UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
611 RYAN PLAZA DRIVE, SUITE 400
ARLINGTON, TEXAS 76011-4005

February 8, 2006

J. V. Parrish (Mail Drop 1023)
Chief Executive Officer
Energy Northwest
P.O. Box 968
Richland, WA 99352-0968

SUBJECT: SUMMARY OF MEETING WITH ENERGY NORTHWEST REGARDING COLUMBIA GENERATING STATION

Dear Mr. Parrish:

This refers to the public meeting conducted at the Region IV office, in Arlington, Texas, on February 3, 2006. The issues discussed included lessons learned from your review of the handling of service water pump shaft coupling failures at Columbia Generating Station, planned corrective actions from the review, and long term plans to ensure service water pump reliability and other equipment reliability at the facility. The meeting attendance list and a copy of Energy Northwest's presentation material are included as Enclosures 1 and 2.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter and its enclosures will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room).

Sincerely,

Claude E. Johnson, Chief
Project Branch A
Division of Reactor Projects

Docket: 50-397
License: NPF-21

Enclosures:
1. Attendance List
2. NPPD Presentation Slides

cc w/enclosures:
W. Scott Oxenford (Mail Drop PE04)
Vice President, Technical Services
Energy Northwest
P.O. Box 968
Richland, WA 99352-0968

Albert E. Mouncer (Mail Drop PE01)
Vice President, Corporate Services/
General Counsel/CFO
Energy Northwest
P.O. Box 968
Richland, WA 99352-0968

Chairman
Energy Facility Site Evaluation Council
P.O. Box 43172
Olympia, WA 98504-3172

Douglas W. Coleman (Mail Drop PE20)
Manager, Regulatory Programs
Energy Northwest
P.O. Box 968
Richland, WA 99352-0968

Gregory V. Cullen (Mail Drop PE20)
Supervisor, Licensing
Energy Northwest
P.O. Box 968
Richland, WA 99352-0968

Chairman
Benton County Board of Commissioners
P.O. Box 190
Prosser, WA 99350-0190

Dale K. Atkinson (Mail Drop PE08)
Vice President, Nuclear Generation
Energy Northwest
P.O. Box 968
Richland, WA 99352-0968

Cheryl M. Whitcomb (Mail Drop PE03)
Vice President, Organizational
Performance & Staffing/CKO
Energy Northwest
P.O. Box 968
Richland, WA 99352-0968

William A. Horin, Esq.
Winston & Strawn
1700 K Street, NW
Washington, DC 20006-3817

Matt Steuerwalt
Executive Policy Division
Office of the Governor
P.O. Box 43113
Olympia, WA 98504-3113

Lynn Albin, Radiation Physicist
Washington State Department of Health
P.O. Box 7827
Olympia, WA 98504-7827

Electronic distribution by RIV:
Regional Administrator **(BSM1)**
DRP Director **(ATH)**
DRS Director **(DDC)**
DRS Deputy Director **(RJC1)**
Senior Resident Inspector **(ZKD)**
Branch Chief, DRP/A **(CEJ1)**
Senior Project Engineer, DRP/E **(TRF)**
Team Leader, DRP/TSS **(RLN1)**
RITS Coordinator **(KEG)**

SUNSI Review Completed: _____ ADAMS: ☑ Yes ☐ No Initials: _____
☑ Publicly Available ☐ Non-Publicly Available ☐ Sensitive ☑ Non-Sensitive

R:_REACTORS_CGS\2006\CGS2-3-06MS-DRP

RIV:PE:DRP/A	C:DRP/A			
MABrown;mjs	CEJohnson			
2/8/06	2/8/06			

OFFICIAL RECORD COPY T=Telephone E=E-mail F=Fax

Enclosure 1

PUBLIC MEETING - MEETING ATTENDANCE

LICENSEE/FACILITY	Energy Northwest / Columbia Generating Station
DATE/TIME	February 3, 2006 8:00 a.m. (CST)
LOCATION	Region IV Office, Arlington, TX

