Tennessee Valley Authority
ATTN: Mr. Oliver D. Kingsley, Jr.
President, TVA Nuclear and
Chief Nuclear Officer
6A Lookout Place
1101 Market Street
Chattanooga, TN 37402-2801

SUBJECT: MEETING SUMMARY - SEQUOYAH NUCLEAR PLANT, DOCKET NOS. 50-327, 50-328

Dear Mr. Kingsley:

On March 25, 1996, the NRC staff met at the Sequoyah Nuclear Plant with representatives of the Tennessee Valley Authority's Sequoyah Nuclear Plant staff. The purpose of this meeting was to discuss recent operational performance of the Sequoyah Units. Enclosure 1 is a list of the individuals who attended the meeting, Enclosure 2 contains a copy of the material supplied by the licensee at the meeting, and Enclosure 3 contains mutually agreed to additional information provided by the licensee on March 29, 1996.

In accordance with Section 2.790 of the NRC's "Rules of Practice," Part 2, Title 10 Code of Federal Regulations, 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 M. S. Lesser

Mark S. Lesser, Chief Reactor Projects Branch 6 Division of Reactor Projects

Docket Nos. 50-327, 50-328 License Nos. DPR-77, DPR-79

Enclosures: 1. List of Attendees

Handout Material
 Additional Material

cc w/encls: (See page 2)

090033

9604100179 960402 PDR ADOCK 05000327 PDR cc w/ encls: Mr. O. J. Zeringue, Senior Vice Pres. Nuclear Operations Tennessee Valley Authority 3B Lookout Place 1101 Market Street Chattanooga, TN 37402-2801

Dr. Mark O. Medford, Vice Pres. Engineering & Technical Services 3B Lookout Place 1101 Market Street Chattanooga, TN 37402-2801

Mr. R. J. Adney, Site Vice Pres. Sequoyah Nuclear Plant Tennessee Valley Authority P. O. Box 2000 Soddy Daisy, TN 37379

General Counsel Tennessee Valley Authority ET 11H 400 West Summit Hill Drive Knoxville, TN 37902

Mr. P. P. Carier, Manager Corporate Licensing Tennessee Valley Authority 4G Blue Ridge 1101 Market Street Chattanooga, TN 37402-2801 Mr. Ralph H. Shell Site Licensing Manager Sequoyah Nuclear Plant Tennessee Valley Authority P. O. Box 2000 Soddy Daisy, TN 37379

TVA Representative Tennessee Valley Authority Rockville Office 11921 Rockville Pike Suite 402 Rockville, MD 20852

Mr. Michael H. Mobley, Dir. Div., of Radiological Health 3rd Floor, L and C Annex 401 Church Street Nashville, TN 37243-1532

County Judge Hamilton County Courthouse Chattanooga, TN 37402

Distribution w/encls: (See page 3)

Distribution w/encls:

E. W. Merschoff, RII

M. S. Lesser, RII

S. E. Sparks, RII F. J. Hebdon, NRR

D. E. LaBarge, NRR

G. T. MacDonald, RII

C. F. Smith, RII G. B. Kuzo, RII

D. H. Thompson, RII

J. H. Moorman, RII

D. W. Jones, RII

PUBLIC

NRC Resident Inspector U. S. Nuclear Regulatory Commission 2600 Igou Ferry Soddy-Daisy, TN 37379

NRC Resident Inspector U. S. Nuclear Regulatory Commission 1260 Nuclear Plant Road Spring City, TN 37381

OFFICE	DBP/RIL 1										
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DATE	04/2/98	04 /	/96	04 /	/ 96	04 /	/96	04/	/96	04 /	/ 96
COPY?	NES NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO

OFFICIAL RECORD COPY DOCUMENT NAME: G:\BR6.SQ\MM325.SUM

LIST OF ATTENDEES

NRC

S. D. Ebneter, Regional Administrator, Region II (RII)

J. R. Johnson, Deputy Director, Division of Reactor Projects (DRP), RII

M. S. Lesser, Branch Chief, Branch 6, DRP, RII

W. E. Holland, Senior Resident Inspector, Branch 6, DRP, RII

F. J. Hebdon, Director, Project Directorate II-3, Office of Nuclear Reactor Regulation (NRR)

S. E. Sparks, Project Engineer, Branch 6, DRP, RII R. D. Starkey, Resident Inspector, Branch 6, DRP, RII

Licensee Attendees:

O. D. Kingsley, President, TVA Nuclear

O. J. Zeringue, Senior Vice President, Nuclear Operations

R. J. Adney, Site Vice President

J. S. Summy, Assistant Plant Manager

W. Lagergren, Acting Operations Manager

L. S. Bryant, Outage Manager

R. F. Driscoll, Nuclear Assessment and Licensing Manager

M. Burzynski, Engineering and Materials Manager



TVA/NRC MANAGEMENT MEETING SEQUOYAH NUCLEAR PLANT

March 25, 1996 Sequoyah Training Center



TVA/NRC MANAGEMENT MEETING MARCH 25, 1996 SEQUOYAH TRAINING CENTER

AGENDA

INTRODUCTION

R. J. Adney

UNIT PERFORMANCE

W. R. Lagergren

PLANT SUCCESSES

W. R. Lagergren

- Programs

- Hardware

PLANT RELIABILITY

EQUIPMENT RELIABILITY

M. J. Burzynski

- Equipment Improvements
- Recent Problems
- Summary of Lessons Learned

PERSONNEL/PROCESS IMPROVEMENTS

J. S. Summy

- Results of Previous Assessments
- Present Ongoing Initiatives

UNIT TWO CYCLE SEVEN OUTAGE

L. S. Bryant

SUMMARY

R. J. Adney







UNIT PERFORMANCE

- Unit 1 is in Mode 1 at approximately 100% power. The unit has been on-line for 11 days. The unit returned from a planned outage to replace the No. 2 reactor coolant pump motor and seal on March 14th.
- Capacity factor for the 1995 calendar year 69.9 (includes 63-day refueling outage)
- Unit 2 is in Mode 1 at approximately 100% power. The unit has been on-line for 92 days. The Unit 2 Cycle Seven Refueling Outage is scheduled to begin on April 19th.
- Capacity factor for the 1995 calendar year 91.9

