

February 13, 1996

Duke Power Company  
ATTN: Mr. J. W. Hampton  
Vice President  
Oconee Site  
P. O. Box 1439  
Seneca, SC 29679

*See Rpt.*

SUBJECT: MEETING SUMMARY - OCONEE

Dear Mr. Hampton:

This refers to the Self-Assessment Presentation by your staff to the NRC staff on February 1, 1996, in the NRC Region II office. The purpose of this presentation was to give the results of your self-assessment of Oconee's performance since October 29, 1994. Enclosed is a list of the meeting attendees and a copy of your presentation.

We considered your presentation beneficial, in that it provided the NRC staff with an understanding of your perceived strengths and challenges.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice", a copy of this letter and its enclosures will be placed in the NRC Public Document Room.

Should you have any questions concerning this letter, please contact us.

Sincerely,

Original signed by:

Richard J. Freudenberger, Acting Chief  
Reactor Projects Branch 1  
Division of Reactor Projects

Docket Nos. 50-269, 50-270, and  
50-287  
License Nos. DPR-38, DPR-47,  
and DPR-55

Enclosures:

1. List of Attendees
2. Self-Assessment Presentation

cc w/encs: (See page 2)

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PDR ADOCK 05000269  
P PDR

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IEB

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 Winston and Strawn  
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SEND TO PUBLIC DOCUMENT ROOM?		YES		NO	
OFFICE	RII:DRP				
SIGNATURE	<i>[Signature]</i>				
NAME	R.Carroll:sm				
DATE	02/13/96	02 / / 96	02 / / 96	02 / / 96	02 / / 96
COPY?	YES NO	YES NO	YES NO	YES NO	YES NO

## LIST OF ATTENDEES

### NRC ATTENDEES:

- L. Reyes, Deputy Regional Administrator, Region II (RII)
- E. Merschhoff, Director, Division of Reactor Projects (DRP), RII
- J. Johnson, Deputy Director, DRP, RII
- C. Casto, Chief, Engineering Branch, Division of Reactor Safety (DRS), RII
- G. Imbro, Acting Director, Project Directorate II-2, Office of Nuclear Reactor Regulation (NRR)
- R. Crlenjak, Chief, DRP Branch 1, RII
- H. Christensen, Chief, Maintenance Branch, DRS, RII
- P. Harmon, Senior Resident Inspector, Oconee, DRP, RII
- S. Rudisail, Project Engineer, Branch 1, DRP, RII
- R. Moore, Reactor Inspector, Engineering Branch, DRS, RII
- R. Baldwin, Reactor Inspector, Operator Licensing Branch, DRS, RII
- N. Economos, Reactor Inspector, Maintenance Branch, DRS, RII

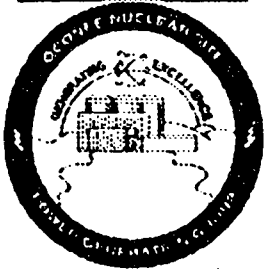
### DUKE POWER COMPANY (DPC) ATTENDEES:

- J. Hampton, Vice President, Oconee Nuclear Station (ONS)
- B. Peele, Station Manager, ONS
- J. Davis, Manager, Engineering, ONS
- W. Foster, Manager, Safety Assurance, ONS
- J. Birchfield, Manager, Regulatory Compliance, ONS
- R. Dobson, Modifications Manager, Engineering, ONS
- S. Weise, Manager, Nuclear Assessment and Issues, DPC
- D. Hubbard, Maintenance Superintendent, ONS
- G. Davenport, Unit Operations Manager, ONS
- D. Groux, Secretary to Site Vice President, ONS

# OCONEE NUCLEAR STATION

## SELF ASSESSMENT PRESENTATION

FEBRUARY 1, 1996



ENCLOSURE 2

Additional Info. 1





# **OCONEE NUCLEAR STATION SELF ASSESSMENT MEETING FEBRUARY 1, 1996 AGENDA**

- INTRODUCTION
- OVERVIEW OF STATION PERFORMANCE
- TOP FOCUS AREAS
- OPERATIONS
- ENGINEERING
- MAINTENANCE
- PLANT SUPPORT
- SUMMARY

# OCONEE SITE FOCUS MEASURES

December 1995

## Team Effectiveness

Safety	EMPLOYEE INJURIES (Davis)	PERSONNEL EXPOSURE (Foster)
	Team Excellence (Foster)	

## Operating Excellence

Site Performance	EFFECTIVE FULL POWER DAYS (Foster)	NUCLEAR SAFETY INDEX (Foster)	LER's (Human Performance) (Foster)	IRC VIOLATIONS (Foster)
	SALP RATING (Foster)	INFO RATING (Foster)	OUTAGE TARGETS (Foster)	
Environmental	REPORTABLE ENVIRON. INCIDENTS (Foster)	SOLID RADIOWASTE (Foster)	LIQUID RADIOWASTE (Foster)	ENVIRON. ASSESSMENT IMPROVEMENT (Foster)
Cost	OPERATING COSTS ACTUAL (Foster)	OPERATING COSTS BUDGET (Foster)	OPERATING COSTS BUDGET (Foster)	FCO PRODUCTION COST (Foster)

Red ■ - Not Meeting Expectations  
 Yellow ■ - Improvement Needed  
 Green ■ - Meeting Expectations  
 White □ - Currently Unreported

Previous Quarters (YTD) →  
 Current Month Status →  
 Most Recent Quarter (YTD) →

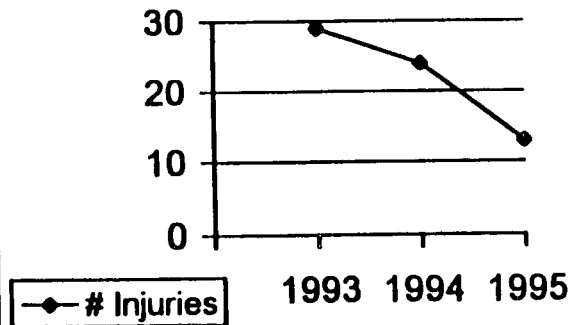


## Management Focus

HUMAN PERFORMANCE (Foster)	EQUIPMENT RELIABILITY (Davis)	DESIGN BASIS (Davis)	SAFETY PERFORMANCE (Foster)
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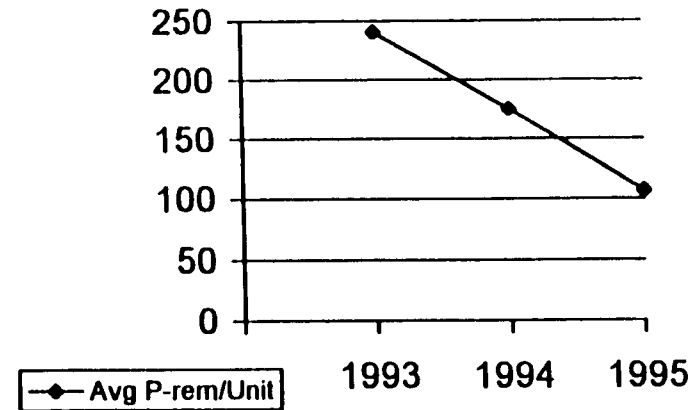
# OCONEE SITE FOCUS MEASURES

## Number of Employee Injuries

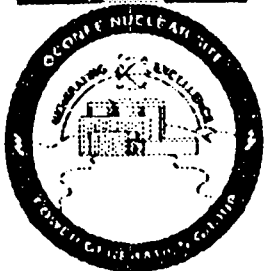


- Significant reduction in numbers of recordable injuries throughout the SALP period

## Personnel Exposure/Unit

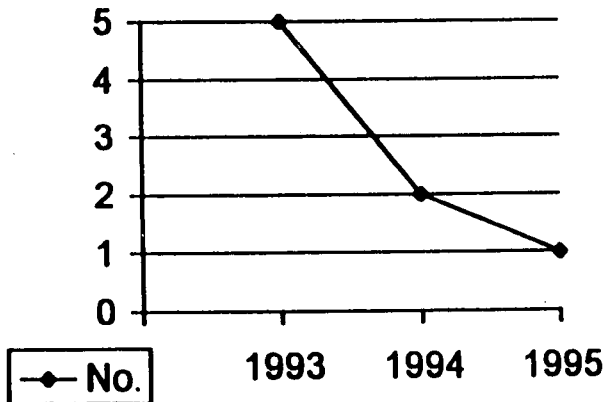


- Very positive results from crud burst each outage
- Focused attention on reduction of contaminated space
- Improved worker performance

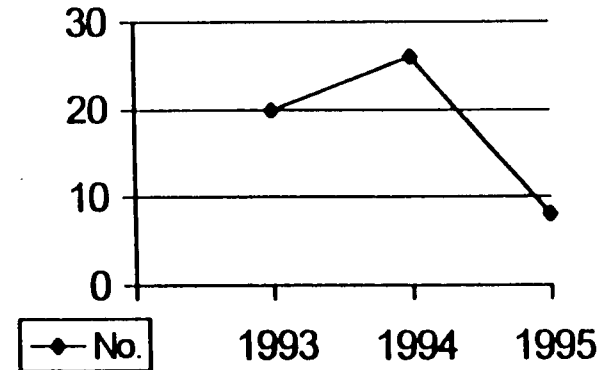


# OCONEE SITE FOCUS MEASURES

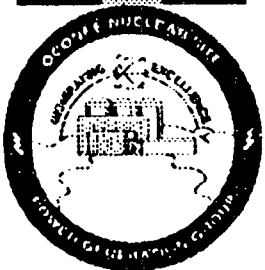
## Personnel Caused LER's



## NRC Violations (Cited Violations)

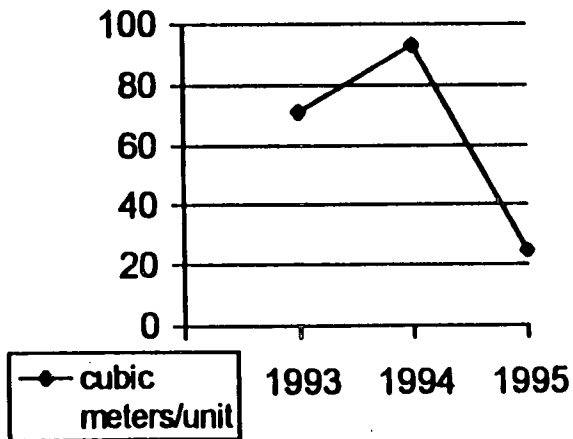


- Many old Engineering issues resolved
- Improved human performance

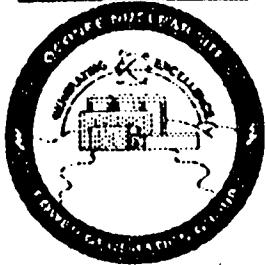
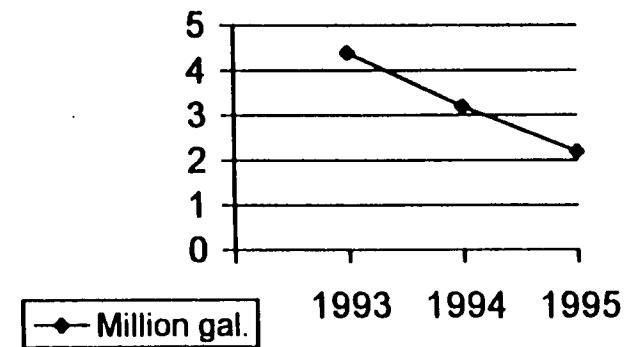


# OCONEE SITE FOCUS MEASURES

## Solid Radwaste

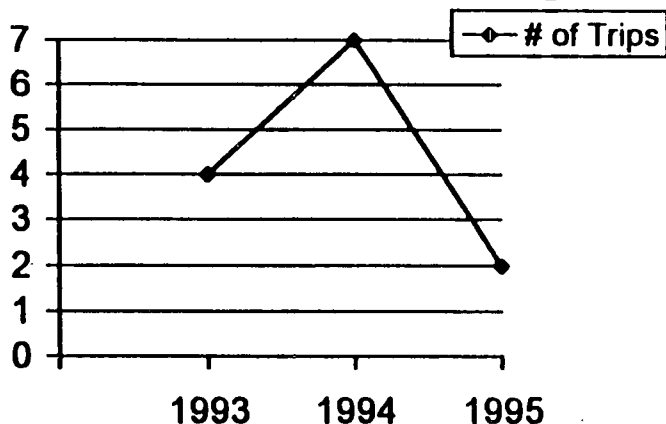


## Liquid Radwaste (millions of gallons)



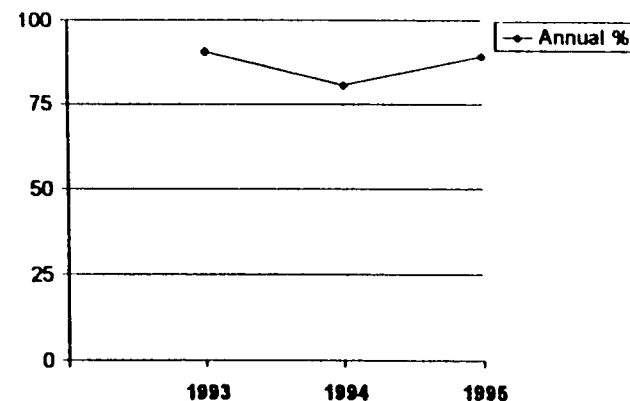
# OCONEE SITE FOCUS MEASURES

## Automatic Reactor Trips

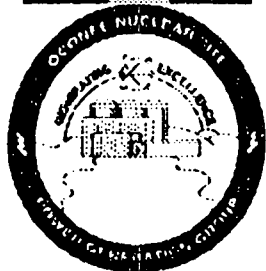


- Lowest number of trips
- Strong attention to trip reduction
- Trip reduction review with industry input

## Capacity Factor




- High capacity factor in '95 with two refueling outages
- Plant ran very well with few power reductions
- Two management-directed outages to address slow control rod drive issues and condenser expansion joints



# OCONEE MANAGEMENT FOCUS

HUMAN PERFORMANCE (Peele)	EQUIPMENT RELIABILITY (Davis)	DESIGN BASIS (Davis)	OPERATIONAL PLANNING (Seafon)
Human Performance	Reactor Trip Frequency	ECOV Spent Fuel Inventory	Corrective Action Program (PIP Backlog)
Reactivity Management	EFW Over-Pressure	Testing	Operational Planning Process
Personal Protective Equipment (PPE)	Valve Reliability	Control of Radioactive Particles	Work Control Process
Design Basis	Control Rod Drive Mechanism Concern	OSRDC (QA-1, QA-5)	End Work Management
Radiological Work Practices	DC Grounds	Penetration Room Ventilation System	Major Maint Process
Configuration Control	Batteries		TSS Transition Plan
	Fuel Integrity		
	OAC Replacement Project		

## ANNUNCIATOR CRITERIA:

RED:  Off Target  
 YELLOW:  Improving  
 GREEN:  On Track



# TOP FOCUS AREAS

- **HUMAN PERFORMANCE**
- **WORK MANAGEMENT**
- **RESOLUTION OF DESIGN BASIS ISSUES**
- **EQUIPMENT RELIABILITY**
- **OPERATIONS FOCUS**





# DEFINITIONS

## ➤ STRENGTHS

Results are meeting expectations / high standards. Continuous improvement is pursued.

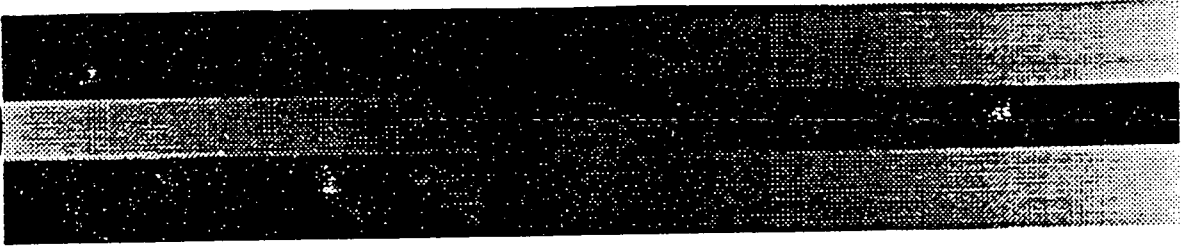
## ➤ AREAS OF PROGRESS

Improvement plans being implemented / have been implemented with recognizable results.

## ➤ CHALLENGES

Not meeting expectations. Improvement plans under development / being implemented. Trending / monitoring to assess results.





# OPERATIONS

# OPERATIONS STRENGTHS

## OPERATIONAL PERFORMANCE

➤ Oconee has operated very well during this SALP period to date (November 1, 1994 - December 31, 1995). The Station capacity factor of 89.07 for 1995 was one of the highest in Oconee's history. A summary of capacity factors, reactor trips, outage durations, and continuous run durations are shown below:

<u>Unit</u>	<u>Capacity Factor</u>		<u>Reactor Trips</u>		<u>Outage Duration</u>		<u>Longest Runs</u> <i>Beginning or ending this SALP Period</i>
	<i>1994(2 mo.)</i>	<i>1995</i>	<i>1994(2 mo.)</i>	<i>1995</i>	<i>1994</i>	<i>1995</i>	
1	100.35	85.83	0	0		38 Days	176 / 303
2	65.00	94.10	1	1	43 Days		126 / 253
3	101.06	87.27	0	1		46 Days	169 / 297
Station	88.80	89.07	1	2			126

➤ A continuous run record for Oconee was established during 1995 when all three units were on-line simultaneously for 126 days. Individually, each unit amassed continuous runs between 126 to 303 days, with Unit 2 continuing to build upon its 253 day run at the present (1/31/96).

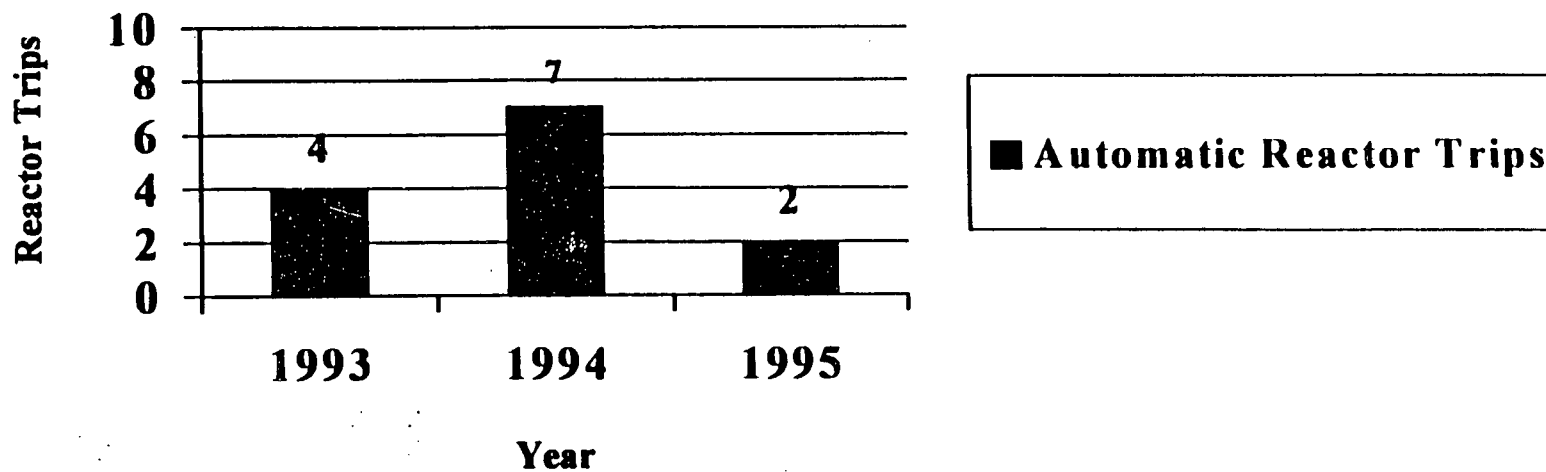
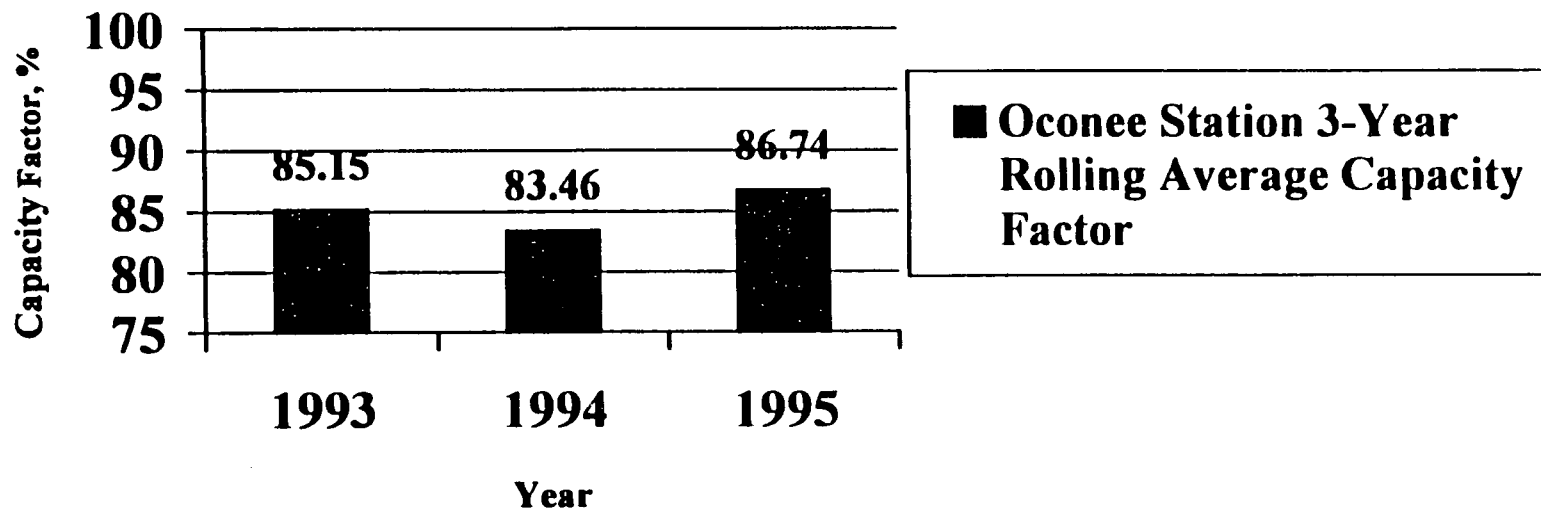
➤ Unit 2 experienced two reactor trips during this review period. The 1994 trip occurred when breaker number 25 in panelboard 2KI failed. This breaker supplies ICS auto power. Unit 2 was returned to service 24 hours later. The 1995 trip occurred when main generator excitation was lost due to a line fault during a storm. Approximately 38 hours later, Unit 2 was returned to service. Unit 3 suffered a single reactor trip in 1995 when control rod group 5 spuriously dropped into the core resulting in a variable low pressure RPS trip. Unit 3 was returned to service 24 hours later following troubleshooting.

