

# **Brunswick Nuclear Plant**

Performance Improvement



# Performance Improvement

- Leadership
- Standards
- Self Evaluation

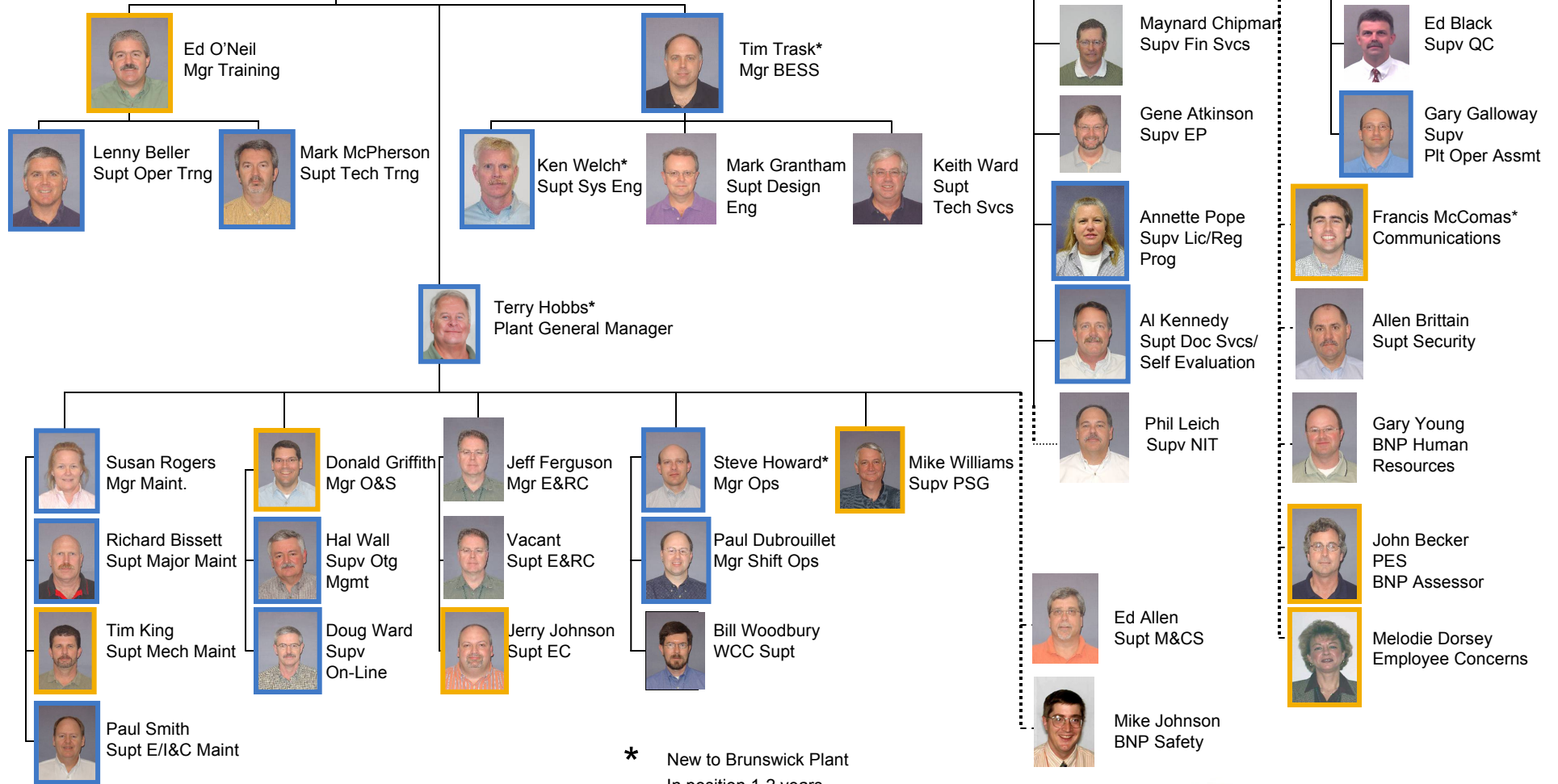
# Brunswick Nuclear Plant Organization Chart



Jim Scarola\*  
Vice President  
Brunswick Plant



Ben Waldrep \*  
DSO



- \* New to Brunswick Plant
- In position 1-2 years
- In position less than 1 year

Brunswick Nuclear Plant  
PO Box 10429  
Southport, NC 28461



# Accountability

- Consequences of Actions
  - ◆ Removal of Qualifications
  - ◆ Termination
- Group/Team to Individual Accountability
  - ◆ Single Point Control

# Behaviors

- Operational Focus
- Operational Decision Making
- Openness to Feedback

# Operational Challenges

- Fuel Assembly Move
- Feedwater Transient During Shutdown
- Contingencies for Red Risk Condition
- Rod 10-25 Notched With SRM Inoperable

# Human Performance

- HU Initiative Is Key to Continuing Improvement
  - ◆ Procedure Use and Adherence
  - ◆ Foreign Material Exclusion
  - ◆ Trainings Role
  - ◆ Observations

## Enter New Observation

Observer:  Position:  Observer's Unit:

Observed Unit:

Date:

Location:  Hours:

Activity Observed:

Person Observed (Opt.):

Type:  Peer  Paired  Off Hour  Outage  Supplemental

Feedback:  Coached:

NCR Required:

PRR/WO Required:

Click to Select Observation Topic

- Hot Work
- Housekeeping
- Human Performance Tools
- Industrial Safety
- Instructor Evaluation
- Ladders
- Log Keeping
- Material Condition
- Meeting Effectiveness
- OJT
- Operational Decision Making
- Operator Rounds
- Ops Turnovers
- PdM Engineering Activities
- Personal Protective Equipment
- Plant Access Authorization
- Post Training Evaluation
- Post-Job Critique
- Powered Industrial Truck (PIT)
- Pre-Job Brief
- Procedure Use and Adherence
- Program Notebook Review
- Rad Protection Controls

Strength (EE) Comments:

OI or UN Comments:

Debriefed:

General Comments:

### Procedure Use and Adherence Attributes

	EE	ME	OI	UN	NO
1. Verifies Revision Current Using PASSPORT	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Verified Complete-Can Be Performed as Written	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Limits/Precautions Reviewed-Prereq's Verified	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Portion That Can't/Won't be Performed Marked Up	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Executed IAW Category Usage Requirements	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. User Understands Expected Responses/Indications	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Questions/Concerns Resolved Prior to Start	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Steps Performed Correct Sequence w/Placekeeping	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. When No Copy In Hand, Direct One Step At A Time	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. STAR When Could Affect Personnel/Equip Safety	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. 3-Way Communications Used During Performance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. Interpreted Conservatively - Judgement Required	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. Turnover-Placekeeping ID's Last Step Completed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. Suspended Extended Period-Conditions Verified	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. Difficulty Using-StopTask-Issue Resolved Prior	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16. Procedure Deficiencies Submitted in a PRR	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17. Review Steps to Ensure Task Completed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18. Self-Check Document Entries Complete/Accurate	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19. Supervisor Verifies Entries Accurate/Complete	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20. Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