PLANT SUCCESSES

TW



PROGRAM SUCCESSES

- Backlogs remain low / not impacting current performance
- Erosion/Corrosion Program
- Strong, continuing operations improvement initiatives
- Excellent steam generator chemistry controls
- Corrective action process



BACKLOGS

- Only six of original fifty backlogs from 1993 restart remain open
- Non-outage Corrective Maintenance Work Orders
 - 1200 reduced to 400
- Vendor Manual revisions
 - >2000 reduced to 0
- Drawing Deviations
 - >700 reduced to 4
- Delinquent Preventive Maintenance (PM)
 - Approximately 25/week reduced to 0
- Temporary Alterations
 - ▶ 58 reduced to 24 (Note: 11 will be cleared during U2C7)



HARDWARE SUCCESSES

- Significant progress in long-term plant improvements
 - Lower compartment cooler replacement complete
 - Charging pump room cooler replacement complete
 - MSIV & MS check valve modification in progress completes U2C7
 - Degraded voltage modifications in progress completes April 5th
 - Arrow-Hart replacement in progress
 - Containment electrical cable penetration replacement in progress
 - BOP enhancements



BOP ENHANCEMENTS

- Installed manual operator on the No. 3 HDT bypass valves to reduce heater drain problems during startup
- Changed single point trip logic on the stator cooling system to 2 of 3 logic
- Upgraded main steam dump controllers
- Modified S/G PORV actuators to improve pressure control
- Stiffened the level columns on the No. 1 heaters to prevent erratic operation due to vibration
- Replaced station battery
- Upgraded the hotwell makeup/drag system
- Added instrument line isolation valves on heater drain valves to allow on-line maintenance
- Enhanced raw cooling water pump packing
- Upgraded generator seal oil system pressure switches
- Improved accuracy of condenser pressure indication



PLANT RELIABILITY



EQUIPMENT RELIABILITY

REASON: PLANT RELIABILITY WAS NOT IMPROVING SUFFICIENTLY DESPITE THE EFFORT WE DIRECTED TOWARDS MATERIAL, PERSONNEL, AND PROCESS ISSUES

FOCUS-TEAM APPROACH: INDEPENDENT TEAMS TO LOOK AT -

- Why are problems still occurring
- Current hardware and process issues impacting reliability
- Vertical slice of representative system
 (System 006 heaters, drains, and vents)
- Common cause of '94/'95 events

RESULTS:

- Recommended equipment improvements
- Areas for process improvements



EQUIPMENT IMPROVEMENTS

- Significant improvements to safety-related equipment
 - Improved equipment performance
 - Improved design capability
- Significant improvements to reliability-related equipment
 - Improved equipment performance
 - Improved design capability
 - Comprehensive plan for reliability hardware improvements ongoing





EQUIPMENT IMPROVEMENTS

Safety-Related Improvements

Arrow-Hart replacement

Penetration replacements

Lower compartment coolers

Chiller upgrades

MSIV/MSCV upgrades

SBO improvements

IPEEE improvements

S/G FW nozzle replacements

Reliability-Related Improvements

Capacitor bank installation

Switchyard breaker replacements

FW/COND chemistry controls

Buckholtz relay improvements

HDT #3 performance

250v DC battery replacements

Offsite power alignment to CSSTs

SEQUOYAH RELIABILITY HARDWARE ISSUES

ISSUE NO.	ISSUE NAME	FY 96 AND PRIOR YRS	FY 97	FY98	FY99	OUT
1	No. 2 Feedwater Heater Bypass	S	U2D	U1D,U2I	U1I	
2	CCW Pump Motor Protection	S, D, U21	U1I			
3	Yarway Valve Replacement		U2D	U1D.U2I	U1	
4	MFP Recirculation Valve		S.U2D	U1D,U2I	U1I	
5	Main Transformer Relay	S	D(TBD)	I(TBD)		
6	Add Duplex Seal Oil Filter	D,U21	U1I			
7A	No. 7 HDT Flow Indication	-,	U2D	U1D,U2I	1311	1
7B	No. 7 HDT Optimization			D		
8	Generator Trip	D,I				
9	WTA Voltage Regulator	0,	U2D	U1D,U2I	U1I	
10	FW Heater Level Control		S.D	U2I	U1I	
	CBP Suction Pressure Switch	S	D.U11	U2I		
11		D,U2I	U11	021		
12	MFP and Turbine Vibration	0,021	D	U21	U1I	
13A	Steam Seal System FCV Operators					
13B	Steam Seal System PCV Indicators		D	U2I	U1I	
14	Replace Station Air Compressors	S,D,I	1			
15	EHC		U1I	U2I		1 .
16	Digital MFW Control System		S	U1D	U2D	'
17	Water Supply for Bearing Lube Pmps	S	D,I	1101		
18	Pressurizer Safety Valves	S,U1D	U2D,U11	U2I		
19	RCP Seals	U2I				
20	PM for Main Generator Exciter	U2I				
21	Station Battery Mod	U2I				
22	No. 3 HDT Relay T.B. Temperature	U2I	1	12 3 300		