NAME (PLEASE PRINT)	ORGANIZATION
Dale Atkinson	Energy Northwest
Scott Boynton	Energy Northwest
Abdy Khanpour	Energy Northwest
Scott Oxenfold	Energy Northwest
Greg Cullen	Energy Northwest
Dave Swank	Energy Northwest
Bruce Mallett	U.S. Nuclear Regulatory Commission
Art Howell	U.S. Nuclear Regulatory Commission
Tony Vegel	U.S. Nuclear Regulatory Commission
Claude Johnson	U.S. Nuclear Regulatory Commission
Jeff Clark	U.S. Nuclear Regulatory Commission
Tony Brown	U.S. Nuclear Regulatory Commission
Tom Farnholtz	U.S. Nuclear Regulatory Commission
Ron Cohen	U.S. Nuclear Regulatory Commission
Zach Dunham	U.S. Nuclear Regulatory Commission
Bob Sherman	Bonneville Power Administration
Kay Nelson	Public

Enclosure 2

ENERGY NORTHWEST

People · Vision · Solutions

NRC Region IV Management Meeting
February 3, 2006

Service Water Pumps and Equipment Reliability

Introduction

Dale Atkinson

Vice President,
Nuclear Generation

Agenda

- Introduction
  - Dale Atkinson, Vice President, Nuclear Generation
- Opening Remarks
  - Scott Oxenford, Vice President, Technical Services
- Extent of Condition/Root Cause
  - Scott Boynton, Manager, Systems Engineering
- Equipment Reliability Program
  - Scott Boynton, Manager, Systems Engineering
- Summary/Lessons Learned
  - Scott Oxenford, Vice President, Technical Services

Opening Remarks

Scott Oxenford

Vice President,
Technical Services

Service Water Pumps
Extent of Condition/Root Cause

Scott Boynton

Systems Engineering
Manager

SW-P-1A and 1B – What We Found

- Shaft component failures induced by IGSCC
- Component-level degradation was not readily identifiable through existing condition monitoring for these deep well pumps

SW-P-1A Assessment

- Pump was capable of providing essential cooling to components required for safe shutdown over a 24-hour period
- Pump degradation occurring on pump starts with "flaring" of the sand cap (primary concern)
- Stable pump performance during operation indicative of longer-term wear mechanism
- Acceptable margins considering seismic loads
- Time-based inspection will be performed in the future

Extent of Condition

- SW-P-1B (standby service water pump)
- HPCS-P-2 (HPCS service water pump)
- Other pumps
  - ECCS pumps
  - RRC pumps
  - BOP pumps (including TSW, TMU, CW, FP)

SW-P-1B

- Long-term wear mechanism evident from pump disassembly inspection (impeller/bowl contact)
- Failure analysis completed by pump vendor and validated by Energy Northwest
- Pump impeller wear had not progressed to a similar point as SW-P-1A
- As-found pump measurements provided reasonable expectation that pump would have operated for a minimum of 30 continuous days
- Our operability evaluation was confirmed by post-disassembly inspection and analysis

HPCS Service Water Pump

- HPCS-P-2 is operable
- Basis for operability:
  - Pump is a different design and manufacturer
  - Couplings are different design
  - Metallurgical properties of the shaft/coupling materials are more robust and less susceptible to IGSCC than those of SW-P-1A and 1B
  - Shaft moves freely by hand rotation, indicating available clearance between pump impellers and bowls

HPCS-P-2 - Actions

- Changing IST procedure to require inoperability at the Alert level
- Revisiting the schedule for pump replacement

ECCS Pumps

- Evaluated from SW-P-1A extent of condition
- Time-based inspection/refurbishment not defined
- Condition monitoring includes pump performance and vibration monitoring
- Pump designs are single shaft (not deep well)
- Water quality is excellent, not conducive to IGSCC (chlorides or sulfates)

ECCS Pumps (cont.)