CLEAR

SAVE and RETURN TO MAIN MENU

Exit WITHOUT Save

EE = Exceeded Expectations, ME = Met Expectations, OI = Opportunities for Improvement, UN = UnSat, NO = Not Observed



## Statistics

From Date

February 2007						
Mor	Tue	Wed	Thu	Fri	Sat	Sun
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28				

To Date:

March 2007						
Mor	Tue	Wed	Thu	Fri	Sat	Sun
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

By Observer

By Observer's Unit

By Observed Unit

By Owner Unit

By Type

On Ops Crew

By Training Program

Observer Position:

Outage Only

Number of Obs:	855	# Strengths:	301	Average Score:	2.74	Supplemental:	30	Generic:	107	Control Rm:	67
Cross Discipline:	472	Total # IO's:	712	Paired:	70	Outage:	728	Focused:	748	Training:	93
Hours of Obs:	1,012.00	Total # Unsats:	95	Off Hour:	32	Peer:	71	Plant:	527	Other:	101
FeedBack:	533	Coached:	286	Debriefed:	506	# NCRs:	31	#PRR/WO:	18		

Observation Topic	# Obs Performed	Average Rating	# Unsat Ratings	# IO Ratings
Procedure Use and Adherence	23	2.68	7	10
Program Notebook Review	1	1	1	0
Rad Protection Controls	29	2.73	2	34
Rad Worker Practices	17	2.7	5	13
Radwaste Operations	4	3	0	0
Reactivity Control	5	2.78	2	4
Security Administrative Duties	1	3	0	0
Security Alarm Stations	1	3	0	0
Security Patrol	4	2.75	0	3
Security Person-Vehicle Search	14	3.03	0	1
Security T / Q	1	3	0	0
Supervisory Effectiveness	3	3.04	0	0
Supplemental Personnel	4	2.23	0	8
Teamwork	6	3.06	0	1

4.0 = Exceeded Expectations, 3.0 = Met Expectations, 2.0 = Opportunities for Improvement, 1.0 = UnSat

[RETURN To MAIN](#)

[Statistics Report](#)

# Equipment Reliability

- Preventive & Predictive Maintenance Programs
- Work Management
- Conduct of Maintenance
- Select Equipment Issues
  - ◆ EDG Reliability
  - ◆ Fuel Defects

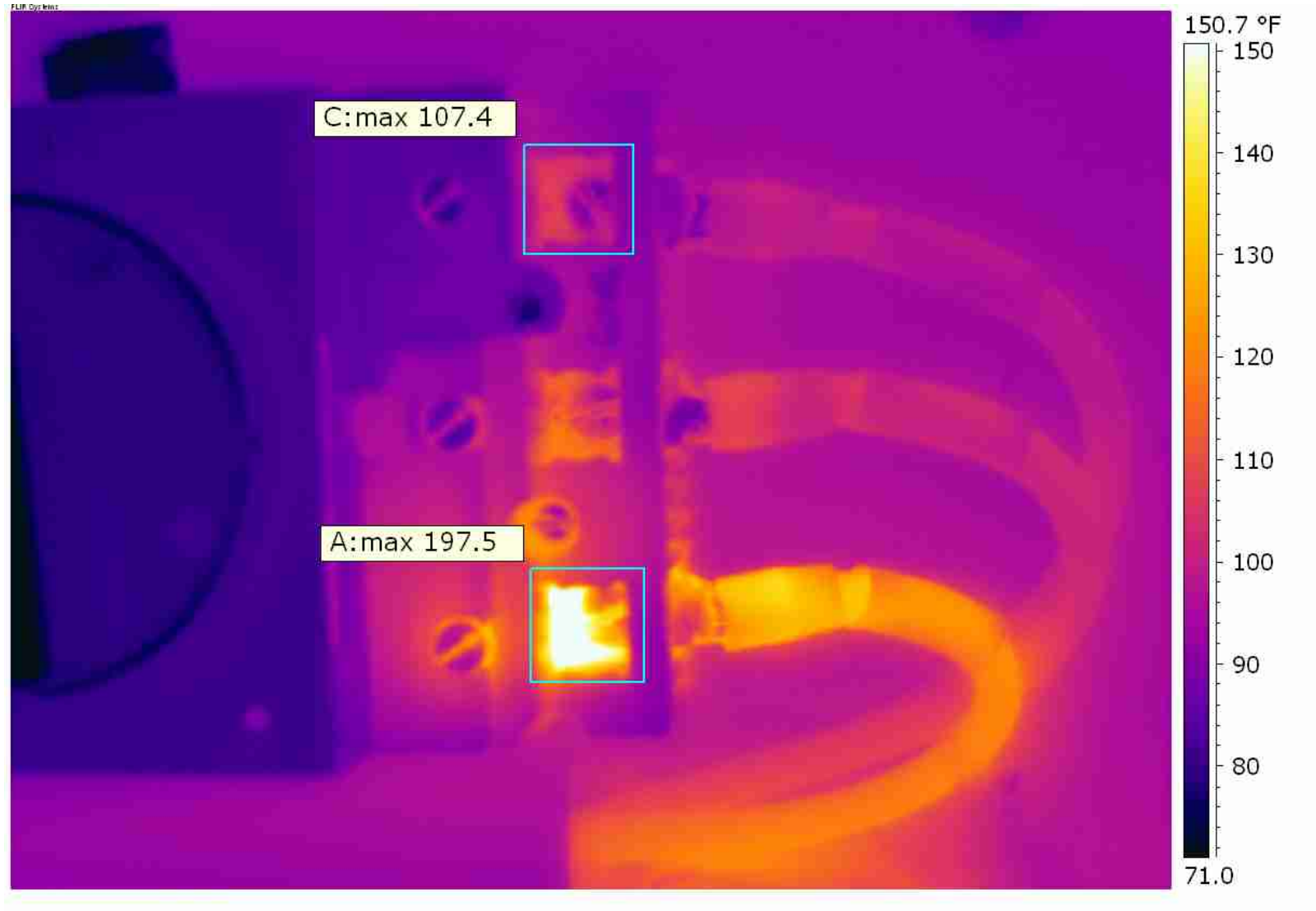
# Preventive Maintenance Program

- Approach
  - ◆ Dedicated Project Team
- Objective
  - ◆ Component Classification
  - ◆ Single Point Vulnerabilities
  - ◆ Upgrade of PM Basis
  - ◆ Establishment of Correct PMs
  - ◆ Critical Spares / Obsolescence
- 18 Month Implementation Schedule
- Large Pumps and Motors Completed

# Predictive Maintenance Program

- Oil Analysis
  - ◆ 2C Heater Drain Pump Motor lower bearing
- Thermography
  - ◆ 1B-3 Recirc MG Set Lube Oil Pump Breaker
- Vibration
  - ◆ 1B Screen Wash Pump