S=Study	D=Design	I=Implementation



RECENT PROBLEMS NOV/DEC - 1995



PROBLEM

CAUSE

CORRECTIVE ACTION

Unit 1 turbine intercept valve closure

Equipment - Failed comparator card in EHC

Feature was not needed; disabled on Unit 1
Unit 2 to be disabled during U2C7

Unit 1 exciter grounds NOV and DEC Equipment - Mfg. defect/error - cable ground in resistor bank area and grounds in field poles

Checked voltage regulator, completed all recommended exciter testing, rerouted cabling, repaired field pole, performed RCA, replaced exciter, evaluating contractor performance

Unit 1 broken air supply line to the No. 4 feedwater regulator valve

Personnel/Process - Improper piping configuration in high vibration environment

Other similar conditions on both units were examined; process change to maintenance procedures

Unit 2 switchyard breaker (PCB 974)

Equipment - Mfg. defect/error in the main control chamber/failure of circulating water pumps to "ride out" relaying transient

Inspection/maintenance on all similar breakers, redesign of relaying schemes



SUMMARY OF LESSONS LEARNED

- Good questioning attitude to identify root cause and critique overall performance during event
- Aggressive corrective actions to correct design issues
- Four of the five events were caused by equipment failures not detectable through routine testing and monitoring



RESULTS OF PREVIOUS ASSESSMENTS

- Reduction in personnel-related events
 - Recent events
 - Operator performance
- Corrective Action Program improvements
 - Use of low level precursors
 - Line organization ownership
 - Quality of investigations



PRESENT ONGOING INITIATIVES

- Improving sitewide accountability
 - Site stand downs
 - Supervisor/Management training
- Improving operator knowledge and command of the plant
 - Fundamentals Training
 - Unit Manager role and Shift Manager accountability
- Increasing emphasis in maintenance area
 - Unit 1 RCP seal
 - Quality of supervisor involvement
 - Postjob critique/scenario training
- Use of Corrective Action Program to assure continuous feedback



UNIT 2 CYCLE 7 OUTAGE



SCOPE

- Forty-three modifications
 - Condenser replacement
 - Integrated computer system
 - Arrow-Hart contactor replacements (88)
 - Containment electrical penetrations (4)
- Steam generator chemical cleaning
- Main turbine inspection
- 10-Year Phase I Inservice Inspection Interval
- 1600 work orders



SCHEDULE

- Fifty-five days breaker to breaker starting April 19th
- Condenser replacement is critical path
- Nine milestone windows/milestone managers
- Resource-leveled schedule currently in independent review
- Added critical path time for control rod insertion testing (NRC Bulletin 96-01)



PEOPLE

- Outage Preparation Team
- Twenty-eight High Impact Teams
 - Defense in depth
 - Electrical distribution
 - Condenser replacement
 - Integrated computer system
- Outage kickoff meetings



IMPLEMENTATION OF LESSONS LEARNED

- Over 200 U1C7 critique items
- U1 RCP outage critique items
- INPO outage assist suggestions
- Implementation of new Work Coordination Center
- Mode change management tools



FOCUS AREAS

- Nuclear safety
- Condenser replacement
- Plant computer upgrade
- Steam generator chemical cleaning
- Startup from outage
- People
 - Teamwork
 - Ownership
 - Accountability



SUMMARY

COMPLETED AND PLANNED EQUIPMENT RELIABILITY IMPROVEMENTS

1992

- Replace 5, 6, 7 Feedwater Heater (U2)
- · Refurbish Hi Pressure Turbine
- Replace Generator Rotor and Rewind Stator
- Replace Load Tap Changing CSS Transformer "C"
- Modify Steam Dump Valves
- Replace CCS Heat Exchanger "A"
- Refurbish RCP Motors
- Fix Feedwater Nozzle Leaks
- Peen Steam Generator Hot Leg
- Install RCS Level Indication (U1 and U2)
- Install Bypassed and Inoperable Status Indicator (BiSi)
- Replace Vital Batteries

- · Refurbish and Upgrade Turbine Control Valves
- Rebuild ERCW Pumps (1 and 2 of 8)
- · Reduce Boric Acid
- Upgrade No. 3 Heater Drain Tank
- CRDR Rework MCR Panels (Cat 3 HEDs)
- Buchholtz Relay Replacement (U2)
- Replace Lower Compartment Coolers (U2)

1994

- Rebuilt ERCW Pumps (3 and 4 of 8)
- · Refurbish RCP Motors
- · Replace Main Steam Traps
- · Buchholtz Relay Replacement (U1)
- Switchyard Breaker Replacement (PCB)
- NIS Power Range Modification
- Install Load Tap Changing CSS Transformer "B"
- · Install Out-of-Water Limit Switch for Fuel Transfer System

- · Capacitor Bank Installation
- Switchyard Breaker (PCB) Replacement
- MSIV Upgrades
- · Erosion/Corrosion Piping Replacement
- Rebuild ERCW Pumps (5 and 6 of 8)
- · Refurbish Arrowhart/Allis Chalmers MCCs (Partial)
- Replace Steam Generator Feedwater Interface Piping (Partial 2 of 4) (U1)
- Replace Lower Compartment Cooler Coils and Temperature Control Valves (U1)
- NIS Power Range Modification (U1)

