

WCNOC-NRC Pre-submittal Meeting



Modification to Essential Service Water System

August 7, 2013



Meeting Agenda

- Introduction of the team
- State the objectives of the meeting
- Describe the waterhammer phenomena
- Explain how this modification will address the issue
- Describe the approach to the modification



Presentation Objective

Discuss the Wolf Creek Waterhammer
Mitigation Modification



Project Team

- Rich Clemens Vice President – Strategic Projects
- Russell Bowie ESW Project Director
- Tom Sydnor Water Hammer Mitigation PM
- Kamran Derakhshandegan ESW Project Engineer
- Larry Stevens Licensing Engineer
- Rich Kokesh Sargent & Lundy - Project Manager
- Tony Ryan Sargent & Lundy - Lead Engineer
- Donald Graf MPR Associates - Consultant



Description of the Total ESW Initiative

- Buried Piping Replacement Project (BPRP)
- Above Ground Replacement Project (AGRP)
- Waterhammer Mitigation Project
- ESW System Inspection and Repair Program



Description of the Waterhammer Mitigation Modification

- The use of a bypass line around the ESW Pump discharge valve
- The closure of the ESW Pump discharge valve for a fixed time period to force flow through the bypass
- The locking shut of ESW cross-tie valves
- A time-delay relay in-line to ESW Pump discharge valve open signal



Waterhammer Phenomena

- Present design results in a pressure transient (waterhammer) when ESW flow is initiated upon shutdown of the normal Service Water (SW) system



System Operation

1. Initiating event
2. Service water shutdown, system begins to drain down
3. EDG start
4. Sequencer operation
5. Cross-tie valve operation
6. Start ESW pumps
7. ESW flow in bypass mode
8. Main ESW Valves open, full flow of ESW



Effects of this Modification

1. Reduces system column closure effects
2. Reduction in pressure pulse
3. Reduction in piping loads
4. Remains within design specifications



Analytical Methods Used

Computer modeling (vice hand calculation)
using the same calculation methods as
existing plant license

- Hydraulic network evaluation
- Void closure pressure - Joukowsky Equation



Conclusion

- The 50.59 process has concluded that prior NRC approval not required
- WCNOOC intends to implement the proposed modifications to the ESW by completion of mid-cycle outage during spring of 2014.



Schedule for Implementation

- Complete design Oct. 29, 2013
- Receive valves & materials Jan. 6, 2014
- Fabrication of sub-assemblies Jan. 17, 2014
- Start outage Feb. 1, 2014
- Start-up April 2, 2014



Any questions or comments?