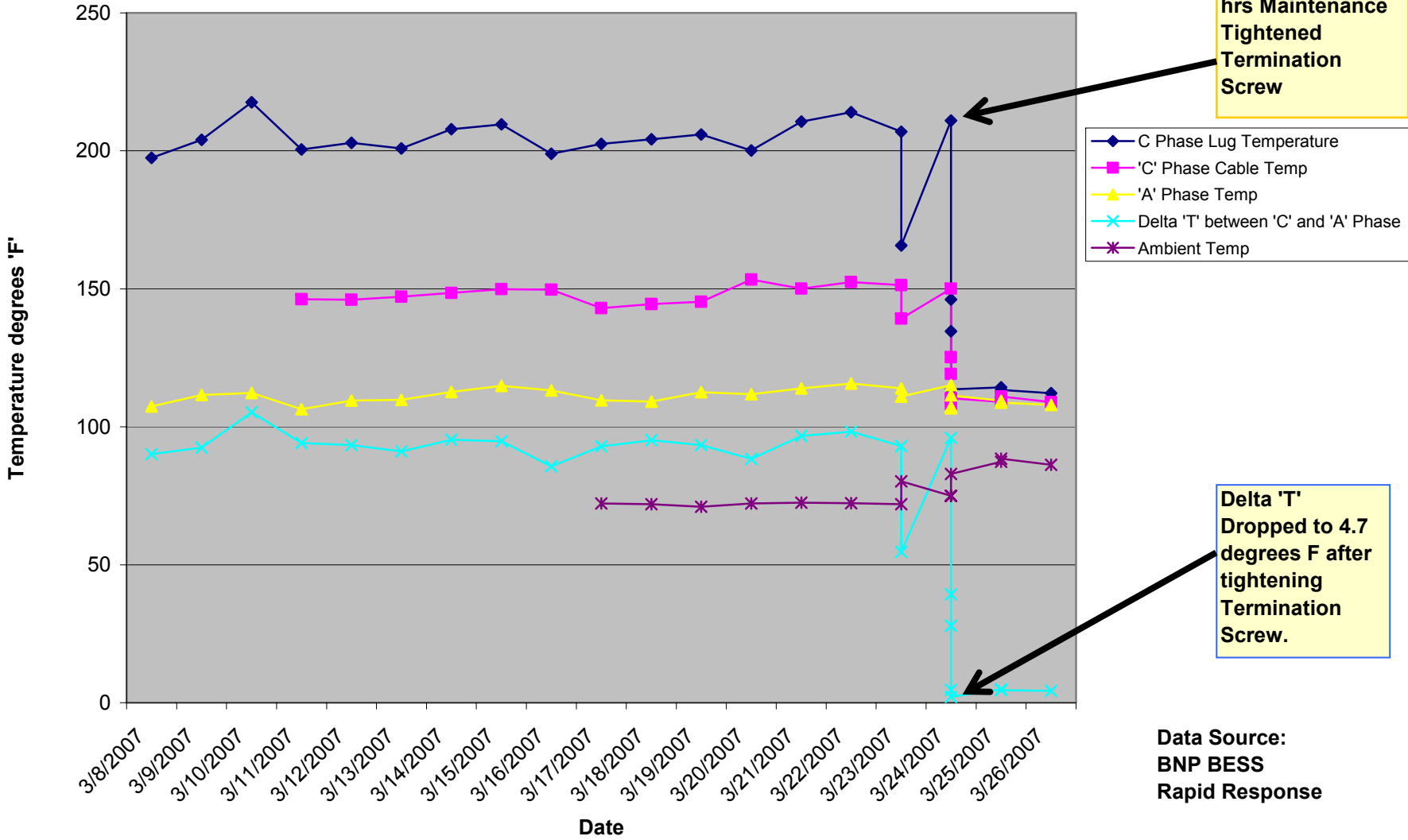
# 1B-3 Recirc MG Set Lube Oil Pump Breaker



# Unit 1, RECIRC MG Set, 1B-3 Lube Oil Pmp Mtr Bkr

3/24/07 @ 1142 hrs Maintenance Tightened Termination Screw

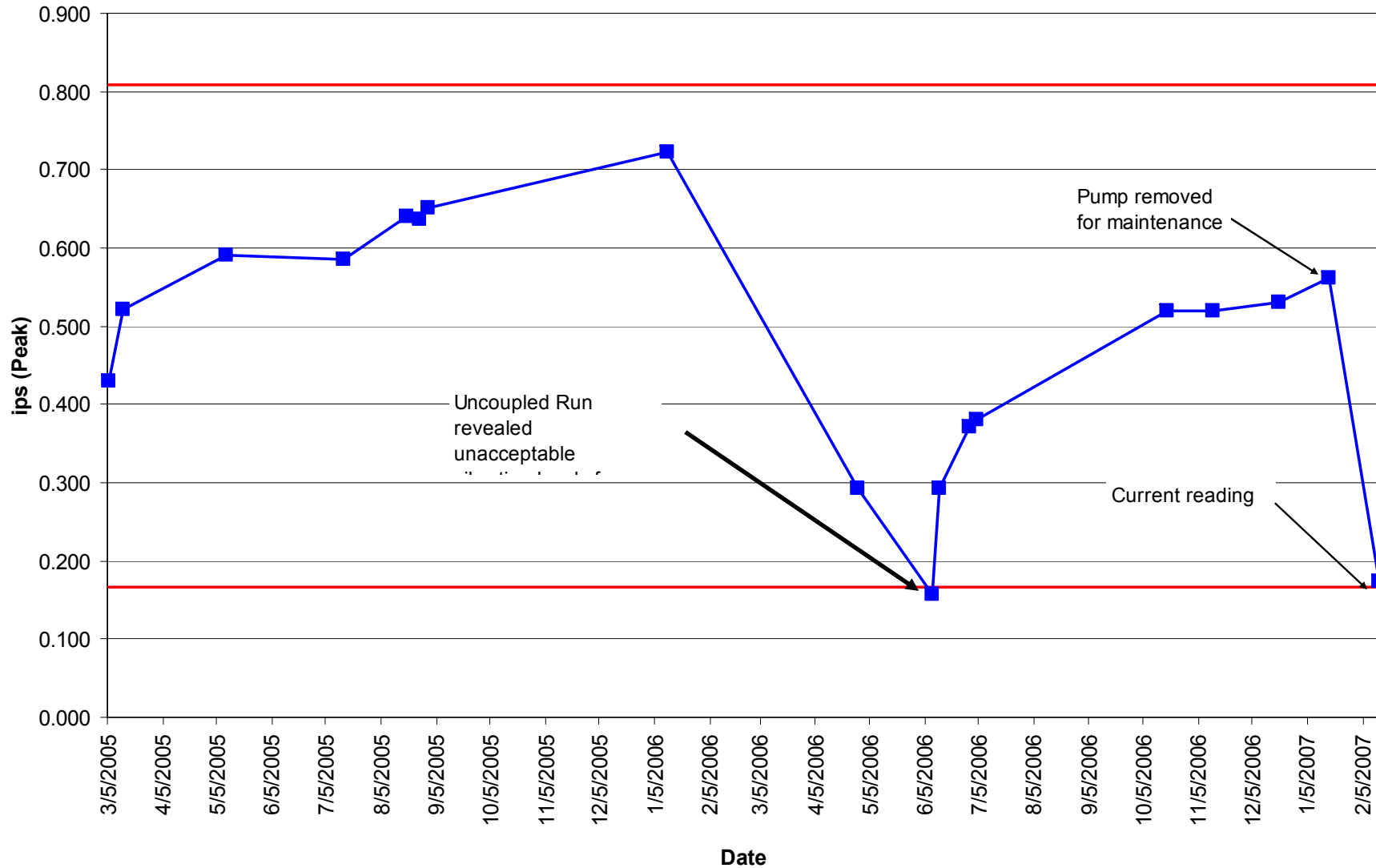
Delta 'T' Dropped to 4.7 degrees F after tightening Termination Screw.



