MEETING PRESENTATION

MARCH 2, 2007

HOPE CREEK GENERATING STATON

STEAM DRYER MARGIN

Enclosure 3

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Hope Creek EPU – Steam Dryer Margin

NRC/PSEG Nuclear Meeting

Rockville, Maryland

March 2, 2007

- Background
- Margin Recovery Report
- Validation of In-Plant Data
- Steam Dryer Power Ascension Test Plan

Steam Dryer Background

EPU LCR Submitted November 2005

- Withdrawn February 2006

NRC - PSEG Meeting March 2006

- Reviewed acceptance issues

NRC - PSEG Pre-submittal Meeting July 2006

- Status update

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Background

EPU LCR Re-submitted September 2006

EPU LCR Supplement – October 10, 2006

- Demonstrated conservatism in ACM loads
- Described substitution for missing strain gage data

EPU LCR Supplement – October 20, 2006

- HC – QC2 ACM loads comparison

NRC - PSEG meeting November 2006

- Submittal overview

Background

EPU LCR Supplement – February 28, 2007

- Margin recovery results
- Updated HC – QC2 ACM loads comparison

Key Steps

- Re-benchmarked the Scale Model Tests
  - More realistic estimate of EPU loads
    - Refined Finite Element Analysis for EPU
  - More realistic stress ratios

SMT Re-benchmarking

- September 2006: 1/8th SMT predicted SRV resonance onset between 80% and 90% CLTP
  - In-plant data showed no resonance at or below CLTP
  - 1/5th SMT predicted no resonance until above CLTP
- Early 2007 re-benchmarking results:
  - Initial 1/8th SMT - 1.16 of target reactor power
    - Over predicted loads
  - Rebenchmarked SMT predicts on-set of SRV resonance just above CLTP
    - Now consistent with plant data and 1/5th scale

EPU Finite Element Analysis

- Refined EPU analyses uses revised SMT loads
  - As before: Frequency shifts to ± 10% at 2.5% intervals
- Credited additional weld on middle hood to end plate and inner hood to end plate connection

EPU Limiting FEA Stress Ratios

Peak Stress (all are welds)	Ratio at nominal frequency	Ratio at limiting frequency	Limiting frequency
Inner hood to outlet end plate	1.53	1.53	0%
Skirt to upper support ring	1.54	1.46	+2.5%
Outer hood to cover plate	1.96	1.77	+2.5%
Alternating Stress (all are welds)			
Middle hood / reinforcement strip	>2.0	≥ 1.90	-10% to + 7.5%
		1.33	+10%
Drain channel to skirt (at bottom)	1.96	1.62	+2.5%
Outer hood to cover plate	2.00	1.80	+2.5%
Steam outlet end plate to middle hood	>2.0	1.76	-10%
Steam outlet end plate to inner hood	>2.0	1.86	-10%

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EPU Conclusions

- Without crediting any SMT conservatism:
  - All non-weld locations stress ratios > 2.0
  - At welds, alternating stress ratios at nominal frequency $\geq$ 1.96
  - At welds, limiting alternating stress ratio occurs at +10% frequency shift

Validation of Plant Data

Compared docketed (September 2006) to recent 2007 in-plant data

Performed steam dome pressure monitoring

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CLTP Plant Data

- September 2006 load definition based only on "A" and "B" MSL strain gages
  - With algorithm to bound loads using only 2 MSLs
- Early 2007: Restored all strain gage channels to service
  - Taken at 100% CLTP
  - More accurate since does not rely on algorithm

CLTP In-Plant Data

- Compared September 2006 to early 2007 loads
  - Low resolution loads
- 2007 dPs lower at all steam dryer nodes
  - Original prediction of peak dP (at outer hood) was ~ 33% higher than the 2007 data predicts
- Confirmed: No indication of SRV standpipe resonance on any MSL

Low resolution loads comparison: 2007 plant data compared to SMT at CLTP

- SMT dPs higher at <u>all</u> steam dryer nodes
  - SMT peak dP (at outer hoods): 0.158 psid.
  - Plant data peak dP (at outer hoods): 0.124 psid.
- SMT 27% higher at outer hoods than plant data

RPV Steam Dome Monitoring

- September 2006 loads excluded the 80 Hz load
- Early 2007: Collected steam dome pressure data
  - No significant 80 Hz load present in HCGS steam dome
  - Consistent with HCGS SMT steam dryer measurements

Steam Dryer Power Ascension Test Plan

Data collection

- MSL and SRV strain gages
- MSL accelerometers
- Moisture carryover

Power ascension limited to 1% per hour

- Hourly (during power increases) strain gage and accelerometers data

2.5% power step

- Review data

5.0% power plateau

- Review data
- Walkdowns of accessible areas
- Report to management and NRC.

Level 1: criteria exceeded, reduce power

Level 2: above 80% of acceptance, reevaluate.

Summary of Margin Recovery and Benchmarking Efforts

CLTP - more than 100% margin on all alternating stress ratios

- 2007 in-plant data confirmed inputted loads were conservative

EPU - SMT predicts positive stress ratios at every location

- SMT rebenchmark removed excess conservatism
- SMT comparison to plant data at CLTP shows SMT loads conservative

Power ascension - will verify adequate margin maintained

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ACRONYMS

ACM	Acoustic Circuit Model
CLTP	Current Licensed Thermal Power 3339 MWt
dP	differential pressure (psid)
EPU	Extended Power Uprate 3840 MWt
FEA	Finite Element Analysis
HC, HCGS	Hope Creek Generating Station
MSL	Main Steam Line
QC2	Quad Cities 2
RPV	Reactor Pressure Vessel
SMT	Scale Model Test
SRV	Safety Relief Valve