# CENTER HILL MAJOR HYDROPOWER REHABILITATION UPDATE

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**District Commander**

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*"The views, opinions and findings contained in this report are those of the authors(s) and should not be construed as an official Department of the Army position, policy or decision, unless so designated by other official documentation."*

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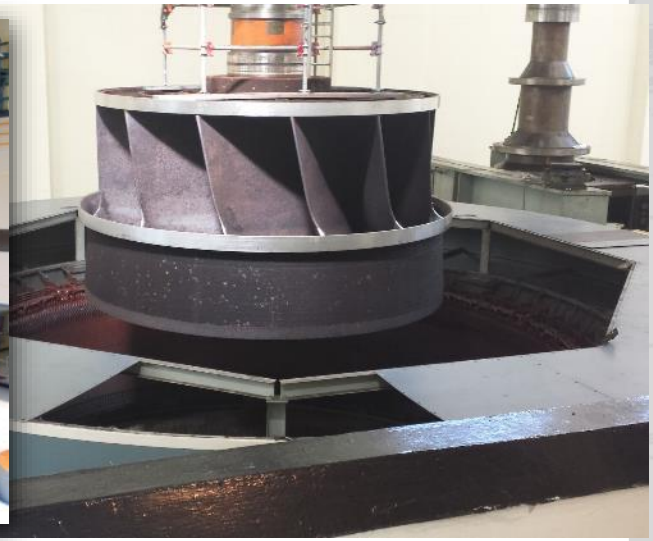
# Center Hill Major Hydropower Rehabilitation

- Complete rehabilitation of 3 generation units
- Funded by Section 212 preference customers
- $47.2M contract awarded to Voith Hydro 25 June 2014
- On budget and scheduled for project completion in 2019

# SITE ACTIVITIES

- **Voith Mobilization – On site for 987 days**
- **Unit #2 completed August 2017**
- **Unit #1 – rewinding stator**



