs.

- Initiation of a broadbased Technical-Staff and Managers Training Program.



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The above examples indicate the high level of management commitment to maintain training programs in Nuclear Operations that contribute to the safe and efficient operation of Waterford 3.

1. Waterford 3 Simulator

Site delivery of the Waterford 3 Simulator commenced with the arrival of the first shipping van on April 28, 1987. Coordination of resources between LP&L and the simulator vendor resulted in a hardware installation period of four days. Onsite acceptance testing began immediately thereafter and the targeted ready-for-training milestone date of June 15, 1987 was met. Between June 15, 1987 and December 6, 1987, the simulator supported four cycles of Operator Requalification Training. Upon completion of the last training session, the simulator's first planned outage for upgrades commenced on December 7, 1987. Emphasis of the outage was directed at enhancing management and performance of the simulator to meet guidelines set forth in 10CFR55. Listed below are the key areas and tasks addressed as part of the simulator outage.

a. Control Room Audio/Visual Recording System

This feature has been installed to enhance simulator training and exam evaluation by providing documented review of operator response and actions during training scenarios. The system consists of two cameras, one of which has pan, tilt, and zoom capabilities. Sessions may be viewed dynamically and/or recorded onto magnetic tape for later evaluation.

b. Instructor Station Software Corrections and Enhancements

This task was specifically targeted at improving reliability of unique simulator features available to the instructor. The majority of this effort was focused in the area of simulator backtrack. This feature allows the simulator to be paced backward to a specified time frame and once again continue a normal simulation scenario.

c. Plant Computer Point Limits

This task has provided enhanced fidelity of the simulated/stimulated plant monitoring computer. The modification involved placing high and low instrument limits within the simulation software models for approximately 1600 data points. This feature ensures that the simulator does not report parameter values which would not be possible within the actual plant system.

d. Simulator Approach to Design Limits Alarm

Identified as an ANSI 3.5 requirement, this feature involves design of a software package whose purpose is to monitor key process variables and alert the instructor when simulation software design limits are approached.

e. Annual Performance Test Support Program

This task integrates 12 additional hard copy pen recorders and a supporting software driver to meet test requirements outlined in the ANSI 3.5 document.

f. Simulator Computer Intelligent Clock Module

This task involves integration of a micro processor based clock module to allow automatic system initialization and enhance the software configuration controls of the system.

g. Simulator Communication System Upgrade

This task involves redesign of the existing communication system to eliminate noise and provide compatibility to allow transmission to the Waterford 3 plant site during emergency drill scenarios.

On February 15, 1988, the simulator was placed back in service with the above upgrades incorporated.

Normal simulator maintenance items are being pursued on an ongoing basis. These include correcting simulator discrepancies and implementing plant station modifications on the simulator.

2. Non-Licensed Personnel Training

LP&L places strong emphasis on non-licensed personnel training programs and is always striving to improve such programs to provide the knowledge and skills necessary for personnel to achieve peak performance. High on the list of management goals for 1987 was to have all 10 of Waterford 3's basic training programs accredited by INPO. Of the 10 programs, eight involve non-licensed personnel training. In December 1987, LP&L achieved accreditation for all 10 of the training programs and was granted full membership in the National Academy for Nuclear Training. Since the end of the last SALP review period in January 1987, LP&L's non-licensed personnel training programs have received extensive reviews by INPO and LP&L management and many program enhancements resulted. It was through these reviews and enhancements that accreditation was ultimately achieved.

In May 1987, Waterford 3 instituted a program to provide familiarization training on Waterford 3 systems for plant personnel other than operators. Engineering, Plant Engineering, Instrumentation and Control Technicians, Quality Assurance, Nuclear Support, Nuclear Safety and Regulatory Affairs, and Nuclear Operations Support & Assessments personnel have taken advantage of these system modules to enhance their knowledge of Waterford 3 characteristics. The system modules are taught at the Licensed Reactor Operator level of knowledge, although 4 hours per session does not provide the same depth of information as an actual licensing course. Each class is repeated four times during a five week interval so that each attendee may find a convenient time to attend. Approximately 20 modules will be given so that he entire course may be completed during a 2 year cycle.

At the direction of the Vice President-Nuclear, a specific training program was developed and implemented for **Responsible** Engineers. **Responsible** Engineers, engineers selected from the Nuclear Operations Engineering Department, are assigned the responsibility of following all phases of station modification implementation which includes design, scheduling, materials procurement, construction, testing, as built checks, and close-out. The training program for these engineers covers all of the above aspects of their responsibility.

3. Correction of Training Program Deficiencies

Problems identified regarding training program administration/documentation have been addressed. The corrective actions required the rewriting of appropriate procedures making them more restrictive. Examples include NTP003 (Training Records), NTP005 (Training Materials) and NTP204 (Instructor Training).

LP&L has a policy of conducting management reviews, Quality Assurance reviews, annual reviews by the Training Department in conjunction with the Nuclear Operations Support & Assessments Department and evaluations by the trainees themselves after each class to assess training programs and to identify problems. As problems are identified appropriate corrective action is taken.

4. University of Maryland B.S. Degree Program

One of the most special "people programs" at Waterford 3 is the B.S. Degree Program which the Training Department helped design in conjunction with the University of Maryland. Nuclear Plant operators, at their option, are presently enrolled in the academically rigorous program, which will enable them to earn a B.S. in Nuclear Science from the University College of the University of Maryland. Although the courses within the program have a theoretical foundation applicable to many scientific and technical situations, the principles have been specially applied to the nuclear power industry. Case studies and sample problems have been drawn from realistic operational situations.

This approach has two big benefits for Waterford 3 personnel. First, they can learn more quickly by building upon the knowledge and experience which they have already acquired. Second, they can apply the theoretical aspects of their courses to their work.

Learning takes place in Louisiana using two long-distance course delivery modes. Computer-assisted courses are used to transmit technical material. Prepared at the University of Maryland, these courses are based on the traditional lecture format but enable learners to work at their own pace. Open university courses are used for general education requirements, management courses, and electives. These courses are structured around assigned readings supplemented by optional on-site discussion seminars. Instructors use a combination of person-to-person, phone, and mail contact to provide guidance to individual learners. Fall 1987 classes were offered in Calculus I, Physics II, and Management.