Stockton Power Plant
Major Equipment Repair and Replacement

Southwestern Federal Regional Hydropower Conference
Kansas City, MO

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General Plant Information

- Rated 45 MW, Operated @ 50 MW capacity
- Single vertical axis Kaplan unit
- Peaking plant
- Average annual energy production of 55,000,000 KWH
- Plant placed in service in 1973
- Remote operated from Truman Power Plant
- Located on the Sac River near Stockton, MO

ARRA Project Scope

- Failed Blade Section Recovery *(Completed)*
- Hydraulic Steel Structures (HSS) Inspection/Repair *(Completed)*
- In-place Turbine Blade Repair *(Completed)*
- Blade Placement in Draft Tube *(Completed)*
- 13.8 kV GM and Station Service Breakers and Station Service Transformer Replacement (*Physically Completed*)
- AC/DC Preferred Systems Replacement (*Physically Completed*)
- Transformer Pad and Secondary Containment Construction (*Contract Ongoing, nearing completion*)
- Main Power Transformer Replacement *(Contract Ongoing)*
- Generator Rewind and Turbine Runner, Governor, and Exciter Replacement *(Contract Ongoing)*

Project Funding

- ARRA funds were authorized for this project.
- $42.73M in ARRA funds have been programmed for this project.

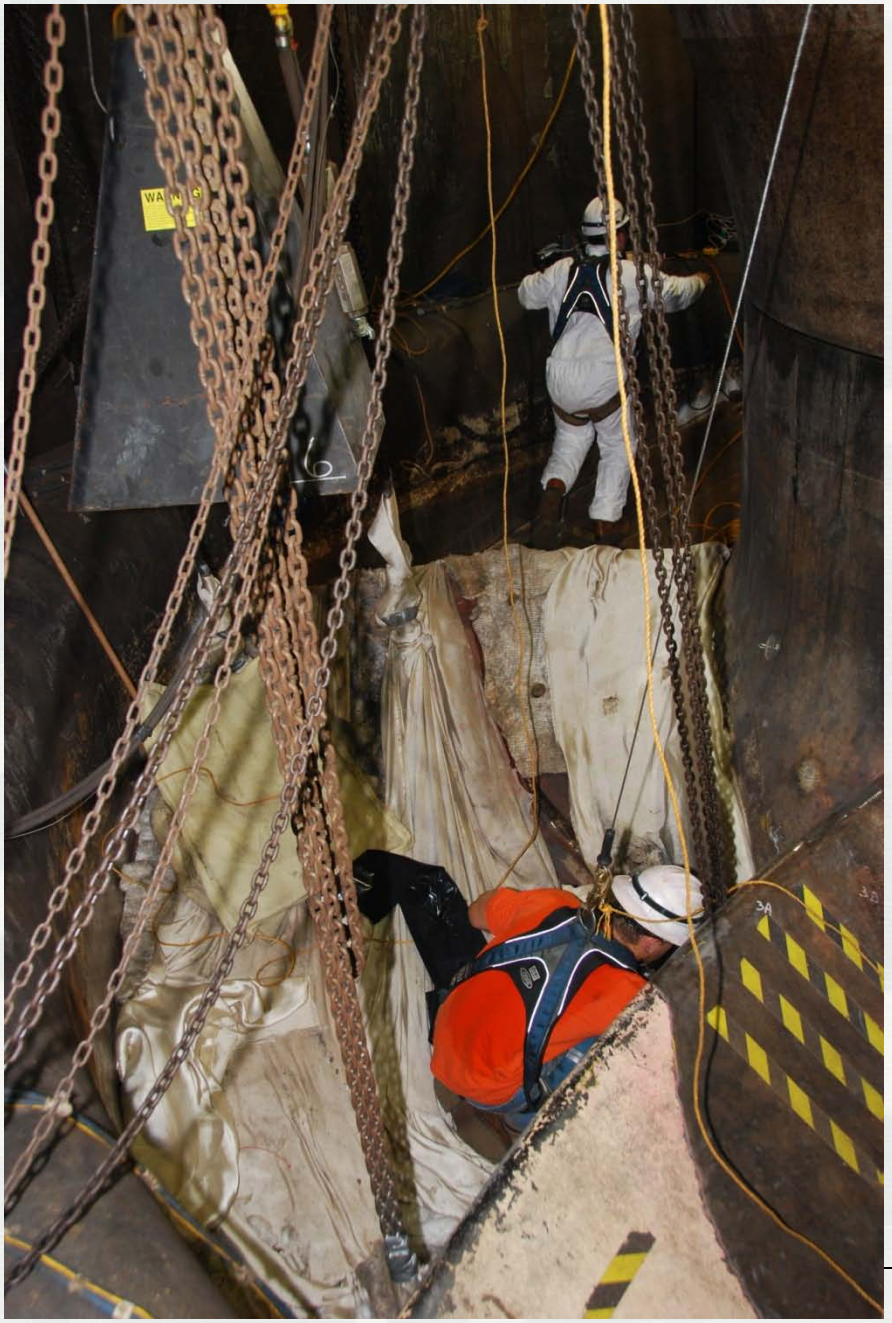
Total ARRA Cost Summary

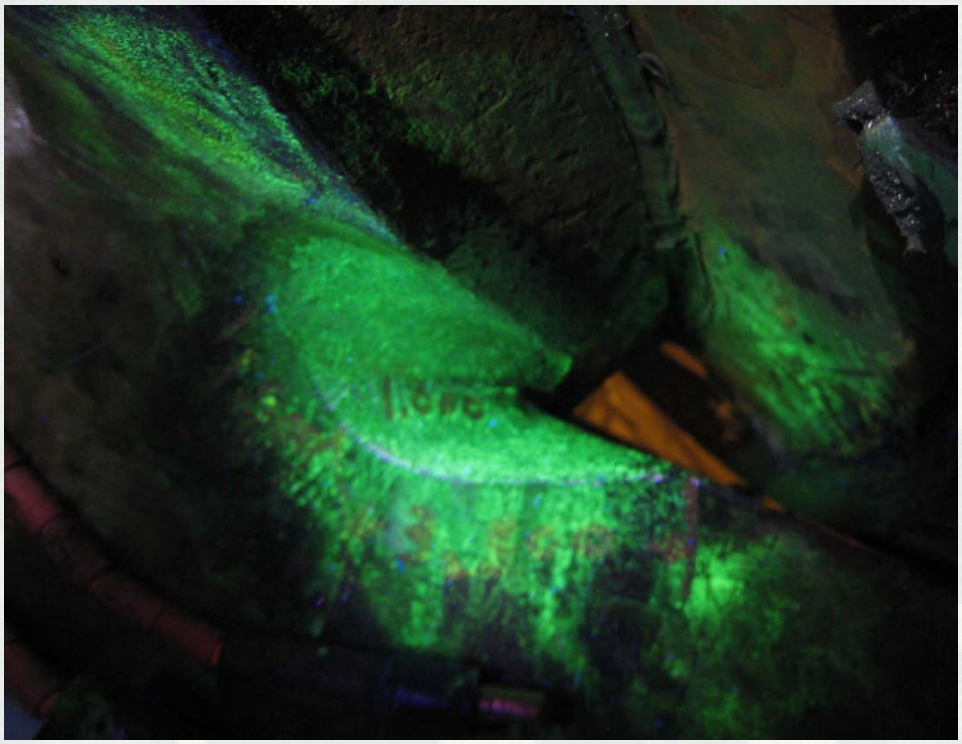
Work Item	Cost
Failed Blade Section Recovery	**$69,487**
Hydraulic Steel Structures (HSS) Inspection/Repair	**$1,156,834**
In-place Turbine Blade Repair	**$1,134,857**
Blade Placement in Draft Tube	**$13,520**
AC/DC Preferred Systems Replacement	**$469,964**
13.8 kV GM and Station Service Breakers and Station Service Transformer Replacement	**$334,850**
Transformer Pad and Secondary Containment Construction	$527,554
Main Power Transformer Replacement	$1,134,560
Generator Rewind and Turbine Runner, Governor, and Exciter Replacement	$31,157,662
EDC, S&A, and Contingency	$5,103,342
Total	$41,102,630