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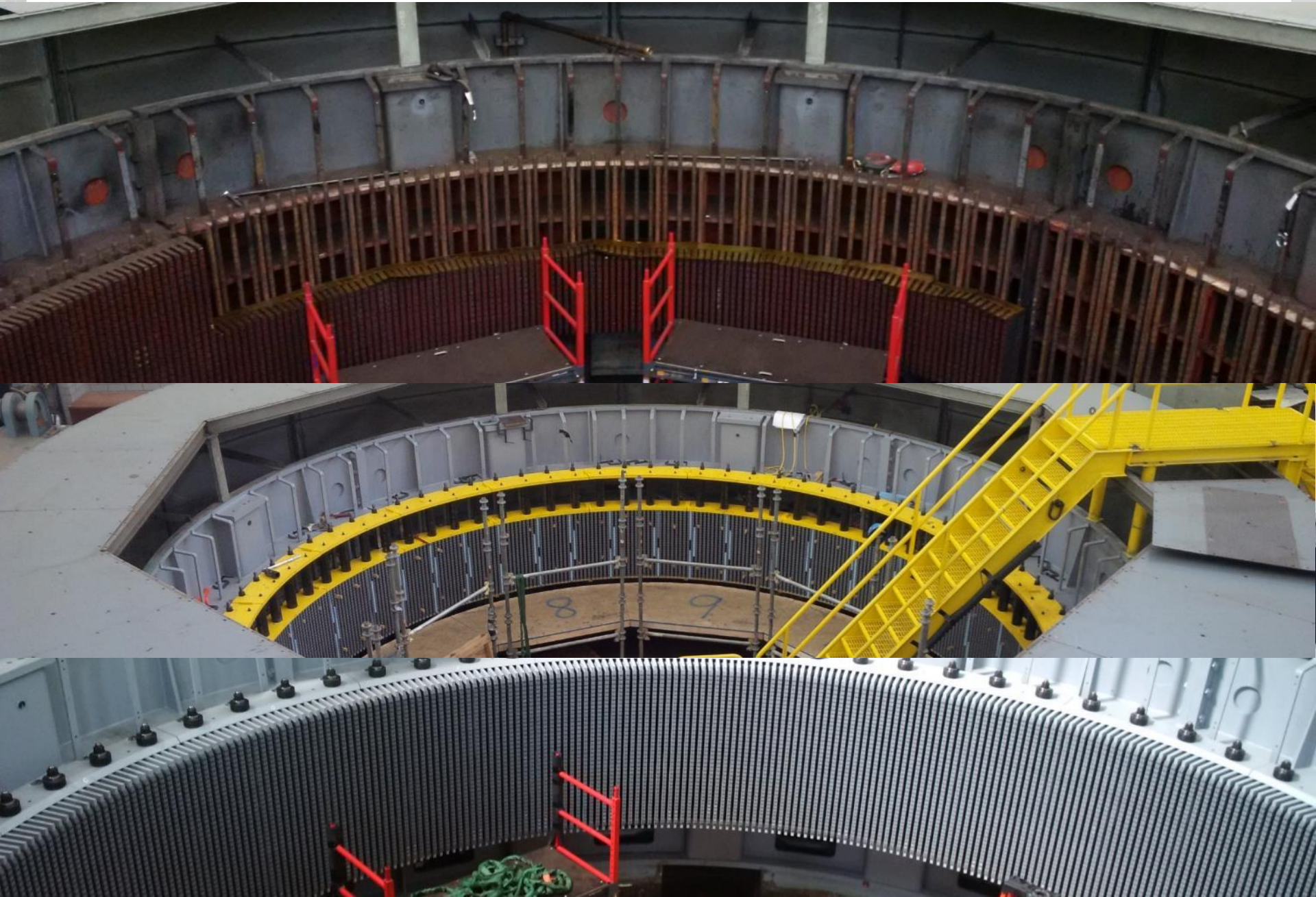
# UNIT #2 STATOR CORE – BEFORE & AFTER



