
Plant Performance Update Meeting

February 13, 2001



McGuire Nuclear Station

Agenda

- **Overview** - *Brew Barron*
 - 2000 Power History, 2001-2003 Operating Plan
 - Performance Indicators
- **Station Performance** - *Dhiaa Jamil*
 - 1EOC14 Refueling Outage
 - Operator Proficiency Improvement
 - Mispositioning Data

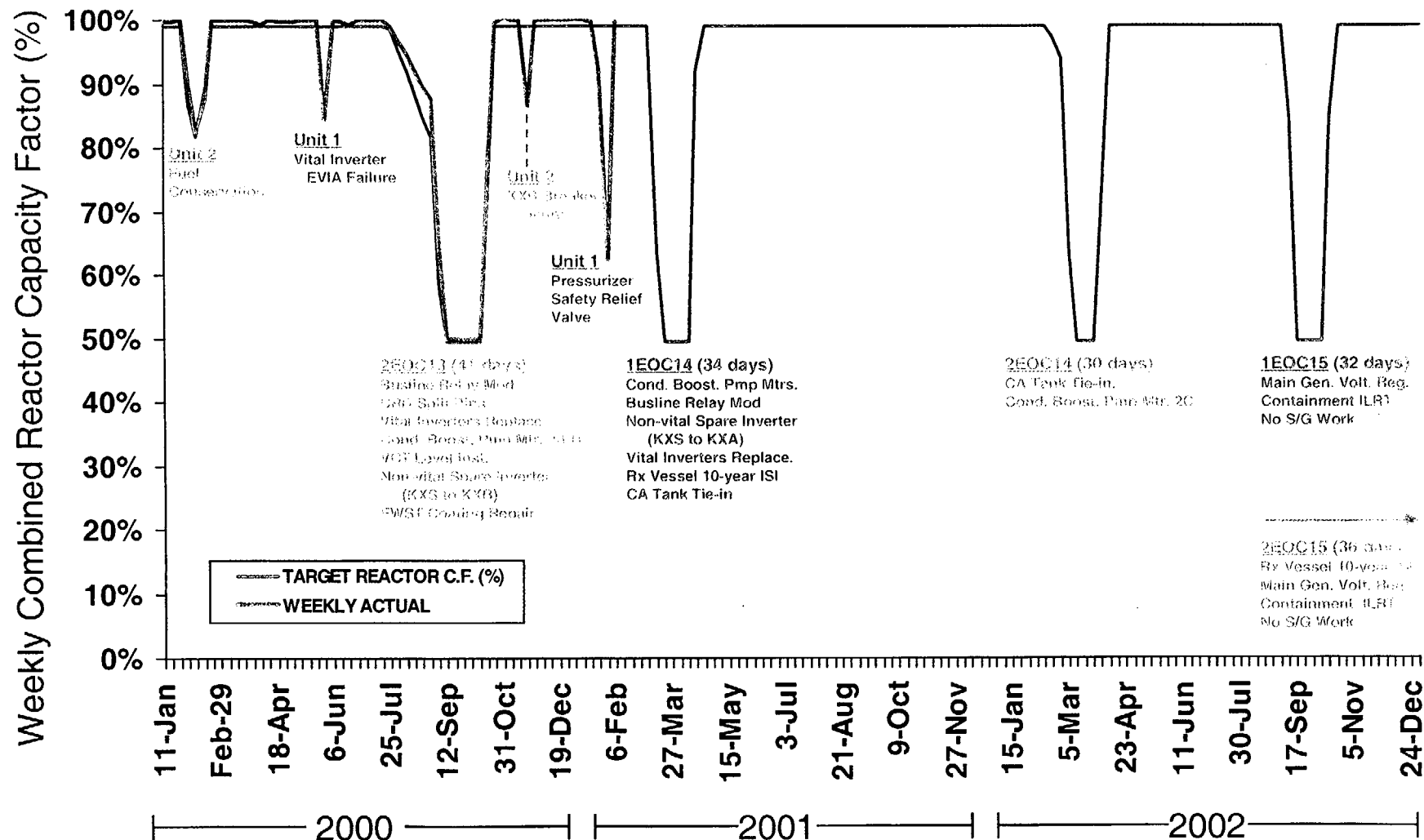
Agenda

- **Engineering Issues** - *Jack Peele*
 - Electrical Equipment Reliability
 - McGuire License Renewal
- **Miscellaneous** - *Bryan Dolan*
 - Special Nuclear Material Control / Accountability
 - Nuclear Safety Index - 2001