- Retube Main Condenser (U2)
- Upgrade Integrated Computer System (U2)
- · Replace Secondary Sampling and Instrumentation
- Modify Main Steam Check Valves
- Rebuild ERCW Pumps (7 of 8)
- · Erosion/Corrosion Piping Replacement
- · Refu. bish Arrowhart/Allis Chalmers MCCs (Partial)
- · Replace Electrical Penetrations
- CCW Pump Motor Protection (U2)
- Replace Station Air Compressors (1 of 2)
 Replace Station Batteries
- · PM for Main Generator Excitor
- Add Duplex Seal Oil Filter (U2)

- Retube Main Condenser (U1)
- Upgrade Integrated Computer System (U1)
- Rebuild ERCW Pumps (8 of 8)
- Replace Main Generator Voltage Regulator
- · Replace RCW Chlorination System
- · Install Bearing Lube Water System
- Replace Secondary Sampling and Instrumentation
- Replace Electrical Penetrations
- Replace Steam Generator Feedwater Heater Interface Piping
- · Refurbish Arrowhart/Allis Chalmers MCCs (Partial)
- · CCW Pump Motor Protection (U1)
- Add Duplex Seal Oil Filter (U1)
- MFP and Turbine Vibration Modification (U1)
- Replace Station Air Compressor (2 of 2)
- Pressurizer Safety Valves (U1)
- Ice Condenser Floor Upgrade (5 bays)

1998

- No. 2 Feedwater Heater Bypass Modification (U2)
- · Yarway Valve Replacement (U2)
- MFP Recirculation Valve Modification (U2)
- · Ice Condenser Floor Upgrade (partial U1 and U2)
- · Main Transformer Relay Modification
- No. 7 HDT Flow Indication (U2)
- WTA Voltage Regulator (U2)
- · Feedwater Heater Level Control Modification (U2)
- Steam Seal System Control Valves, Motor Operators, and PCV Positioner (U2)

1999

- No. 2 Feedwater Heater Bypass Modification (U1)
- Yarway Valve Replacement (U1)
- MFP Recirculation Valve (U1)
- · No. 7 HDT Flow Indication (U1)
- No. 7 HDT Optimization
- WTA Voltage Regulator (U1)
- · Feedwater Heater Level Control (U1)
- Ice Condenser Floor Upgrade (partial U1 and U2)
- Steam Seal System Control Valves, FCV Motor Operators, and PCV Positioner (U1)

- Finish Ice Condenser Floor Upgrades (U1)
- Digital MFW Control System Modification (U1 and U2)

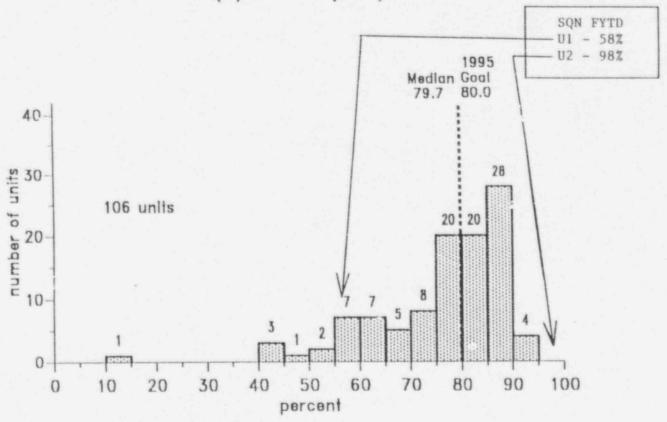
SECONDARY PLANT RELIABILITY IMPROVEMENTS

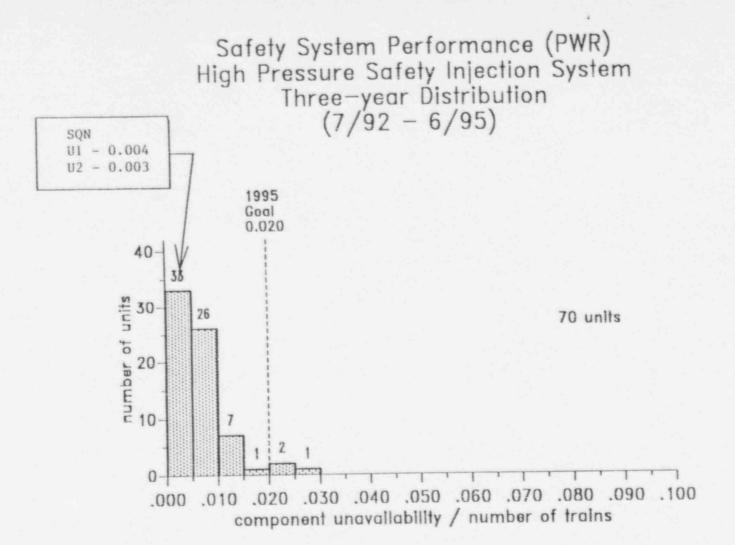
- Rebuilt 1A main feedwater pump
- Rebuilt 1A and 1B hotwell pumps
- Installed portable air compressor to provide backup for aged station air compressors
- Rebuilt Masonelian valves on heater drain system
- Rebuilt main feedwater reg. and bypass valves
- Upgraded reliability of main feed pump controls by enhancements in PM program
- Replaced carbon steel flow limiting orifices with stainless steel orifices throughout the turbine cycle to improve plant reliability (i.e., leaks)
- Replaced level switch floats on heater drain system
- Rebuilt station air compressor after-coolers
- Removed high-point vents in main feed pump leakoff drain lines (improved reliability by eliminating a source of oil contamination)
- Developed full-range level indication for the No. 3 heater drain tanks