➤ There were two forced outages during this SALP period. Unit 1 was taken off-line April 27, 1995, for approximately 12 days to replace thermal barriers on four Control Rod Drive Mechanisms (CRDM) due to concerns with increasing rod drop times. Unit 2 was taken off-line May 4, 1995, for approximately 19 days to replace turbine bleed line expansion joints in the condensers and replace twelve CRDM thermal barriers due to concerns with increasing rod drop times.



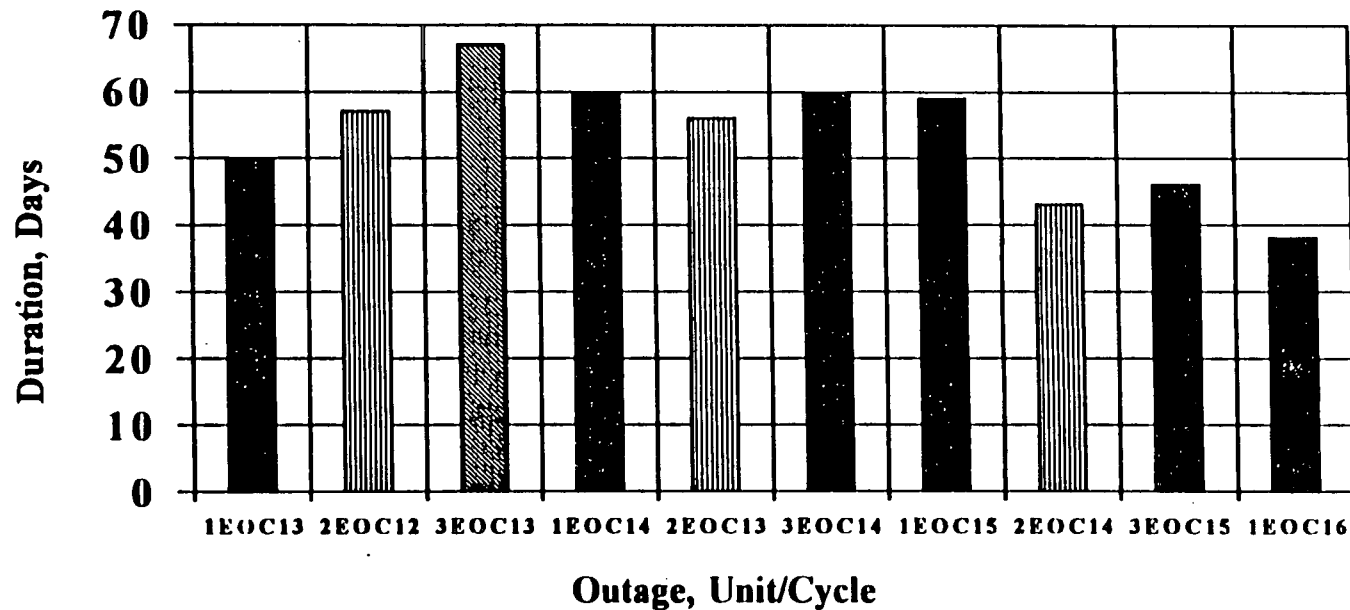
# OPERATIONS STRENGTHS

## OPERATIONAL PERFORMANCE (Continued)

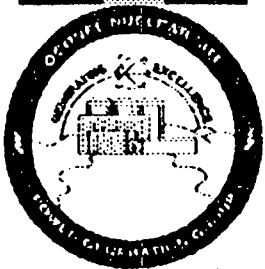


# OPERATIONS STRENGTHS

## OPERATIONAL PERFORMANCE (Continued)



Refueling outages continue to decrease in length, with the average duration of the last three being 42.3 days. Work accomplished during these outages has either remained constant or increased over the years, however, due in part to increased system testing and PM activities. High capacity factors between outages, low forced outage rates, and fewer automatic reactor trips indicates that equipment reliability is improving.



# OPERATIONS STRENGTHS

## PERFORMANCE OF OPERATING TEAMS

### *Attention to Operating Parameters*

The performance of the Shift Teams during this SALP period in the area of board watch standards was good. Several instances occurred where Operator's close attention to plant parameters identified abnormal conditions and in some cases prevented potential reactor trips.

➤ During a control board sweep on June 25, 1995, it was observed that the position indicating light for valve 2LP-2, Decay Heat Suction Isolation, was not lit. A refueling outage was in progress on Unit 3 at the time so Unit 3 Operations personnel were contacted about any scheduled work on 3LP-2. A VOTES test was in fact in progress on 3LP-2, and it was discovered that the craft team performing the work had erroneously opened the breaker for 2LP-2 instead of 3LP-3. The error was corrected and work on 3LP-2 resumed. Good Operator attention to the control board valve position lights discovered this problem only 11 minutes after it occurred in the field.

➤ On November 17, 1995, an ICS In Track Statalarm was received in the Unit 3 Control Room. It was immediately recognized that the 3B Main Feedwater (FDW) Control Valve, 3FDW-41, was behaving erratically. The ICS Stations for all four feedwater control valves were quickly placed in manual and proper FDW flow was restored to each header. Within six minutes, the transient had been mitigated and the unit stabilized at approximately 94% full power. FDW transients of this nature can easily lead to a reactor trip if not promptly recognized and acted upon, as this Shift team did.

➤ During a routine control board sweep on December 26, 1995, FDW flow and Steam Generator levels were observed to be decreasing on Unit 2. A reactor power runback signal was not present, so the Operators quickly took ICS to manual and adjusted FDW flows to match reactor power. Within minutes, the reactor was stable at approximately 98% full power. Investigation revealed that a temperature compensation module contained in the ICS FDW Master Stations' input circuitry had failed, resulting in a decrease in input signal of about 33%. Since the input signal was only partially failed, close Operation attention was required to quickly diagnose and mitigate this problem. No alarms or other abnormal indications existed when this problem was observed.



# OPERATIONS STRENGTHS

## PERFORMANCE OF OPERATING TEAMS

(Continued)

➤ On November 12, 1995, it was observed during a routine board sweep that Group 7 Rod 5 was misaligned from the group average by about 4%. Engineering was immediately contacted and following discussions, the rod was repositioned to align with the group average. It was noted that a similar event involving this same rod had occurred in August 1995 during performance of the Control Rod Movement Test. No failures which would have caused this condition were identified during troubleshooting following either event. A PIP (Problem Investigation Process) form was initiated to note that this was a recurring problem and to provide a means to document subsequent troubleshooting findings.

### *Control Room Material Condition/Decorum*

➤ Improved Control Room indication availability has been achieved through increased attention to the "Black Board" philosophy. This increased attention has resulted in the elimination of all continuously lighted annunciator alarms except for one per unit. This single annunciator is in the process of being modified so it will be extinguished during normal power operations. Another tool implemented that has improved the availability of Control Room indications is the weekly out of service Control Room Instrument Survey conducted by the Operations Shift personnel and provided to the Work Control Group. A Control Room Instrumentation Problem (CRIP) list is created from these surveys which receives a great deal of attention from Scheduling and Maintenance personnel. This list includes defective indications, computer alarms, statalarms, recorders, and control devices. During 1995 hundreds of items on this list were successfully repaired.

➤ Through Management involvement in Shift Meetings and Staff Meetings, increased awareness of management's expectations for Supervisor field observations, Operator Logs, Annunciator verbalization, and Control Operator responsibilities has been achieved. This is demonstrated through much greater consistency in all of these areas among the five Operations Shift Teams.

➤ Control Board overlay modifications in both Oconee Control Rooms have now been completed. This has resulted in a more uniform appearance of the control boards and has also enhanced labeling standards. As future modifications are implemented affecting equipment controls/switch layout, more timely updates to the control boards will be possible due to the ease of replacing these overlays.



# OPERATIONS STRENGTHS

## PERFORMANCE OF OPERATING TEAMS

(Continued)

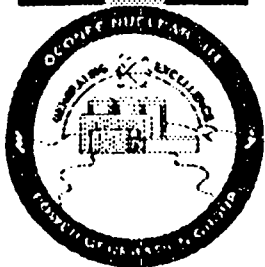
### *Operations Control of Special Evolutions*

➤ Operations' control of special or unusual evolutions has been improved as demonstrated by activities such as the on-line repair of the Unit 2 Main Feedwater Control Valves. This evolution was accomplished with a special procedure that directed the pre-job briefing, placed the unit in the required operating mode, provided contingency actions to the Operators for various plant transients, and specified the communication paths that were to be in place during the repairs. In addition to the controls specified by the procedure, Reactor Engineering, Systems Engineering, and Component Engineering personnel were involved with this evolution to provide any necessary support.

➤ Awareness of plant conditions or evolutions affecting reactivity management has improved during this SALP period. An example of keen focus on reactivity management was the special controls put in place during recent Unit 2 Secondary Chemistry changes. Modifications to Feedwater (FDW) water chemistry were made in an effort to de-foul the 2A Steam Generator Nozzles that introduce FDW into the Steam Generators. In planning for these chemistry changes, it was identified that not only would these FDW Nozzles de-foul, but that the FDW Flow Measuring Venturies could also de-foul. This would in turn affect the accuracy of calculated reactor power which is based directly on FDW flow. Because of this concern, several special controls were put into place. These included resetting the fouling coefficients used in the power calculation to 1.0 for conservatism, placing a maximum limit on the Integrated Control System Unit Load Demand Setpoint, and increasing monitoring of the various power level calculations to ensure agreement. These measures were formalized in procedures with the intent being to avoid even the potential of an unexpected reactivity change.

### *Conservative Decision Making*

➤ Conservative decision making is continuously emphasized throughout the Operations Group. INPO SOER 94-01 was thoroughly addressed with all Operations personnel, with the emphasis being on the importance of making conservative decisions when faced with options. At each Shift Briefing, this concept is reinforced to all the Shift Teammates by the Operations Shift Manager. Through this constant reinforcement, conservative decision making has become ingrained in the thought processes of Oconee Operators.





# OPERATIONS STRENGTHS

## PERFORMANCE OF OPERATING TEAMS

(Continued)

### *Operations Involvement With Work Scheduling*

➤ Operations involvement with the planning of non-outage maintenance activities continues to remain strong. Operations personnel assigned on a rotating basis to the Work Control Scheduling Section provide an Operations focus to the planning and scheduling of all work. These Operations Matrix personnel review all work requests and apply their skill and experience to ensure work execution is slotted in the best possible schedule window. Other Operations Staff personnel are also deeply involved with the scheduling process. An individual representing each Oconee unit attends the weekly schedule commitment meetings and approves work items selected for execution for subsequent weeks. This involvement improves the accuracy of the schedule while minimizing any required LCO time.

➤ Operations personnel also remain closely involved with significant modification work. For example, a Shift RO is currently assigned full time to participate in the design and installation planning for a new Operator Aid Computer (OAC). This individual serves as a single-point-of-contact to ensure the final design meets the needs of the Operations Group. Once the OAC project is completed, this individual will bring a high level of knowledge and understanding back to Operations. This will enhance the ability to quickly modify Operations procedures and processes which will change as a result of the new computers.



# **OPERATIONS STRENGTHS**

## **EMERGENCY OPERATING PROCEDURE**

## **AND PERIODIC SURVEILLANCE**

## **PROCEDURES**

➤ The Emergency Operating Procedure is a strength for Oconee. Recent revisions have streamlined the subsequent actions section in order to address mitigation of plant accident symptoms in a more timely manner. Abnormal Procedures are also a strength in their level of detail in mitigating specific degradations or failures of plant equipment and unusual environmental conditions. Periodic surveillance procedures are also an on-going strength for Oconee, including those related to Keowee Hydro Station.

## **ATTENTION TO MAINTENANCE RISK**

## **ISSUES**

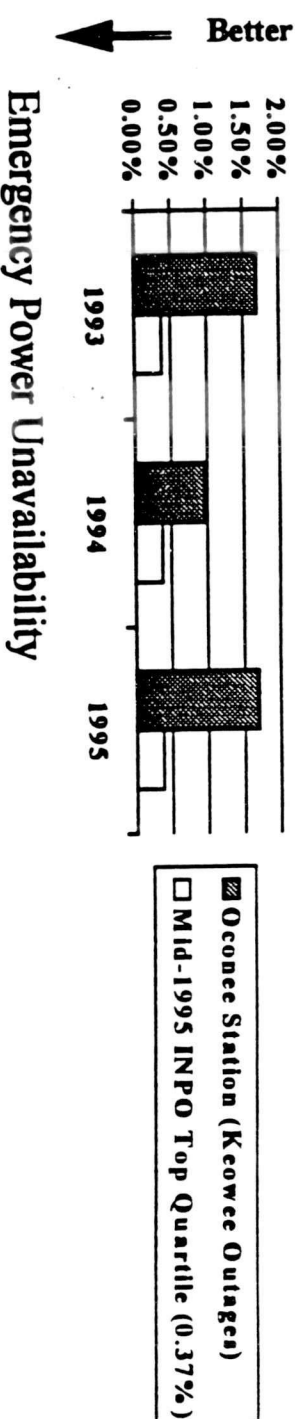
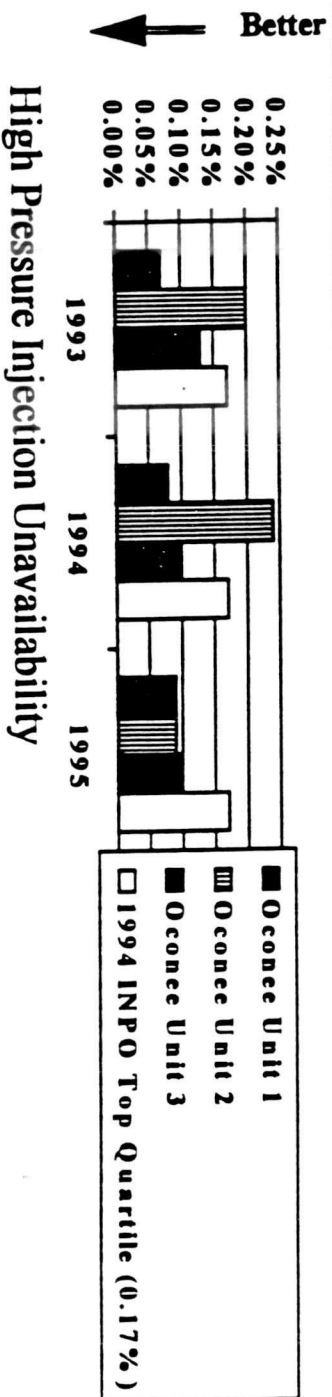
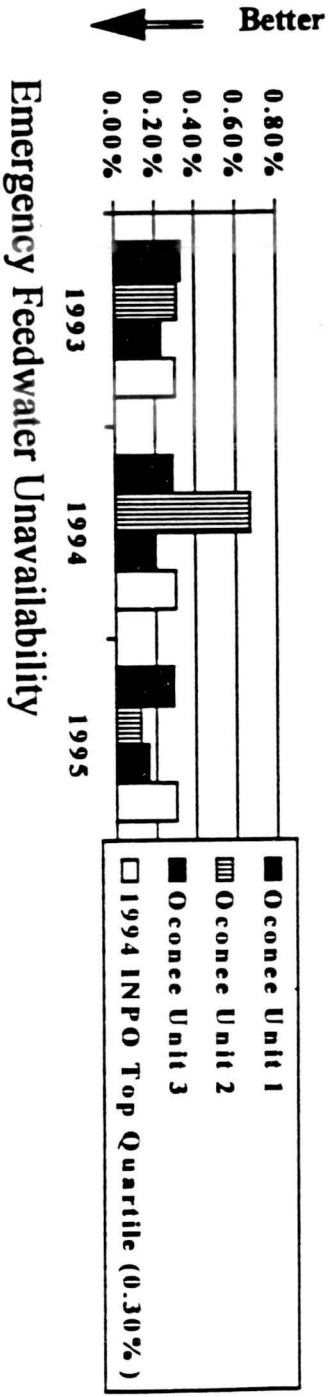
➤ A detailed Maintenance Rule Matrix chart was implemented during the first quarter of 1995 and was developed using detailed PRA methodology. It quickly informs the user of unacceptable risk conditions when multiple safety systems are simultaneously removed from service for maintenance. A Work Process Manual Section was developed to provide instructions and guidance on the use of the matrix chart.

➤ The scheduling of maintenance activities is based in part on the use of this matrix chart. High risk parallel activities taking multiple safety systems out of service are noted on the chart. Such activities are not allowed to occur. Once work is on the schedule, Operations SROs conduct a further review of the chart as a final filter to assure risks are maintained low. Only after this review is completed to the satisfaction of Operations are work requests released to the craft teams. This process has proven valuable as several instances have arisen resulting in re-scheduling of work due to conflicts on this matrix chart. Although this is a simple manual process, it is very effective as it has focused the attention of all Site support groups on the value and importance of applying PRA to scheduled evolutions.



# OPERATIONS STRENGTHS

## SAFETY SYSTEM UNAVAILABILITY



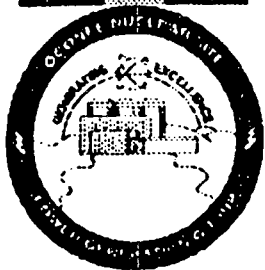
# OPERATIONS

## AREAS OF PROGRESS

### SSF ACTIVATION CONCERNS

➤ Early in this SALP period, concerns arose about the ability to activate the SSF within the design basis document time limits. Although formal time response records for drills had not been maintained, several training records documented operator response times greater than the maximum allowed 10 minutes. To address these concerns, many revisions were made to the SSF EOP to streamline the staffing and activation process. Additional SSF training was provided to Operations shift personnel. A number of successful timed drills were then conducted to confirm the ability to staff the SSF within the allowed time.

➤ This issue was thought to be resolved until an SSF drill conducted May 24, 1995, failed to satisfy the activation time requirement. SSF Auxiliary Service Water flow was established 11 minutes, 4 seconds after drill initiation again exceeding the 10 minute limit. This event was documented in PIP 4-O95-0596. Additional margin in the activation times was justified through an Engineering evaluation. Additional corrective actions included making further revisions to the SSF AP which included the repositioning of numerous valve breakers to their accident position in the SSF. This drastically reduced Operator response time as repositioning these breakers was previously a manual activity. Following training on these additional AP changes, each of the five shifts successfully completed timed activation drills. Such unannounced timed drills will continue at the rate of ten per year to maintain readiness of the Operators. No further concerns with SSF activation have arisen since this event.