Data Source:  
BNP BESS  
Rapid Response



# 1B Screen Wash Pump



# Work Management

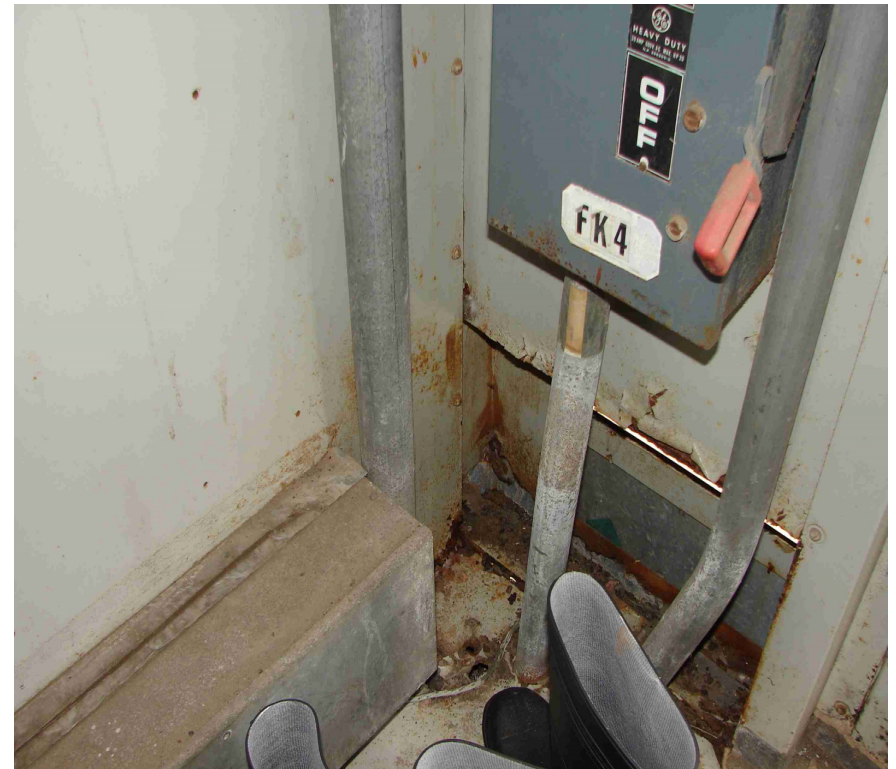
- Plant Health Committee Meeting Established as the “One-Stop-Shop” for Equipment Reliability Issues.
- Performance Standards and Expectations Established for “T” Meetings.
- Lower Tier Intrusive Performance Indicators Established.
- Implementer Review Standards and Requirements to be Implemented by May 2007.
- Work Week Critique Improvements by May 2007.



# Fixing the Equipment

- Actions Completed
  - ◆ CWIP Trip Logic Modification
  - ◆ Rebuilt 10 Service Water Pumps
  - ◆ Heater Drain Pump Rebuilds
  - ◆ Switchyard Maintenance
  - ◆ Unit 2 No Load Disconnect Switch
  - ◆ HPCI – 10 Year Service Inspection
  - ◆ SULCV and “H” Valve Positioner Replacements
  - ◆ BOP Breaker Coordination Improvements

# 2-2SA MCC & CTO MCC Replaced



# 2-2SA MCC Replaced



# 2-2SA MCC Replaced



# New No-Load Disconnect Switches



# Non-Seg Bus Bolting Inspection



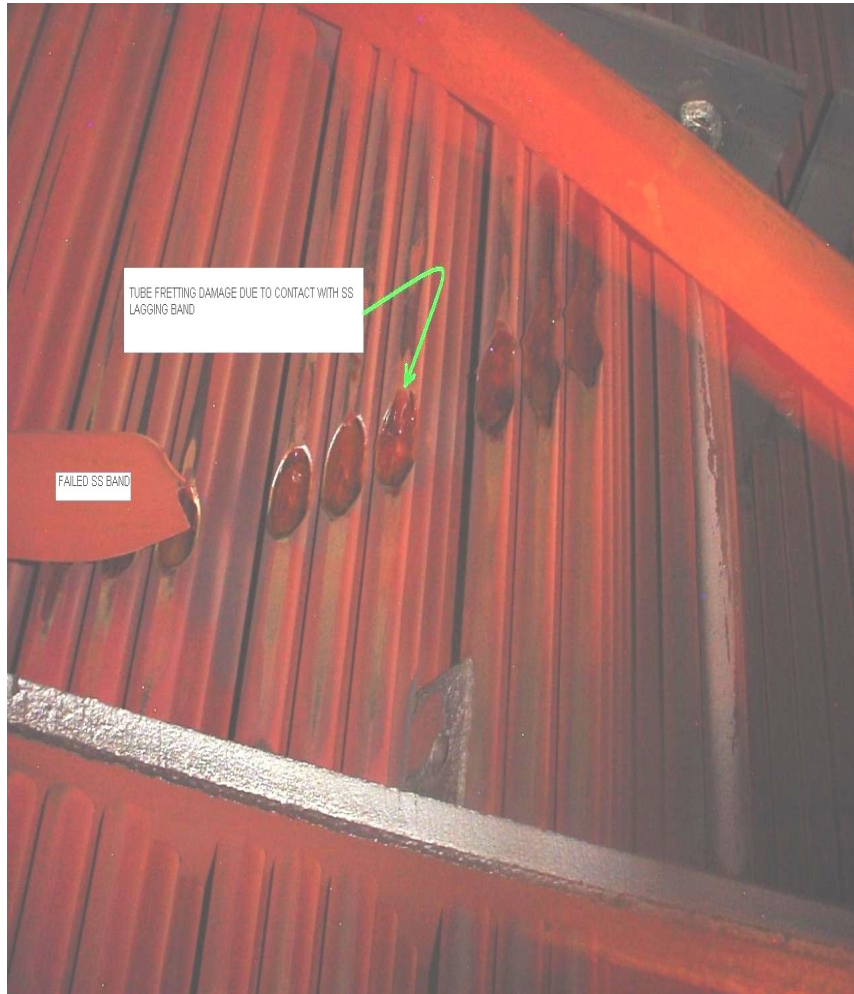
A side view of the bolted connection.