In-Place Blade Repair

- Contract Awarded: 15 May 2010
- Contractor: Peak Hydro
- Contract Completion: 30 August 2010
- Contract Amount: $1,134,857
- Summary
  - Laser alignment technology (first-time use in Corps projects)
  - Weld wire deposited – 600 lbs
  - Thickness of weld ranged from 3 – 10 inches thick
  - Weight of blade – 9,000 lbs
  - Hours worked – 6,400 (2 -12 hour shifts)
  - Unit back in service: 3 Sep 2010

In-Place Blade Repair Photos





- Magnetic Particle Testing on Crack Repairs (Above)
- Rigging, placement, and preheating of the broken blade (Left)

Why Repair the Blade?

- Estimated Lost Power Generation
  - 82,500 MWH (Feb 2009 thru Aug 2010)
  - $7.6 Million in energy benefits

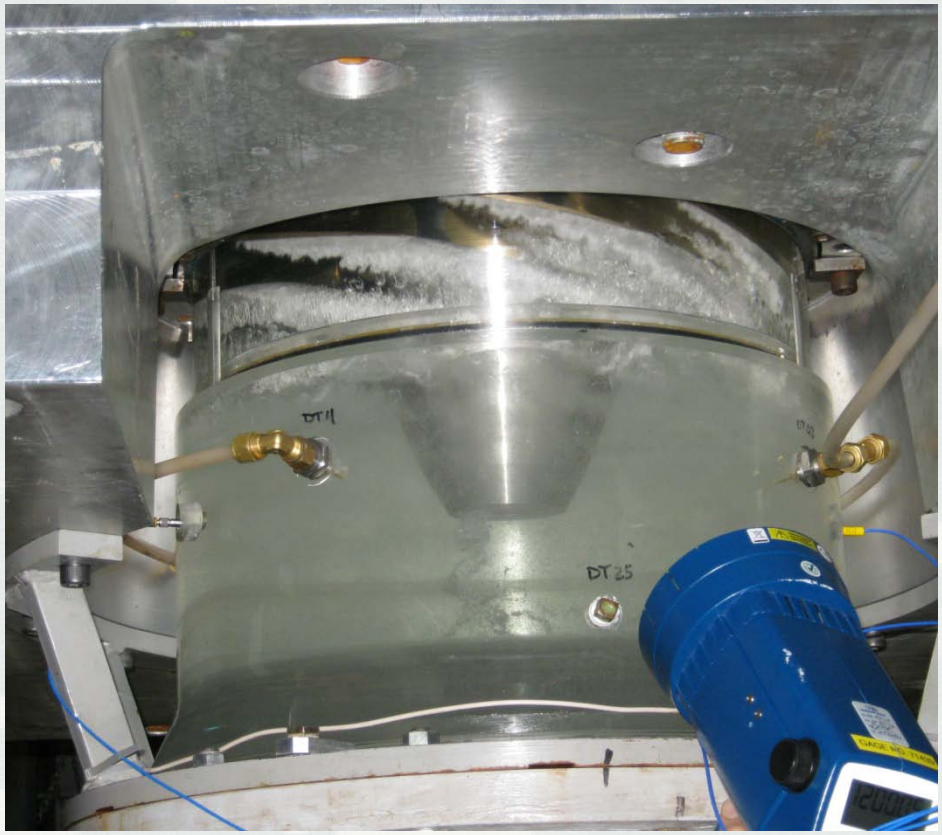
- Since 3 Sept 10 completion of the blade repair
  - Generated 42,191 MWH through 12 June 2011
  - Approximately $4.2 million in energy benefits