# OPERATIONS

## AREAS OF PROGRESS

### OPERATIONS SIMULATOR TRAINING

Improvements have been made to the licensed requalification simulator program as follows:

- Simulator scenarios focusing on abnormal operations (AP usage) have been developed to complement the emergency operating scenarios (EOP usage). The abnormal operating scenarios focus on events which are more likely to happen and are in some ways more challenging to Operators than emergency operating scenarios because of the need to continuously prioritize which abnormal situation to address first. This effort coincides with the industry direction to develop and train on abnormal operating scenarios.
- Several lab-type simulator exercise guides have been developed. This increases the amount of learning taking place during simulator training and improves the Operators' perception that all time spent on the simulator is for evaluation. These simulator sessions concentrate on one type of failure and provide hands on, detailed instruction of the topic. Some of the topics chosen for this type of training include: Main Steam line Breaks, Small Break LOCAs, and a Loss of essential bus KI (Automatic power for ICS).
- "Cold Crew" simulator evaluations are now given to all shift and backup simulator crews. This type of evaluation results in a more realistic assessment of crew and individual competency.



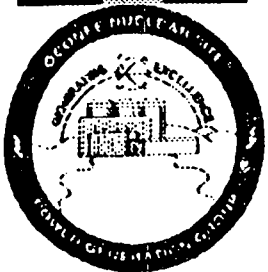
# OPERATIONS

## AREAS OF PROGRESS

### OPERATIONS SIMULATOR TRAINING

(Continued)

- As part of continuing training, Shift Technical Advisors (STA) are now evaluated twice a year on the simulator as an STA. STA specific competencies have been identified and are used during simulator evaluations. For at least one of these evaluations each year, Operations line management as well as Operator Training will evaluate the STA.
- The following changes have been made to improve the Non Licensed Operator (NLO) Requalification program during this period:
  - Simulator training has been incorporated into the NLO requalification program. Each NLO receives approximately 12 hours of contact time on the simulator. Actual simulator training sessions are conducted with the NLOs acting as licensed individuals. Systems start-up, integrated plant operations and some Abnormal Procedure casualties have been performed. Feedback indicates that this training has helped NLOs to better understand how their actions affect plant operations.
  - Annual JPM requalification exams have been implemented for the NLOs. NLO JPMs have been written on critical/safety related tasks that the NLOs are required to perform. This assures that the NLOs are capable of performing any identified critical/safety related tasks.
- The License Preparatory program has been improved during this assessment period. Site Management is committed to improving this program, and the duration was lengthened from 48 weeks to 61 weeks.
- The NRC administered operator licensing initial examinations during July 1995 and 100% of the participants passed.



# OPERATIONS

## AREAS OF PROGRESS

### OPERATIONS SIMULATOR TRAINING

(Continued)

➤ During this review period the pass rate on NRC administered or monitored exams has remained high. A licensed operator requalification program inspection was conducted in May 1995 with the following results:

- No violations or deviations were identified.
- The Sample plan was identified as a strength. The Inspection report stated: "Overall, the inspectors considered the sample plan's organization, degree of detail, clarity, and usefulness in constructing content-valid, reliable examinations a strength of the program".
- Several inspector follow-up items were closed out on this visit.

➤ The licensed operator requalification exams continue to increase in complexity and difficulty. Site Management continues to monitor the Requalification program to ensure that the standards are maintained at a high level. The 1995 requalification exam was discriminatory and identified individuals with problem areas which were then re-mediated and re-tested. The pass rate for the last two requalification exams are as follows:

	<u>1994</u>	<u>1995</u>
JPMs	100%	99%
Simulator	100%	95%
Part A&B	N/A	92%

➤ One Shift had a significantly higher failure rate on the written portion of the exam. A root cause analysis was performed and it was determined that the exam was valid but some of the personnel had not adequately prepared for the exam. After remediation of this Shift, all personnel passed the followup exam.



# OPERATIONS AREAS OF PROGRESS

## OPERATOR SIMULATOR TRAINING

(Continued)

➤ During the inspection associated with the initial licensing examinations administered in July of 1995, the NRC closed out an Inspector Follow-up Item on the "Inability of the licensee to effectively train the board Operators to identify the failure of ICS to runback".

➤ During this SALP period, the written exam scores for the initial licensing examinations has continued to increase. The average score on the July 1995 exam was 90%. The average score has increased with each of the last three initial exams as shown in the following chart:

	<u>1992/1993</u>	<u>1993/1994</u>	<u>1994/1995</u>
<i>RO Average</i>	N/A	85.3	87.3
<i>SRO Average</i>	86.3	88.2	90.7
<i>Combined Average</i>	86.3	86.8	89.8





# OPERATIONS

## AREAS OF PROGRESS

### QUALITY OPERATION OF KEOWEE

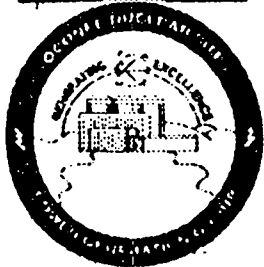
### HYDRO STATION

➤ Keowee Hydro Station personnel and activities have been fully integrated with Oconee Operations and other Site Groups. Communications, procedures, performance expectations, and training have been upgraded to nuclear standards. The Operations Group has actively participated in the Keowee Upgrade Project. Special hydro plant operations for tests/evolutions such as Loss of HVAC, load rejections/overspeed control, plant modifications (NSM-52966, portions of which are still in progress), and Emergency Power System Testing were completed with no Operator errors or deficiencies.

➤ Conservative operation of the Keowee Hydro units to meet the emergency power system requirements for Oconee Nuclear Station is always first priority. Violation 95-06-01 (Inadequate measures to prevent further uncontrolled changes to Keowee load limits) and Violation 94-38-01 (Keowee Unit 1 unplanned trip) have resulted in a much higher degree of diligence in Oconee Site personnel with regard to control of the hydro units.

➤ Oconee and Keowee Operators cross-train by spending parallel shift time in both facilities. Teamwork has improved through assigning the Keowee on-duty Operator to shift rotation with the corresponding Oconee Shift Team. Of special note, a former Oconee RO has become a qualified hydro operator assigned to Keowee Shift.

➤ In late 1995, Duke Power performed a Self Initiated Technical Audit (SITA) of Keowee Operation, Maintenance, and Engineering support. The SITA Team identified no concerns that would question the operability or reliability of the emergency power system. Areas for further improvement in Work Planning and Scheduling, Maintenance and Operations procedures, and Quality Assurance programs were identified during this audit. Site personnel are in the process of acting upon the SITA Team findings to further improve Keowee operations.

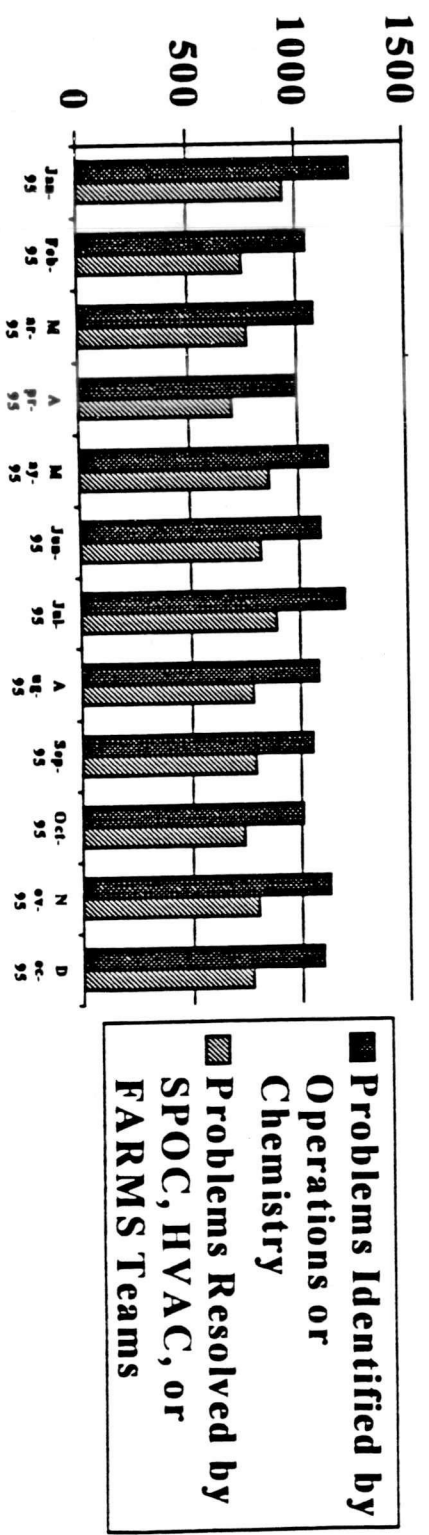


# OPERATIONS

## AREAS OF PROGRESS

### RESOLUTION OF EQUIPMENT PROBLEMS

> Operations continues to increase expectations with regard to timely repair of equipment problems. All Operations Shift personnel are responsible for the prompt identification of problems affecting plant operation. As problems are identified, an electronic work request is initiated through the Oconee Work Management System. Single Point of Contact (SPOC) Teams evaluate each work request to determine if immediate repair is possible. SPOC Teams are comprised of multi-discipline shift maintenance personnel who respond quickly to emerging equipment problems. Some work requests are routed to HVAC or Facilities (FARMS) Teams depending on the nature of the problem. If immediate repair is not possible, the work requests are routed to Work Control for scheduling and planning for a future work window. The graph below shows that of the 13,230 problems identified by Operations and Chemistry personnel in 1995, 9,617 or 73% were quickly resolved by SPOC, HVAC, or FARMS Teams.



# OPERATIONS AREAS OF PROGRESS

## RESOLUTION OF EQUIPMENT PROBLEMS (Continued)

► To ensure adequate focus exists for problems that could not be addressed by SPOC, an Operations Work Around program was implemented during September 1994. This program consists of a list of the highest priority concerns to Operations that affects their ability to “understand or control important plant parameters”. This list is owned and maintained by the five Operations Shifts. Each week, this list is updated to include a composite representation of each Shift’s input and is limited to approximately 15 outage and 15 innage (non-outage) items. Each item is assigned an owner along with a scheduled milestone completion date. Daily Site Direction Meetings are held involving representatives from each Site Division. At the Wednesday Site Direction Meeting, the Operations Shift Manager (OSM) covers this list in detail. The responsible owner is expected to provide a status update for their respective items, including projected completion date information.

► This process has been successful in increasing Site awareness of problems and issues affecting Operations. From October 1994 through October 1995, 44 short-term items on this list were repaired/resolved and another 5 long-term items were addressed.

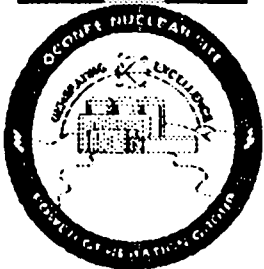


# OPERATIONS CHALLENGES

## MISPOSITIONED COMPONENTS

► During the first half of this SALP period, there were concerns about the number of plant configuration control events. In June 1995, PIP O-095-1002 was initiated to document an adverse trend related to configuration control and safety tag events. A comprehensive root cause analysis was performed which included extensive interviews of a broad range of Operations personnel. As a result of this analysis, a number of corrective actions were initiated:

- Human error reduction training will be provided to all Operations personnel. A portion of this training has been completed for Staff personnel with the Shift personnel to receive the training during requalification sessions beginning in April 1996. All major elements of human error reduction including re-emphasis of STAR, QV&V, questioning attitude, conduct of pre-job briefings, and supervisor observations will be covered in detail.
- Specific goals and objectives with regard to human error events was communicated to all Operations personnel by the Superintendent of Operations in concert with a reinforcement of expectations.
- Operations ownership of the tagging process was re-emphasized to all Shift personnel. Operations personnel were tasked with re-familiarization of the content of Nuclear System Directive (NSD) 500, Safety Tags/Equipment Protection Tags. This action was accomplished for all Operations personnel by October 31, 1995.
- Vertical communication among all members of the Operations Shifts is being strengthened.
- Additional emphasis has been given for the importance of conducting an appropriate pre-job brief prior to beginning work. Guidelines were developed to specify the proper way to conduct such briefings, with an Operations Management Procedure under development to detail specific requirements.

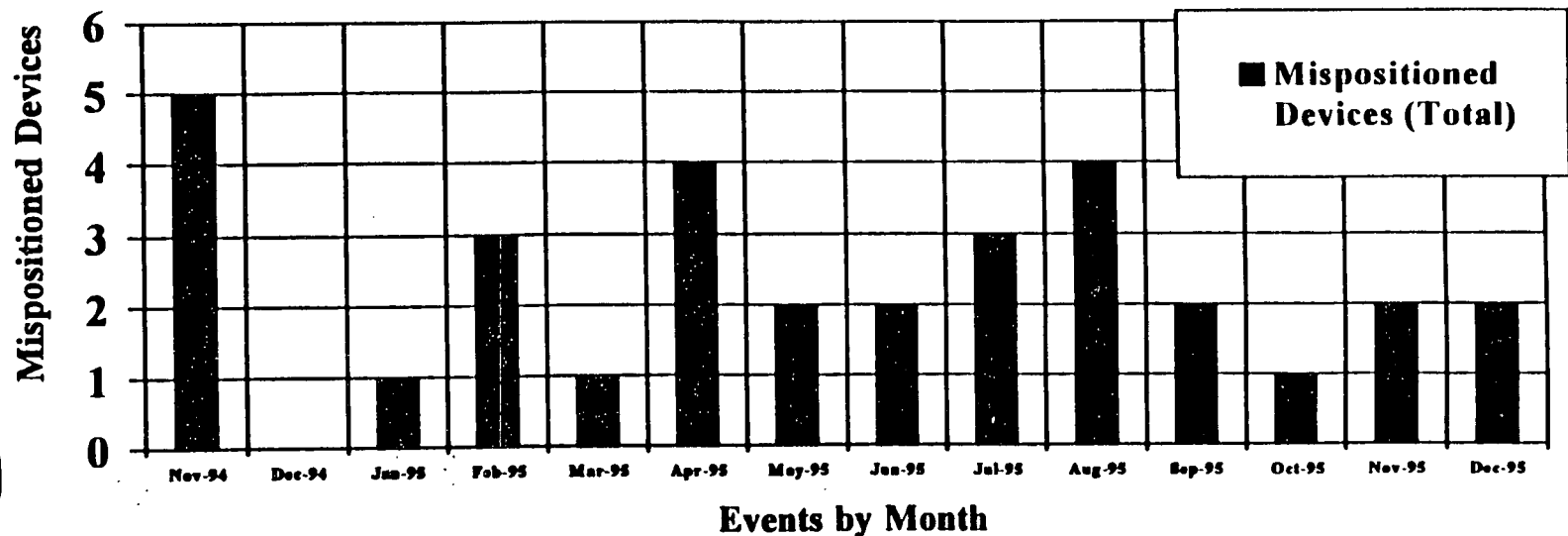


# OPERATIONS CHALLENGES

## MISPOSITIONED COMPONENTS (Continued)

– Field surveillance of work in progress is a requirement of all Operations management personnel. These are documented observations that are intended to further reinforce management expectations with respect to error-free performance.

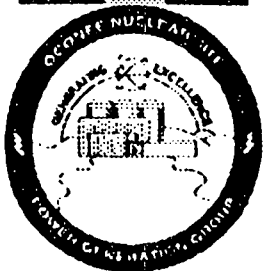
➤ The following plot illustrates the trends with mispositioned components and includes both the Operations and Chemistry Group events. The data was obtained from the Oconee PIP database for all events related to a mispositioned device (valve, breaker, switch, damper, sliding link, jumper, or fire door). Peaks can occur during outages due to the number of tagouts in progress and system lineup procedures being completed. The peak from June - September occurred during and shortly after the Unit 3 EOC 15 Refueling outage when eleven mispositioning events occurred. During the Unit 1 EOC 16 Refueling Outage from November 2 - December 9, 1995, a total of four events occurred. Only one of these was outage related, representing a substantial improvement over prior performance.



# OPERATIONS CHALLENGES

## GENERIC FUNDAMENTALS EXAM TRAINING

- The Generic Fundamentals Exam (GFE) portion of the License Preparatory program continues to be a challenge during this review period. Program changes implemented after the results of the June 1994 exam were not successful in preparing the candidates scheduled to take the GFE in October 1995. Based on overall performance of the candidates during the program, Training and Line management made the decision that the Oconee candidates were not adequately prepared for the exam. The candidates did not participate in the October 1995 Generic Fundamentals Exam. Duke Power Company Management at all levels is committed to significantly improving the GFE program. A meeting was held among all three nuclear site Operations Training managers, Operations line representatives, Electric System Support Technical Division representatives and Nuclear Generation Department Training Section to determine root causes and identify corrective actions for the Oconee Generic Fundamentals program. As a result, the following changes have been made:
- The Oconee Operator Training Division will conduct the upcoming Oconee Generic Fundamentals class.
  - Oconee will use proven vendor training material for the Generic Fundamentals program.
  - A diagnostic exam has been given to the Oconee Generic Fundamentals class participants to determine entry level knowledge to allow for proper course content and duration.
  - The GFE program has been extended in duration from 4 weeks to 8 weeks.



# OPERATIONS CHALLENGES

## QUALITY OF NORMAL OPERATIONS PROCEDURES

► While the overall quality of Operations procedures is good, the Operations Group needs to continue to improve in the area of detailed review of procedure revisions.

► Outage events such as the unplanned reverse flow of water from the Unit 3 Spent Fuel Pool to the Fuel Transfer Canal (PIP 95-0872) and spillage of primary water from the downstream side of a Unit 1 High Pressure Injection (HPI) relief valve open for maintenance (Violation 95-27-7) point out areas for improvement.

► The Duke Power Nuclear Safety Review Board and an In-Plant Review Committee have both recommended increased application of the root cause investigation process to procedure-related errors. As a result of performing root cause analyses, Operations is modifying all system block tagout procedures to clearly designate relief valves as system boundaries. This action will provide closure to the HPI concern noted previously.

► Operations personnel who originate or revise procedures are being encouraged to provide a detailed summary of all items changed during the reissue/revision process. This gives Qualified Reviewers an important tool to use during the procedure review process.

► Enhanced training is being given to all Operations personnel concerning the Qualification, Verification, and Validation (QV&V) process. Use of QV&V during routine work assignments has become an expectation for all members of the Operations Group.

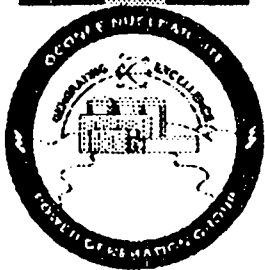


# OPERATIONS CHALLENGES

## OPERATIONS FOCUS

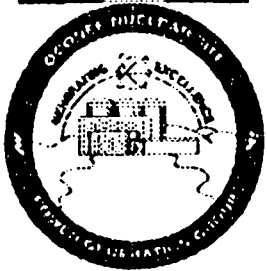
► An initiative is under way to increase Operations Focus among all Oconee Site Divisions. A key element of this initiative is that Operations leadership is clearly evident in all station activities. To achieve and enhance this leadership role, the following corrective actions have been taken or are underway:

- Operations management in work control activities will be improved. This will be accomplished by having Work Control Managers in place with a strong Operations background and a high degree of credibility among Site personnel.
- Operations will establish clear ownership and control of all plant equipment. To this end, Operations has assumed ownership of the equipment safety tagging program for all plant equipment. Also, a policy statement was developed and communicated to Site personnel that clearly identifies Operations as the owner of all plant equipment.
- Operations is taking a leadership role in the conduct of plant status meetings. The Operations Shift Manager (OSM) conducts an early morning briefing to discuss plant status, problem areas, and major scheduled work activities. This meeting is attended by representatives of supporting Site groups who report for their areas. The OSM also plays a key role in the daily Site Direction Meeting and establishes the standards and expectations for those supporting plant operations.
- The OSMs are considered key members of the Site Management Team, in addition to serving as the backshift Station Manager. To support this role on the Management Team, the Station Manager periodically attends the monthly OSM meetings to discuss and act upon issues important to Operations.





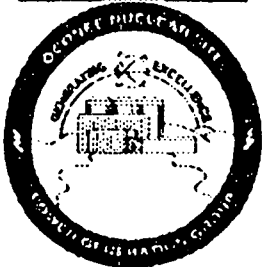
# ENGINEERING



# ENGINEERING STRENGTHS

## LONG STANDING ISSUE RESOLUTION

- Engineering has made significant progress in addressing some long-standing issues in a direct manner:
  - Service Water
  - Emergency Power
  - Safety Related Designation Clarification
  - Backlogs
- Engineering has been proactive in obtaining funding approval for other needed projects that require efforts above "baseline" capabilities:
  - DC Calculation
  - Loop Accuracy Calculations
  - Calculation Index/cross referencing
  - Electronic Library (electronic drawings and procedures)
  - Equipment Database
  - Reactor Coolant Branch piping analysis
  - Core Flood Line Leak-before-break analysis
  - Completion of resolution to Unresolved Safety Issue (USI) A-46 (Seismic Qualification Utility Group (SQUG))
  - Service Water Issues Resolution
  - PERFORMA (Computerized Performance Monitoring Tool)



# ENGINEERING STRENGTHS

## DESIGN BASIS DOCUMENT (DBD) PROJECT

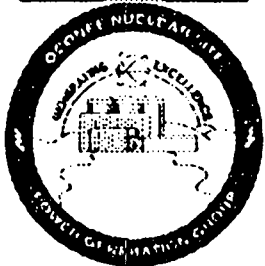
- DBD Project which began in 1989 was completed in December 1995 and should provide a solid basis of information relative to the design of Oconee systems, structures and components.
- Eighty-nine DBDs completed with a total project cost of \$2.5 million.
- Remaining action is to resolve open items.



