TURBINE TIPS
Turbine Tips provided by Pond and Lucier, LLC. ®
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Subject: Taylor Sensaires and Overtemperature Protection
Applies to: General Electric MS5001D-L Gas Turbines (circa 1961-68)

GE gas turbines that still utilize Taylor Sensaires for overtemperature protection should be upgraded. Sensaires are pneumatic devices that do not provide adequate overtemperature protection for the gas turbine. A typical system has two Sensaires with probes installed in the turbine exhaust. There is a high-signal selector on the control air panel at the outputs of the two Sensaires, used to pass on the highest temperature sensed. See Fig. 1 below for a typical Sensaire

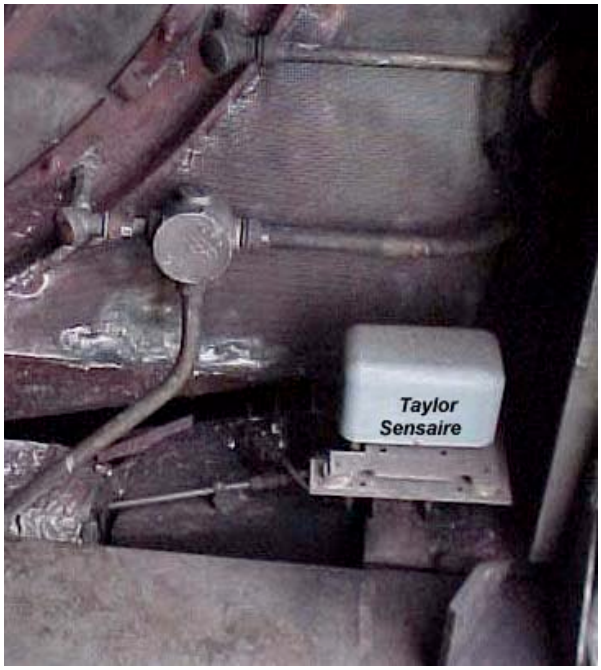

Fig. 1: Taylor Sensaire – Turbine Exhaust

The Sensaires have a typical operating range of 900 to 1000 degrees Fahrenheit for an output air pressure range of 3 to 15 psig. Most systems also have a third Sensaire to measure the compressor inlet temperature. This provides a "biasing" signal to compensate for changes in inlet ambient temperature. See Fig. 2 below. There are two pressure switches for turbine protection. The output of the high selector is connected to pressure switches **26EA** (overtemperature alarm) and **26ET** (overtemperature trip). An ***alarm*** setting might be set at 10 psig; a ***trip*** signal at 12.0 psig on a typical turbine.

Fig. 2: Taylor Sensaire – Compressor Inlet for Ambient Compensation

When the Taylor Sensaires are eliminated, the overtemperature protection can be integrated with the temperature control. In Fig. 3 below, the thermocouple averaging cabinet can be eliminated.

Fig. 3: Thermocouple Averaging Cabinet

Once the cabinet is eliminated, the twelve exhaust thermocouples are connected to signal conditioners (shown with orange connectors in Fig. 4 below) on the back of the programmable logic controller (PLC) called the **OCS-200**. The **OCS-200** processes the twelve signals for both exhaust temperature control and overtemperature ***alarm*** and ***trip***.

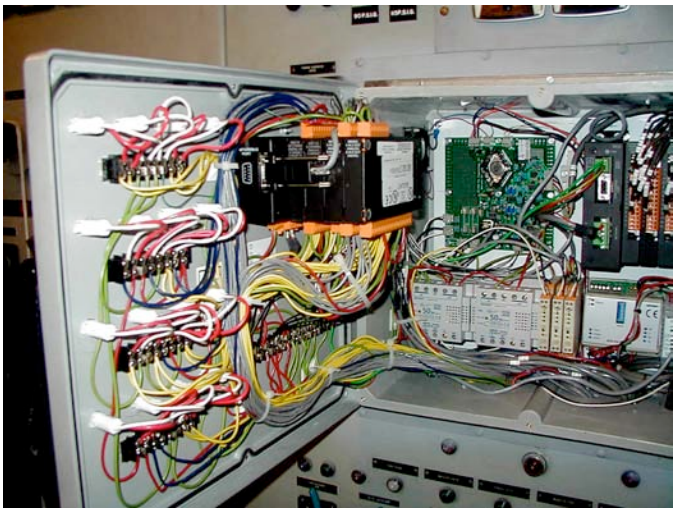
Fig. 4: Thermocouple Cards (orange connectors) stacked behind OCS-200 PLC

In Fig. 5 below, the screen displays turbine exhaust temperature as an average of twelve thermocouples. This signal serves to control and protect the gas turbine against a high exhaust temperature condition. Such features as automatic thermocouple rejection (for electrical grounds or short circuits) are also part of the signal conditioning scheme.

Fig. 5: PAL5000™ Protection System showing Exhaust Temperature, Txa

For further information about the installation of a **PAL5000™** to replace the Taylor Sensaire system, contact Dave Lucier of ***Pond and Lucier, LLC*** by calling: 518-330-4801.