# UNIT #2 STATOR WINDING – BEFORE & AFTER

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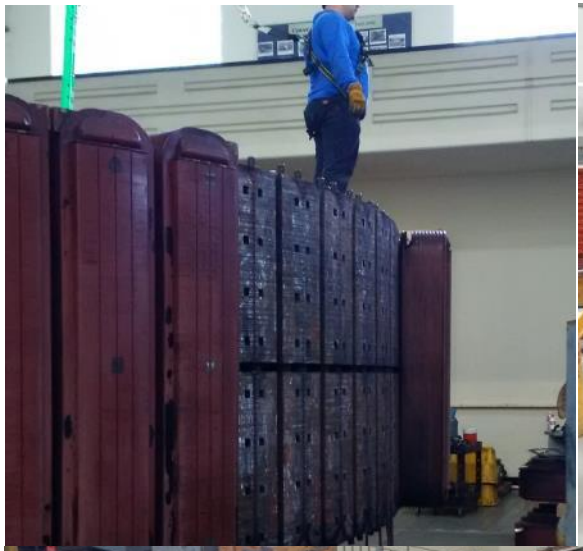
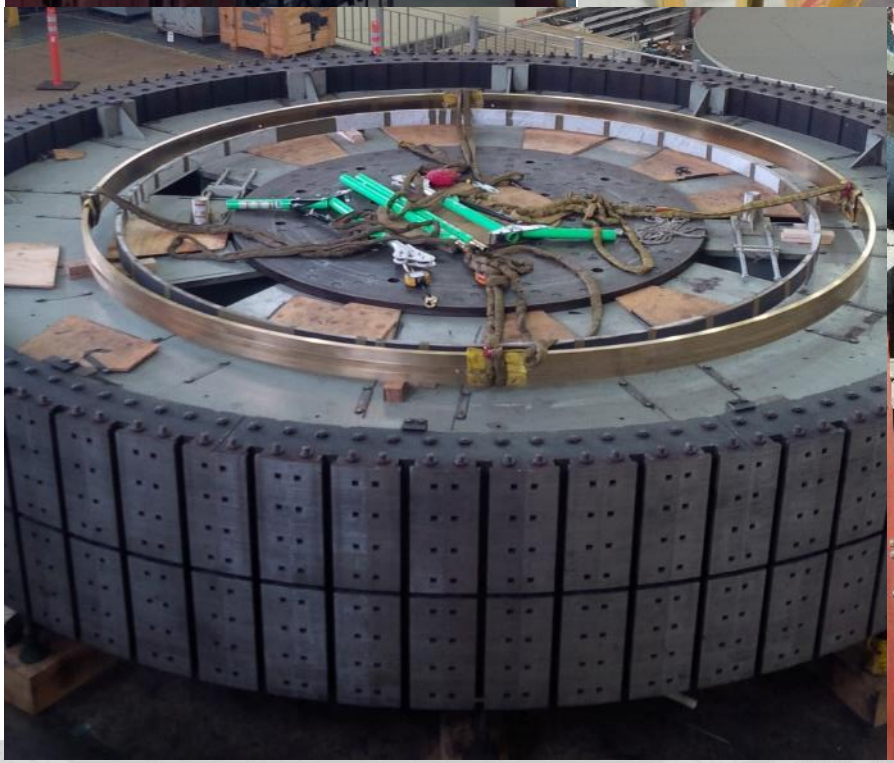
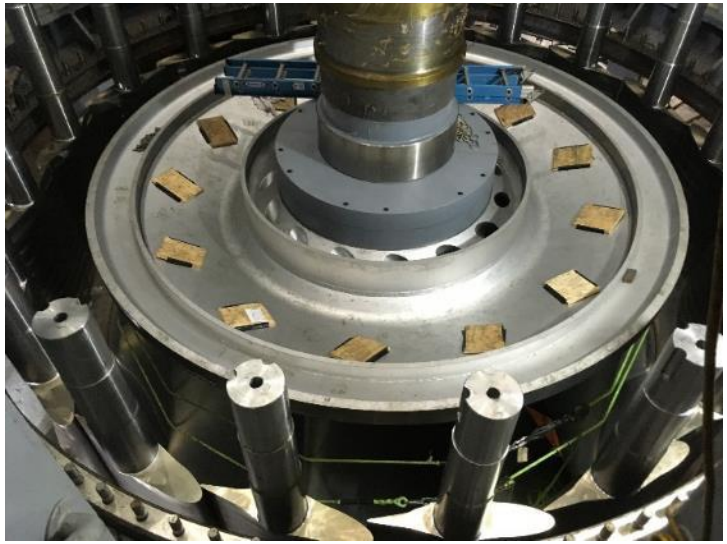
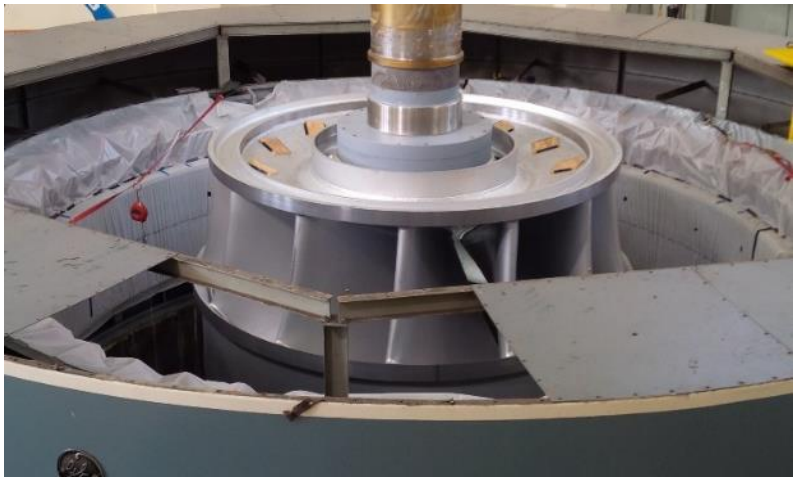
# UNIT #2 ROTOR– BEFORE & AFTER