# ENGINEERING STRENGTHS

## SELF ASSESSMENT

- A second Engineering Self Assessment (ESA) was performed utilizing INPO Performance Objectives and Guidelines and NRC Inspection guidance, during the 10/2 through 10/13/95 timeframe. The ESA team was made up of seven Duke Power personnel from varied disciplines from the Oconee site Engineering organization and the General Office and a nuclear site Engineering person from another utility. The team performed an independent assessment of the ONS Engineering Organization. The assessment results were broken down into strengths, findings, observations, positive initiatives, and recommendations. A total of 49 recommendations were identified in the 1995 ESA final report.
- Each of the 49 recommendations contained in the 1995 ESA final report has been assigned to an Engineering management person, who will be responsible for ensuring the completion of the corrective actions. These recommendations and assignments will be tracked within PLAN Project 95-557.



# ENGINEERING STRENGTHS

## SELF ASSESSMENT (cont'd)

- A follow-up review of the 46 findings identified in the 1994 ESA Final Report indicated:
  - 25 findings were completed by 12/31/95 categorized as follows:
    - ◆ PLAN was implemented and management continues to better understand Engineering work load.
    - ◆ Root Cause training is being implemented
    - ◆ Management increased involvement in training
    - ◆ Developed Engineering Operational Plan to show how Engineering objectives and initiatives fit into the site operational plan
    - ◆ Reworked the performance appraisal process
    - ◆ Implemented the Self Assessment process
    - ◆ Initiated projects to improve drawing legibility (Electronic Library, Drawing Updates)
    - ◆ Implemented project to address concerns with calculations. Failure Prevention International (FPI) provided an assessment (see "Design Control")
  - 21 remaining findings are either addressed in the 1995 ESA Final Report or will be completed in 1996 under previously developed plans:
    - ◆ Improve long range planning
    - ◆ Resolve roles and responsibilities issues with the Station organization and within Engineering.
    - ◆ Establish Individual Development Plan process
    - ◆ Define Plant Performance monitoring expectations
    - ◆ Improve selected processes
    - ◆ Develop/enhance work place procedures



# ENGINEERING STRENGTHS

## SELF ASSESSMENT (cont'd)

- The 1994 and 1995 ESAs demonstrated the value of this type assessment.
- A follow-up ESA will be performed in late 1996 to assess the progress made.
- Periodic review meetings will also be held among Engineering Management and the ESA Team Leader to monitor progress being made on the ESA recommendations.

## LOW SAFETY SYSTEM UNAVAILABILITY

- Engineering supports the achievement of low safety system unavailability:
  - Working with Operations, Maintenance and Work Control in establishing goals
  - Engineering Support Program
    - ◆System Monitoring
    - ◆Improved equipment reliability
  - Involvement in train maintenance scheduling



# ENGINEERING STRENGTHS

## DEPTH OF EXPERIENCE

- The Engineering Division serves as the architect-engineer for Oconee. This in-house capability is an advantage for the resolution of short and long term problems.
- The Engineering Division is made up of a highly experienced workforce; the average years of experience with Duke Power of the Engineers and Technicians is almost 15 years.
  - Attrition rate is low
  - Work experience is diverse
  - All managers are SRO or Technical Nuclear Certification (TNC) trained
  - Four Engineering Supervisors are SRO certified; four more will begin TNC in 1996
- The General Office provides support for specialized areas of expertise such as nuclear fuels, safety analysis, probabilistic risk assessment, seismic analysis, electrical power systems analysis, etc. This promotes consistency and maintains expertise.



# ENGINEERING STRENGTHS

## ENGINEERING SUPPORT TRAINING PROGRAM

- The Oconee Engineering Support Training Program per INPO ACAD 91-017 received accredited renewal by INPO in fall 1994, with two strengths (line ownership and pre-class systems workbook). Engineering line ownership and involvement continues to be a recognized strength. Since the 1994 accreditation team visit, INPO has been referring other utility questions about engineering training to the Oconee Engineering Support Training Section.
- Position Specific Guides (PSG's) have been developed for accredited program incumbents. PSG's are being developed for non-accredited engineering personnel.
- An Engineering Training and Development Team (ETDT) comprised of managers, supervisors and individual contributors from each discipline has been formed, and it meets monthly to review ongoing training needs, program revision needs and general training.
- An 18 month training schedule is in use for Engineering. This includes continuing training, which is conducted at least annually for all Engineering/Safety Assurance personnel. Topics for continuing training are solicited from all Engineering personnel. The average number of continuing training hours for 1995 was 81 hours per person.
- During the period July 1994 - June 1995, 51 people completed remaining formal requirements, such that 161 people in the Engineering Support Training Program have now completed all formal initial training requirements.
- In March 1995, the Oconee station manager requested Failure Prevention International (FPI) assistance in determining common causes for human errors at Oconee. Engineering human errors were much lower than expected compared to other utilities. Engineering managers and supervisors completed a two day human error reduction training tailored for Engineering. Thirty staff personnel attended a one day worker class. The rest of the staff is to complete training in 1996.





# ENGINEERING STRENGTHS

## CONSISTENCY AMONG SITES

- **Business Excellence Steering Teams (BEST) exist at each organizational level within the Engineering Divisions.**
- **Each BEST consists of representatives from each nuclear site and the General Office who meet and have conference calls on specified frequencies.**
- **Established to foster communication of and solutions to problems of interest to other sites and to better promote consistency among the sites.**
- **SuperBEST (Engineering Division Managers and direct reports from each location) meetings are held to work on common initiatives such as work management, performance appraisals, self assessment process, root cause analysis, etc.**



# ENGINEERING STRENGTHS

## SUPPORT OF LICENSE RENEWAL

- The Oconee License Renewal Project Team continues to develop the technical and licensing details of a renewal operating license application for submittal to the NRC. The team has six main areas of focus that range from working within the industry forums to establish a common renewal process to working with the Duke business strategists to fit the Oconee license renewal business decision in among other major corporate decisions Duke will be faced with in the latter part of this decade. Team members are working within the industry structure (BWOG, WOG, EPRI and NEI) and with the NRC to complete the initial license renewal implementation guidance which will provide structure for the Oconee license renewal information and to develop technical processes and solutions, especially focusing on common solutions, to aging management issues identified during preparation of the Oconee license renewal information.
- The project team members have been aligned with the Oconee and General Office Engineering staffs and within the BEST structure to promote and to establish clear, defensible aging management program activities for the structures and components falling into the Oconee license renewal scope. They are working with the Oconee and General Office licensing compliance staffs and the Duke Legal Department to develop an Oconee license renewal application which is consistent with the Oconee current licensing basis and is sufficient to meet 10CFR54 requirements. They are working with the appropriate Duke environmental specialists to update and document Oconee's environmental report supplement which forms a piece of the Oconee license renewal application. Finally, they are working with the Duke business strategists and communication specialists to assure a positive business environment exists for Oconee license renewal application processing.
- The major challenge currently facing the renewal effort is to successfully merge the aging requirements of license renewal within the fiscal environment of plant operations.



# ENGINEERING STRENGTHS

## KEOWEE PRA

- ▶ The Keowee PRA completed in 1995 is a detailed analytical reliability study of the Keowee hydroelectric generating facility. The Keowee reliability model can be coupled with the existing PRA model of the Oconee AC power system to provide information on the reliability of the overall Oconee AC power system. The Keowee PRA concluded that Keowee is a reliable source of emergency power for Oconee.

## IPEEE EVALUATION

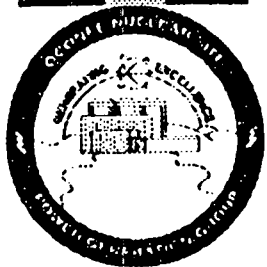
- ▶ The ONS Individual Plant Examination for External Events (IPEEE) was submitted to the NRC in December of 1995. The IPEEE provides a probabilistic assessment of vulnerabilities to external events such as earthquakes, tornadoes, fires, and floods. The IPEEE concludes that there are no fundamental weaknesses or vulnerabilities with regard to severe accident risk at Oconee Nuclear Station.



# ENGINEERING AREAS OF PROGRESS

## DESIGN CONTROL

- Design Basis Document Project is complete (enhances documentation and understanding of Oconee design bases).
- DBD Project included review of testing procedures for design basis function.
- Improvements in calculations:
  - Revised directives on our modification process to include calcs as documents to be included in the Documents Affected list. This addressed the issue of timely revision of calcs as the plant changed.
  - Our calculation directive was also revised to clarify management expectations on the role of checkers and approvers, specifically as it related to the importance of verifying assumptions. These expectations have been communicated to Engineering personnel.
  - The inspections on electrical and mechanical calculations recently completed is an indicator of progress in this area.
  - Information Technology has developed a searchable database that will allow sorting, searching by text, title, date, responsible engineer, QA condition, system, etc. Portions of calculations will be scanned/typed in to provide text fields for scanning. This effort will be completed in 1996.
  - Training on Engineering Documents Manual 102 (setpoint uncertainty analysis) is in progress for all affected Engineering personnel.
  - Improved work management process should allot sufficient time for calculation work. Use of this type process led to on-time completion of Emergency Power Upgrade Project June 1st milestone.
  - A number of the findings on calculations were human performance related. Actions taken include:
    - ◆ Leaders within Engineering have received Human Error Reduction training by FPI.
    - ◆ FPI completed a common cause assessment of the Oconee Engineering Calculation Process in October 1995. An Oconee Engineering project team has been created to review the findings of this assessment and to determine the appropriate actions to be taken.



# ENGINEERING AREAS OF PROGRESS

## OPERATIONS AND MAINTENANCE SUPPORT

- Enhanced support of Maintenance:
  - Approximately 50 Engineering personnel are in direct support of maintenance activities
  - Pump and valve working groups have strengthened relationships
  - Site focus on top equipment reliability issues
  - Engineering Support Program is clearly defined in directive
  - Preventive Maintenance Optimization program was completed in 1995
  
- Enhanced Operations focus
  - Participation in daily operations meetings, site direction meetings
  - In depth mechanical system reports
  - Emphasis on control room instruments out of service
  - Review of operating procedures by Systems Engineers
  - Review of/participation in Operator training
  - Weekly management focus on a formalized workaround list



# ENGINEERING AREAS OF PROGRESS

## EMERGENCY POWER PROJECT

- ▶ The Oconee Emergency Power Project was completed on schedule by November 1, 1995. This project upgraded the Maintenance program at Keowee to the same standards as Oconee, and involved the following project elements:
  - Calibration of over 300 instruments
  - Conduct of several new or revised test procedures
  - Creation/upgrade of over 200 maintenance, test and calibration procedures
  - Creation/upgrade of Design Basis Documents to include testing and calculation cross references
  - Creation/upgrade of approximately 64 engineering calculations
  - Seismic qualification of piping and supports for QA1 mechanical systems at Keowee
  - Conduct of SQUG (USI A-46) analyses for Keowee and switchyard
  - Review of systems and equipment at Keowee for proper QA classification. Reissued approximately 800 drawings/documents to include the QA1 stamp
  - Creation/revision and issuance of additional drawings for Keowee
  - Upgrade of the Quality Standards Manual with additional detailed lists of equipment and a Roadmap for use by job planners to assure proper determination of QA classification
  - Resolution of significant numbers of electrical connection drawing discrepancies at Keowee
  - Completion of the Keowee PRA (Probabilistic Risk Assessment) and implementation of recommendations
  - Incorporation of Keowee, the switchyard and Lee Combustion Turbines in the Maintenance Rule



# ENGINEERING AREAS OF PROGRESS

## DC GROUND DETECTION AND LOCATION

- Significant improvements have been made in our responsiveness to grounds on our DC systems. A design study was performed in late 1994 evaluating the following:
  - Basics of grounds and ground-induced malfunctions
  - Normal operation of the 125 Vdc Vital Instrumentation and Control System
  - Modeling of the system with grounds present
  - Calculation of ground magnitude on an operating system
  - Postulated ground induced failures
  - Design of relay logic and vulnerability to grounds
  - Factors influencing the detector setpoint
- Engineering criteria have been developed giving guidance for setting ground detectors.
- A directive common to all three Duke nuclear stations has been written to establish "Nuclear Safety-Related DC Systems Ground Response".
- Selected Licensee Commitment (SLC) has been issued to establish time restrictions for locating grounds on the 125Vdc Vital Instrumentation and Control System based on the magnitude of the ground. Procedures are in place to support the SLC.
- A modification has been initiated to replace ground detectors and modify test circuits on the 125 Vdc Vital I&C System (currently planned for implementation in 1998).



# ENGINEERING AREAS OF PROGRESS

## DC GROUND DETECTION AND LOCATION (cont'd)

- Calculations to be completed in 1996 will document ground detector setpoints for all safety-related DC systems.
- Electrical load lists and impact statements are being prepared during 1996 which will give a significant boost to our ability to research and eliminate grounds in a timely manner.
- Grounds received during this SALP period have received timely and aggressive corrective action...a significant improvement.

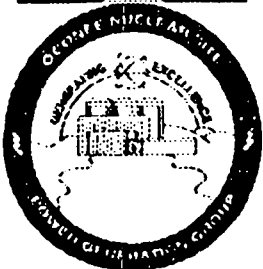




# ENGINEERING AREAS OF PROGRESS

## BACKLOG MANAGEMENT

- ▶ Engineering has placed additional emphasis on understanding and prioritizing work backlogs. Efforts this period have been in three areas: work orders on hold for Engineering, modification drawings and PIP's.
- ▶ Backlog work orders (which includes Control Room Instrument Problems (CRIPs) are reviewed periodically in team meetings. The oldest ones are reviewed closely to determine that appropriate action is being taken. Additional emphasis is placed on resolving backlog items affecting operating equipment. NRC Inspection Report 269-95-31 concluded that backlogged work orders assigned to Engineering were being addressed in a timely manner and are being tracked by management for timeliness (this area is reviewed once per week in the site direction meetings).
- ▶ In the PIP area, the number of overdue activities each month has been significantly reduced. Less significant events (LSE's) are closed out or evaluations are made to resolve them whether by minor modification, work request, design study, maintenance program or procedure and directive changes. One noteworthy accomplishment this period dealt with meetings with Safety Review Group (SRG) personnel to review all outstanding corrective actions in Engineering. By utilizing criteria developed by SRG, a number of the outstanding items were closed out. NRC Inspection Report 269-95-31 concluded that the licensee is effectively managing the backlog of PIP corrective actions assigned to Engineering.
- ▶ In the modification drawing area, approximately 13,000 drawings were issued to clear a Nuclear Station Modification and Minor Modification drawing update backlog. Vital-to-operation drawings are now issued within two days of field work completion, and other documents are issued within 60 days of field completion. This has greatly improved the availability of as-built information for Operations, Maintenance, Work Control and Engineering.



# ENGINEERING

## AREAS OF PROGRESS

### PLANNING AND WORK

### MANAGEMENT PROCESS

▶ A work management tool (PLAN) is in place that provides a central repository to list and monitor work activities for NSMs, Minor Mods, and Site Projects. All NSM and MM activities are included in PLAN. Any special projects, initiatives, etc.... that require significant Engineering resources are included as projects in PLAN. PLAN is intended to be a tool to help an individual and their leader manage workload and commitments, with the focus on detail, short term, day to day work and project management.

▶ Oconee Engineering has developed an Engineering Operational Plan (EOP). The EOP is a list of the initiatives and projects whose success is most critical to the division. The EOP was developed by reviewing the Site Operational Plan, Employee Opinion Survey, Self Assessment, etc. The EOP is not intended to be an inclusive list of all Engineering work; it is a list of those items most critical to our success. The Engineering Division has weekly meetings to focus on EOP items to ensure successful completion; barriers are identified and removed. The focus is on medium range, mid-level milestones.

▶ Oconee Engineering has revised our method of Operational Planning. Work is segregated in the Operational Planning Tool (OPT) such that work activity teams are responsible for evaluating, planning, scheduling, and budgeting the work activities in their areas. These teams have created a partnership between Engineering and the Station to ensure resources are allocated to solve the "right" problems. The focus of this element is on high level, long range planning.

▶ Engineering Managers at the three nuclear sites have chartered a team to develop an effective Work Selection Process. Since Engineering cannot do all that is requested, an effective means to evaluate new work, assess requirements for the work, assess its priority relative to other work, and determine an appropriate time frame to perform the work is needed. Engineering resource optimization facilitated by an effective work selection process is the goal.



# ENGINEERING AREAS OF PROGRESS

## SERVICE WATER

- Plan for resolution presented during Duke/NRC meeting on Feb. 24, 1995.
- Revised plan for modification presented November 1, 1995.
- The conceptual design of the upgrade was provided to the NRC December 28, 1995. The objectives of the upgrades are as follows:
  - Eliminate dependence on the High Pressure Service Water (HPSW) System for mitigating a LOCA/LOOP.
  - Ensure adequate Net Positive Suction Head (NPSH) for the Low Pressure Service Water (LPSW) pumps during all design basis conditions.
  - Upgrade/reclassify the systems, structures, and components necessary for supplying suction to the LPSW pumps after a LOCA/LOOP to QA Condition 1.
  - Enhance the reliability of the ECCW siphon supply to the LPSW pumps and eliminate reliance on manual restart of CCW pumps after a LOCA/LOOP by addition of a QA Condition 1 Emergency Siphon Vacuum (ESV) System.
  - A dedicated project team has been assigned to design and oversee implementation of the ECCW Upgrade modifications.
  - Modifications planned for completion by 12/31/97.
- Remaining SWSOPI issues have been resolved



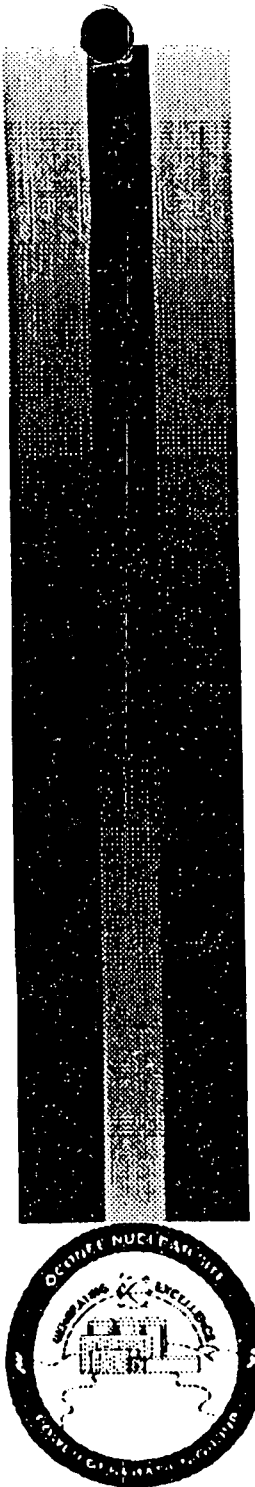
# ENGINEERING AREAS OF PROGRESS

## SERVICE WATER (cont'd)

➤ **Service Water System Program Manual**

- In November, 1995, a new updated Service Water System Program Manual was issued. This new manual is more comprehensive than the previous version in describing programs and methods for operating, maintaining and testing the Service Water Systems. A new Nuclear System Directive will be issued in the first quarter of 1996 which will provide additional management emphasis on the Service Water System Program as described in the new manual. This new manual will eventually include information for the McGuire and Catawba Nuclear Stations as well as Oconee to facilitate maintaining consistency among the Service Water System Programs at all Duke Power nuclear stations.





# ENGINEERING

## AREAS OF PROGRESS

### VALVES-CLOSURE OF GL 89-10

- Valves continue to be a major focus for ONS. While significant efforts have been expended on regulatory issues, additional work has been expended to streamline the valve diagnostics process, preventive maintenance review, component reliability and performance enhancement. Recent outage performance reflects reduced impacts from valve problems. **A significant milestone was achieved with the successful Closure Audit of GL 89-10. The results of the audit included two strengths associated with a proactive MOV program and industry involvement.**
- The Valve Working Group established during this SALP period has matured. The group routinely reviews the operational, maintenance, engineering, and financial performance of the valve area. Where appropriate, small work improvement teams are initiated to improve specific performance deficiencies. Teams currently exist for AOV's, MOV's, Relief Valves, and Valve Modification Planning.
- Valve replacements continue at historical levels. Recent commodity focused efforts have resulted in the recommendations to replace small valves rather than attempt repair efforts. Additionally, recommendations have been made on the standardization of small valve replacements, the need to revise purchase specifications, and the need to focus valve procurement and specification for the Nuclear Department. These recommendations have been endorsed by the three Nuclear Site Engineering management groups. Detailed implementation of these recommendations will begin during 1996.