Main Power Transformer Replacement

- Contract Awarded: 8 Mar 2010
- Contractor: National Electrical Systems
- Manufacturer: CG Power Systems Canada Inc.
- Contract Amount: $1,134,560
- Schedule
  - Design: Complete
  - Manufacturing: 80% Complete
  - Pre-Vapor Phase Inspection this week at the Plant
  - Factory Acceptance Testing: August 2011
  - Delivery: August/September 2011
  - Field Assembly/Testing: August /September 2011
  - Contract Completion Date: Jan 2012

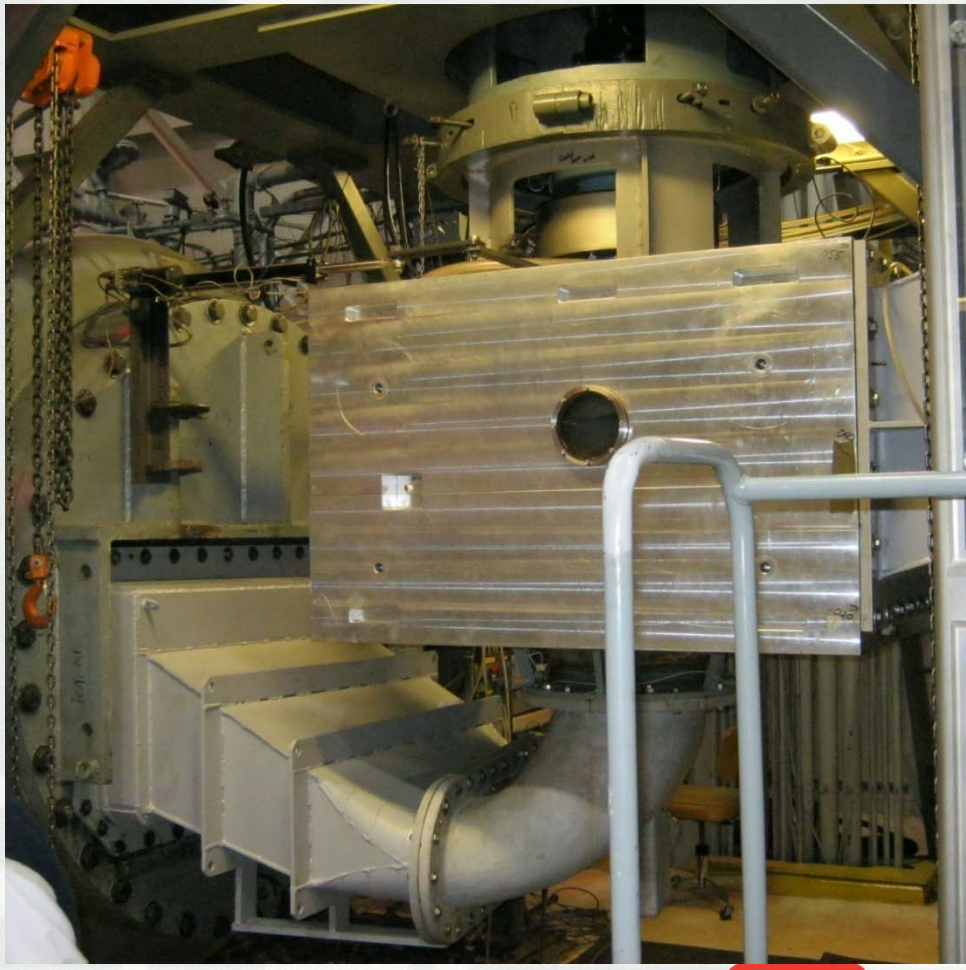
Generator Rewind and Turbine Runner, Governor, and Exciter Replacement