# UNIT #2 TURBINE RUNNER & WICKET GATES





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# PROJECT SCHEDULE

- **Commissioning Unit #1** **Jul 2018**
- **Commissioning Unit #3** **Jun 2019**
- **Contract Complete** **Aug 2019**

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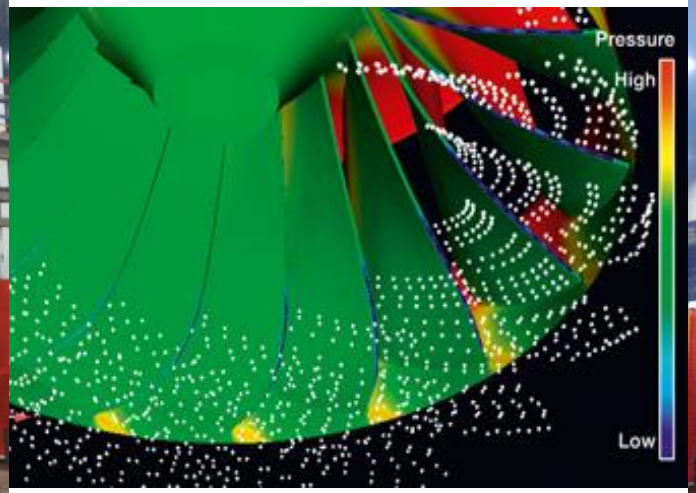
# AUTO-VENTING TURBINE RUNNER




- **State minimum 6 mg/L DO in tailrace**
- **Limited to one unit generation with sluice operations (Jul-Nov)**
- **AVT designed to provide 6 mg/L of DO without sluicing with one unit in operation at tailwater elevation 478’ above msl**

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# DISSOLVED OXYGEN TESTING

- Design tailwater elevation – 478’ above msl
- Observed tailwater elevation – 481.5’ above msl
- Uptake of 2 mg/L seen during SEP 2017 testing
- Design is sensitive to tailwater conditions

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# RECENT ACTIVITY RELATED TO D.O.

- Determination of Responsibility
  - Ongoing
  - Aeration capabilities are directly correlated to setting difference between distributer center line and tailwater level
  - Transposition report to better understand unit performance

- After Action Review
  - Internal and external reviews conducted
  - Evolving technology
  - Recommend field verified data vs. historical drawings and updates to HDC Guide Specs and Turbine Design EM
  - Design Documentation Report

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# MITIGATION SUMMARY

- USACE and Voith met 1-FEB

**Mitigation Options**

- Runner Methods
  - Addition of Blowers
  - Runner Trailing Edge Modifications
  - New Runners
  - New Runners with Trailing Edge Modifications
- Non-Runner Methods
  - Forebay Mixers
  - Oxygen Injectors

**Considerations**

- Improved DO potential
- Efficiency Impacts (aerating and non-aerating modes)
- Cavitation Impacts (aerating and non-aerating modes)
- Investigation costs
- Life-cycle costs
- Implementation Schedule
- Design Life

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# PATH FORWARD

- Engineering analysis of potential runner modifications
- Determine
  - Potential effectiveness
  - Modification cost and schedule
- Compare runner modifications with other forebay measures
- Develop recommendation
  - Modify turbine and test (if applicable)
  - Other mitigation alternatives with new Section 212 authorization or Operations funds, if available
  - Continue capacity limitations and sluice operations during low-DO season
- Monthly updates provided during regular Section 212 Program calls