McGuire Nuclear Station

GENERATION STATUS TRENDING

2000 - 2002 Actual vs. Target



NRC Performance Indicators Annunciator Panel

4th Quarter 2000

#	NRC Performance Indicator	Unit 1	Unit 2
Initiating Events:			
IE-1	Unplanned Scrams Per 7000 Critical Hours (automatic & manual during previous 4 quarters) White > 3.0 Yellow > 6.0 Red > 25.0	0.8 =	0.9 -
IE-2	Scrams with a Loss of Normal Heat Removal (over the previous 12 quarters) White > 2 Yellow > 10 Red > 20	0 =	0 =
IE-3	Unplanned Power Changes (Transients) per 7000 Critical Hours (over previous 4 quarters) White > 6.0	0.8 =	0 =
Mitigating Systems:			
MS-1	Safety System Unavailability (SSU) - Emergency Power (average of previous 12 Quarters)	0.9 =	1.6 =
MS-2	Safety System Unavailability (SSU) - High Pressure Safety Injection (average of previous 12 Quarters) White > 1.5 Yellow > 5.0 Red > 10.0	0.8 =	0.7 =
MS-3	Safety System Unavailability (SSU) - Auxiliary Feedwater (average of previous 12 Quarters) White > 2.0 Yellow > 6.0 Red > 12.0	0.6 =	0.6 =
MS-4	Safety System Unavailability (SSU) - Residual Heat Removal (average of previous 12 Quarters) White > 1.5 Yellow > 5.0 Red > 10.0	0.9 =	0.9 =
MS-5	Safety System Functional Failures (over previous 4 Quarters) White > 5	0 =	0 =
Barrier Integrity:			
BI-1	Reactor Coolant System (RCS) Specific Activity (maximum monthly values, % of Tech. Spec. Limit, during previous 4 Qtrs.) White > 50.0 Yellow > 100.0	0.1 =	0.0 =
BI-2	RCS Identified Leak Rate (maximum monthly values, % of Tech. Spec. Limit, during previous 4 Qtrs.) White > 50.0 Yellow > 100.0	16.1 -	0.5 =

NRC Performance Indicators Annuciator Panel

4th Quarter 2000

	NRC Performance Indicator	Unit 1	Unit 2
	Emergency Preparedness:		
EP-1	Drill/Exercise Performance (over previous 8 Qtrs.) White < 90.0 Yellow < 70.0	96.9 =	96.9 =
EP-2	ERO Drill Participation (% of Key ERO personnel that participated in a (drill or exercise in the previous 8 quarters) White < 80.0 Yellow < 60.0	99.4 =	99.4 =
EP-3	Alert & Notification System Reliability (% reliability during previous 4 quarters) White < 94.0 Yellow < 90.0	97.7 =	97.7 =
	Occupational Radiation Safety:		
OR-1	Occupational Exposure Control Effectiveness (occurrences during previous 12 Qtrs.) White > 2 Yellow > 5	1 =	1 =
	Public Radiation Safety:		
PR-1	RETS/ODCM Radiological Effluent Occurrence (occurrences during previous 4 Qtrs.) White > 1 Yellow > 3	0 =	0 =
	Physical Protection:		
PP-1	Protected Area Security Equipment Performance Index (over a 4 quarter period) White > 0.080	0.018 =	0.018 =
PP-2	Personnel Screening Program Performance (reportable events during previous 4 Qtrs.) White > 2 Yellow > 5	0 =	0 =
PP-3	Fitness-For-Duty (FFD)/Personnel Reliability Program Performance (reportable events during previous 4 Qtrs.) White > 2 Yellow > 5	0 =	0 =

