



BWR Owners' Group Extended Power Uprate

Presentation for NRC 2005 Regulatory Information
Conference

Session H1 "Power Uprates"

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BWROG Program Objectives

- ✦ Assure that BWR steam dryer integrity issues are appropriately resolved
- ✦ Ensure that EPU operating experience and lessons learned are incorporated into power uprate programs to assure safe and reliable operations
- ✦ Assure that uprates are done safely and result in reliable plant operations
- ✦ Provide oversight for a broad range of industry efforts related to BWR power uprates

Understanding Equipment Challenges From EPU

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- ✦ Material condition assessment
 - ◆ Extent of Condition evaluation by Exelon/GE
 - ✦ Survey of BWR EPU experience
 - ✦ INPO Power Uprate and Cycle Extension database evaluation
 - ◆ Includes PWR and smaller uprates
 - ✦ Vibration monitoring information exchange
 - ✦ EPU power ascension test program evaluations

Improving Management of Steam Dryers

✦ SIL 644 revision 1 issued November 11, 2004

- ◆ Includes inspection and evaluation guidance and BWR Moisture Carryover Operational Guidance

✦ BWRVIP Inspection and Evaluation Guidelines

✦ BWRVIP-06 section 4 – enhanced Loose Parts potential and consequences evaluation

✦ Development of enhance methodology for determining steam dryer loads

- ◆ Finite Element Modeling
- ◆ Acoustic Circuit Analysis
- ◆ Scale Model Testing
- ◆ Benchmark With Plant Data (Instrumented Dryers)

Status of GE Enhanced Methodology for Determining Steam Dryer Loads

- ✦ GE encouraged with results and progress in correlating acoustic model with QC-1 scale model test data
- ✦ Frequencies measured on scale model dryer consistent with plant data (corrected for plant-specific dimensions)
 - ◆ Source of lower frequencies is from inside vessel (turbulence and natural frequencies of steam volume)
 - ◆ Source of high frequencies is from SRV piping
- ✦ Initial data from QC-1 instrumented steam dryer expected in April 2005
- ✦ Rated thermal power data from QC-1 instrumented steam dryer expected in summer 2005

BWR Extended Power Uprate Lessons Learned and Recommendations Report

✦ Rev 0 issued on November 23, 2004

✦ Distributed to:

- ◆ NRC
- ◆ NEI
- ◆ INPO
- ◆ EPRI
- ◆ Westinghouse Owners' Group
- ◆ B&W Owners' Group

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Summary of Lessons Learned and Recommendations Report

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- ✦ Implementation of EPU via the approved LTR process assures plant safety is maintained
 - ✦ Majority of recent problems attributed to EPU related to power production rather than plant safety
 - ◆ Many issues involve pre-existing plant component issues that are exacerbated by EPU
 - ✦ Majority of BWROG recommendations involve operational strategies to improve robustness during EPU implementation
 - ✦ Recommendations will reduce challenges during the EPU implementation process and will help assure that plant reliability remains high

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Summary of Lessons Learned and Recommendations Report



- ✦ Recommendations will also reduce the potential that safety components will be degraded by loose parts from non-safety systems
- ✦ BWROG believes the major vibration problems that have occurred at Quad Cities are an anomaly related to high steam velocities and unusually high acoustic vibration levels
- ✦ Steam dryer load definition methodology will allow BWR steam dryers to be redesigned (if required) in accordance with the higher loads so that additional failures will not occur

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Key Recommendations

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- ✦ Prior to EPU implementation identify plant component condition deficiencies that may be impacted by EPU-related process changes and resolve as appropriate
 - ✦ Review and disposition recommendations resulting from the GE/Exelon extent of condition review to assure increased component wear following EPU implementation does not adversely impact plant reliability
 - ✦ Obtain the recommended pre-EPU baseline data and carefully compare with post-EPU implementation data and EPU predictions to ensure that unanticipated impacts are not occurring

BWR Extended Power Uprate Key Recommendations (continued)

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- ✦ Consider steam dryer acoustic loads evaluation and complete appropriate upgrades/modifications prior to implementation of EPU
 - ✦ Update operational strategies and PM strategies related to systems, equipment, and components that are susceptible to changes as a result of EPU implementation
 - ✦ Evaluate instrument setpoint and calibration requirements for all instrumentation that are susceptible to changes as a result of EPU implementation

2005 BWROG EPU Work Scope

- ✦ Re-survey plants included in 2004 survey to provide experience update
- ✦ Prepare summary of steam dryer scale model testing, acoustic model developments, and results of instrumented dryer testing
- ✦ Issue revised NEDC-33159 that incorporates above information