- Operating times are lower than service water
- Pump materials are IGSCC resistant
- Actual pump performance remains above IST action limits
- Inspected RHR-P-2B in 1999 based upon industry OE
- Search of industry operating experience did not identify any other concerns

ECCS Pumps - Actions

- Detailed inspection of RHR-P-2B planned for R-18 (May 2007) to coincide with motor replacement
- HPCS-P-1 inspection also planned for R-18
- Results will be used to determine the scheduling of additional inspections

Reactor Recirculation Pumps

- Evaluated from SW-P-1A extent of condition
- Time-based inspection/refurbishment not defined
- Extensive condition monitoring available for pump performance
- Single shaft design with monitoring capability for shaft cracking
- Participating with BWROG to address the shaft cracking issue
- Water quality is excellent, not conducive to IGSCC (chlorides or sulfates)

Balance of Plant Pumps

- Time-based refurbishments exist for
  - Circulating Water
  - Tower Makeup Water
  - Plant Service Water
  - Reactor Feed-water
- Condition-based inspection/refurbishments exist for
  - Control Rod Drive
  - Standby Liquid Control
  - Fire Protection
- Recently added time-based inspection/refurbishment for
  - Condensate
  - Condensate Booster

Root Cause and Corrective Actions

- Root cause was an inadequate PM program for vertical shaft, deep well pumps
- Over-reliance on condition monitoring to define timing of preventive maintenance for deep well pumps
- Contributing Causes:
  - Ineffective application of external OE
  - Limited focus on large pumps as a component group

Corrective Actions

- SW-P-1A replaced in June 2005
- Aggressive replacement schedule established for SW-P-1B (completed December 2005)
  - Expedited procurement of refurbished pump
  - Weekly status calls between Energy Northwest Plant General Manager and Flowserve senior management
  - Contingency planning established
  - 6000 person-hours used to support in 6 months

Corrective Actions

- PM Program
  - Maintenance Optimization Templates (MOTs) assigned to Engineering owners
  - MOTs compared to EPRI and industry maintenance PM templates for gaps
  - MOTs revised to close gaps
  - MOT revisions to drive PM Program changes

Corrective Actions

- PM Schedule – 4-Year Matrix
  - A 4-Year PM Matrix has been developed to bring all PMs up-to-date by 6/30/2010
  - The MOT changes will be incorporated into a revised 4-Year Matrix
  - Resource requirements are being evaluated
  - Performance against the 4-Year Matrix will be tracked

Pump/Motor Refurbishments

- Station experience and industry benchmarking identified gaps
- Refurbishment/replacement/inspection schedule is being finalized to fill gaps
- Plans already in place for most groups of large pumps/motors
- Additional PMs being established for condensate and condensate booster pumps and motors

Operating Experience

- OE coordinator daily communications
- Department continuous improvement coordinators (CIC)
- Process weaknesses identified in PER 205-0690
- Screening form being developed to aid in OE disposition
- Historical OE being reassessed

SW Pump Conclusions

- Division 1 and 2 SW pumps replaced
- Aggressively pursuing HPCS-P-2 inspection/replacement
- Continued reliability of SW pumps assured
  - New PM inspection added
  - Trending and monitoring
- SW-P-1A will have interim inspection in R-18 to address WD-40 concern