NRC Color Codes:	Quarterly Trending
Acceptable Performance	+ Improving
Increased Regulatory Response	- Declining
Required Regulatory Response	= Unchanged



Station Performance

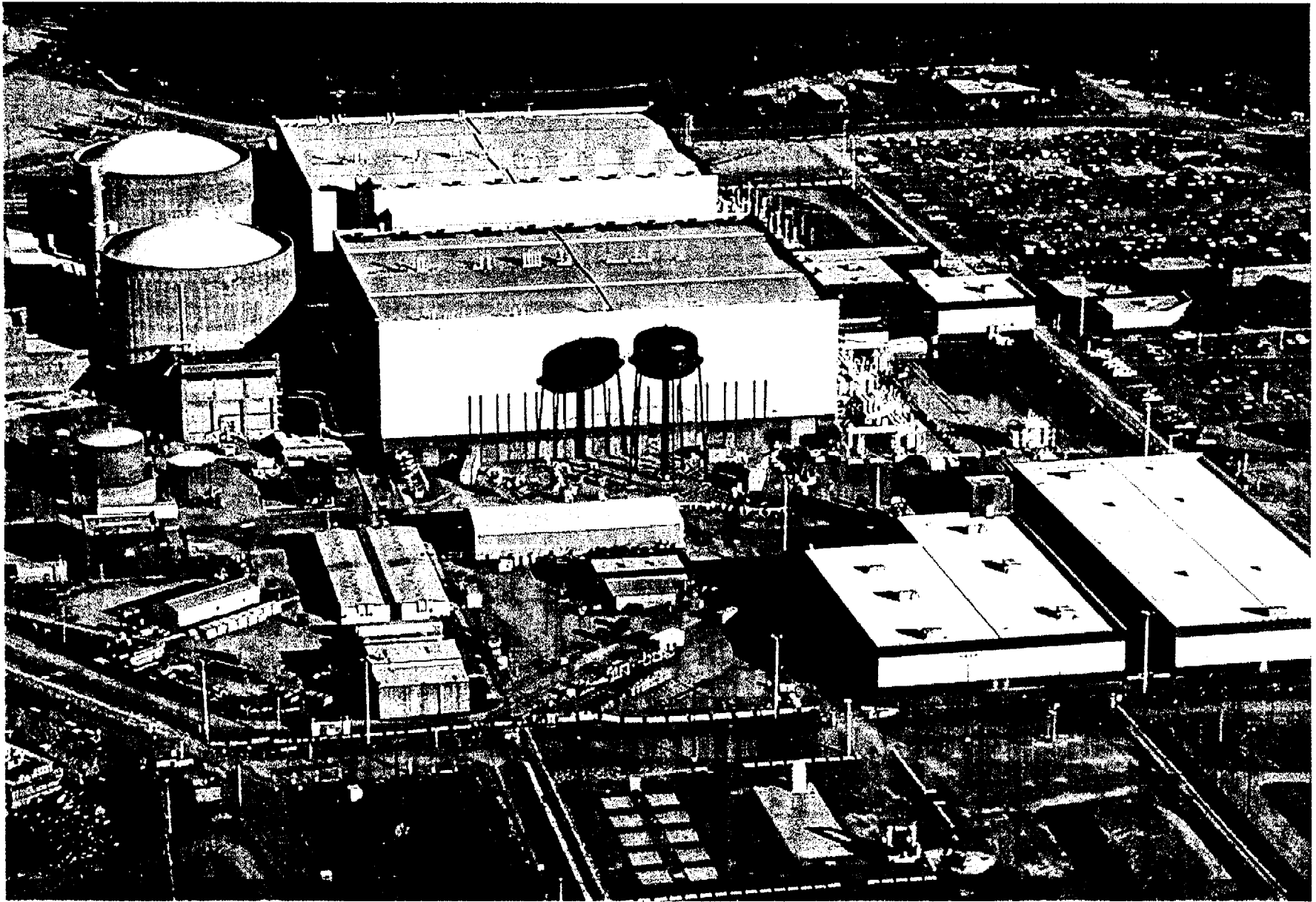
**1EOC14 Refueling Outage
Operator Proficiency Improvement
Mispositioning Data**

