Rocky Reach Small Turbine Program

November 4, 2019
What we will cover today...

- Rocky Reach Small Turbine Seal Overview
- C2 Status
- C3 Status
- c1 Progress
- Rocky Reach Small Turbine Program

No Board Action Required Today
History/Overview

We’re in the midst of an aggressive increase in capital expenditures for our aging hydropower system – Aligned with our Strategic priorities of investing in our assets and our people.

- C2 – Currently evaluating trunnion bushing/seal concerns as of 10/11/19. Volume estimated at 83 gallons and to be reported after final review.
- C3 – Evaluated new seal designs since Fall 2018. Currently removed from service but with new seal design installed. In parallel, designing a procedure to temporarily remove oil from hub and satisfactorily test to ensure no excessive oil passes through the blade servo rod piston rings and seals. Reported 208 gallon loss on 6-6-19 and another 105 gallon on 10-11-19.
Potential Path Forward

Short Term:
• New seal designs
• Blade blocking (mechanical or hydraulic) with oil removal from hub (temporary)
• Trunnion bushing replacement - 3 sets of overstock trunnion bushings ordered

Long Term Solution:
• Replace trunnion bushings and seals and refurbish turbine hubs on C2-C7
C1 Line Boring
C1 Trunnion Bushing Replacement
C1 Summary

C1 Next Steps:

• Wicket gate servo motor refurbishment
• Test & dry commission Jan. 2020
• Test & wet commission Feb. 2020
• Return to service Feb. 19, 2020
Summary

Next Steps:
• Test C3 and evaluate results to determine whether or not to return to service
• Develop best blade block option for small units
• Develop long term turbine hub refurbishment schedule for C2 – C7