# U2 Condenser Inspection and Repairs



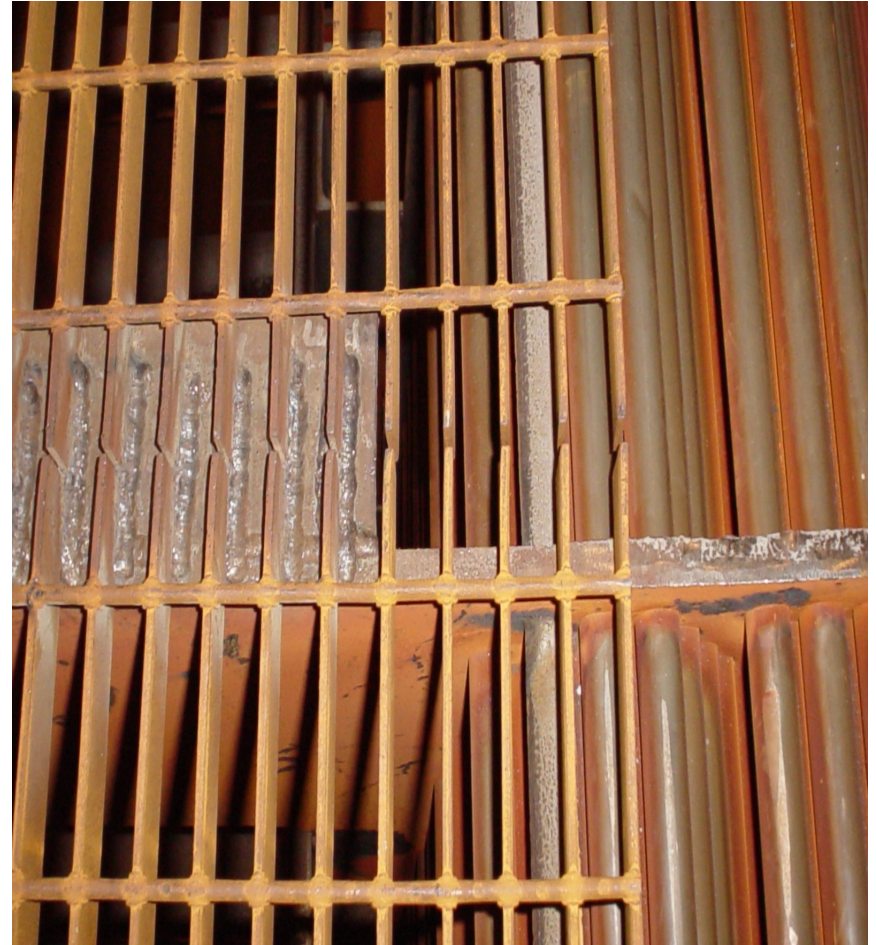
**U2 Condenser South Side  
Eroded Tubes 06/08/2006**