1EOC14 Refueling Outage

- Start 3/9/01
- Schedule duration 32 days

1EOC14 - Significant Work Activities

- **Auxiliary Feedwater Storage Tank**
 - Unit 1 tank construction - complete
 - Tank flush - complete
 - Readiness review - complete
 - 1EOC14 - pipe tie-in and place in service

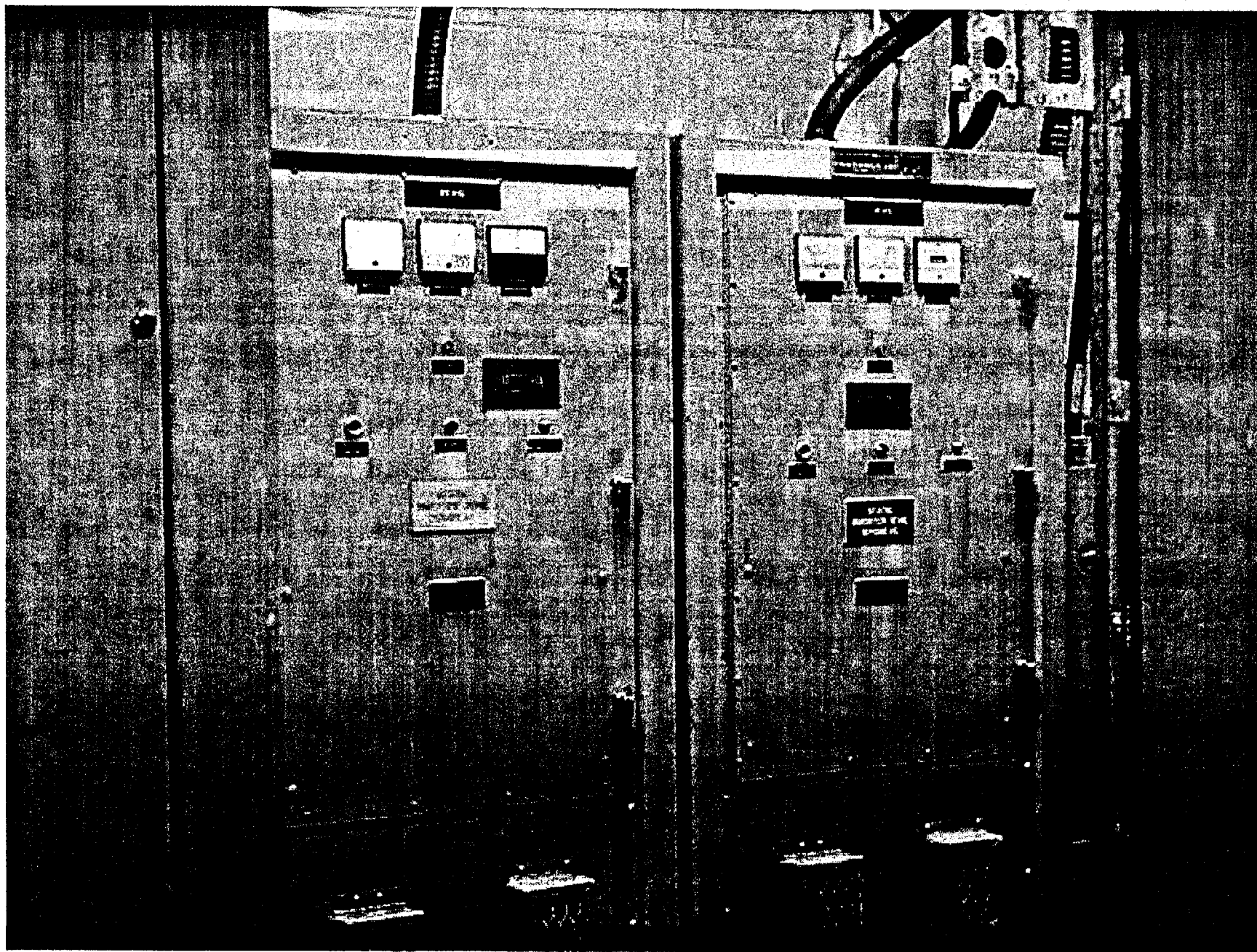


Auxiliary Feedwater Storage Tank

1EOC14 - Significant Work Activities

- **Inverter Replacement**

- Replace all four vital inverters
- Electrical tie-in of new spare non-vital inverter to Unit 1 panelboards
- Implementation plan includes lessons learned from 2EOC13
- Readiness reviews - complete



