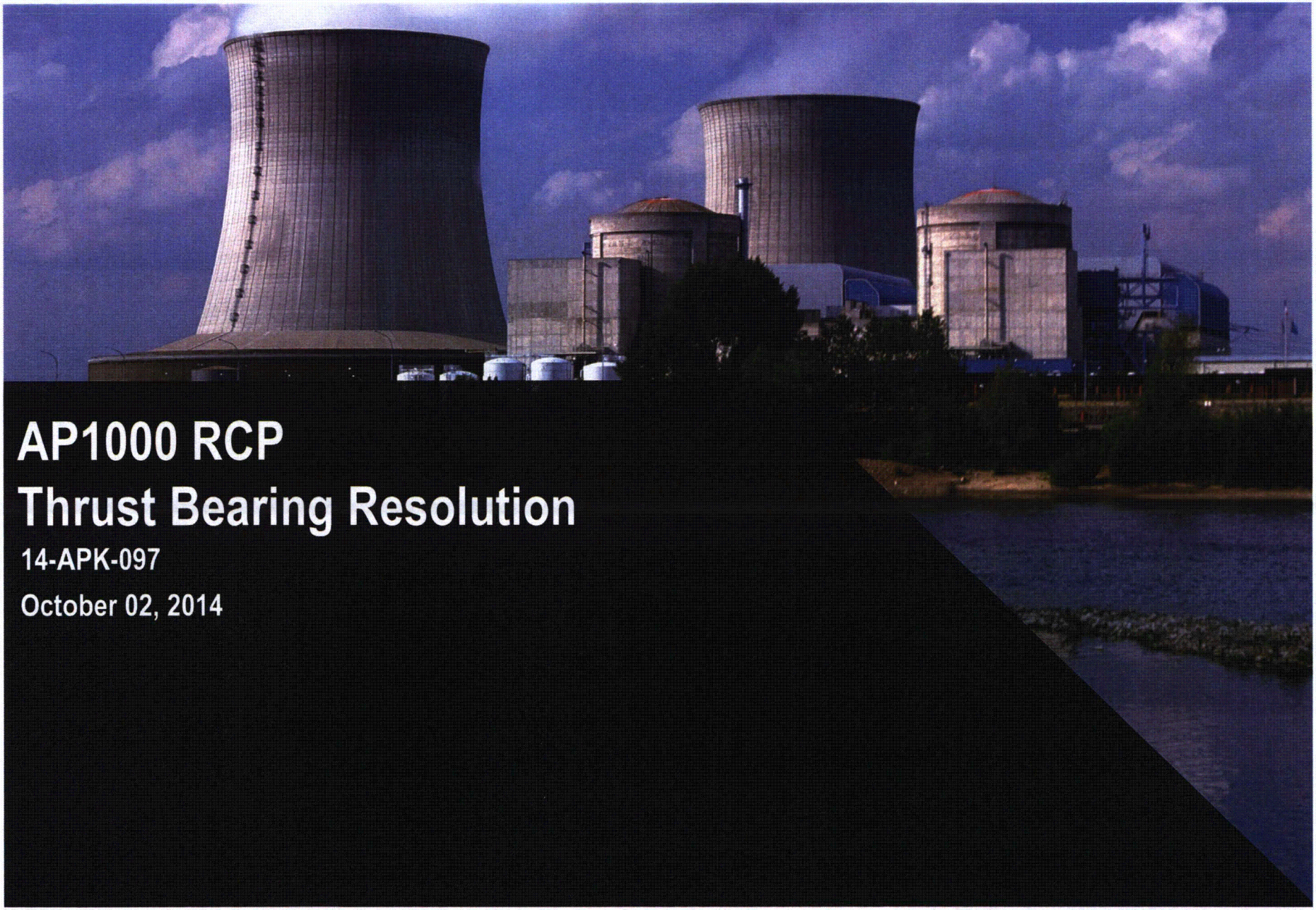
ENCLOSURE 8

14-APK-097

Closed Meeting – EMD AP1000 Reactor Coolant Pump Technical Update – October 29, 2014 (Non-Proprietary)



AP1000 RCP
Thrust Bearing Resolution

14-APK-097

October 02, 2014

CURTISS-WRIGHT

AP1000 RCP Bearing Damage/Thrust Runner Heat Checking

[a,c]

Effects of Condition, LOCW – Surface Damage

a,c

Effects of Condition, Heat Checking – Surface Damage

[a,c]

Cause Analysis Approach (1)

- Cross-functional, multi-agency teams performed causal analysis of LOCW and Heat Checking

[a,c]

- Action plan was developed based on Cause Map

Cause Analysis Approach (2)

a,c

Causal Analyses – Summary of Findings

a,c

Extent of Condition

a,c

Part 21 Evaluation Status

[a,c]

Bearing Performance Prediction Method

Developed as part of the Root Cause Analysis

a,c

Define Thermal Transients

a,c

Thermal Analysis

a,c

Structural and Distortion Analysis

a,c

Hydrodynamic Bearing Film Analysis

a,c

Impact of RCP Changes

a,c

RCP Design Changes

- Incorporation of heat shield to thrust bearing shoe holder

[ ] a,c

- Optimization of upper and lower thrust bearing shoe crowns

[ ] a,c

[ ] a,c

RCP design changes substantially contribute to resolving LOCW and Heat Checking bearing damage issues

Manufacturing Tolerances

[a,c]

Manufacturing Tolerance controls reduce pump-to-pump variability and contribute to resolving LOCW and Heat Checking bearing damage issues

Materials – Seasoning Carbon Graphite

a,c

Validation RCP Configurations/Tests

- Two RCPs were tested to validate acceptability of the modifications

[a,c]

Validation Test Data Review Summary

[ ] a,c

- Long consistent coastdown times indicate healthy predictable bearing behavior during entire coastdown event

[ ] a,c

Post Validation Test Inspection Summary

- No bearing damage as a result of LOCW tests
- No heat checking found on runners
- Thrust shoes meet post test inspection requirements of quality standard

[a,c]

Confirmatory Engineering and Endurance Retest

- AP1000 RCP is being tested[ ]a,c

[ ]a,c

LOCW and Heat Checking Resolution

[a,c]

Robust plan executed for low risk, high confidence path to ensure long term RCP operation