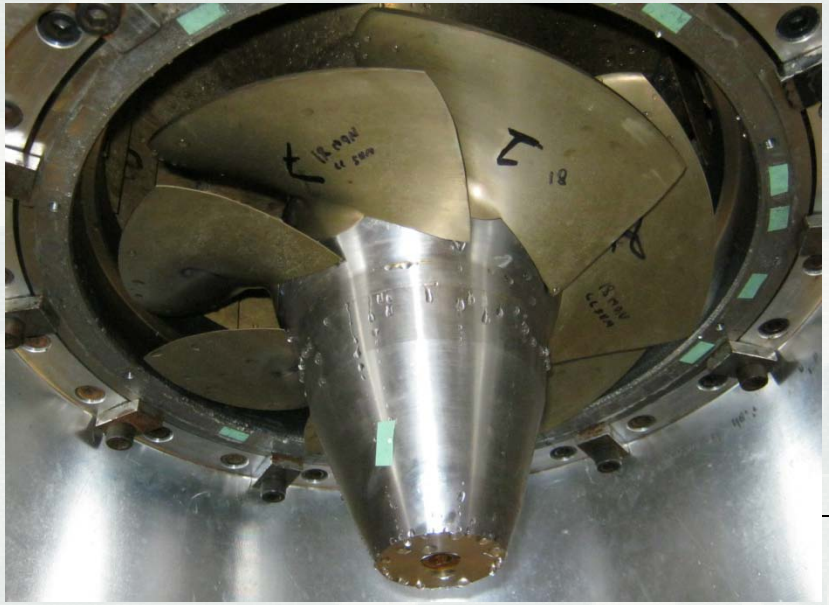
- Contract Awarded: 8 Apr 2010
- Current Contract Amount: $31,157,662
- Contractor: Voith Hydro
- What has been completed:
  - Turbine model test and delivery of the model complete May 2011
  - Prototype coil test completed: Apr 2012
- Challenges
  - Hysteresis (Cause of the rough operation since 1970)
- Modifications
  - Eliminate Turbine Rough Operation (+$338,722)
  - Vibration Monitoring Equipment (RFP)



Generator Rewind and Turbine Runner, Governor, and Exciter Replacement

- Schedule:
  - Prototype coil test completed: Apr 2012
  - Stator winding delivery: Jan 2013
  - **Generator-turbine unit disassembly: Jan – Feb 2013**
  - Unit reassembly: Jun – Dec 2013
  - Commissioning: Dec 13 – Jan 14
  - **Unit placed into service: Feb 14**





AC/DC Preferred Systems Replacement

- Contract Award: 13 Jul 10
- Current Contract Amount: $469,964
- Contractor: Koontz Electric Company, Inc.
- Schedule
  - Design/Manufacture: Aug10 – Feb 11
  - Delivery/Installation: Mar – Apr 11
  - Contract Completion: Jun 11