# ENGINEERING AREAS OF PROGRESS

## SSF DESIGN MARGINS

- Additional margin was needed between the time when SSF activation is required (SSF RC Makeup System & SSF ASW System) and the time it takes Operations to activate the SSF. Engineering performed the following actions to increase the margin for SSF activation:
  - Calculations were revised to increase the time at which SSF ASW System activation is required from 10 to 14 minutes after the event.
  - A minor modification was performed to allow numerous SSF breakers to be left in their normally closed position so the amount of time it takes to activate the SSF is decreased.
  - Engineering worked with Operations to rewrite the procedure used to activate the SSF with the goal of minimizing the amount of time it takes to activate the SSF.
  
- Changes have resulted in a reduction of the time it takes Operations to activate the SSF.
  
- Modifications are in progress to improve the accuracy of seal leakage instrumentation, which will reduce required SSF RC Makeup Flow.



# ENGINEERING AREAS OF PROGRESS

## EMERGENCY FEEDWATER OVERPRESSURE PROTECTION

- The following modifications, when complete, resolve the EFW overpressure protection concerns:
  - Replace Motor Driven EFW Pump Automatic Recirculation Control (ARC) Valves on all units
  - Install Strainers in Steam Supply Lines (Units 1 and 3); Unit 2 planned for EOC15 RFO
  - Reduce overspeed trip setpoint for TDEFDW pump turbine (in progress)



# ENGINEERING AREAS OF PROGRESS

## TRIP REDUCTION

- An adverse trend in reactor trip frequency led to the formation of a team (including other utility participants) to:
  - Review Reactor Trip Reports
  - Review responses to selected SPIP recommendations
  - Review Feedwater/Condensate System trips
  - Make recommendations to station management
- Human Performance Program improvements were considered highest priority.
  - A Human Performance Improvement Plan was developed
- Three Modifications were implemented during 1EOC16.
- We plan to implement the 12 remaining modifications on Unit 1, and the 15 modifications on Unit 2 and Unit 3 during the next RFO's
  
- Two actual unit trips in 1995 versus seven in 1994.





# ENGINEERING AREAS OF PROGRESS

## MAINTENANCE RULE

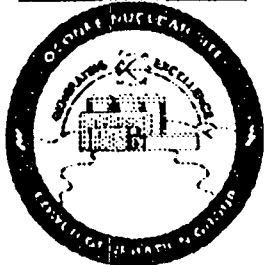
- Special Project Team developed consistent Duke Power Program which is defined in a Nuclear System Directive (NSD) issued on Jan. 1, 1996.
- Implementation of program in progress with full compliance by July 10, 1996.
- Internal assessment of program scheduled for June 1996.
- Performance monitoring has been transferred to the System Engineers.
  - System Engineer Training has been completed
- Removal-from-Service Risk Assessment Matrix implemented.
  - Used by Work Control for work planning
  - Used by Operations in routine operations
- Site orientation is in progress.



# ENGINEERING AREAS OF PROGRESS

## SYSTEM LEVEL TESTING

- Special Project Team developed Duke Power's Testing Philosophy (System Level Testing is always preferred).
  - NSD 408 was developed to consistently implement this philosophy
  - Testing Working Group formed to implement NSD recommendations
  - Developed computerized on-line Post Maintenance/Post Modification Testing (PMT) database to identify required testing of components to Planners and Operations
  - Recommended Test Coordinator requirements be formalized
  - Formed IST and Appendix J working groups
  - Developed DBD Testing matrix to confirm and justify all required functions tested
- Emergency Condenser Circulating Water (ECCW) System Testing examples:
  - Periodic test procedures have been revised to incorporate new test acceptance criteria for the ECCW System siphon supply to the Low Pressure Service Water (LPSW) pumps. The new criteria incorporate instrument uncertainty per Duke commitments resulting from the Service Water System Operational Performance Inspection (SWSOPI).
  - A special test was performed in June 1995, which demonstrated that a CCW pump can operate acceptably at the pump minimum flow rate specified by the manufacturer. Such flow rates may be expected after a Loss of Lake Keowee event or after a LOCA/LOOP.
  - In November 1995, special tests were performed to determine the maximum air in-leakage at the CCW pump shafts during ECCW siphon operation with all packing removed from the shaft seal. These tests were performed with shaft seal water supply from the High Pressure Service Water (HPSW) System and without the HPSW seal supply. The results are being used to size the new Emergency Siphon Vacuum (ESV) pumps to be added as part of the ECCW System Upgrade modifications described earlier.



# ENGINEERING AREAS OF PROGRESS

## MISCELLANEOUS

### FUEL PERFORMANCE

- Detection and repair of leaking fuel assemblies excellent
- **All three units currently have clean cores with no fuel leakers predicted**
- Eliminate Debris Failures
- Eliminated Grid to Rod (design flaw) fretting failures
- Hot cell program planned to determine fuel failure mode of type found on Unit 3 Cycle 15. Believed to be a manufacturing defect, potentially in the fuel pin end cap welding process.

### RBCU'S

- Modifications to replace the cooling coils have been completed on all three units. The RBCU's are performing as expected. The conditional operability has been removed for all three units.

### SFP WATER CLARITY

- Both Spent Fuel Pools were cleaned in 1995. Water clarity has been a concern of the NRC for some time and ONS has had some near misses in the Fuel Handling area due to poor visibility in the pools and transfer canal. The cause of the problem is crud which is dislodged from the fuel assemblies during fuel handling operations. The spent fuel pool purification loop does not have sufficient capacity to handle the volume and type of particulate matter typically generated by fuel handling. This has resulted in a layer of silt and debris in the bottom of the fuel pool as well as poor visibility in the pool. The problem has been growing progressively worse. The cleanup effort involved direct vacuuming of the accessible surfaces in the pools and a general area cleanup by recirculation through Tri-Nuc Vacuum/Filtration Units. ONS is also now using the Tri-Nuc Units in the Fuel Pool and Transfer Canal prior to and during fuel movement at each unit outage. **Pool water clarity has significantly improved.**



# ENGINEERING AREAS OF PROGRESS

## MISCELLANEOUS (cont'd)

### ▶ REACTOR PROTECTION SYSTEM

- Due to problems with spurious channel trips of the reactor protection system in the flux/imbalance/flow trip string (which led to one unit trip), engineering began an investigation into monitoring equipment which could be installed to help pinpoint the cause of the channel trips. Evaluation of available equipment led to the installation of STAR hardware from Framatone Technologies (formerly B&W) in place of the original Bailey hardware in the flux/imbalance flow string of RPS on a permanent basis. The new hardware is Oconee's first installation of digital hardware in a QA1 protection system. This equipment was installed on Unit 3 and is planned for installation on Unit 2 in '96 and on Unit 1 in '97. This equipment provides the monitoring capability needed to help pinpoint the cause of spurious channel trips in addition to other features such as increased accuracy and reduced maintenance as compared to the original equipment.

### ▶ SCORPIO PROJECT

- This is an on-line 3-D core simulator that provides fast and accurate power maneuvering predictions. Computers and software were purchased by Nuclear Engineering. Currently the core models are being developed.

### ▶ LOW PRESSURE SERVICE WATER ENHANCEMENTS

- Due to the completion of NSM ON-52972, seismic boundary valve LPSW-139 is capable of being quarterly stroke tested. The completion of this major modification allowed the closure of a significant GL 89-10 open item.
- Safety Analysis has completed a RELAP5 analysis of the two-phase flow conditions downstream of the RBCUs. The investigation originated from NRC concerns of flashing of LPSW cooling water downstream of the RBCUs during accident conditions. Their analysis concluded that the current system design is acceptable and that no vapor condensation type water hammer will occur.
- Through integrated LPSW system testing performed on a refueling basis, the LPSW hydraulic models have continuously improved. Correlation between test results and model results are excellent with accuracies within 5 percent. Various system parameters are also being trended to monitor the system for long term degradation, system fouling, flow blockages, etc.



# ENGINEERING AREAS OF PROGRESS

## MISCELLANEOUS (cont'd)

### ➤ THERMAL PERFORMANCE

- Engineering has ongoing efforts to maintain and enhance the thermal performance of the Oconee units. Several activities have led to enhanced thermal performance:
  - ◆ Routine monitoring and trending minimizes FDW flow venturi fowling effects
  - ◆ Replaced broken expansion joints in the Unit 2 condenser
  - ◆ Modification planned to install a powdex system in the MSRH drain system to allow pumping of both MSRH drain tanks forward
  - ◆ Replaced TBV's on Unit 1 to reduce leakage. Units 3 and 2 will be replaced in 1996 and 1997
  - ◆ Perform maintenance on MSRH drain pumping system to allow pumping of the MSRH drain tanks forward
  - ◆ Improvements to the OAC are planned to upgrade the thermal performance subroutines to allow better monitoring and trending. Expected values created in the subroutines will allow easy identification of abnormal conditions.
  - ◆ Thermal Loss program identifies leaking valves
  - ◆ Additional activities are planned to enhance thermal performance

### ➤ HYDRILLA INFESTATION

- In September 1995, a Fossil/Hydro mosquito control crew discovered a large infestation of Hydrilla in the Cane Creek arm of Lake Keowee. Hydrilla is an aquatic weed that has caused serious intake fouling at other power plants. Mechanical System Engineering participated heavily in planning appropriate treatment in terms of lowering lake levels to minimum acceptable levels. Lowering of the lake level combined with herbicide application is the aggressive strategy for controlling and reducing the Hydrilla infestation.



# ENGINEERING

## AREAS OF PROGRESS

### MISCELLANEOUS (cont'd)

- Significant modifications have been or are being installed this SALP period:
- 1E and non-1E inverters and chargers replacement
  - Radiation Monitor System replacement/upgrade
  - Reactor Coolant Pump Vibration Monitors Upgrade
  - Ex-core Detector Replacements
  - LPI Cooler Trend Recorder Addition (included first installation of fiber-optic cabling)
  - Generator ground fault protection (INPO item)
  - MS-93 inlet strainer addition--to prevent TDEFWP overspeed
  - ARC valve addition to the MDEFWP's--overpressure protection
  - HPI motor cooling water addition--additional defense-in-depth for HPI motor cooling
  - Polar crane upgrades
  - Dry Cask expansion
  - Vehicle barrier installation
  - Feedwater isolation for MSLB protection
  - Reactor Coolant Pump seal leakage instrumentation upgrade
  - Turbine Bypass Valve replacements
  - Low Pressure Service Water essential/non-essential isolation bypass
  - Replacement of Letdown Line Outside Containment Isolation Valve HP-5



# ENGINEERING CHALLENGES DEVELOPMENT AND IMPLEMENTATION OF A "QA-5" PROGRAM

- Formed Oconee Safety Related Designation Clarification (OSRDC) team to clarify licensing basis and develop QA-5 program.
- Submittal of design basis information to NRC 4/12/95.
- NRC meetings held in February and April 1995.
- Verifying QA-1 SSC's are properly categorized.
  - Design document review is complete, verification begun
  - Documents reviewed for post-licensing commitments, tabulation begun
  - Tabulation sent to NRC 7/10/95
- Identified non QA-1 SSCs that mitigate accidents.
  - Pilot accident review has been completed, several additional accidents are under review
- Challenge is to develop augmented quality standards program (QA-5) for non QA-1 SSCs - to begin 3rd quarter 1996.



# ENGINEERING CHALLENGES

## BATTERIES

- A detailed plan has been developed to address issues related to vital I&C batteries and power batteries, both manufactured by Exide. Exide determined that the most probable cause of apparent battery degradation (capacity reduction seen through testing) was due to inappropriate manufacturer ratings on the batteries. Exide conducted additional testing to establish a new rating which was evaluated and found acceptable for the vital batteries. Testing conducted to date on the re-rated batteries supports the manufacturer's finding. Calculations do not support re-rating the power batteries. At this time, one of the six power batteries (1PA) is out of service awaiting availability of replacement cells. Although replacement cells may return this battery to service, a modification has been initiated to replace all power batteries with 1PA and 1PB being replaced later this year. Evaluation of testing of the vital I&C batteries will determine appropriate actions for these batteries.

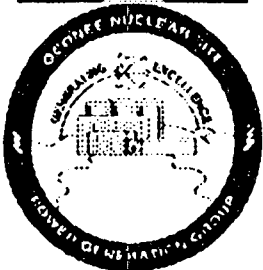




# ENGINEERING CHALLENGES

## CRDM TRIP TIMES

- In May/June 1995 outages were entered on Unit 1 and 2 to conservatively determine status of rod insertion times. On Unit 1, five CRDM drop times were greater than Tech Specs, with an additional four greater than 1.53 seconds. On Unit 2, twelve drives were found to have insertion times greater than 1.4 seconds, none were greater than Tech Specs. All affected CRDMs were repaired by replacing their thermal barriers with an improved design.
- In November 1995, testing was performed during shutdown for the refueling outage on Unit 1 with no rods exceeding Tech Spec requirements. All CRDMs with insertion times greater than 1.4 seconds were repaired by replacing thermal barriers with improved design. During start up there were no CRDMs with insertion times greater than 1.4 seconds (fully acceptable).
- In April 1996, trip time testing will be performed during the shutdown of Unit 2 for its refueling outage. All CRDMs with insertion times greater than 1.4 seconds will be repaired by replacing thermal barriers with the improved design, as well as those CRDMs removed for other maintenance. Currently there is one CRDM with an insertion time greater than 1.4 seconds, but still within the Tech Spec limit.
- Ten percent rod movements are done monthly to discourage and minimize crud build up.
- A repair program will continue with trending of rod insertion times during shutdown and start -up from refueling outages as well as any trips encountered.
- The automatic trip time recording feature will be maintained.
- Primary chemistry is maintained in strict compliance with BWOG guidelines.
- All CRDMs are in compliance with Tech Specs, and the degrading trend of rod insertion times has been turned around.



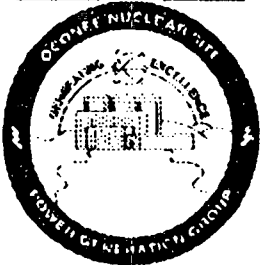
# ENGINEERING CHALLENGES

## UNIT 3 OUTAGE

- Unit 3 EOC 16 RFO work scope represents significant challenges:
  - Operator Aid Computer Installation
  - Significant Integrated Control System Upgrade
  - Emergency Condenser Circulating Water Upgrades/Additions
  - 50 day planned outage

## STANDARDIZED TECHNICAL SPECIFICATIONS

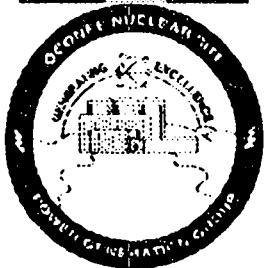
- Oconee has unique tech specs.
- Significant effort to begin in mid 1996 to convert to standardized tech specs.



# ENGINEERING CHALLENGES

## MISCELLANEOUS

- **PENETRATION ROOM VENTILATION SYSTEM (PRVS)**
  - The PRVS is marginal in its ability to maintain the penetration room at a lower pressure relative to the rest of the Auxiliary Building and the outside atmosphere, as required by the FSAR. To assist in testing requirements and in ensuring optimum system performance, an additional testing manometer has been added on all three units. PRVS testing procedures are being revised to incorporate the new manometers. Future test results will be used to improve system performance and resolve any interactions with the Auxiliary Building Ventilation System.
  
- **FDW VALVE DELTA P**
  - Unit 2 has experienced an increasing differential pressure across one of the main feedwater control valves. Engineering has determined the cause to be fouling of the main feedwater nozzles in the steam generators. To control the increasing differential pressure, the chemical DMA has been added in an attempt to de-foul the affected nozzles. The concentration of the DMA was increase to approximately 1000 ppm. The differential pressure decreased from 75 psid to 57 psid. Currently, the DMA at a concentration of approximately 400 ppm is maintaining the differential pressure constant.
  - Further corrective actions will be to inspect and clean the main feedwater nozzles during the next refueling outage.



# ENGINEERING CHALLENGES

## MISCELLANEOUS (cont'd)

### LOW PRESSURE SERVICE WATER ISSUE

- During the performance of an LPI Cooler Flow Test, sufficient LPSW flow could not be achieved through the 1A LPI Cooler. Further investigation revealed that a key connecting the manual operator to the valve stem of 1LPSW-254 vibrated out of the keyway allowing the disc to partially close and restrict flow. 1LPSW-254 is a manual isolation valve which is exposed to significant vibration due to flow induced cavitation through an upstream flow control valve. The LPI System was subsequently declared past inoperable (PIP 1-095-1396).
- Minor modification OE-8640 has been completed which installed a washer plate that mechanically prevents the key from vibrating out of the keyway. An investigation is in progress to determine if any other potential failures exist due to the excessive vibration. Modifications are also being pursued that may eliminate or significantly reduce the degree of cavitation.



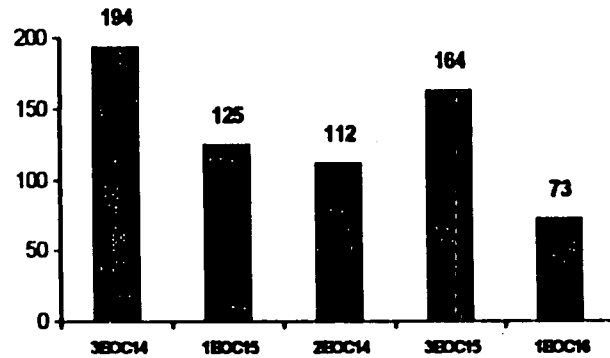
# MAINTENANCE



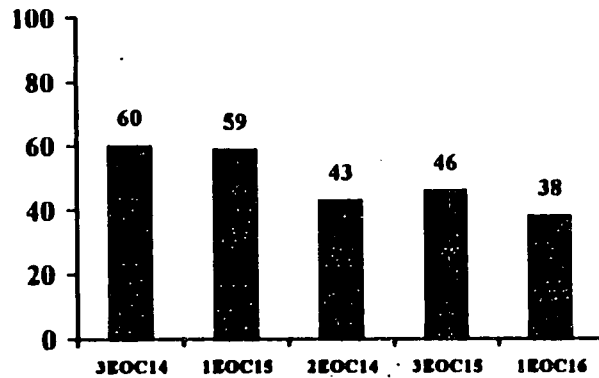
# MAINTENANCE

## STRENGTHS OUTAGE PERFORMANCE

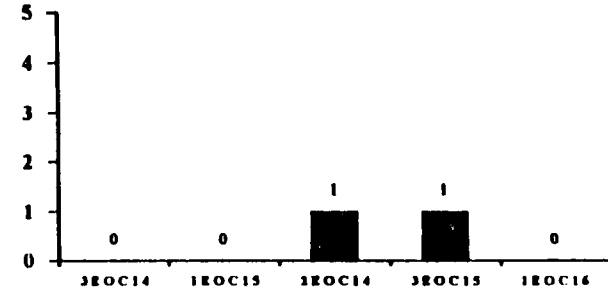
► Five areas are closely tracked during each Oconee refueling outage. During the past five refueling outages, positive trends exist in each area. Tremendous strides have been made in reducing personnel radiation exposure and the amount of solid radwaste generated.



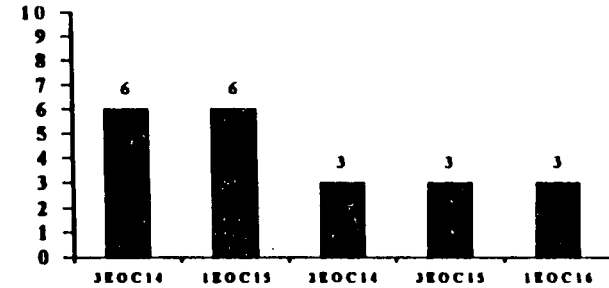
■ Exposure, Person-Rem



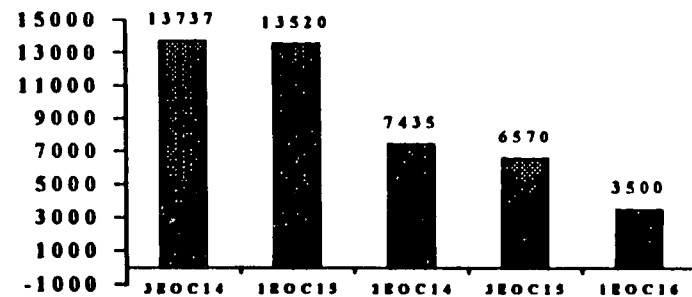
■ Duration, Days



■ Errors (L.E.R.s)



■ Personnel Injuries



■ Radwaste, Cubic Feet



# MAINTENANCE

## STRENGTHS

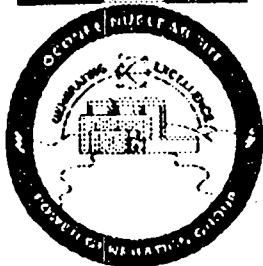
### OUTAGE PERFORMANCE (Continued)

Three refueling outages have been completed during this SALP period, with a fourth planned to start March 28, 1996, and last 35 days. The most recently completed refueling outage on Unit 1 (EOC-16) was the shortest in Oconee history, completed in just over 38 days. The Unit 1 EOC-16 outage was also the most successful Oconee outage with respect to goals performance, especially in the areas of personnel exposure and solid waste generation. A total of 45 refueling outages have now been completed at the Oconee Site.