EQUIPMENT RELIABILITY

- Key safety systems unavailability continues to meet established goals by significant margins
 - Safety Injection
 - Auxiliary Feedwater
 - Diesel Generators
 - Component Cooling

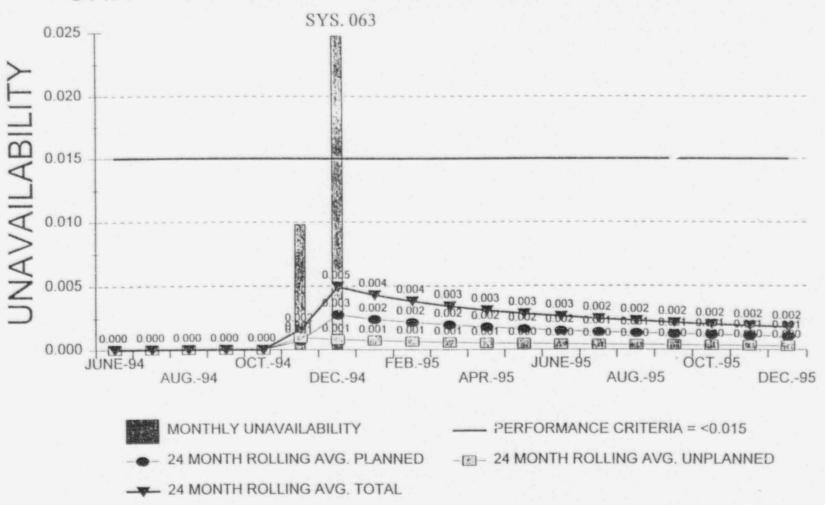
Unit Capability Factor Three—year Distribution (7/92 - 6/95)

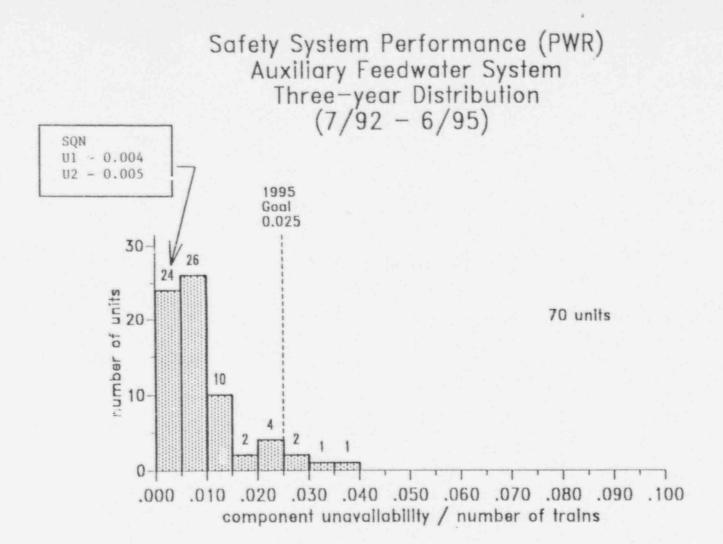




Units should strive to optimize safety system performance below the industry goal rather than minimize unavailability.

UNIT 1 ECCS RHR TRAIN B UNAVAILABILITY

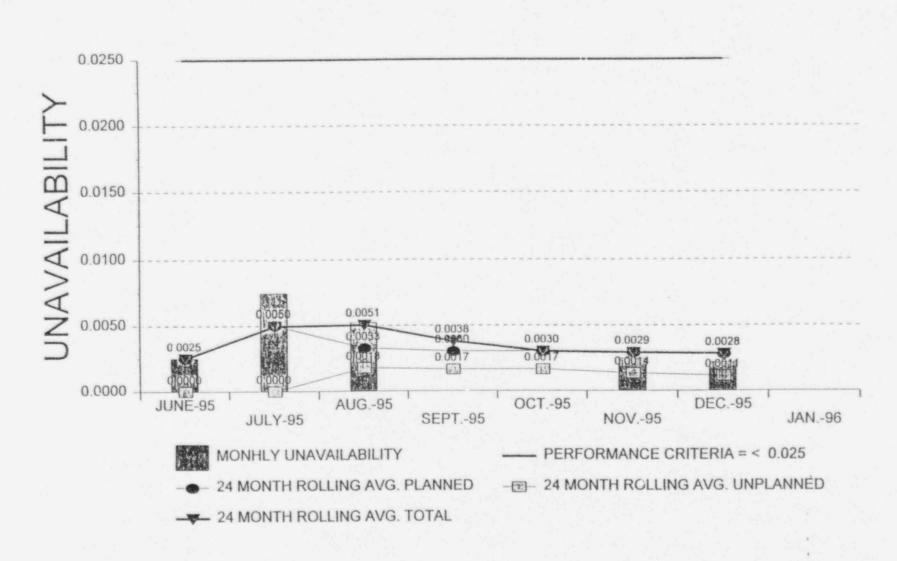


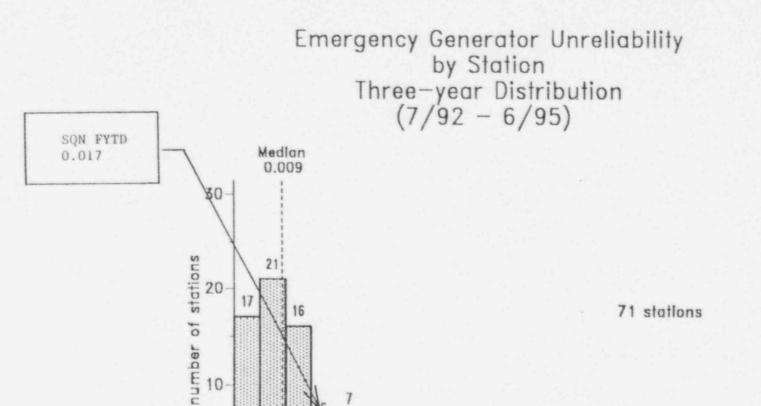


Units should strive to optimize safety system performance below the industry goal rather than minimize unavailability.