Equipment Reliability Program

Scott Boynton

Systems Engineering Manager

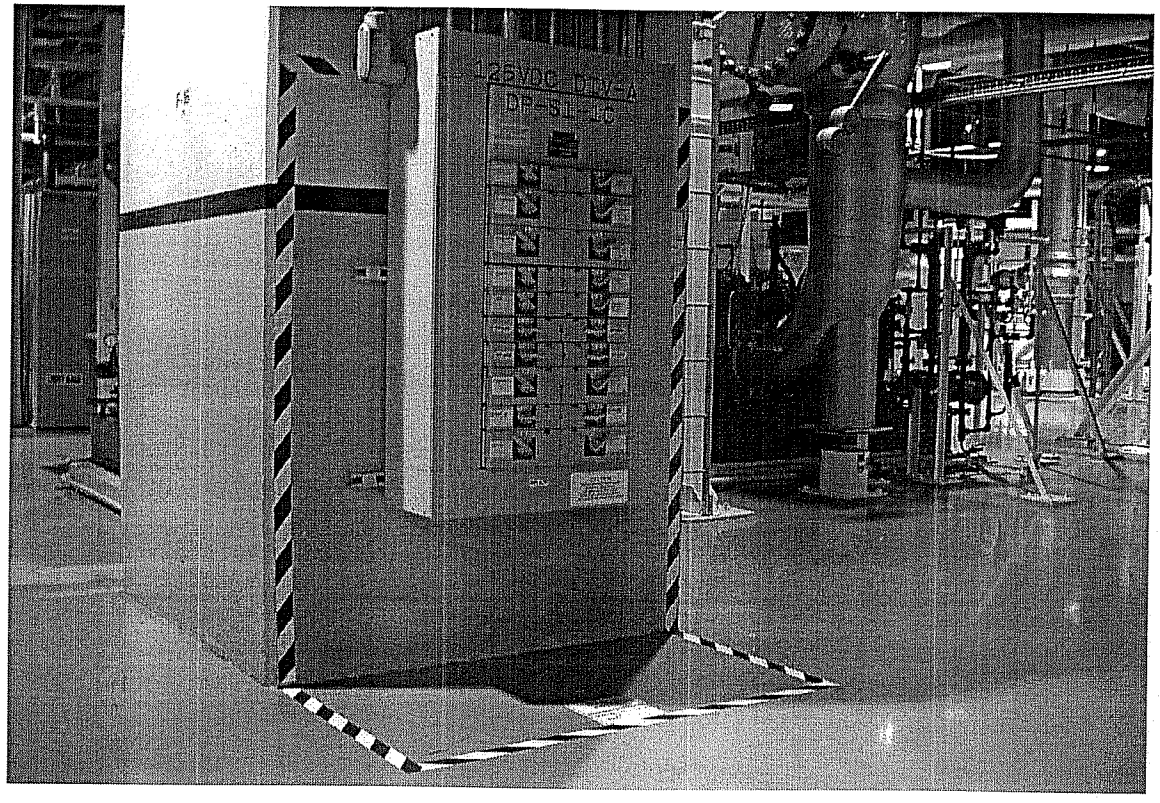
Equipment Reliability Program Improvements

- PM Program Upgrade
- Single Point Vulnerability Project
- Top Ten Equipment Issues
- Maintenance Backlog Reduction
- Operator Aggregate Impact Index
- Plant Health Committee
- System Monitoring/Trending
- Equipment Reliability Clock

Single Point Vulnerability

- 24 modifications identified
  - RFW and booster pump trips (R-18)
  - ASD electrical bus power (R-18)
  - DEH/turbine trip system (R-18)
- 20 separate procedure changes/plant labeling completed
  - BOP power panels/instrumentation
- 21 changes to PMs in progress