The Unit 2 EOC-14 refueling outage began on October 6, 1994, and concluded during this SALP period on November 18, 1994 for a duration of 42 days. As with previous Oconee outages, core goals were established to measure performance in five key areas; Personnel Injuries, Personnel Exposure, Personnel Errors, Duration, and Solid Radwaste. The following table displays the results of goals performance for this outage:

<i>U2 EOC-14 Goals</i>	Minimum	Target	Maximum	Actual
Personnel Injuries	8	6	0	3
Exposure, Person-Rem	140	134	127	112
Personnel Errors	2	1	0	1
Duration, Days	44	42	40	43
Radwaste, Cubic Feet	11,046	10,494	10,000	7,435

The 43 day duration was the shortest Oconee refueling outage since 1989. Three personnel injuries, 112 person-Rem total exposure, and 7,435 cubic feet of solid radwaste established new Oconee best records. Major work accomplished during this outage included upgrade of all vital and essential inverters, upgrade of Source and Intermediate Range NI instruments, and replacement of RBCU cooling coils in the reactor building. Steam Generator maintenance was completed ahead of schedule. This allowed the cold leg nozzle dams to be removed before refueling thus eliminating the need for a second mid loop condition. The one mid loop operation that did occur to install the nozzle dams lasted only 16 hours minimizing risk during that critical evolution. There was one personnel error associated with a mispositioned RCP Seal Return Cooler drain valve that was promptly recognized and corrected during running of the 2B HPI Pump.



# MAINTENANCE STRENGTHS OUTAGE PERFORMANCE (Continued)

➤ The Unit 3 EOC-15 refueling outage began on June 6, 1995 and concluded on July 23, 1995, for a total duration of 46 days. The following table displays the results of goals performance for this outage:

<i>U3 EOC-15 Goals</i>	Minimum	Target	Maximum	Actual
Personnel Injuries	8	4	0	3
Exposure, Person-Rem	215	204	193	164
Personnel Errors	2	1	0	1
Duration, Days	39	37	35	46
Radwaste, Cubic Feet	11,046	10,494	10,000	6,570

➤ Major work items during this outage included an upgrade of all vital and essential inverters, replacement of Source and Intermediate Range NI instruments, refurbishment of 14 fuel assemblies, and successful completion of several major first time system tests. An all-time Oconee best record for mid loop operations was established at 10 hours and 53 minutes during removal of the cold leg nozzle dams.

➤ A substantial success story associated with this outage was the fuel repair efforts. Prior to shutdown, high RCS activity in the 0.20 - 0.25 DEI range existed. Extensive fuel UT and visual examination was conducted during the core offload which identified a total of 20 leaking pins contained in 14 individual assemblies. Twelve of these assemblies were successfully reconstituted using dummy pins, with the remaining two having to be entirely recaged. Since the completion of this outage, no further fuel leaks have been identified. Unit 3 continues to operate today with a clean core.

➤ Another innovation implemented this outage was the use of double inflatable bladders to seal the main steam lines internally. This provided continuous refueling containment closure while performing maintenance on both inside and outside components simultaneously.

The personnel error recorded was due to improper packing of the Pressurizer spray control valve. Packing failure occurred at hot shutdown conditions and the unit had to be returned to cold shutdown for repairs, resulting in a four day outage overrun.





# MAINTENANCE STRENGTHS OUTAGE PERFORMANCE (Continued)

➤ The Unit 1 EOC-16 refueling outage began on November 2, 1995, and concluded December 9, 1995, for a total duration of 38 days. This was overall the most successful refueling outage in Oconee history. New performance records were established in three of the five goal areas: exposure, duration, and solid radwaste generated. The following table displays the results of goals performance for this outage:

<i>U1 EOC-16 Goals</i>	Minimum	Target	Maximum	Actual
Personnel Injuries	6	3	0	3
Exposure, Person-Rem	125	119	113	73.2
Personnel Errors	2	1	0	0
Duration, Days	39	37	35	38
Radwaste, Cubic Feet	7,230	6,950	6,570	3,500

➤ Major work accomplished during this outage was first time installation of the main steam line break isolation protection modification, replacement of the turbine bypass valves, first time installation of a new RCP vibration monitoring/alarm system, and modifications to the station LPSW piping.

➤ An enhanced RCS induced crud burst was performed similar to the Unit 3 EOC15 outage and the personnel exposure results were outstanding. The final outage exposure of 73.2 person-rem established a Duke Power record and represents the first time a refueling outage has been performed on a B&W design plant for less than 100 person-rem. Generation of solid radwaste was approximately 46% less than the previous Oconee record established during the 3 EOC15 outage.

➤ No personnel errors occurred this outage, compared to one each for the two previous Oconee refueling outages.



# MAINTENANCE STRENGTHS

## OUTAGE PERFORMANCE (Continued)

► Outage quality as measured by continuous runs and forced outage rate:

Unit 1 Performance

303 Continuous Days

176 Continuous Days

1 Forced Outage

Unit 2 Performance

126 Continuous Days

253 Continuous Days\*

1 Forced Outage

Unit 3 Performance

297 Continuous Days

169 Continuous Days\*

0 Forced Outage

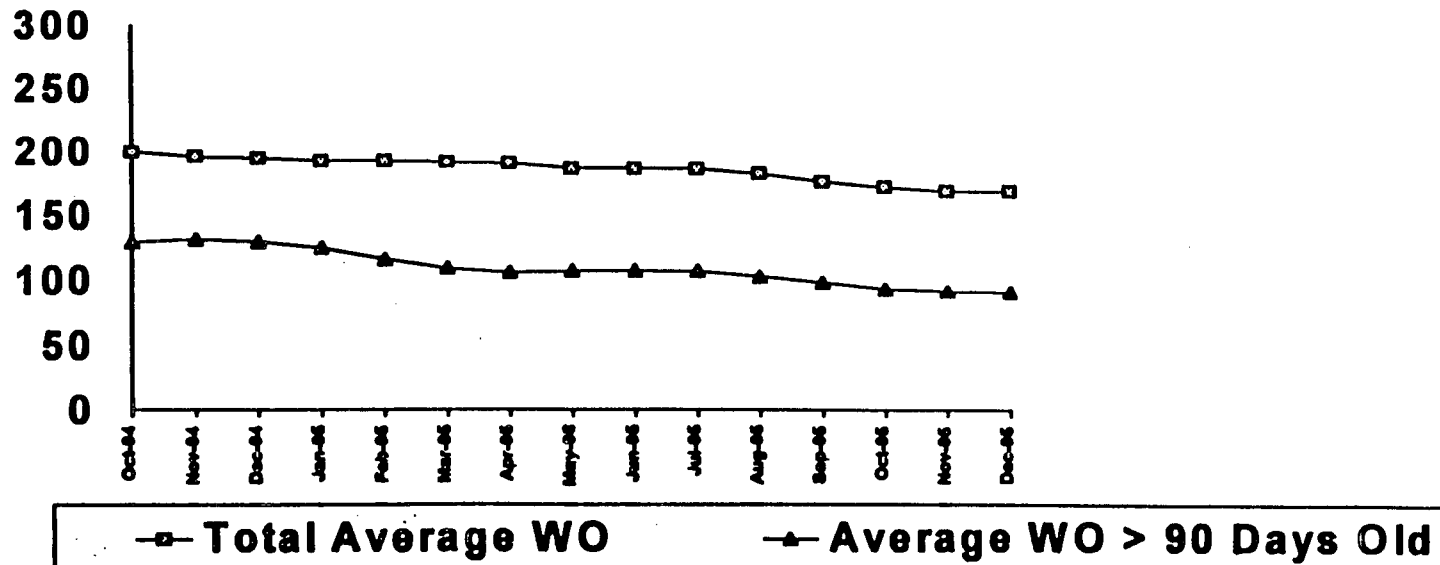
\* Current run as of 01/31/96



# MAINTENANCE STRENGTHS

## WORK ORDER BACKLOG PER UNIT

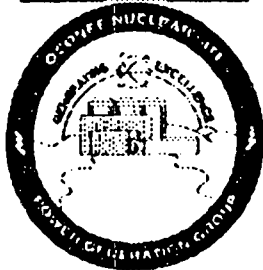
➤ Oconee has consistently maintained a work order backlog among the lowest in the industry. During this SALP period, Oconee has maintained its backlog of outstanding work orders greater than 90 days old, to less than 135 per unit. The average backlog of work orders greater than 90 days old has steadily declined over the SALP period to less than 92 per unit. This represents a commitment to keep plant equipment repaired and available to the Operators. Urgent repair items are handled by the Single Point of Contact (SPOC) Shift Teams. SPOC resolves over 42% of the emergent work, including the urgent work orders which helps to keep backlogs low.



# MAINTENANCE STRENGTHS

## RAPID RESOLUTION OF EMERGENT WORK - SPOC

➤ All emergent work is screened by the shift team known as SPOC (Single Point of Contact). The SPOC work process has resulted in a significant improvement in work efficiency and responsiveness to emergent work items. On shift SPOC teams screen all new emergent work requests and resolves those that can be handled by on shift personnel. The Shift Work Manager, who holds a current SRO, provides dedicated oversight and review of all the emergent work for the SPOC team. Those that cannot be quickly resolved are converted into a work order. The first level planning of the work order is completed by SPOC and it is forwarded to the appropriate team for the detailed planning. An average of 42% of the emergent work orders screened by SPOC teams are resolved by the SPOC teams. SPOC teams are skilled and experienced in problem investigation and resolution.



# MAINTENANCE STRENGTHS

## MULTI - DISCIPLINE WORK TEAMS

- Six functional areas have been modified to include both Mechanical and Electrical / I&C skilled employees. The six functional areas that are currently multi-disciplined are: HVAC, Motor Operated Valves, Rotating Equipment, Cranes, Predictive Maintenance, and SPOC. This approach has resulted in reducing hand-offs, improving communications, increasing single point accountability and increasing schedule efficiency. Cross training has been taking place during this SALP period to move the teams toward becoming multi-skilled.



# MAINTENANCE STRENGTHS

## PREDICTIVE MAINTENANCE

- ▶ A continued strength is the use of predictive technologies for station components. The predictive maintenance team is skilled in the use of vibration analysis, infra-red inspection, ultra-sound, oil analysis, motor current analysis, and video probe technologies for early detection of equipment degradation. Examples of some of the early detections include: 3B and 1B Low Pressure Service Water Pump bearing failure, Unit 1 230 KV Main Step-up transformer connector near failure (avoided a unit trip), 1C Hotwell Pump connection near failure (avoided unit trip), and the Unit 3 failed extraction expansion joint in the condenser. The predictive maintenance team monitoring is scheduled on a pre-determined frequency as well as responding to suspected degradation on an emergent basis. This continues to serve as a proactive method for establishing base line performance of equipment and the early detection of potential problems.

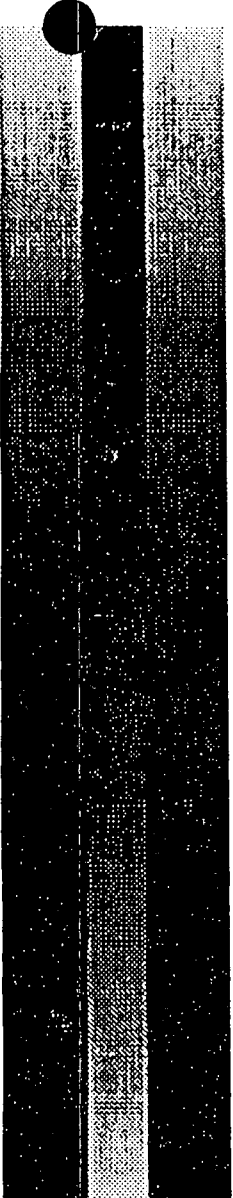


# MAINTENANCE AREAS OF PROGRESS

## FOREIGN MATERIAL EXCLUSION

- In this SALP period Duke Power developed and implemented new and aggressive guidelines for Foreign Material Exclusion (FME) in systems and components. Training for all Maintenance personnel and increased attention by management has resulted in a significant decrease in foreign material intrusions. Along with the new guidelines and associated training, FME performance has been measured and trended. Foreign material intrusions are classified in two categories. FME Events are foreign material intrusions that impact unit operation, nuclear safety, or personnel safety. FME Incidents are reported any time there is a loss of control with minor consequences or no consequences. In the current review period, Oconee had a single FME Event when a Marbo plug was temporarily lost in the low pressure service water system. There were a total of 11 FME Incidents for the review period with only two FME Incidents in the last outage (U1EOC16). FME control will continue to be a focus area.





# MAINTENANCE AREAS OF PROGRESS PROCEDURE USE AND ADHERENCE

- Early in this SALP period a major initiative was introduced to improve procedure use and adherence. This initiative included a clear communication to all personnel by the station manager for strict adherence to procedures at all times as required by the nuclear system directive. At the same time, a commitment was made to give procedure changes priority to minimize the time required to fix procedure problems. Accountability was the third part of the initiative in that lack of strict adherence would result in disciplinary action. The result was an immediate increase in needed procedure changes and a corresponding decrease in failure-to-follow-procedure events. This initiative has also been credited as a major contributor in the decline of human performance events as well. Other aspects of this initiative include field observations for proper procedure use and an independent technical review of completed procedures to assure quality. Procedure use and adherence will continue to be a strong focus area for Oconee.





# MAINTENANCE AREAS OF PROGRESS

## MANAGEMENT OVERSIGHT

- As mentioned earlier, Duke contracted with Failure Prevention Incorporated (FPI) to help improve human performance. One of the recommendations from FPI was for supervision and management to spend more time in the field specifically reinforcing work practice standards and practices. Oconee responded by establishing daily observations in the field by all team supervisors and managers. Also, the daily Maintenance meeting includes a review of risk significant work, all of which requires documented field observations. Weekly staff meetings have a standing agenda item to review job observations of the previous week to compare and communicate lessons learned as well as clarify work practice standards when questions arise. This approach has had a significant effect in improving compliance to work standards.



# MAINTENANCE AREAS OF PROGRESS

## SELF ASSESSMENTS

- Maintenance started a new formal process of self assessment to help better focus limited resources on critical areas and to measure progress in those areas. A self assessment of eight to ten areas is done following each refueling outage and includes a review of:

1. Human Performance
2. Procedure Use and Adherence
3. Maintenance Rework
4. Quality of Completed Work Packages
5. Backlogs (work orders and control room indications)
6. FME Occurrences
7. Potential Adverse Trends
8. PM Performance
9. Planning Quality
10. Maintenance PIP Program

- Each area is examined for areas of success, areas needing improvement, and initiatives. This assessment has helped the leadership in Maintenance focus on continuous improvement where it is desired most. An example of improvements made as result of self assessment include: a new feedback process for team leaders on quality of completed work packages, identified the need to develop a training video specifically for Maintenance personnel (on STAR, Touch-the-label, and repeatbacks), adverse trend of mispositioned components identified, and the need to improve the timeliness of closing out work order support tasks.



# MAINTENANCE AREAS OF PROGRESS

## KEOWEE PM PROGRAM UPDATES

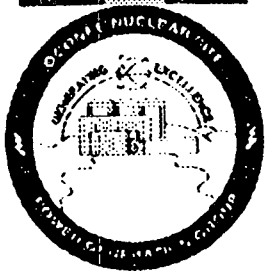
- As part of the Emergency Power Upgrade project, Keowee hydro maintenance and the associated procedures were reviewed to make sure that all were conducted by the same standards as the nuclear station. As a result, 77 new procedures were originated, and 116 existing procedures were upgraded. Preventative maintenance requirements were reviewed and updated. The predictive maintenance team also set up PM surveillance routines for thermography, motor current analysis, oil analysis, and vibration analysis trending. Keowee will continue to be a focus area as new baselines are established and new procedures are implemented.



# MAINTENANCE AREAS OF PROGRESS

## DC GROUND DETECTION

- Significant progress has been made in the rapid resolution of DC grounds. Oconee developed a new site directive for DC ground detection and resolution titled, "Nuclear Safety Related DC Systems Ground Response." Along with this directive, a new ground detection procedure and new ground detection equipment was put into service. Because of the multi-unit backup ties in the Oconee DC systems, special testing had to be used to help learn how to better diagnose and trace grounds. Ground detection now routinely starts within a shift once it reaches a level that is determined to be traceable. This ground detection effort has been applied to Keowee hydro and the switchyard DC system as well.



# MAINTENANCE CHALLENGES

## EQUIPMENT RELIABILITY / UPGRADES

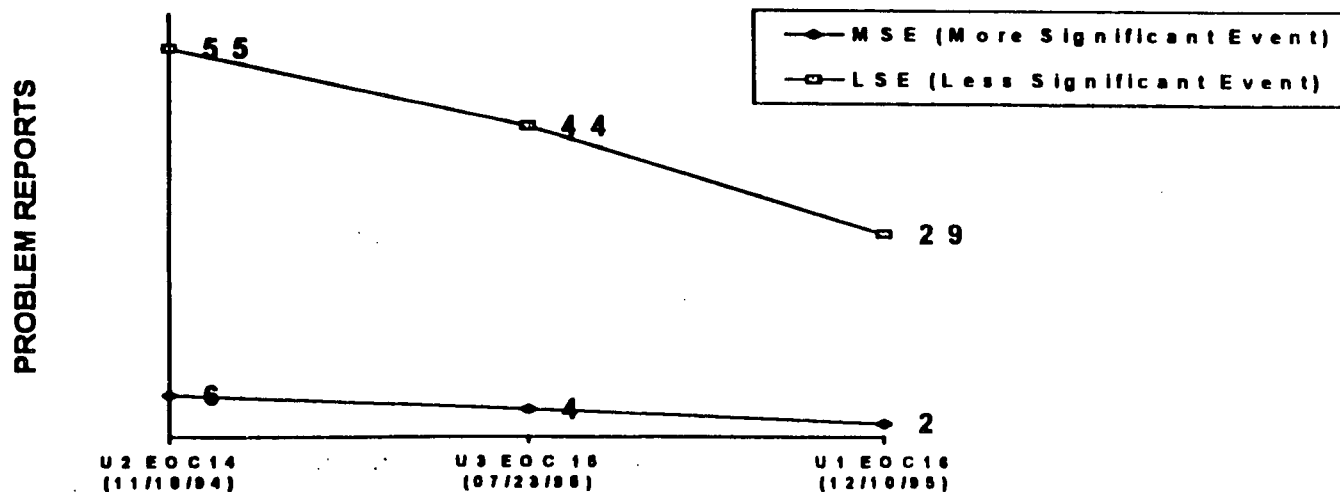
- Equipment reliability continues to be a focus area at Oconee. Equipment reliability is vital to unit reliability. While our safety system reliability is high, a number of equipment failures have affected plant operation such as slow control rod drive drop times, LPSW valve operator failures and condenser expansion joint failures. Both unit trips in 1995 were caused by equipment failures. One major initiative in this area is the upgrade of equipment such as: all AC inverters on site, all reactor building cooling coils, source and intermediate range NI's, reactor coolant pump vibration instrumentation, and GL 89-10 valve/operators. A second major initiative finished in 1995 was the complete review of all equipment PM's associated with the Maintenance Rule systems and components. This PM optimization review when fully implemented will help to better direct limited resources toward equipment with the greatest likelihood of failure. A third initiative is the measuring and tracking of rework. This will help to detect and reduce flawed work methods and errors.



# MAINTENANCE CHALLENGES

## HUMAN PERFORMANCE TREND

➤ During this SALP period there has been a reduction in the overall number of human performance errors. A more proactive approach by management to define human performance expectations, train on human performance tools, and being held accountable to the standards have been the key strategies in reducing human performance errors. Strict procedure use and adherence along with procedure upgrades have also been a major contributor to improving human performance.