# U2 Condenser Inspection and Repairs





# U2 Condenser Grating Installation



# U2 Condenser FME Retrieval



# U2 Service Water Tap from 30" Header

Before Cleaning



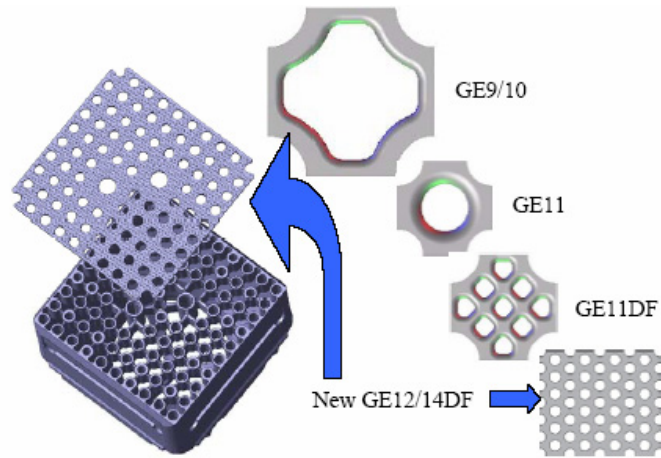
After Cleaning



# U2 Service Water F068A



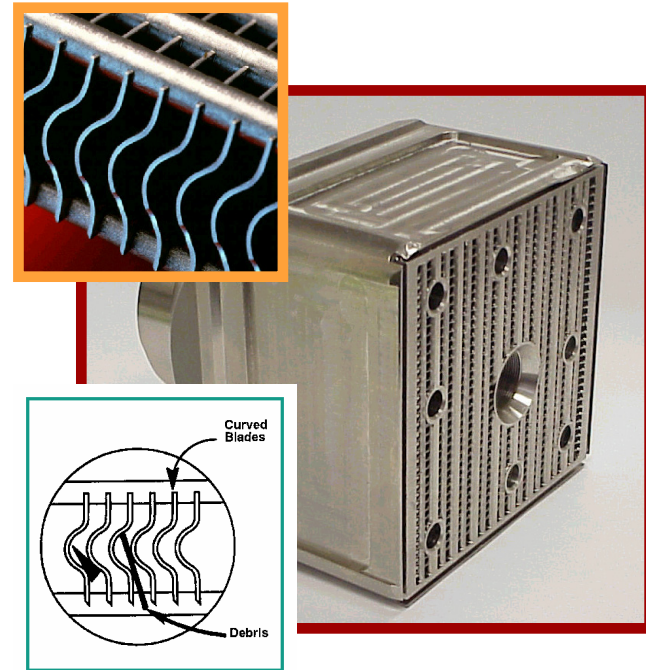
# New GE14 "Defender" Debris Filter



GE Debris Filter – Evolution to Present Design



Defender Debris Filter



ATRIUM-10 Fuelguard Debris Filter

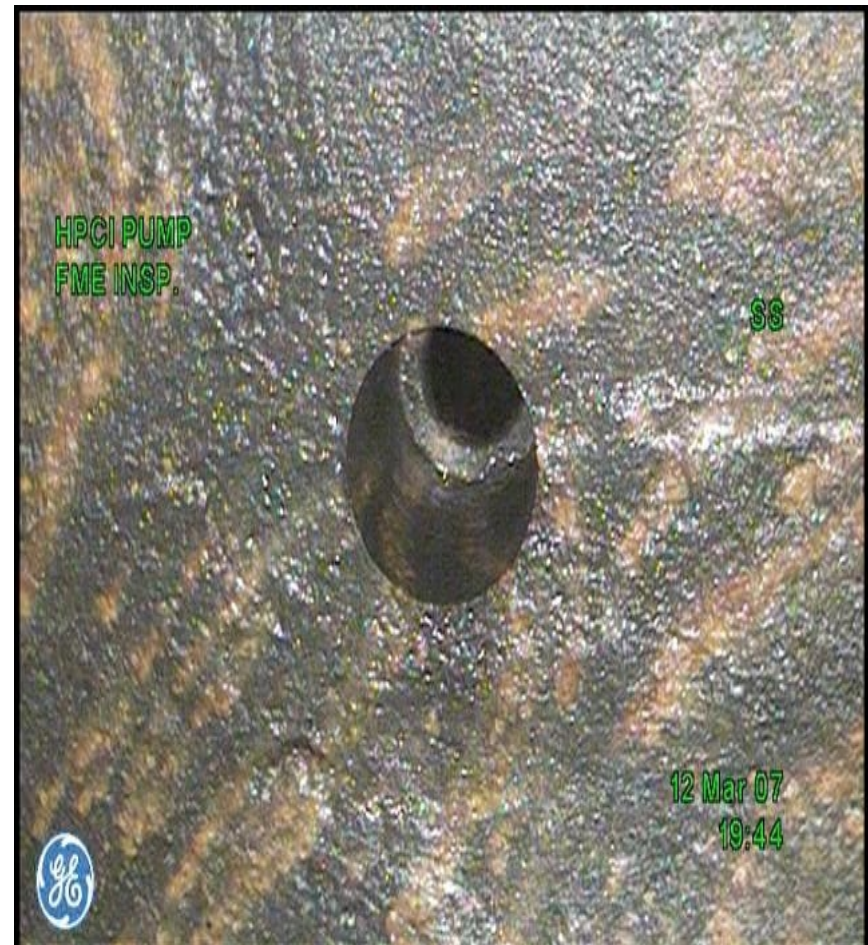
# Fixing the Equipment

- FME Actions Completed
  - ◆ B218R1 Flooded Up Through CDDs & CFDs
  - ◆ Improved Fuel Design - “Defender” Filter
  - ◆ Aggressive Search and Removal of “Legacy” Material
    - ◆ 2-2SA New MCC
    - ◆ Condensate Storage Tanks
    - ◆ Heater Drain Pumps
    - ◆ HPCI – Extensive Boroscope Inspections
    - ◆ Feedwater, 2-FW-V118 and 2-FW-V119
    - ◆ Under Core Plate Inspection
    - ◆ FME Recovery Manager and Plans During B218R1