Inverter Replacement

1EOC14 - Significant Work Activities

- **Ten Year ISI**

- 100% hot leg and cold leg nozzle to vessel and nozzle to pipe welds

- | | |
|------------------------|---|
| • Nozzle to vessel | UT from the ID |
| • Nozzle inside radius | UT from the ID |
| • Nozzle to safe-end | UT from the ID |
| • Safe-end to pipe | UT from the ID |
| • Vessel welds | UT from the ID |
| • Nozzle to safe-end | PT from the OD (100% examination performed during past outages) |
| • Safe-end to pipe | PT from the OD (100% examination performed during past outages) |

1EOC14 - Significant Work Activities

- **Ten Year ISI**

What will be done differently?

- Accusonex ID UT Inspection System

- Know capabilities and limitations of system
- Aware of lessons learned from VCS - nozzle ID contours where lift off potential exists
- Smaller probe for inspection to resolve lift off potential
- Process to evaluate any potential indication - involves our corporate engineering

1EOC14 - Significant Work Activities

- **Ten Year ISI**

- Post shutdown containment inspections

- Increased sensitivity of what may be a potential leak

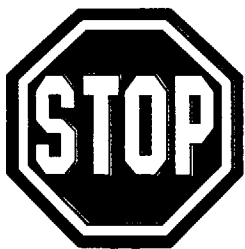
- Inspection Plan is being developed

- Closer inspection of areas that are not easily accessible

- Inspection of top of head areas

1EOC14 - Management Focus Areas

- **Shutdown / Startup Performance Improvements**
 - Real Time Simulator Exercises
 - Shut Down Sequence (Unit Off-Line to Solid Ops)
 - Start Up (Mode 3 to 15% Power)
- **Configuration Management Improvement**
 - Configuration Management Status Board
 - Big picture plant configuration
 - Seven key plant parameters
 - Real time plant condition
 - Referred to prior to any plant manipulation



Configuration Assessment Board

AND



Protected Train

A

B

S/Gs Status

A S/G WR	B S/G WR	C S/G WR	D S/G WR

- * BW Alignment
- * Containment Closure
- * Shut Down Risk
- * Level Effects
- * CA Pump Status

LTOP Required?

Yes

No

- | | |
|------------------|------------------|
| * NC-32 | * NC Pressure |
| * NC-34 | * NC Instruments |
| * NC Vent | * 7300 / SSPS |
| * Vital Busses | * Tech Specs |
| * Rx Vessel Head | * Cold Leg Temp |

Power Systems Status

Normal Power	List Alternate Power	Normal Power	List Alternate Power
<div>ETA</div>	<div>ETA</div>	<div>ETB</div>	<div>ETB</div>
EKVA	↑↓	EVDA	↑↓
EKVB	↑↓	EVDB	↑↓
EKVC	↑↓	EVDC	↑↓
EKVD	↑↓	EVDD	↑↓

Other Busses Effected:

- * Channel Relationships
- * SSPS/7300
- * Boration Flow Path
- * Tech Specs
- * Protected Train
- * NC Pumps
- * Unwatering

SSPS



- * CA Pumps
- * S/G Levels
- * LTOP
- * ESF Components
- * ESF Instrumentation
- * RTBs
- * Blocks In Place

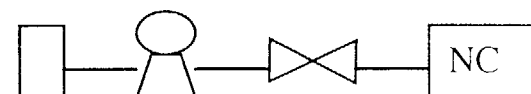
NC/ND Status

NC Level: _____ % _____ Inches

ND Train: A _____ B _____

- * Protected Train
- * NCPs
- * Reduced Inventory
- * Shut Down Risk
- * Where Is The Fuel
- * Am I Going To Move Water

Boration Flow Paths



BAT Available	YES	NO
FWST Available	YES	NO
NV Pump Available	"A"	"B"

- * Protected Train
- * Valve Work
- * SLC Requirements
- * ESF Alignment
- * Emergency Power
- * What Is My Flow Path?