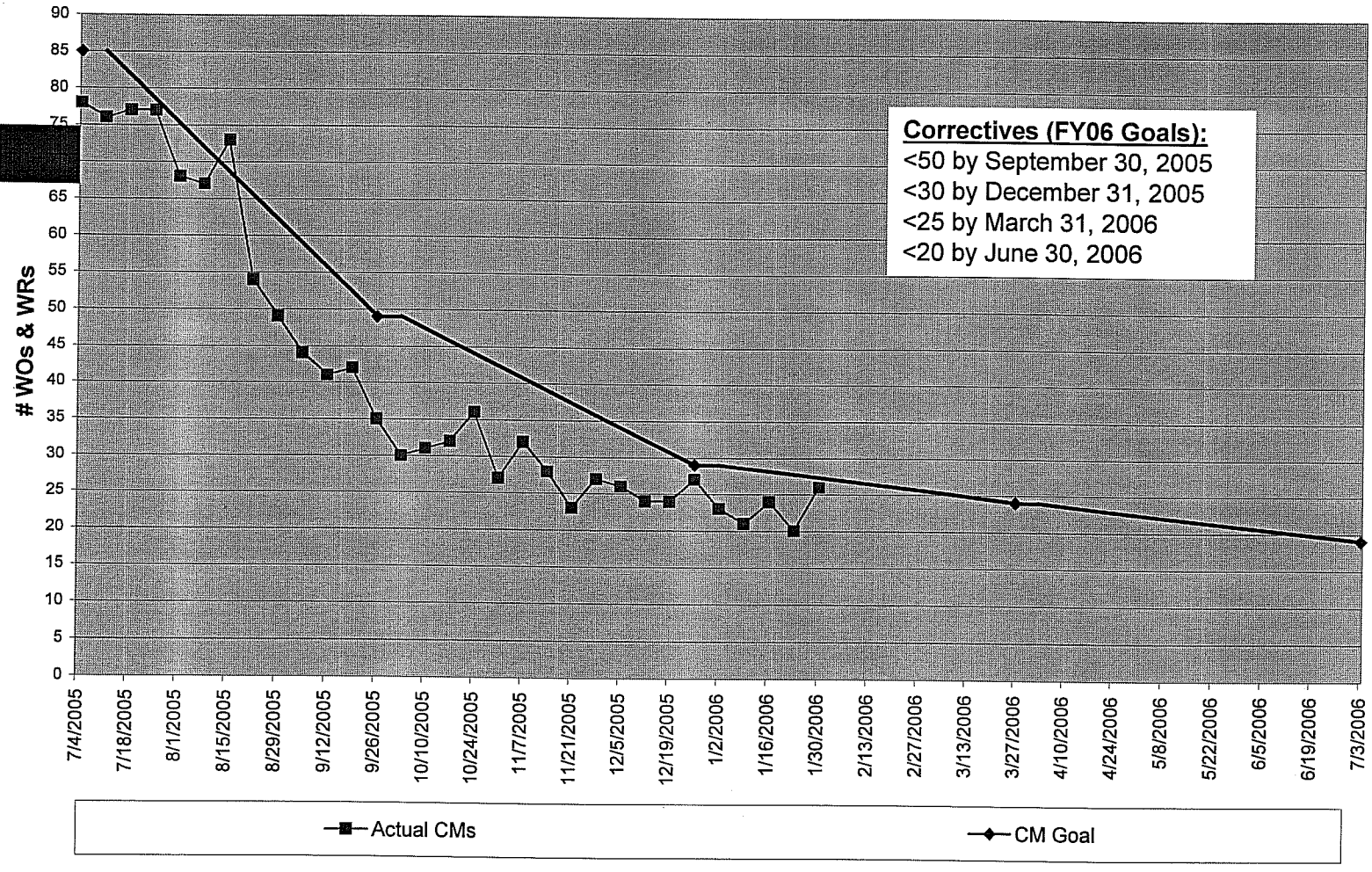
RFW Turbine Control Power Panel



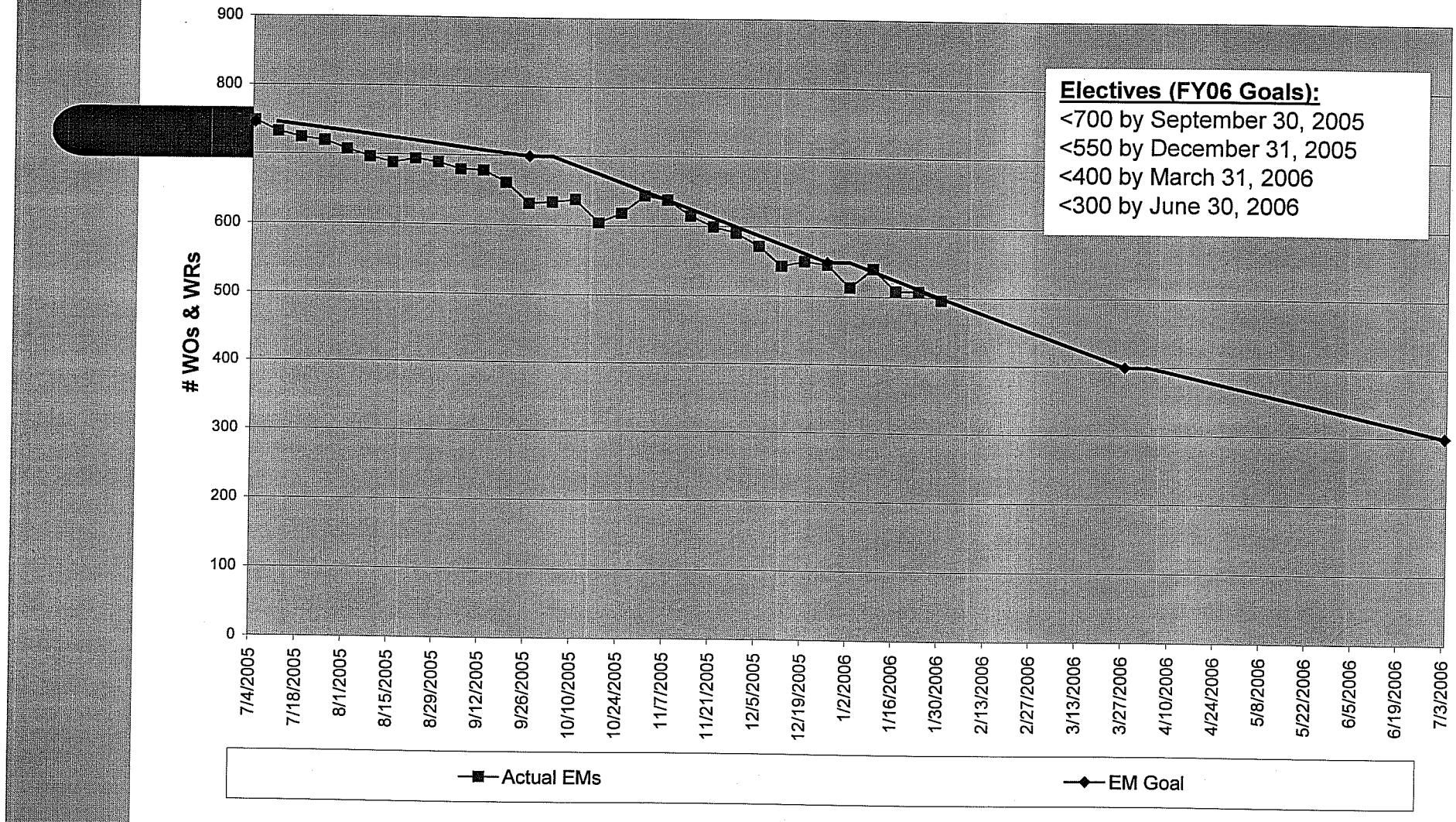
Maintenance Backlog Reduction

- Milestones established for both corrective and elective maintenance backlogs