# Heater Drain Pump Strainer FME



# HPCI Boroscope Inspection

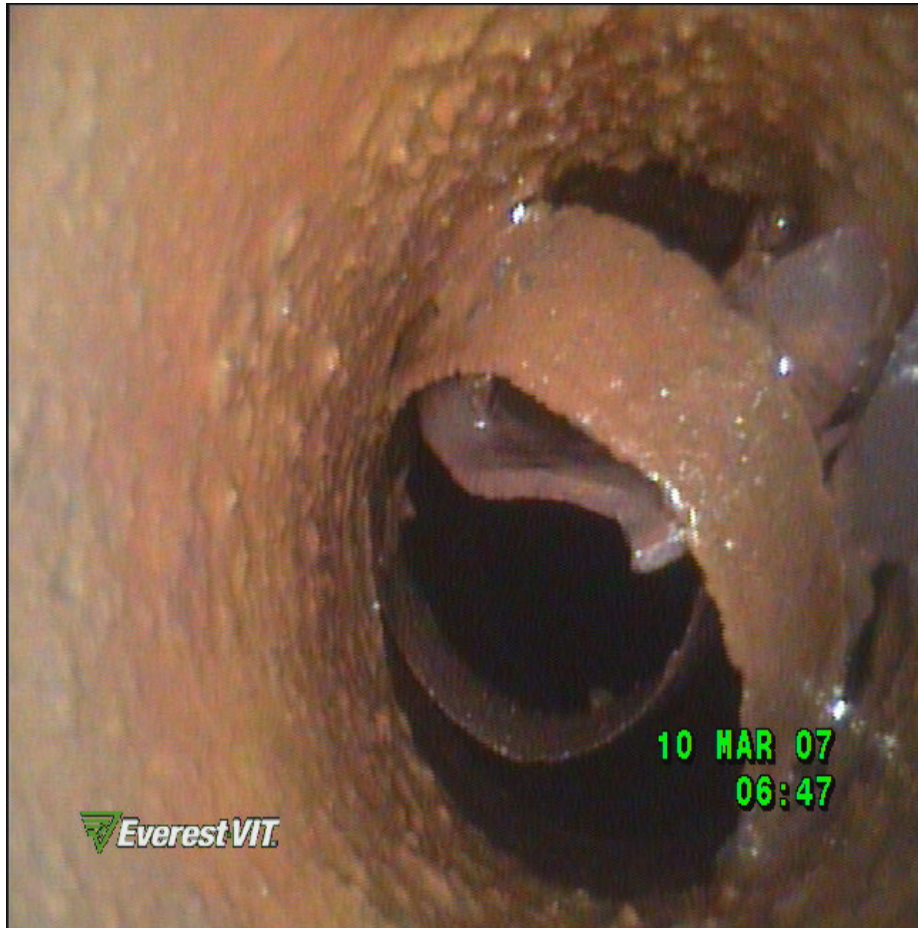




# Feedwater V118



# Feedwater V39



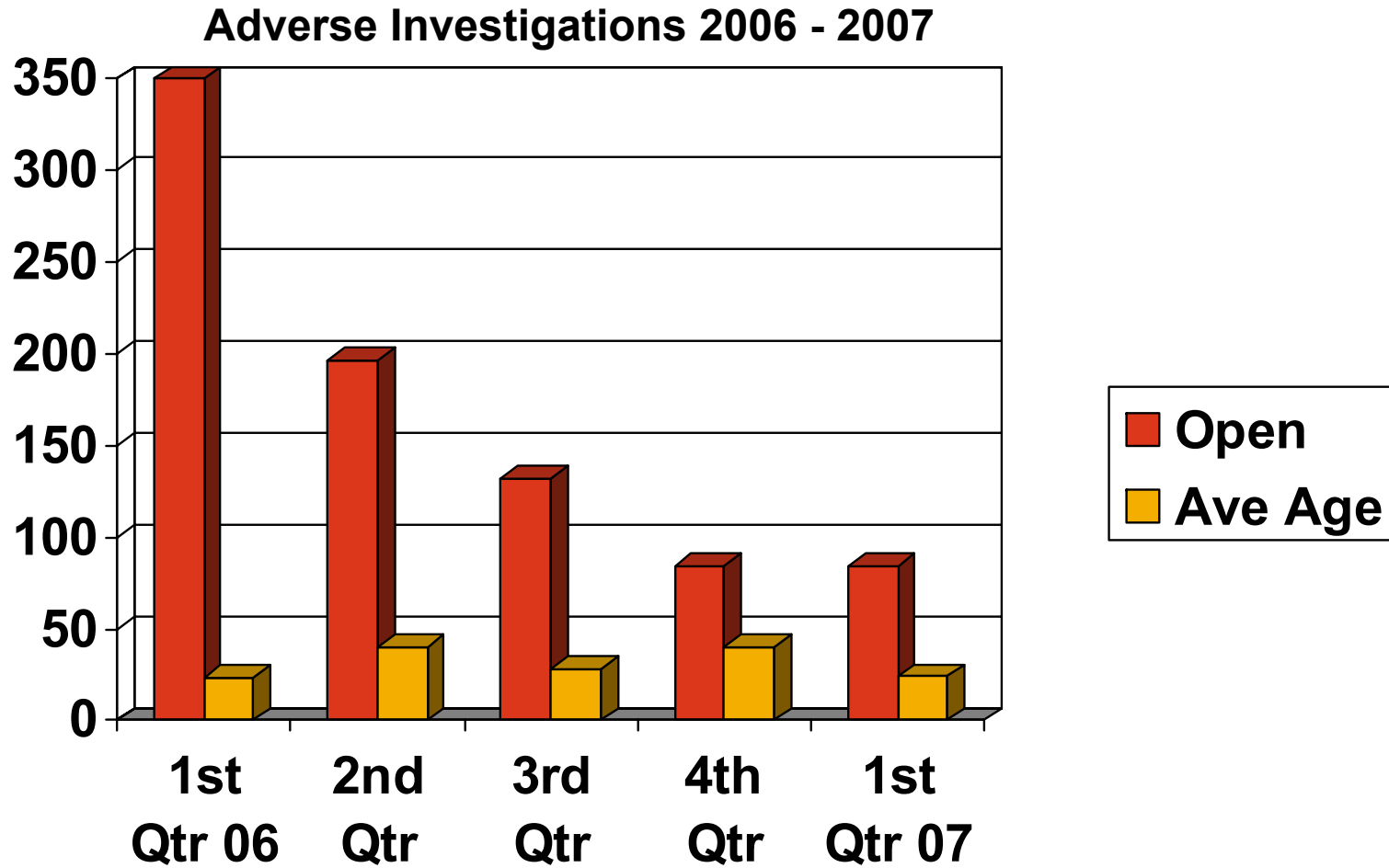
# Fixing the Equipment

- Upcoming Significant Improvements
  - ◆ Sodium Hypochlorite
  - ◆ Once Through Ventilation
  - ◆ U1 No Load Disconnect Switch
  - ◆ Switchyard Breaker Replacement