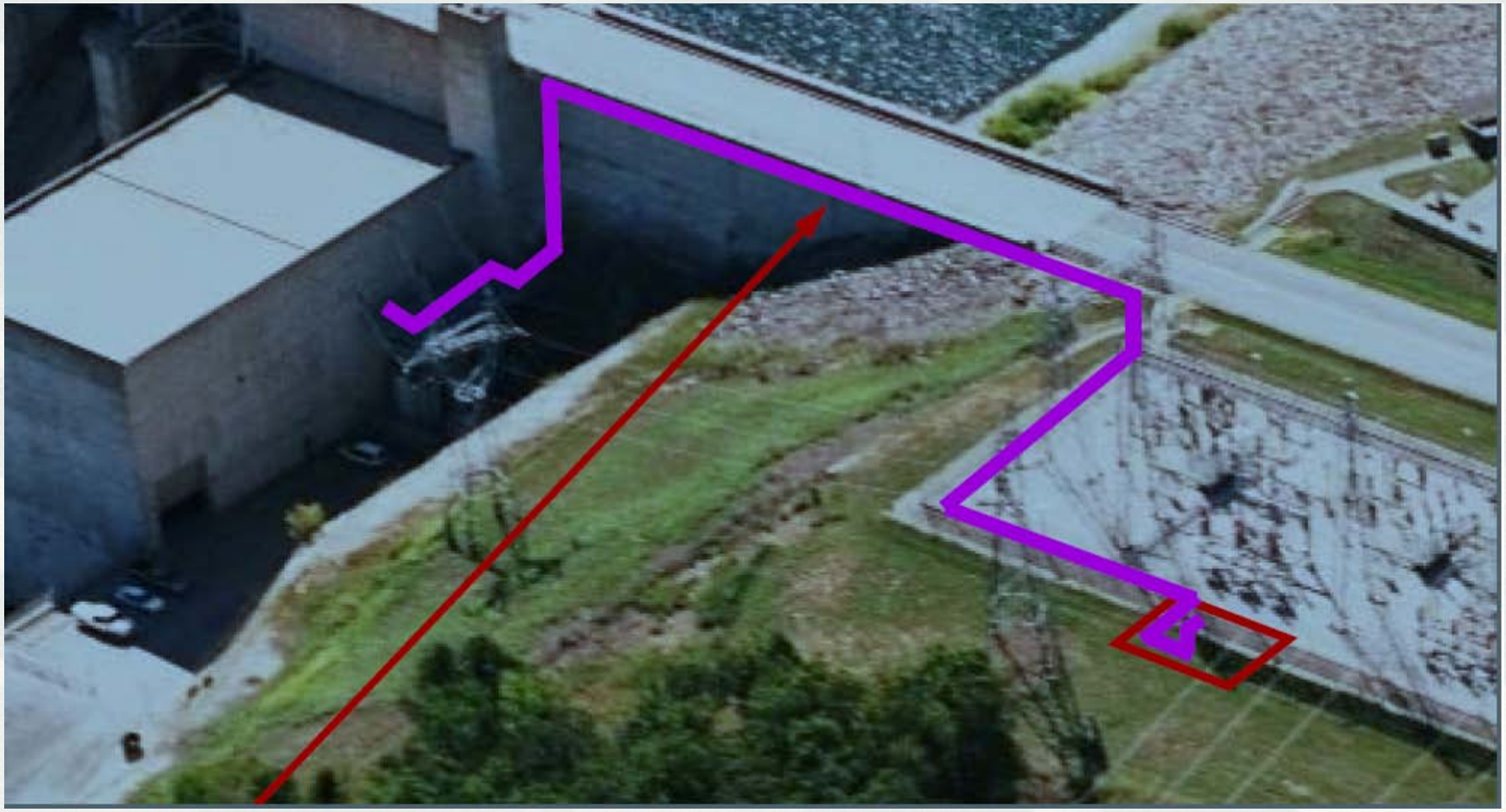
13.8 kV GM and Station Service Breakers and Station Service Transformer Replacement

- Contract Award: 29 Jul 2010
- Current Contract Amount: $334,850
- Contractor: C.E. Power
- Schedule
  - Design/Manufacture: Completed in Mar 2011
  - Delivery/Installation: Completed in May 2011
  - Closeout Documents: Jun 2011
  - Contract Completion: Jul 2011
- The new 3,000 amp breaker has allowed the plant to be operated at full capacity of 50 MW.

Transformer Pad and Secondary Containment Construction

- Contract Award: 3 Sep 2010
- Current Cost: $527,554
- Contractor: Caman/Strickland Construction
- Schedule
  - Design: Complete
  - Construction: 95% Complete should be complete late June 11
  - Contract Complete: Jul 11

Transformer Location



Project Impacts/Issues

- Potential Impact: asbestos abatement and lead paint removal may impact schedule for Feb 2014 unit back in service.
- Change in the ARRA funding regulations in October 2010 rescinds any funds not expended by 30 Sep 2012.

Upcoming Projects/Funding to Support the ARRA

- FY12
  - ►Emergency Generator - $350K (already funded)
  - ►Transformer install $880K
    - (includes Main Unit BUS & Cable)
  - ►Asbestos Abatement $250K

Upcoming Projects/Funding to Support the ARRA

- FY13
  - ►EDC, S&A and Contingency - $1.5M
    - (need by 1 Oct 2012)

Upcoming Projects/Funding to Support the ARRA

- FY14
  - EDC, S&A and Contingency - $500K
  - 480V Distribution System - $1.745M
    - Includes Main & Aux. Control Boards

Questions?

Happy Hour