1EOC14 - Management Focus Areas

- **Outage Schedule**
 - More detailed activities in the schedule
 - Tighter schedule controls (start - finish)
 - New schedule adherence expectations

Operator Proficiency Improvement

- **Simulator Performance Improvement Plan**

- A project to improve simulator training and overall operator crew performance
- Led by one operations manager and an operations training supervisor
- The project will cover the first three training segments of 2001 (7/01)

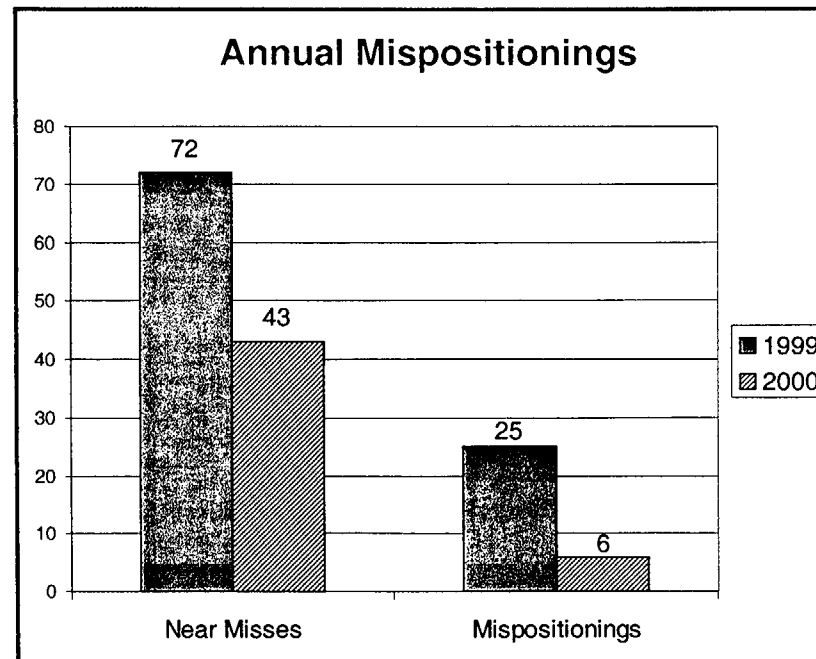
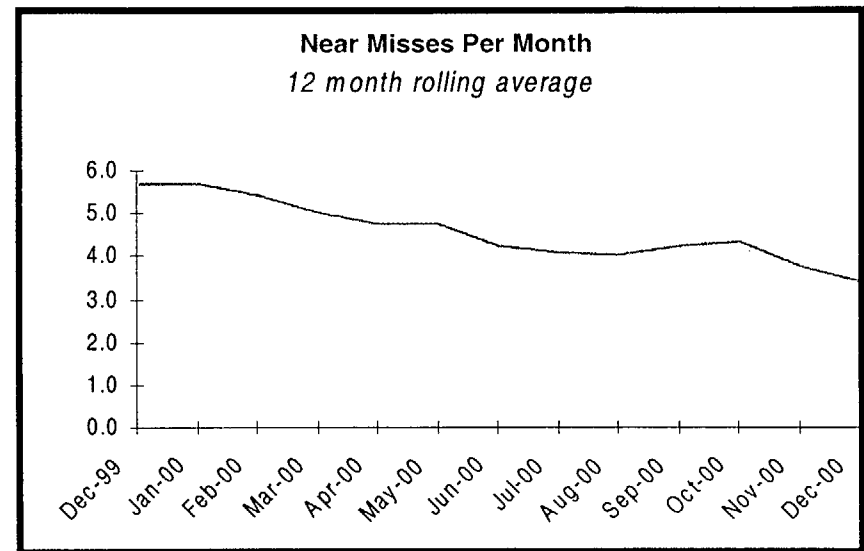
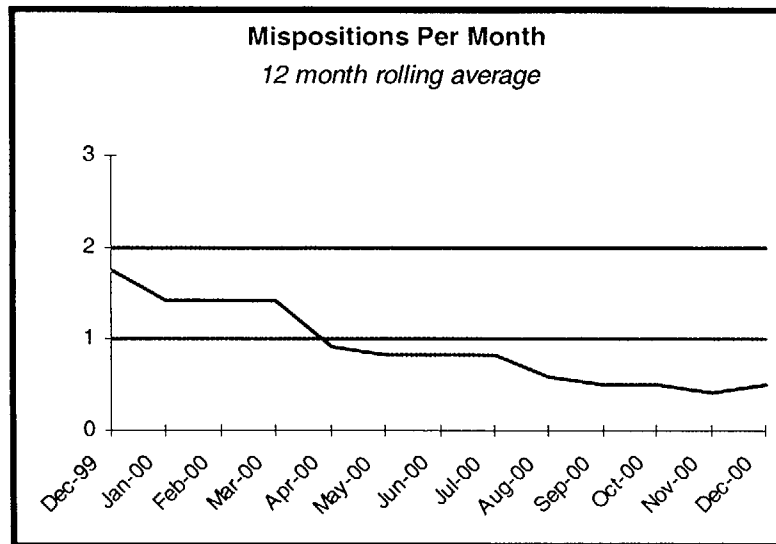
Operator Proficiency Improvement