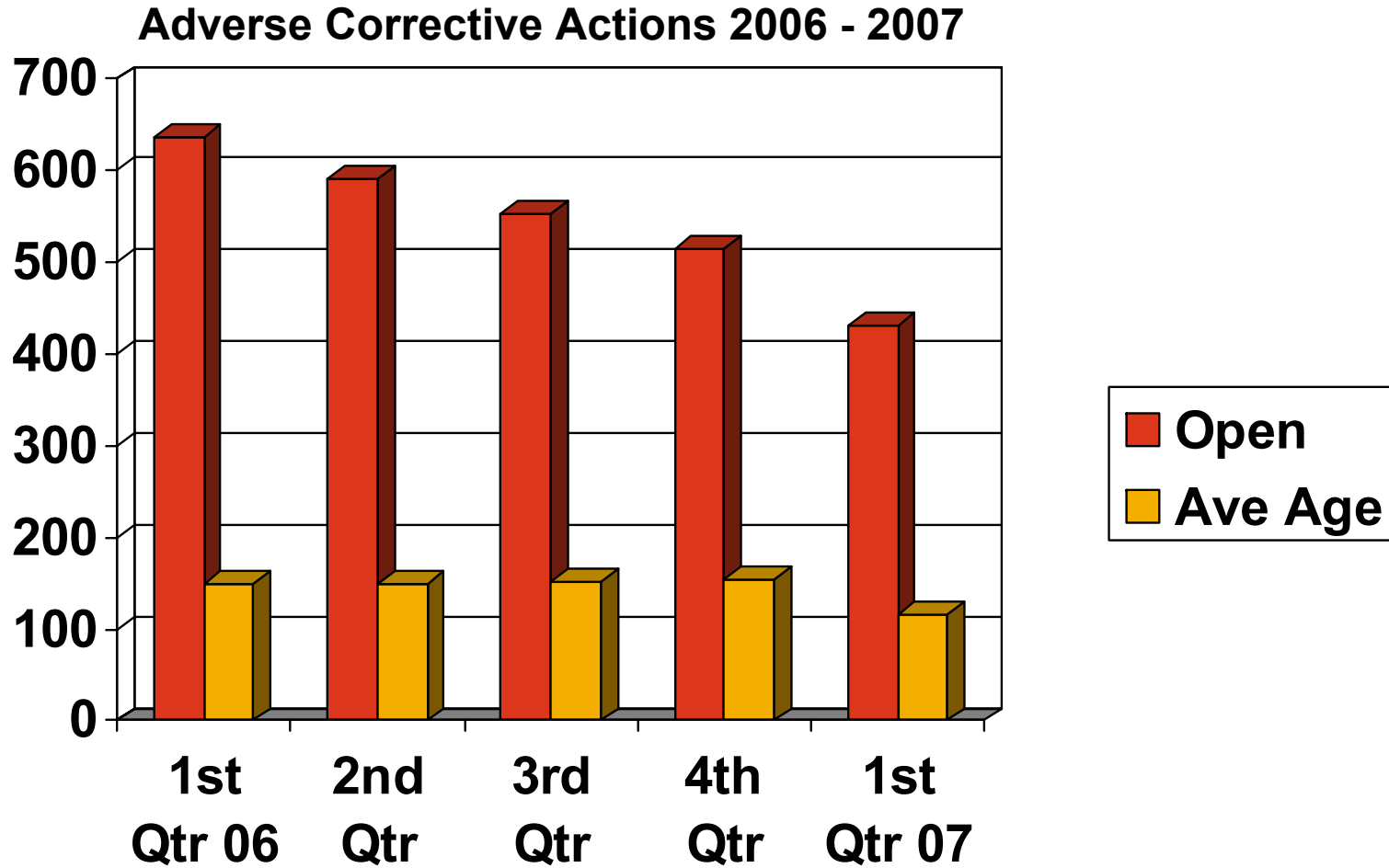
# Self Evaluation

- Oversight
- Performance Gap Awareness
- Corrective Action Program

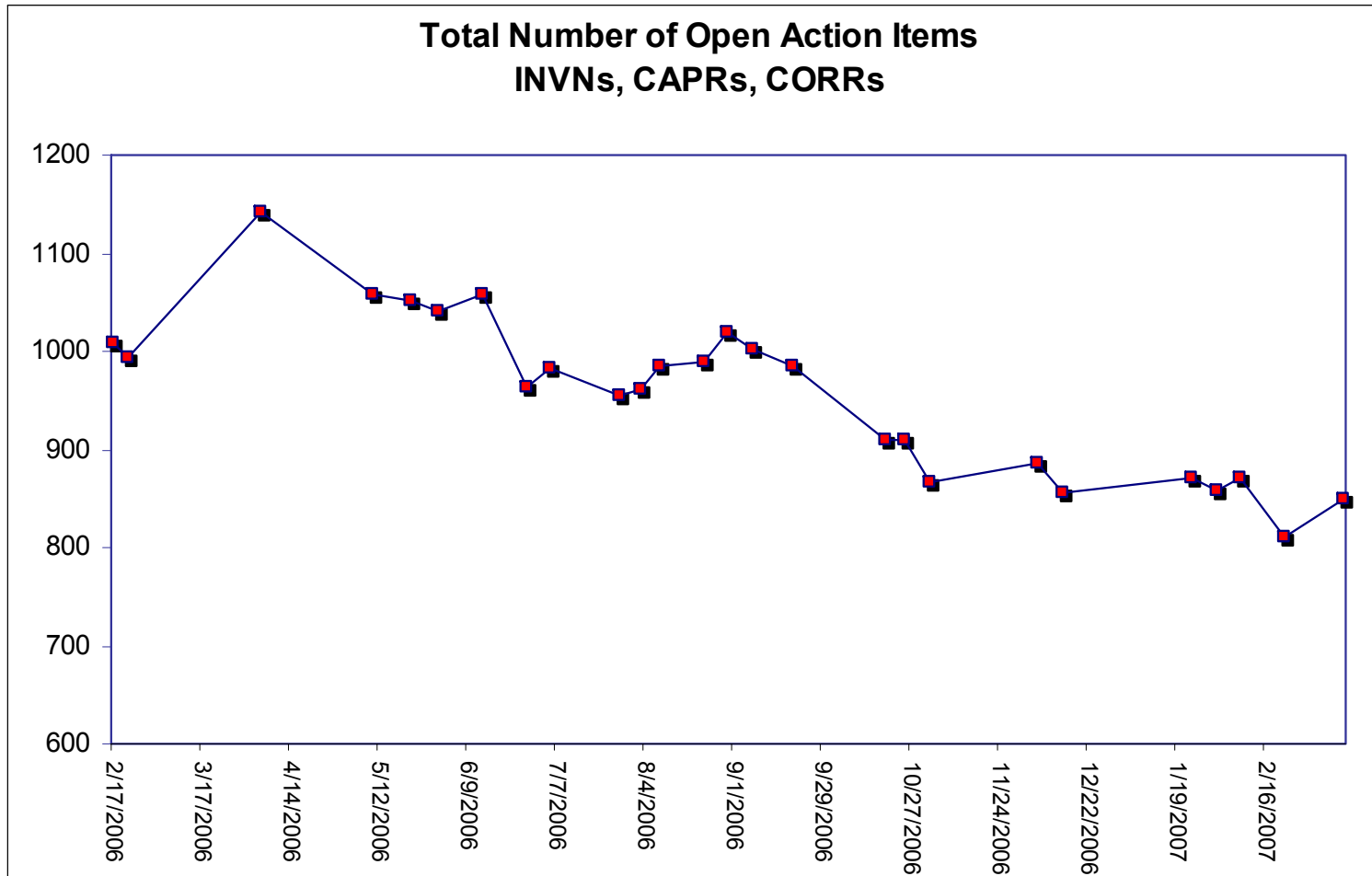
# Corrective Action Program



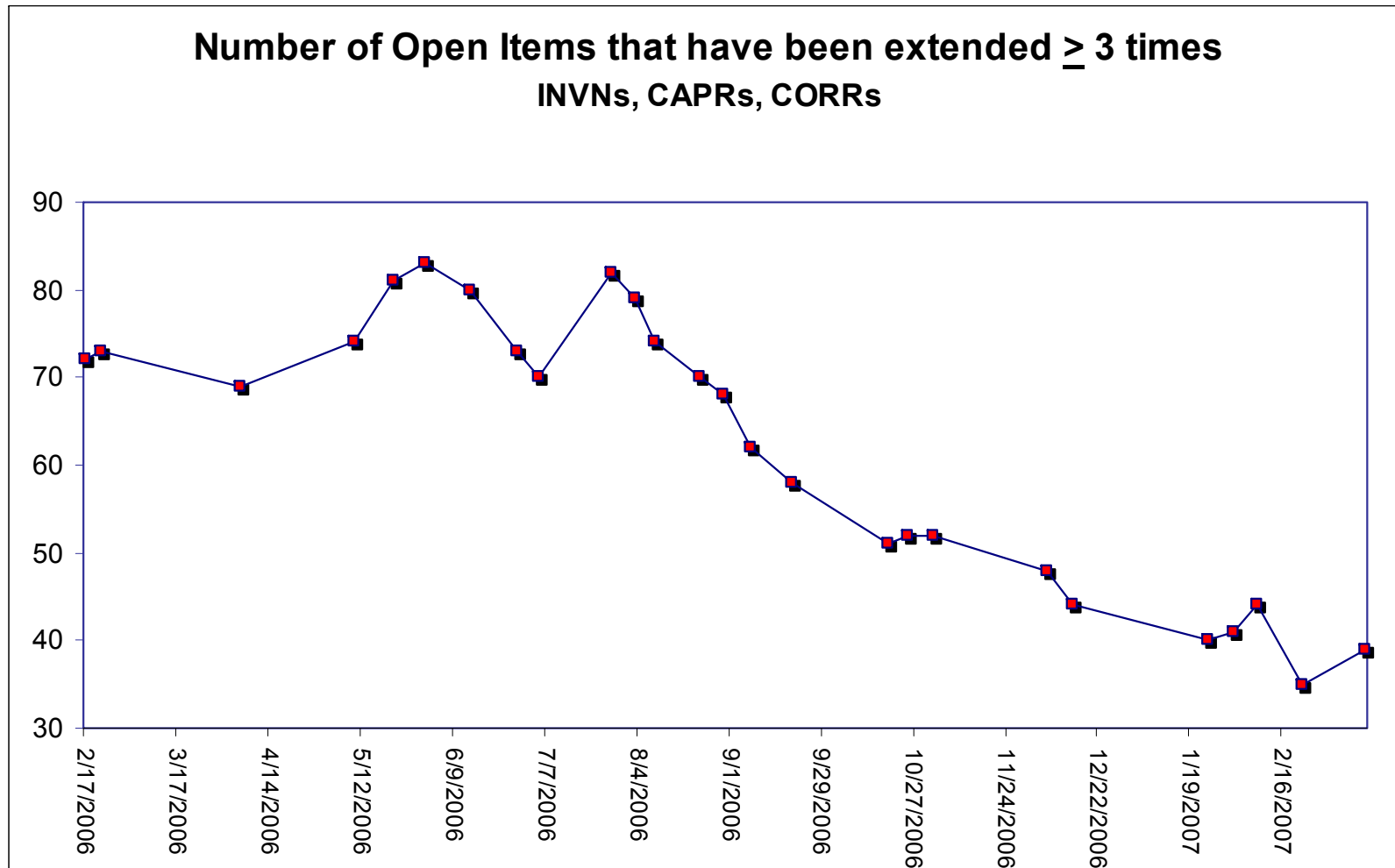
# Corrective Action Program



# Corrective Action Program



# Corrective Action Program





# Corrective Action Program

- EDG Capacitors
- EDG Potential Power Transformers
- Max Electrical Bus Calculations
- Electrical Breaker Coordination
- MOV Seat Torque Setting Calculations
- Elimination of Chlorine Tanker
- SW Building Concrete Repairs

# SW Building Concrete Repairs



# SW Building Concrete Repairs



# SW Building Concrete Repairs



# Closing Comments

Mr. Scotty Hinnant

*Senior Vice President and Chief Nuclear Officer*

# Questions & Comments