UNIT 1 MDAFW A SYSTEM UNAVAILABILITY

SYS. OO3D

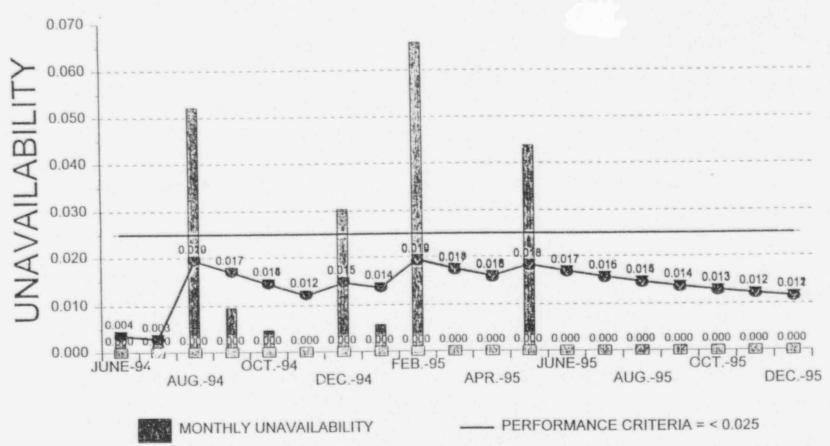




.000 .010 .020 .030 .040 .050 .060 .070 .080 .090 .100 unreliability by station

UNIT 1 DG1A TRAIN UNAVAILABILITY

SYS. 082



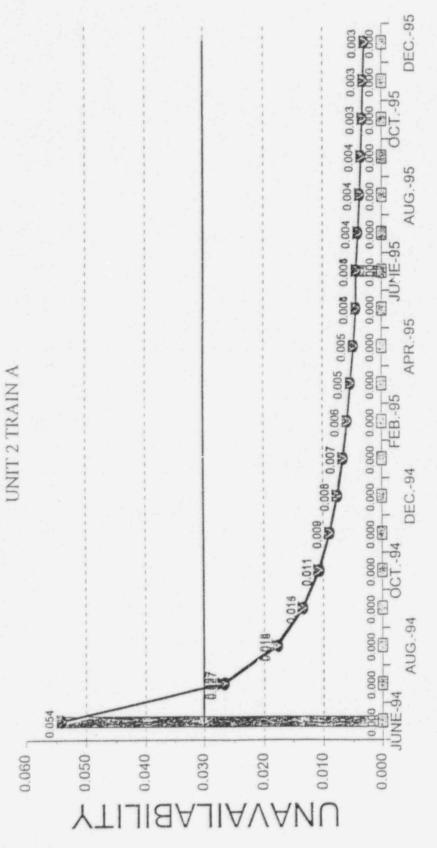
24 MONTH ROLLING AVG. PLANNED

- 124 MONTH ROLLING AVG. UNPLANNED

24 MONTH ROLLING AVG. TOTAL

SYS 070 CCS SYSTEM UNAVAILABILITY





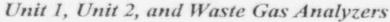
MONTHLY UNAVAILABILITY

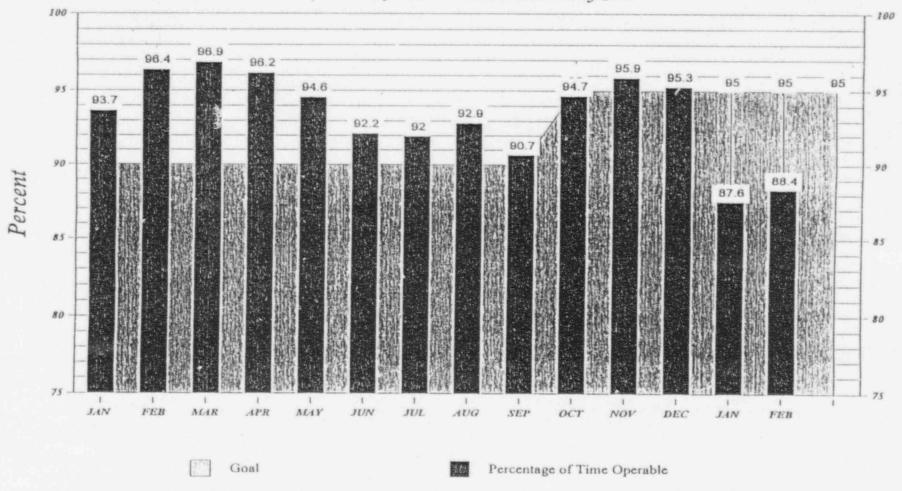
– PERFOMANCE CRITERIA = < 0.03</p>

24 MONTH ROLLING AVG. UNPLANNED 24 MONTH ROLLING AVG. PLANNED

24 MONTH ROLLING AVG. TOTAL

Chemistry Instrumentation Operability



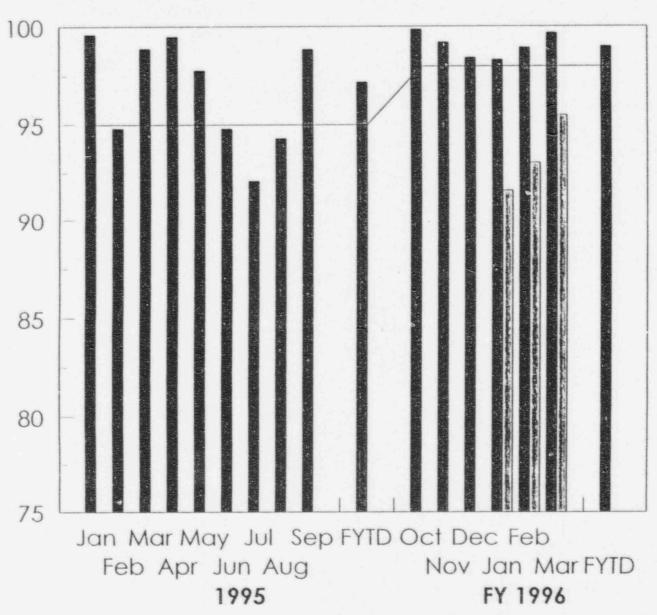


THIS CHART DEPICTS THE PERCENTAGE OF TIME INSTRUMENTATION UTILIZED BY THE CHEMISTRY SECTION FOR PROCESS MONITORING WAS OPERABLE DURING THE MONTH. CURRENT DATA FROM 2\1\96 THROUGH 2\8\96.