- **Simulator Performance Improvement Plan**

- Focus areas

- Instructor and operations shift manager (OSM) real time reinforcement of management expectations
 - Procedure use and adherence
 - Instructor use of exercise guides
 - Operator performance of immediate actions
 - Reactor operator use of attachments and generic enclosures
 - Proficiency of EAL clarifications by OSM/STA

Mispositioning Data



Engineering Issues

Electrical Equipment Reliability

McGuire License Renewal

Electrical Equipment Reliability Issues Completed

- **Switchyard Busline Relaying and Communication
Obsolescence Unit 2 Replacement *Completed in 2000***
- **Inverter Obsolescence and Reliability**
 - Non-Vital Swing Inverter Addition *Completed in 2000*
 - Unit 2 Vital Inverter Replacement *Completed in 2000*
- **Charger Obsolescence**
 - Non-vital Chargers CXA, CXB, & CXS (Swing) Replacement *Completed in 2000*
- **Refurbished Generator Circuit Breakers 1B (1999) and
2 B (2000)**

Electrical Equipment Reliability Issues In Progress

- **Instrument Power Supply Replacements & PMs due to Electrolytic Capacitor Aging**
- **Cutler Hammer Relay Replacements Due to Base & Phenolic Cracking**
- **Unit 1 Switchyard Busline Relaying and Communication Replacement 1EOC14 (2001)**
- **Inverter Obsolescence**
 - KXA (Non-vital I&C) Inverter Replacement (2001)
 - KXB (Non-vital I&C) Inverter Replacement (2001)
 - Unit 1 Vital Inverter Replacement 1EOC14 (2001)

Electrical Equipment Reliability Issues In Progress

- **250V Power Battery (Emergency Lighting and Turbine Protection) Replacement**
 - Tracking & Trending Identified Degradation of Unit 1
 - Unit 1 Scheduled Summer 2001
- **125V Non-vital I&C Battery Replacement**
 - CXA Scheduled Summer 2001
 - CXB Scheduled Fall 2001
- **Refurbishing Generator Circuit Breakers 1A (2001) and 2A (2002)**

Electrical Equipment Reliability Issues Future

- **Control System Obsolescence**
 - Performed studies on current state
 - Established joint project with Catawba to address for both sites
 - Groundwork for integrated system approach and long range plan
- **Main Generator Voltage Regulator Replacement**
 - Equipment specified and ordered
 - Unit 1 replacement scheduled 1EOC15 (Fall 2002)
 - Unit 2 replacement scheduled 2EOC15 (Fall 2003)
- **Unit 2 250V Battery (Emergency Lighting and Turbine Protection) Replacement**
- **Evaluate Single-Point Vulnerability**