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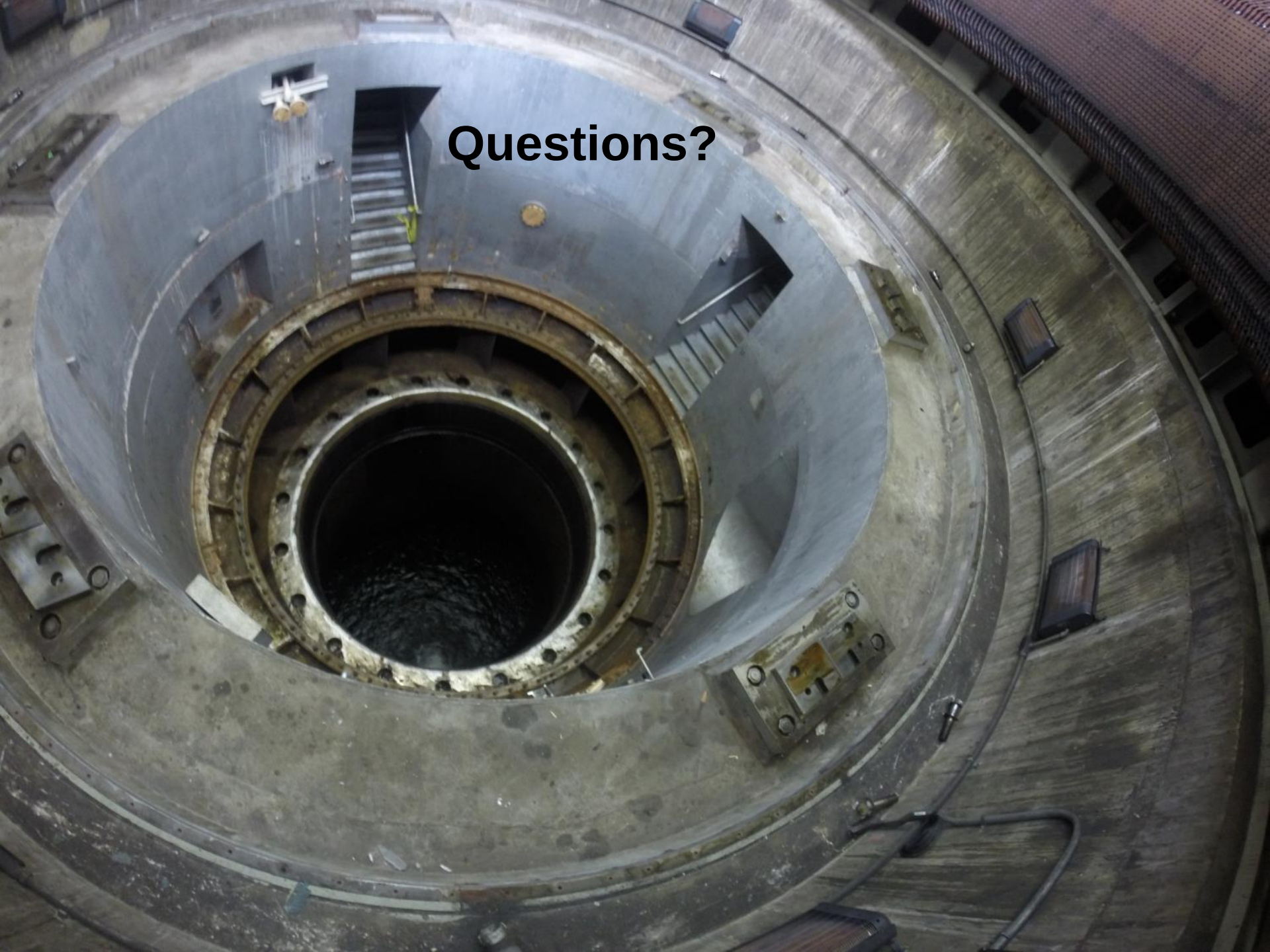
Questions?