- Work-off curve on track since February 2004
- Current goals by July 2006 are:
  - 300 Elective
  - 20 Corrective

Corrective Maintenance Backlog



Elective Maintenance Backlog



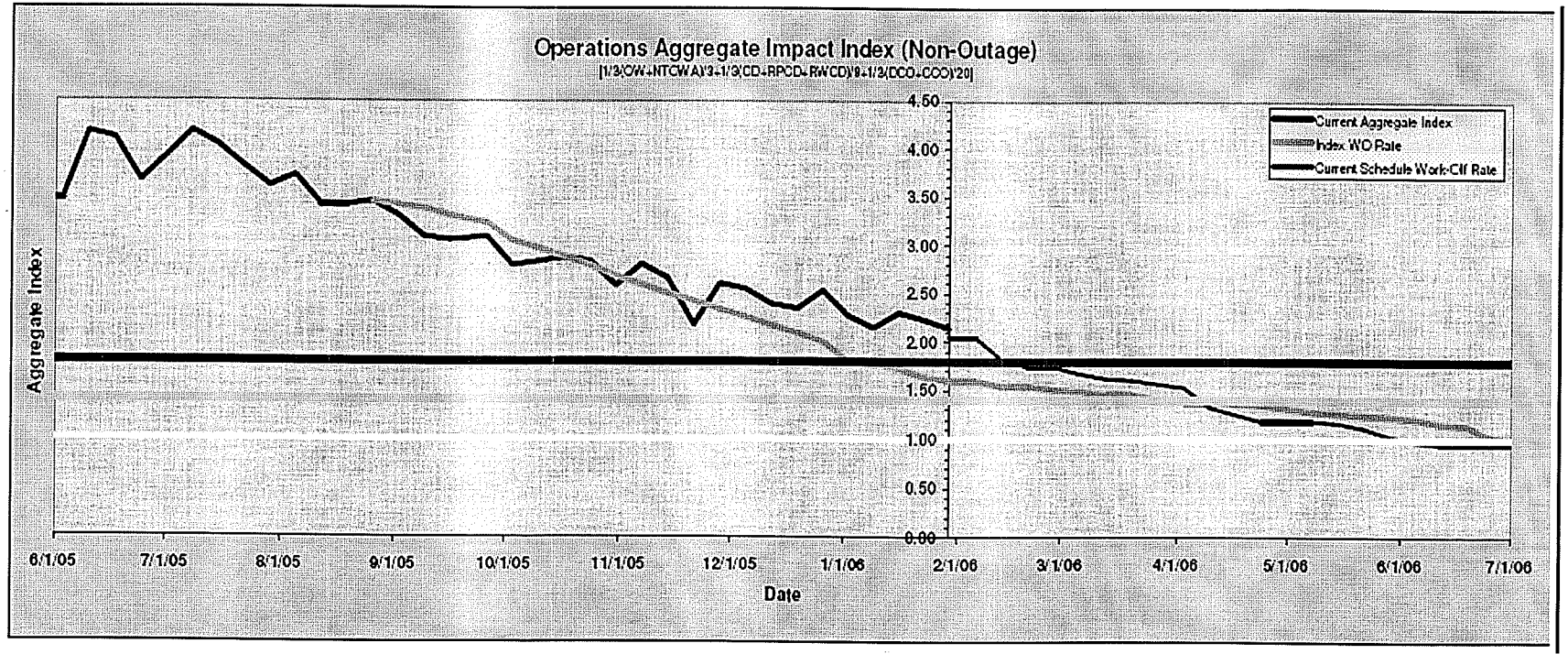
Electives (FY06 Goals):