McGuire License Renewal

Key Dates of Interest to NRC Region II

Duke Submits (McGuire & Catawba) Application	June 2001
McGuire 2EOC14 Refueling	1Q 2002
NRC Inspects Safety Related Scope	March 2002
NRC Inspects Aging Mgmt Programs within Safety Related Scope	July 2002
NRC Performs Follow-Up Inspection (Optional)	December 2002
Commission Issues Decision	2Q 2003

Special Nuclear Material Nuclear Safety Index - 2001

Special Nuclear Material

- **Scope of Recent Reviews**

- Location verification of a sample of very old fuel assemblies
- Verification of inventory frequency and documentation
- Review of computer program used to track spent fuel material
- Sample documentation of fuel assemblies for dry cask loading
- Review of industry events

Special Nuclear Material

- **Findings**

- CNS inappropriately applied a grace period of 25% to the inventory check
- Data inputs and outputs for computer program used to track spent fuel material need to be reviewed

Special Nuclear Material

- **Plans for 2001**

- Complete the development of a new departmental computer code
- Review data quality
- Continue to follow lessons learned from industry events

Nuclear Safety Index

- Previous Nuclear Events Index replaced with a new risk-informed incentive measure to track Safety Performance of Duke Plants as employee incentive measure.
- Nuclear Safety Index (NSI) is comprised of two parts:
 - mitigating systems unavailability 50%
 - station events 50%
- Mitigating systems: those important to mitigate core damage in Duke PRAs.

Nuclear Safety Index

- **Mitigating Systems Unavailability - Counts as 50% of Total Year-End Score**
 - Emergency AC Power (EAC) - NRC PI
 - High Pressure Injection (HPI) - NRC PI
 - Auxiliary Feedwater (AFW) - NRC PI
 - Residual Heat Removal (RHR) - NRC PI
 - Safe Shutdown Facility (SSF) - not an NRC PI but being included in the measure since it is important from a Duke PRA perspective.

Nuclear Safety Index

Ranges & Weights

- **Mitigating System Unavailability Ranges and Weights (10% each)**

– Emergency AC Power	1.0% - 2.5% (Catawba & McGuire) 1.0% - 2.0% (Keowee UG Path only)
– High Pressure Injection (HPI)	1.0% - 1.5%
– Auxiliary Feedwater (AFW)	1.0% - 2.0%
– Residual Heat Removal (RHR)	1.0% - 1.5%
– Safe Shutdown Facility (SSF)	2.0% - 4.0% (Catawba & McGuire) 2.0% - 5.0% (Oconee)

Nuclear Safety Index

- **Station Events - Counts 50% of Total Year-End Score**
 - Includes events evaluated for Core Damage Significance (CDS)
 - Evaluations performed by PRA Group
 - Station LERs containing CDS results will be primary source
- **CDS = Conditional Core Damage Probability (CCDP)**

Nuclear Safety Index

Ranges & Weights

- **Events - % Score Reduction Due To CDS Assessment**
 - CDS is $< 1.0\text{E-}07$ 0%
 - CDS is $\geq 1.0\text{E-}07$ but $< 1.0\text{E-}06$ 5%
 - CDS is $\geq 1.0\text{E-}06$ but $< 1.0\text{E-}05$ 15%
 - CDS is $\geq 1.0\text{E-}05$ but $< 1.0\text{E-}04$ 25%
 - CDS is $\geq 1.0\text{E-}04$ 50%

Events during shutdown are evaluated same as At Power Events

Nuclear Safety Index

Station Averages and Goals

<u>STATION</u>	<u>2000</u>	<u>1999</u>	<u>1998</u>	<u>1997</u>	<u>97 - 99</u>
CNS	79.85	87.85	81.7	81.95	83.83
MNS	91.30	81.87	87.25	87.50	85.54
ONS	82.98	73.00	75.73	62.53	68.69

2001 NGD Incentive Goals

MIN: 70.0

TARGET: 80.0

MAX: 90.0



Questions