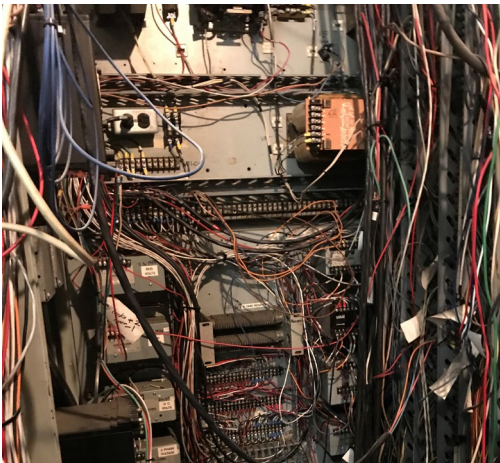


Vintage Equipment Upgrades and Services

The rapid increase in renewables is transforming the way generation assets are dispatched on the grid. Renewables are driving change with new markets, demand curves, and dispatch timing. But, despite renewables popularity, there is still a very real need for flexible and reliable backups to stabilize the grid and ensure uninterrupted supply.

Many operators have vintage assets inside the fence line that can be started quickly but are often not reliable enough to be part of the solution for tomorrow's grid demand curve. The good news is that in many cases, these vintage machines need relatively modest updating to be made reliable and begin contributing to the grid transformation and the operator's revenue.

The following list of upgrades/services is a comprehensive series of typical unit reliability improvement modifications and or upgrades:



Before



After

There are several less common upgrades and modifications that would improve reliability including Partial Control System Modifications (Power Supplies), Replacing Starting System, MCC Upgrade, Synchronous Clutch Upgrade, and Oil Cooling Upgrade. If any of these feels like a solution you are interested in pursuing, please contact one of our engineers.

On-Base Device Upgrade & Rationalization

- Replace/upgrade critical switches, transmitters, and sensors: 26 QT, 63 QT, 96CD (single point of failure).
- Add redundant switches or transmitters to remove a single point of failure or provide backup.
- Upgrade critical sensors: flame detectors, exhaust thermocouples, speed pickups, and Overspeed device.
- Replace pneumatic / hydraulic device with current technology electrical device.

Rewires

- Replace all on-base wiring to JB-1 and JB-2 (GE units)
- "Homerun" to control system
- Run external conduit for extended exhaust thermocouples
- Repair / replace the internal conduit
- Add generator devices

Hydraulic or Pneumatic System Removal / Fuel System Simplification

- Replace Hydraulic/ pneumatic control valves with electric valves
- Replace Hydraulic/ pneumatic trip valves with electric valves
- Replace Hydraulic/ pneumatic IGV actuators with electric actuators

Control System Upgrade (Turbine)

- Upgrade governor
- Upgrade entire system (governor and sequencing)
- Upgrade HMI
- Upgrade Historian

Generator Excitation and Protection System Upgrade

- Upgrade AVR
- Upgrade protection system
- Install new thyristor bridge