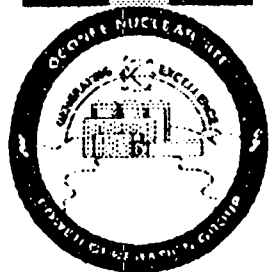
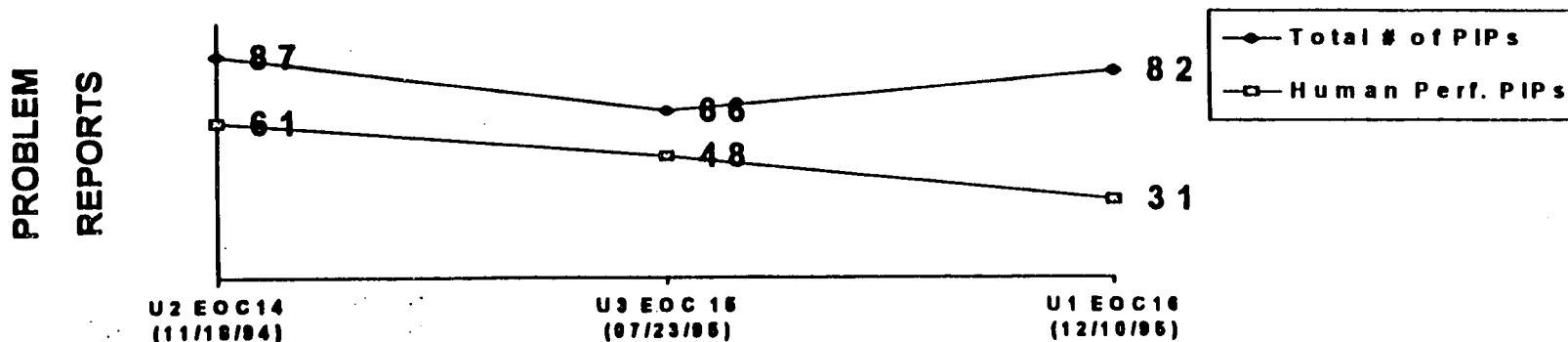


# MAINTENANCE CHALLENGES

## HUMAN PERFORMANCE TREND (Continued)

➤ Human Performance is emphasized in the Maintenance Plan of the Day meeting and includes management field observations for all risk items to assure that work practice standards are being met. Human performance root cause training conducted by Failure Prevention Inc. has helped to better diagnose the human failures and helped ensure that corrective actions are effective. It should be noted that the decline in errors has continued despite the lower threshold level for the generation of problem reports.

➤ In spite of the progress seen during this SALP period, at least two significant human performance failures have occurred (Keowee tagging failures and the fuel assembly left in the refueling bridge mast) which shows that human performance remains a major challenge and focus area for Maintenance.



# MAINTENANCE CHALLENGES

## SCHEDULE EFFECTIVENESS

- Effective scheduling and schedule adherence are both critical links in performing work correctly and efficiently. Completing a task successfully is dependent on qualified personnel having the right procedure, the right parts, and the proper coordination with Operations to remove and restore the equipment to service safely. Two initiatives are in progress to increase schedule effectiveness. The first is putting into place an annual schedule to implement Train Maintenance. This initiative will put all preventative and corrective work that can be done on-line, into a common LCO for the given train. Total LCO time for the system on an annual basis will be lower and work will be better planned and coordinated. Part of the train maintenance program will be a committed schedule for all work one month in advance. The current committed schedule is two weeks in advance. The second initiative that is underway is weekly schedule effectiveness meetings that are held between refueling outages. This process helps to diagnose scheduling and execution problems to determine needed process improvements for each functional area. Schedule effectiveness increased approximately 15% in 1995 but is still well below the expected 90%.





# MAINTENANCE CHALLENGES

## CONTROL OF CONTRACT AND NON- SITE PERSONNEL

- ▶ In 1996 there will be an increase in contract personnel performing work at Oconee. With this increase in contract personnel, there is a need to change controls and oversight to assure that site work processes are followed. This is a change for Oconee as internal resources are trimmed. Refresher training has been recently conducted for all site sponsors. The number of site sponsors for contract and non-site personnel has also been increased. Benchmarking trips are planned for early 1996 to learn from other sites that have been successful in using large percentages of contract personnel.



# MAINTENANCE CHALLENGES

## OPERATIONS FOCUS

- Operations Focus is a department initiative to help all site personnel understand that Operations is the ultimate owner of all equipment on site. As ultimate owner, they must be kept well informed at all times of the condition of their equipment. This includes degraded equipment, unexpected configurations, spills, releases, fires, improper storage, and suspicious activities. The threshold of reporting is being lowered and Maintenance personnel are being trained to meet the new expectations. This will be a focus area for 1996 and will become a part of annual training for Maintenance personnel working on site.



# PLANT SUPPORT CHEMISTRY





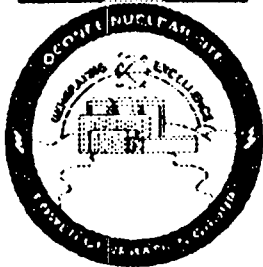
# CHEMISTRY STRENGTHS

## REDUCTION IN CURIES RELEASED

➤ Oconee has sustained a downward trend in curies released in liquid radwaste since 1989. The site total for 1995 excluding noble gases and tritium was 0.31 curies, A RECORD LOW.

## REDUCTION IN LIQUID RADWASTE VOLUMES

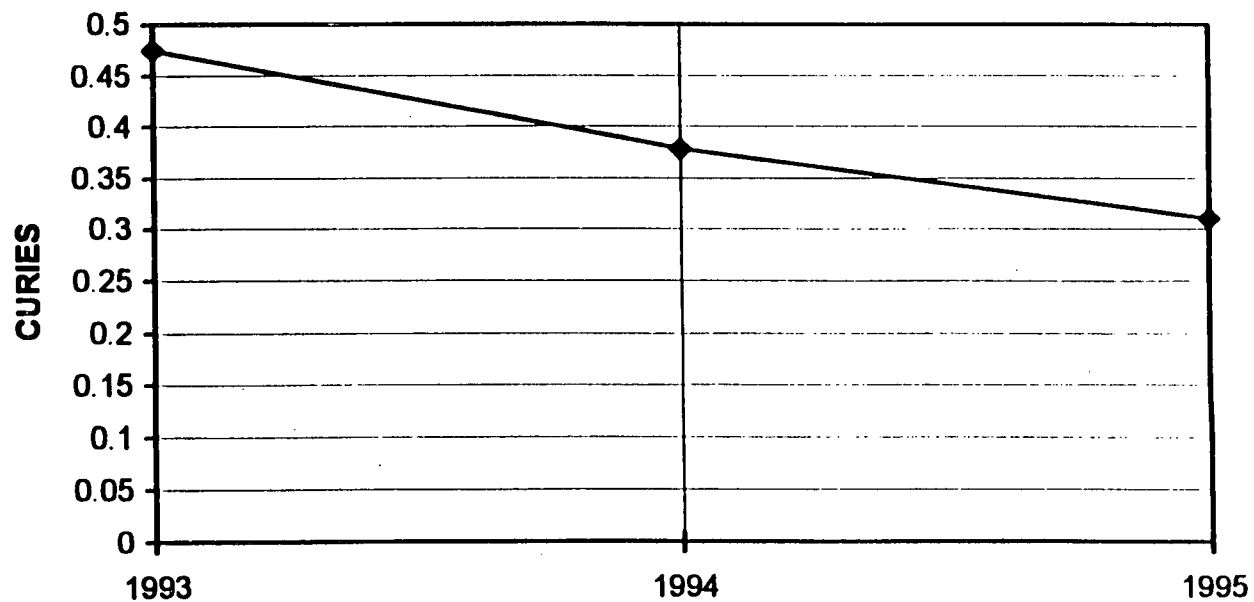
➤ Liquid radwaste releases continue to be minimized. In 1995, 2,180,000 gallons were released.



# CHEMISTRY STRENGTHS

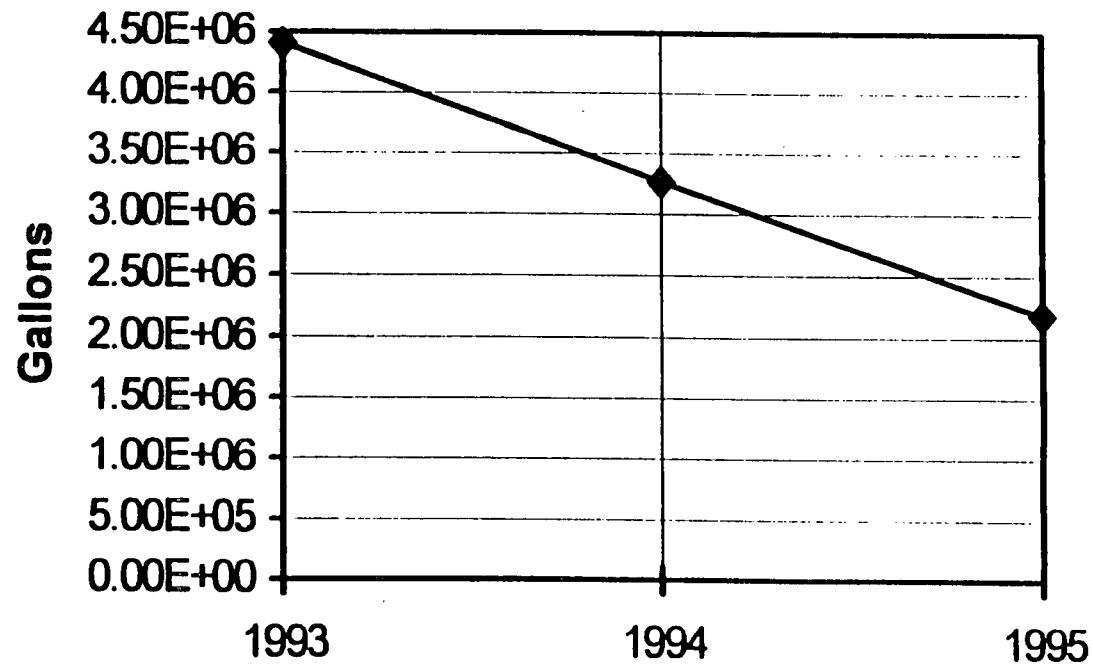
## CURIE REDUCTION

Liquid Curies Released



# CHEMISTRY STRENGTHS

## Liquid Radwaste Released



# CHEMISTRY STRENGTHS

## DATA EVALUATION AND TRENDING

- Reactor Coolant System chemistry is maintained within administrative limits 99.9% of the time. 1995 out-of-guideline hours were as follows: Unit 1 - 10.9 hrs.; Unit 2 - 15.3 hrs.; Unit 3 - 17.5 hrs.
- Secondary Chemistry control is good as measured by the INPO Chemistry Index. 1995 values were as follows: Unit 1 - 1.00; Unit 2 - 1.02; Unit 3 - 1.13.
- - Post Accident Liquid Sampling system availability for 1995 was 95.3%.
- Oconee has excellent compliance with the Radiological Environmental Monitoring Sampling program. In 1995 only eight of 1242 environmental samples had an associated sampling deviation. Oconee's contribution to the environmental radioactivity levels is small and continues to have no significant impact on the health and safety of the general public.
- In line gamma monitors have been added to the Reactor Coolant System to allow prompt identification of significant changes in reactor coolant activity.



# CHEMISTRY STRENGTHS

## USE OF INDUSTRY EXPERIENCE

- Chemistry and Operations have developed a methodology which allows venting of the Letdown Storage Tank gas space during start-up that significantly enhances reactor coolant dissolved hydrogen control.
- Orbisphere oxygen and hydrogen in-line monitors have been placed in service on the reactor coolant.
- Carbohydrazide, a hydrazine substitute, is used for secondary oxygen control during wet lay-up and start-up operations.
- Secondary iron transport reduction by using alternate amines (currently all three units are using ethanolamine) has allowed one Moisture Separator Reheater Drain to be routed forward in the feedwater train to recover 3-5 megawatts per unit.
- Electrochemical potential monitoring and Mossbauer analysis has been completed and confirms that secondary chemistry control is minimizing iron transport.
- Dimethylamine is being used successfully to control feedwater nozzle fouling on Unit 2.
- Sulfurhexafluoride has been used successfully for condenser tube leak detection.
- Polishing demins are being used to further reduce impurities in make-up water. Sodium concentrations have been reduced from 0.1 ppb to 0.05 ppb.
- A new methodology has been developed which consolidates liquid radwaste releases. This multi-tank release concept realized a greater than 50% reduction in liquid waste releases in 1995. (1994 - 494 releases, 1995 - 212 releases using the multi-tank concept).





# CHEMISTRY AREAS OF PROGRESS

## CONSISTENCY AMONG SITES

- A laboratory quality control program has been developed and implemented at all Duke Nuclear Stations. This program is integrated with a new database which allows extensive data manipulation and trending.
- Standard laboratory methods are now being implemented at all Duke Nuclear Stations.
- Personnel from Duke's three sites participate in Chemistry's annual self-assessment.

## MANAGEMENT INVOLVEMENT

- Chemistry management implemented field observation requirements in December 1994. Team Leaders are expected to document at least one observation per day.
- Chemistry Staff and Technicians are also expected to document field observations.
- Accountability for these expectations is established in each performance work plan.
- Self assessments facilitated by the corporate office are conducted annually against the INPO Guidelines for Chemistry.



# CHEMISTRY AREAS OF PROGRESS

## SECONDARY CLOSED COOLING SYSTEMS CHEMISTRY

➤ Monitoring of secondary closed cooling water systems has been improved by revising chemistry specifications and performing additional diagnostic analysis to conform to industry standards. INPO, visits to other utilities, vendor consultation, and the Nuclear Network were used to set direction for this program.



# CHEMISTRY CHALLENGES

## IMPROVE COMMUNICATIONS WITH OPERATIONS

- Operations shift focus meetings have been established at the beginning of each shift at which Chemistry is represented.
- Chemistry is re-formatting its Restoration and Removal procedure to be consistent with Operations. Changes to this procedure will require Operations cross review.
- Chemistry procedures have been changed to clarify specific communications which are required when communicating with the control rooms.
- Training will be developed and presented to Chemistry personnel in 1996 on expectations for communications with Operations.



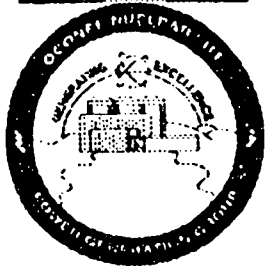
# CHEMISTRY CHALLENGES

## IMPROVE HUMAN PERFORMANCE

- Chemistry has seen improvement in the use of self checking and document adherence this SALP period.
- However, Chemistry did not meet established expectations for component positioning in 1995. Efforts to reduce the error rate include: improving communications with Operations; increased management observation of field activities which involve manipulating components; clear communication of management expectations; and clear communication of responsibility and accountability.
- Chemistry is using the Problem Investigation Process database to identify adverse trends and take corrective actions before significant events occur.



# PLANT SUPPORT RADIATION PROTECTION



# RADIATION PROTECTION STRENGTHS

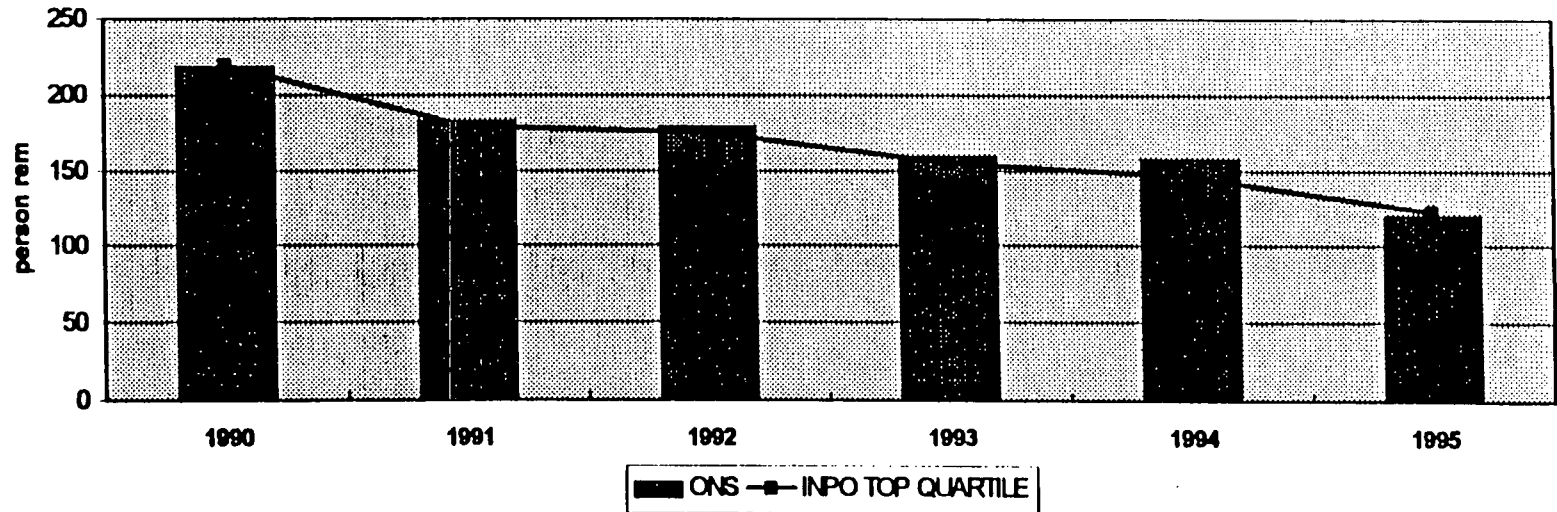
## ALARA PROGRAM

- Oconee continues to make strides in dose reduction. Our current three year average for collective dose per reactor has fallen to an all time Oconee low of 120 person rem. This should place us in the first quartile for PWRs. We made significant progress with Unit 1 outage dose. This outage was completed with 73 person rem which is the 7th lowest U.S. PWR refueling outage ever recorded. Exposure reduction at Oconee is a direct result of management's commitment to:
- an aggressive crud burst program, which include ALARA hold points during unit shutdown
  - an aggressive hot spot reduction process
  - RP Technicians directly involved in planning and execution of outage activities
  - technology improvements in RP job coverage
  - teamwork between Operations and Chemistry to maintain excellent boron/lithium control which minimizes corrosion product transport
  - downsizing of letdown filters for improved filtration - 0.45 micron filters have been tested on Unit 2 with 0.1 micron filters to be installed on the next filter changeout



