2014 Spring CTOTF 7FA Controls and System enhancements

**Turning Gear Reduced RPM Package**

**Fleet identified issue:** GE and users have identified that 7FA gas turbines on turning gear for extended periods have developed wear or damage in the 3rd stage turbine wheel blade root and dovetail due to extensive blade rock at 6 RPM.

Koenig Engineering in a co-development effort with General Electric proposed a 7FA turning gear system add-on modification. This enhancement uses a parallel motor arrangement which allows the Generator/GT shaft speed to be reduced to .1 RPM from 6 RPM during extended “on gear” periods. The driving motive behind this idea is that by slowing down the shaft speed, GT rotor “blade slap/rock” is greatly reduced thereby precluding associated blade root/slot damage. While the concept can certainly be seen to be sound, the mechanical, electrical, control development, and integration issues are costly and complex.

After reviewing all the available information and subsequently assessing alternative strategies to accomplish the same goals TC&E has deployed a more leveraged and simplistic approach using a single Variable Frequency Drive (VFD) and motor combination.

In conjunction with Essential power at the Ocean Peaking and Rock Springs facilities, we have designed and installed 4 of these systems. These systems have been in operation since 2011 and have not been contributed to any forced outages or missed starts.

TC&E also designed and incorporated a custom logic package that includes securing the turning gear, lift oil and hydraulic pumps during extended periods when the unit is not expected to run. This provides a parasitic load reduction which over a period of time would return the cost of the installation.

**7FA Manual Adjust Fine Tuning (MAFT)**

**Fleet Identified Issue:** GE 7FA Gas Turbine Emissions Tuning

The GE 7FA DLN 2.6 combustion system requires periodic DLN “tuning” to maintain sufficient emissions and combustion dynamics. Historically, energy providers have been forced to call on specially trained field engineers to make these “tuning” adjustments at a cost of $5,000.00 to $20,000.00 per event. TC&E has developed custom control screens and/or logic that allow properly trained plant operators make simple adjustments to the PM1 and PM3 gas control valves that in most cases will put the machine back into compliance.
89SS Limit Sw Enhancements

**Fleet Identified Issue:** GE 7FA LCI 89SS issues:

The most reported cause of missed starts on GE 7FA gas turbines are issues with the 89SS switch assembly in the GTE. One of the most common reported issues are with the Pringle model limit sw assembly installed in the GE Canada manufactured GTE’s.

Steve Scarfe of SC Sarfe LLC has developed a modification that address and corrects this fault mode. This has been implemented at 2 sites on 6 machines and has not had a failure since 2007.

VM-HMI Replacement

**Fleet Identified Issue:** Windows HMI failures and upgrades:

GE HMI technology on MKV and MKVI control systems since 1999, were installed with WinNT, Win 2000 or Win XP HMI’s. Many of these HMI’s are still in service today and are 5, 10 or even 15 years old. Most computer manufactures recommend replacing hardware every 5 years when in continuous operation.

Current GE and Microsoft Windows 7/8 Technology are not compatible with previous TCI, Cimplicity or Toolbox versions. To upgrade to new hardware, the customer must also purchase new licenses for TCI, Cimplicity and Toolbox at significant costs.

TC&E has developed and deployed a cost effective new hardware configuration that utilizes technology allowing the continued use of previous versions of TCI, Cimplicity and Toolbox. This new configuration provides the latest security capability to meet tough new NERC standards.

WWW.TCEXG.COM
1-855-TCE-CTRL
ADMIN@TCEXG.COM