Radiation Monitor Operability

(ODCM and 1,2-RM-90-106,112)





% Operable (Requiring Sampling)



Admin Goal

% Operable (Not Requiring Sampling)

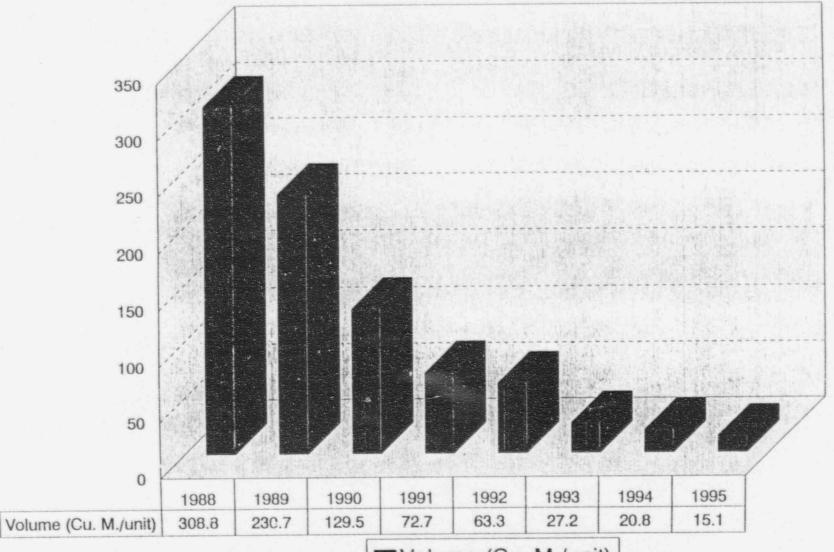


Data through 3/20/96

WORK PROCESSES

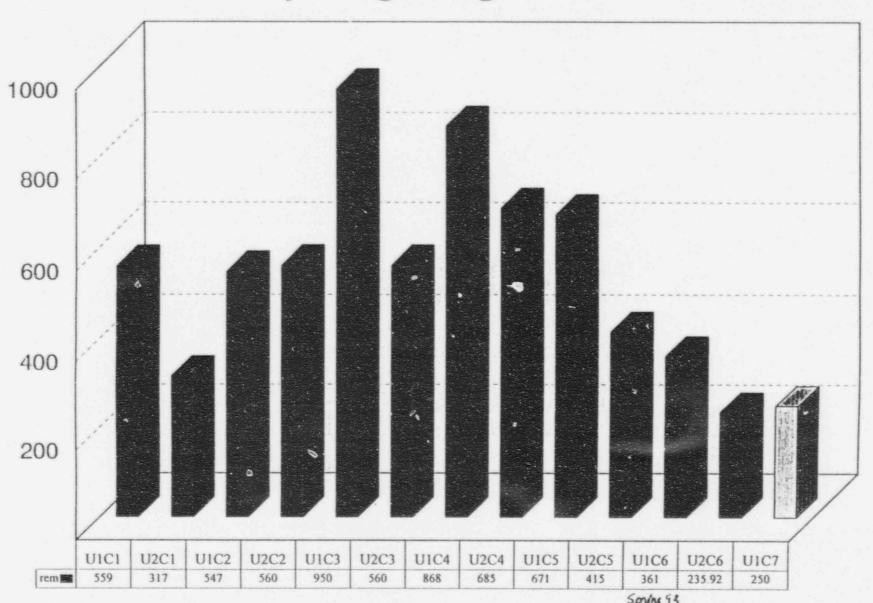
- Unit radwaste volume disposal has been reduced to 5% of the 1988 total
- Outage personnel exposure has been significantly reduced
- Non-outage corrective maintenance work orders on plant process equipment have been reduced to process level (current number of approximately 400 for two units)
- Delinquent PMs (preventive maintenance) have been eliminated
- Plant backlogs have been reduced to a non-impacting level

SEQUOYAH NUCLEAR PLANT Unit Radwaste Volume Disposal



■ Volume (Cu. M./unit)