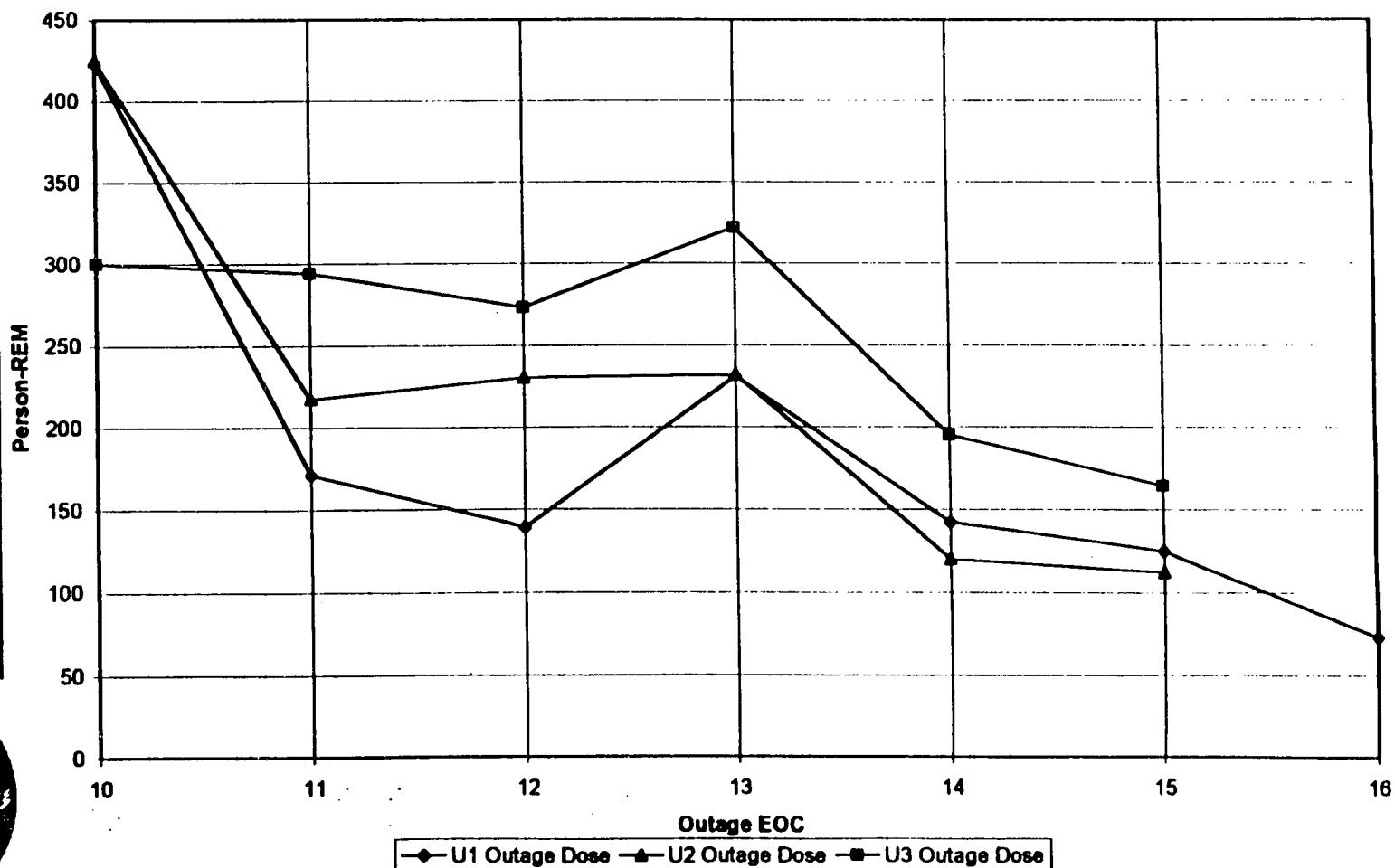
# RADIATION PROTECTION STRENGTHS

3 YEAR AVERAGE COLLECTIVE DOSE PER REACTOR



# RADIATION PROTECTION STRENGTHS

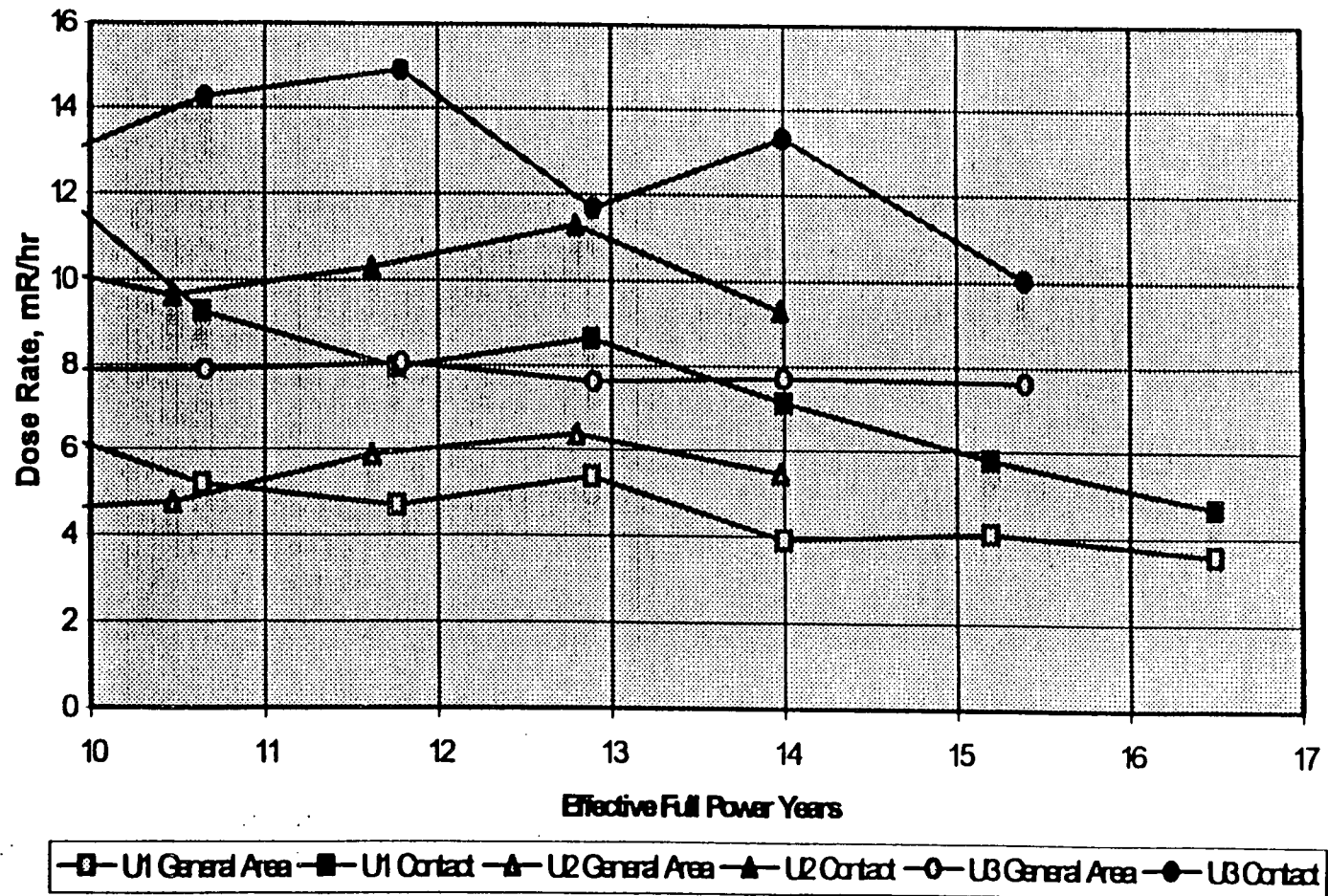
Oconee Outage Dose





# RADIATION PROTECTION STRENGTHS

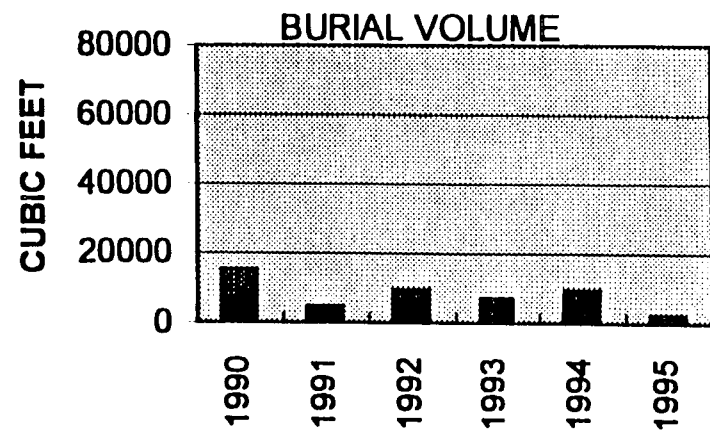
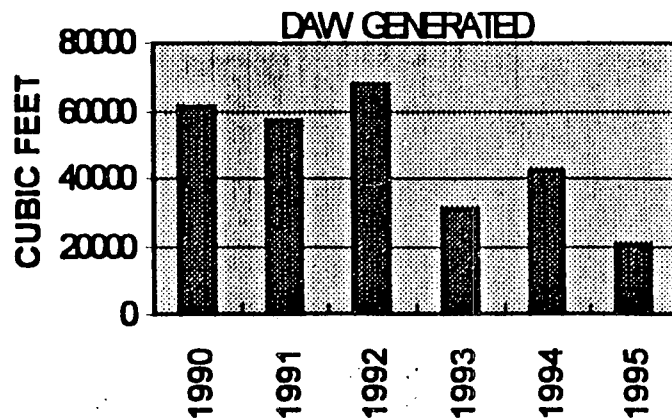
Oconee Steam Generator Average Dose Rates thru 1995



# RADIATION PROTECTION STRENGTHS

## SOLID RADWASTE REDUCTION

- Oconee's 1995 solid radwaste burial volume was 2630 cubic feet with a goal of not more than 6356 cubic feet. This is the lowest burial volume year on record for Oconee. This was accomplished by:
- aggressively pursuing reusable (launderable) materials
  - minimizing use of plastic materials
  - reclaiming low level contaminated laydown materials
  - startup of a CO<sup>2</sup> decon unit
  - incineration of Powdex resin
  - direct communications to our workers concerning the need to reduce burial volumes



# RADIATION PROTECTION AREAS OF PROGRESS

## HOT PARTICLE CONTROL DURING UNIT 3 OUTAGE

- Historically, the Oconee Unit 3 outage has had significant hot particle problems. In 1995, the Unit 3 outage had the highest reactor coolant activity in the country due to failed fuel problems. In anticipation of the potential hot particle problems, RP developed and implemented a plan to protect the worker and to mitigate the potential for the spread of hot particles. As a result of this plan, hot particle incidents were minimized and control was maintained. The program was recognized by the NRC as a strength.

## INCREASED USE OF TECHNOLOGY

- In 1995 we implemented technology improvements in the areas of teledosimetry, video, and communications. This technology was extensively used for containment outage work during the Unit 3 and Unit 1 RFOs. This resulted in improved radiological control with lower dose for the RP technician and worker. The Unit 1 outage steam generator work is a good example of this technology's capabilities. We performed 100% eddy current inspection, plugged 150 tubes, and performed electrosleeving for 7.8 person rem. In 1987, this same work required >200 person rem.



# RADIATION PROTECTION CHALLENGES

## RADIOLOGICAL WORK PRACTICES

- ▶ The Oconee management team has made this item a top site management focus issue. Actions taken to date to resolve this issue include:
  - the closing of five RCA exits to allow better control of our boundaries
  - elimination of our buffer zone area, which historically has been a source of confusion for our workers
  - use of Station and Corporate personnel at the RCA exit points during the Unit 1 outage to ensure tools, equipment, and personnel were properly frisked
  - Quality Assurance checks to ensure that facility personnel were conducting activities in accordance with RP procedures
  
- ▶ Our future plans include placing small article monitors at the remaining RCA exits to improve frisking of hand held items and to develop more practical factors training to enhance our general employee training.
  
- ▶ There were no concerns identified during the last NRC inspection of this area.



# OCONEE SELF ASSESSMENT PROGRAM



# OCONEE SELF ASSESSMENT PROGRAM STRENGTHS

## IN-PLANT REVIEW TOPIC SELECTION AND QUALITY

- KEOWEE SELF INITIATED TECHNICAL AUDIT
- CONTROL OF NON-ASSIGNED INDIVIDUALS & ORGANIZATIONS
- CORRECTIVE ACTION EFFECTIVENESS
- 3EOC15 OUTAGE ASSESSMENT
- 1EOC16 OUTAGE ASSESSMENT
- SPARE PARTS AVAILABILITY
- STATION BLACKOUT RULE
- CROSS DISCIPLINARY REVIEW
- USE OF "RED-STAMPED" PROCEDURES
- CONSOLIDATED PERFORMANCE ASSESSMENT

**The presentation by SALP functional area lists some of the key self assessments for those areas.  
Shown here are some of the significant self assessments that apply to more than one specific SALP area.**



# OCONEE SELF ASSESSMENT PROGRAM STRENGTHS

## IN-PLANT REVIEW TOPIC SELECTION AND QUALITY (con't)

- Twenty Inplant Reviews were completed during 1995 by the Safety Review Group as well as many assessments performed by the General Office Nuclear Assessments and Issues Division.
- An improved process for assessment item selection and prioritization was implemented in 1995. As well, assessments performed by the SRG and General Office Groups were well coordinated to eliminate duplication of assessments and completed over 70% of the original 1995 list of potential assessment subjects during the year.
- Significant improvement was made in the quality and timeliness of Shutdown Risk assessments in 1995.
- Assessment findings were more significant and critical. All findings and even recommendations were entered into the Corrective Action Program for documented action and follow-up.
- We believe that a key to continuous improvement is a strong Self Assessment Program. Therefore, we are attacking self assessment on multiple levels.





# OCONEE SELF ASSESSMENT PROGRAM AREAS OF PROGRESS

## NSRB ASSESSMENT QUALITY

➤ NSRB improved its performance by becoming more independent and critical. The addition of highly qualified industry peers and professionals brought an outside perspective to the assessments performed. More attention was focused on Site Management's perspective of and involvement in problem areas. All management attention items were entered into the Corrective Action Program for documented action and follow-up.





# OCONEE SELF ASSESSMENT PROGRAM CHALLENGES

## GROUP SELF-ASSESSMENT CULTURE

➤ It was recognized during 1995 that top performing sites had more formal and aggressive group self assessment processes. Two initiatives are being implemented to improve our performance in self assessments:

- In February, 1996, the site will begin documented observation assessments to be completed by upper management each quarter. Activities observed will be outside the manager's current area and will provide an outside perspective to managers and supervisors concerning performance in their areas.
- Beginning in 1996, a more formal group self assessment process is being implemented. Each major site group will perform at least one self assessment quarterly. The assessments may be as broad as INPO criteria type assessments or more specific such as an evaluation of how a new process is working. Actions taken as a result of these assessments should improve group performance.



# OCONEE CORRECTIVE ACTION PROGRAM



# OCONEE CORRECTIVE ACTION PROGRAM STRENGTHS

## CORRECTIVE ACTION CONTINUOUS IMPROVEMENT TEAM

- Monthly review of items coming due, old items, and program performance issues by Site Management.
- Performance goals are set and reviewed and site trends are reviewed and acted upon in this forum.



# OCONEE CORRECTIVE ACTION PROGRAM AREAS OF PROGRESS

## ROOT CAUSE ANALYSIS

► We have trained a team of 25 Human Performance and Organizational/Programmatic Root Cause Evaluators. These individuals performed 60 root causes during 1995. The corrective actions taken as a result have been beneficial in preventing more significant events. Utilizing FPI methodology, analysts determine more exact organizational and programmatic failure modes and root cause “drivers” are more easily identified.

## PROBLEM RESOLUTION CYCLE TIME

► The time from problem discovery until a proposed resolution is reached has greatly decreased. For less significant events in 1995, the cycle time averaged 30.5 days. For more significant events, the cycle time averaged about 45 days, a significant improvement over 1994.



# OCONEE CORRECTIVE ACTION PROGRAM AREAS OF PROGRESS

## OVERDUE ACTIVITIES CONTROL

➤ Site commitment has resulted in gaining control and managing PIP backlog. Activities overdue have averaged about two per month for the last eight months of 1995.

## CENTRAL PIP SCREENING TEAM

➤ A multi-disciplined team screens problem reports daily for significance, event coding, description quality, and cause evaluation assignment. This has improved consistency of screening and eliminated assignment errors. Trending by event coding is now more reliable than ever before.



# OCONEE CORRECTIVE ACTION PROGRAM CHALLENGES

## IMPROVED EQUIPMENT FAILURE ROOT CAUSE ANALYSIS

➤ Engineering is being trained on investigation process, equipment failure modes, and root cause analysis. This is to be integrated with human performance root cause analysis via changes to NSD 212. Long term improvements in equipment reliability and availability should result.

## HIGH QUALITY COMMON CAUSE ANALYSIS/TRENDING

➤ Challenges include cause analysis resources, especially when their service is needed during outages. Enhanced education to apparent cause evaluators is required to facilitate coding of PIPs for quality trending. The first Oconee performed common cause analysis is scheduled to be completed in March 1996.



# PLANT SUPPORT SECURITY



# SECURITY STRENGTHS

## CONSISTENT IMPLEMENTATION of SECURITY and CONTINGENCY PLAN REQUIREMENTS AMONG SITES

- The Duke Power Company Nuclear Security and Contingency Plan replaced the individual site's Security and Contingency Plans. This new licensing document will significantly enhance the compliance consistency for the company. Additionally, this action reduced company licensing documents which resulted in improved efficiencies for both the licensee and regulators.

## FITNESS FOR DUTY PROGRAM EFFECTIVENESS

- Program audits continue to validate the Fitness for Duty (FFD) program as an effective method of providing for the health and safety of employees and the general public.





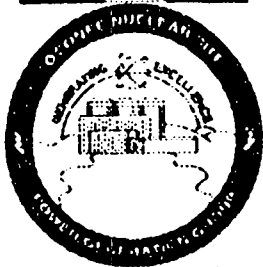
# SECURITY AREAS OF PROGRESS

## SAFEGUARDS INFORMATION PROGRAM CONTROLS

- Management oversight of the Safeguards Information Control Program has been enhanced and more stringent control processes have been implemented. Examples of actions taken include: volume reduction, consolidation of documents, centralized work areas, inventory process, and a screening classification methodology.

## PROTECTED AREA VEHICLE BARRIER SYSTEM INSTALLATION

- Installation of a vehicle barrier system to implement the "Malevolent Use of Vehicles at Nuclear Power Plants" rule enhanced the protection of station personnel, equipment and the general public.



# SECURITY CHALLENGES

## OPERATIONAL SAFEGUARDS READINESS EVALUATION (OSRE)

- Oconee continues to move forward in preparation for the OSRE currently scheduled for May 1996. Successful completion of this activity will be a significant milestone.



# PLANT SUPPORT FIRE PROTECTION



# FIRE PROTECTION STRENGTHS

## FIRE BARRIER AUDIT

- This year we had our triennial fire protection audit by an off-site independent contractor. The audit concentrated on fire barrier qualification testing and documentation, installation procedures and inspection and repair procedures. Overall, the fire barrier programs were considered acceptable.



# FIRE PROTECTION AREAS OF PROGRESS

## APPENDIX "R" MATERIAL CONDITION

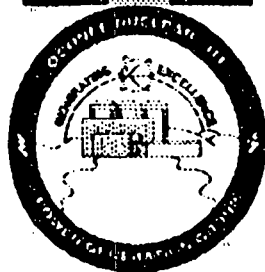
- This equipment required repainting and repacking due to the many years of warehouse storage and movement. The equipment is now regrouped within enclosed structures and protected by either fire protection and/or detection systems.

## REACTOR COOLANT PUMP FIRE DETECTORS

- Since installation of the Honeywell FS90A addressable ionization fire detectors, located in the reactor building cavities, detector failures within months of a unit startup and after repair frequently occurred, leaving the reactor coolant pumps with degraded monitoring capabilities. A modification was completed on each unit that installed heat/temperature sensing detectors. No reported failures have occurred on these detectors since installation.



# PLANT SUPPORT EMERGENCY PLANNING



# EMERGENCY PLANNING STRENGTHS

## AGGRESSIVE DRILL SCHEDULE

- The drill program at Oconee continues to be a strength. In addition to the annual exercise, four full scale integrated drills involving activation of the Emergency Response Organization and Facilities are conducted. Semi-annually, after hours activation drills are also conducted. These drills require the Emergency Response Organization to respond to the TSC, OSC and EOF. The number and type of drills provide an opportunity for Emergency Response personnel to practice their response to emergency events.

## COMPREHENSIVE EMERGENCY PLAN

- Feedback from site personnel and offsite agencies (Federal, State and Local) indicates that the emergency response program at Oconee is a comprehensive program designed to cope with fires, security incidents, hazardous material spills, natural disasters as well as radiological events.



# EMERGENCY PLANNING STRENGTHS

## EMERGENCY RESPONSE TRAINING PROGRAM

- The Emergency Response Training Program has been assumed by the Training Group. The Oconee Emergency Response Organization is made up of approximately 800 people. The Emergency Plan training program consists of initial and continuing training ( for Emergency Response Organization, fire brigade and hazmat members), lesson plan development , presentation, documentation and record retention. Some of the required training is being factored into the INPO accredited program. EP training will be scheduled through the Duke Power McCormick and Dodge training data base.
- An Emergency Response Training Data Base has been developed to provide information concerning current training status of Emergency Response personnel. This data base serves to assure that all personnel assigned to the Emergency Response Organization have current training qualifications.
- A simulated Selective Signaling system was installed at the Operations Training Center. This system provides offsite communicators with a hands-on training aid that duplicates operation of the primary system used for notification of offsite agencies. By using this training aid, offsite communicators can practice operating the Selective Signaling phones as well as effective communication skills.





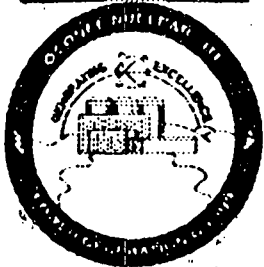
# EMERGENCY PLANNING STRENGTHS

## RESPONSE TEAMS

➤ Fire Brigade , Hazmat , and Medical Emergency Response Team members represent all site groups.

➤ To assure response can be made to medical, fire and hazmat events at any time, the following programs have been initiated:

- Additional Oconee Nuclear Site Fire Brigade members can be called back to the plant for response by the automated call-back phone system.
- HAZMAT members wear pagers to notify them of a hazmat event. The pagers are used for normal workday response and after hours response.
- Medical response is provided around the clock by shift personnel trained to the DOT first responder standards.



# EMERGENCY PLANNING AREAS OF PROGRESS

## IMPLEMENTATION OF NUMARC EALS

- A complete revision of the emergency action levels was developed and submitted to the NRC during this SALP period. Approval has been received, training provided and the new classification scheme adopted effective November 1, 1995.



# EMERGENCY PLANNING CHALLENGES

## SEVERE ACCIDENT MANAGEMENT GUIDELINES

- A team has been named and work has begun on the Severe Accident Management Guidelines. A draft Technical Basis Manual and a site specific Guideline Manual is anticipated to be ready for review by mid-summer, 1996. Training for evaluators, decision makers and implementers is being developed by the Training Group with assistance from the B&W Owner's group and INPO. Implementation is scheduled for 1997.



# EMERGENCY PLANNING CHALLENGES

## SIREN FEEDBACK SYSTEM

- Accuracy of the siren feedback system is questionable due to tree foliage, radio signal strength, and increased volume of radio signals being generated by cellular phones and personal/business radio systems. Enhancements such as increasing radio antenna height, replacing some of the radio antennas, and moving the siren to a different location are being made to increase the reporting accuracy of the feedback system. We are working to address system enhancements.



# SUMMARY

- **Our goal is to perform and be recognized as a SALP 1 Plant**
- **During this SALP period:**
  - **Making significant progress in Operations**
  - **Making significant progress in Engineering**
  - **Sustained performance in Plant Support**
  - **Making steady improvement in Maintenance**
- **Continually raising standards**
- **Focusing on challenges**
- **Oconee is committed to continual performance improvement**