<700 by September 30, 2005
<550 by December 31, 2005
<400 by March 31, 2006
<300 by June 30, 2006

Operator Aggregate Impact Index

- Developed using industry best practice to focus on equipment issues impacting Operations
- Includes:
  - Control room deficiencies
  - Operator workarounds
  - Operator burdens
  - Danger and caution clearances
  - Others
- Current goal is less than 1.0 by July 2006

Operator Aggregate Impact Index



Equipment Reliability - Conclusions

- Program improvements are in place
- Program improvements are based on OE, benchmarking, industry best practices
- Several areas have been reassessed with additional actions established
- Plan is accelerated; 4-year plan to complete new PMs
- Focuses on most important equipment/issues
- Station management is committed to improving equipment reliability
- Station alignment is evident through improved performance

Summary/Lessons Learned

Scott Oxenford

Vice President,
Technical Services

Summary

- SW-P-1A was capable of performing its function for the 24-hr PRA mission time
- SW-P-1B was capable of performing its function and remained Operable
- HPCS-P-2 remains capable of performing its safety function and is Operable

Lessons Learned

- CGS management should have better communicated with employees to ensure all issues and perspectives were understood
- Focus on timely corrective action was appropriate

Lessons Learned

- Commissioned independent expert review of Operability Determination performance
  - Pete LeBlond
    - Former nuclear utility manager
    - Consultant providing OD, 50.59, and Design Basis training
    - Member of NRC/industry team that developed RIS 2005-20

Lessons Learned

- Five questions addressed
  - Were Columbia procedures followed?
  - Do CGS procedures properly implement guidance?
  - How should procedures be altered, if at all?
  - How can CGS become industry leader in OD?
  - How could an OD have been formulated?

Lessons Learned

- Three primary weaknesses identified
  - A degraded condition should have been identified on SW-P-1B based on information from SW-P-1A
  - As a result, a formal Operability Determination should have been performed for SW-P-1B
  - CGS personnel would have had difficulty performing this OD due to an incorrect belief that NRC guidance requires a "Reasonable Assurance of Operability" vs. a "Reasonable Expectation of Operability"

Lessons Learned

- Two primary recommendations to achieve superior performance in ODs
  - Case studies to illustrate the concept of "Reasonable Expectation of Operability" should be developed and provided to all Operations SROs and Engineering personnel
  - Refresher training and/or joint engineering/operations discussions on the balance between operability and corrective action, and the mutual responsibilities each organization shoulders could be beneficial

Lessons Learned

- Formal OD training is being evaluated
  - Refresher training on OD process
  - Review lessons learned from this issue
  - Provide case studies to illustrate "Reasonable Expectation of Operability"
  - Roll out information in RIS 2005-20

Lessons Learned

- Assessment also suggested an approach for how an Operability Determination could have been adequately performed and documented

Concluding Remarks

Dale Atkinson

Vice President,
Nuclear Generation