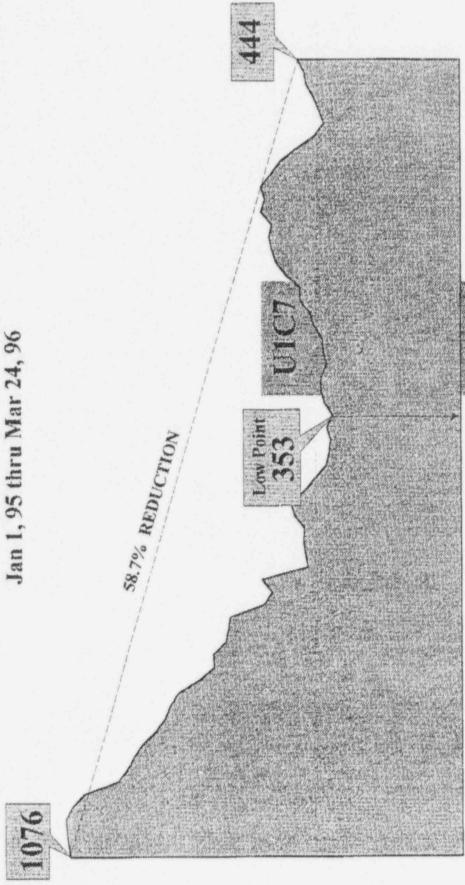
SEQUOYAH NUCLEAR PLANT Refueling Outage Dose



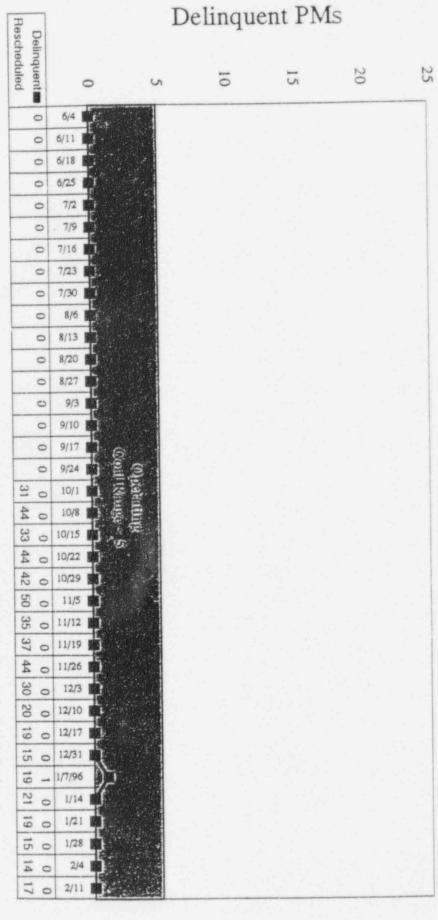
Spring 93

Sequoyah Nuclear Plant

Non-Outage CM WR's/WO's Plant Process Equipment



Delinquent Maintenance PM's



operability evaluations for extension past the late date in accordance with SSP 6.3. Note: Rescheduled items are PM's rescheduled past their late date have received technical and



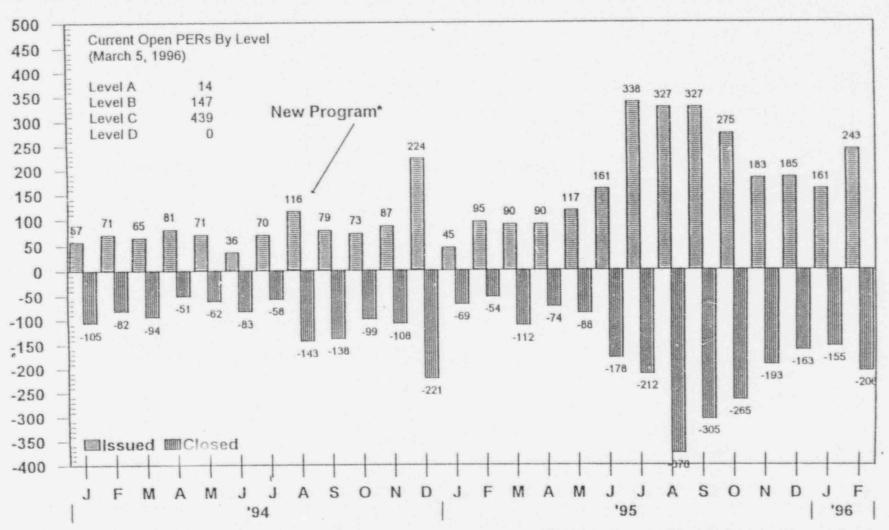
BACKLOGS

- Only six of original fifty backlogs from 1993 restart remain open
- Non-outage Corrective Maintenance Work Orders
 - 1200 reduced to 400
- Vendor Manual revisions
 - >2000 reduced to 0
- Drawing Deviations
 - >700 reduced to 4
- Delinquent Preventive Maintenance (PM)
 - Approximately 25/week reduced to 0
- Temporary Alterations
 - ▶ 58 reduced to 24 (Note: 11 will be cleared during U2C7)

CORRECTIVE ACTION PROGRAM

- The corrective action process has been upgraded and is actively being used as a tool for improvement
- The threshold level for problem identification has been lowered
- Cycle time and average age of corrective action documents is low and trending down (problems are being resolved)
- The corrective action process indicates that most problems are caused by Maintenance & Modifications (32%) and Operations (22%). Problem activities within those organizations include:
 - (1) Procedure compliance
 - (2) Planning
 - (3) Procedure preparation and review
 - (4) Monitoring of plant conditions
 - (5) Corrective maintenance

Sequoyah Nuclear Plant Problem Evaluation Reports - Issued/Closed (Monthly)



* Incorporated the Incident Investigation and Significant Corrective Action Report

Data: TROI as of March 5, 1996

Sequoyah Nuclear Plant Average Age of Open PERs

