

# Rocky Reach C-8 Turbine Repairs Final Acceptance

## Commission Presentation

December 17, 2018



CHELAN COUNTY

# C-8 Turbine Repairs

## Presentation Purpose

- Final Acceptance of Unit C-8
- Review Lessons Learned
- View of Project Moving Forward



# Landmarks & Milestones

DESCRIPTION	DATE
Crack discovered in C-10 servo rod	Sept. 20, 2013
Emergency declaration for add'l head gates* and temp blade blocks	Oct. 21, 2013
Blade blocks installed on all 4 units - completed	April 2014

\* Repurpose of concrete head gates used for Powerhouse 2 construction.

# Landmarks & Milestones

DESCRIPTION	DATE
Stator repairs and rewinds	2/15/2015 – 8/17/2017
Start of 1 <sup>st</sup> Unit Outage (C-8)	June 10, 2015
Emergency declaration for bridge crane hoist drum repairs	Feb. 1, 2016
Emergency declaration for new head covers	May 16, 2016

# Landmarks & Milestones

DESCRIPTION	DATE
Headcover misalignment with bottom ring - discovered	Jan. 27, 2017
Headcover line boring with bottom ring – complete	June 14, 2017
Powerhouse bridge crane rehab	8/28/17 – 4/22/2018
C8 Commissioning complete, unit available	Dec. 15, 2017

# C8-C11 Turbine Repair Project Budget

Description	O&M Budget	Status	O&M Cost to Date	Estimate at Completion
<b>C8</b>	\$13 M	Repairs complete	\$11.6 M	\$11.7 M*
<b>C9</b>	\$12 - 13 M	Unit dis-assembled. Work underway in pit. Repairs underway at Voith shop.	\$ 3.7 M	\$10.3 M*
<b>C10</b>	\$12.3-13.3 M	Long lead parts received	\$ 386k	\$12.2 M
<b>C11</b>	\$12.7 - \$13.7 M	Long lead parts ordered	\$ 482K	\$12.5 M
<b>TOTAL</b>	\$50 to 53 M	(Budget from Aug. 17, 2015 presentation)	\$16.17 M	\$46.7 M

\* Includes recovery of LD's for head cover issues.



# Lessons Learned

- Site Safety
  - No incidents of injury or illness
  - Unplanned rotation of C8 improved safety awareness, use of written procedures and pre-task plans.
  - Re-emphasized Stop Work Authority

# Lessons Learned

- Quality of New Head Covers
  - Take verification measurements after parts have been moved from machining tool
  - Take verification measurements while assembled, not when disassembled
  - Pre-purchased from same contractor performing line-boring in the field





# Lessons Learned

- Decision making process
  - Metallurgical analyses proved beneficial in making decisions on existing components as to scrap, repair or leave as-is.

# Moving Forward

- Update on progress of C-9 in January
- Ratification of Field Work Orders for C-9, C-10, C-11.
- Insurance Recovery
  - Payments rec'd for C-10 to date - approx. \$4.35M
  - Payments rec'd for C-8 to date – approx. \$1.33M
  - Confirmation of cracks for C-8, C-9 and C-10.
  - Payments pending for C-8, C-9 and C-10.

# Conclusion

- There were many turning points over the course of the almost five years since C-10 tripped off-line in March 2013
- Many participants and stakeholders assisted the project team with unravelling the unforeseen issues encountered.
- Overcoming these challenges, C-8 was returned to commercial operation safely and with a quality that should see the unit run reliably during its 30 year design life.
- Schedule for future units estimated at 14 months.
- C-9 completion anticipated August 2019.



# C8 Resolution

- Ratification of Field Work Order 1-19 for adjustment to estimated vs. actual shop and site work. Reduction in contract price.
- Acceptance of C-8.

# Questions?

