HRSG Anomaly Detection
HRSG Remote Monitoring & Diagnostics Service

Improve reliability and availability and reduce O&M costs and the risk of forced outages

As the global fleet of HRSGs is aging and shifting towards a more cyclic operating regime, the risk of forced and unplanned outages due to failure of critical components such as tubes, valves and attemperators is increasing. In order to mitigate this risk and avoid costly periods of HRSG unreliability, operators benefit from support to understand the condition of their assets so they can continue running profitably. HRSG operational process anomalies have the potential to develop in to major failures leading to forced outages, thus negatively affecting the reliability and availability of combined cycle plants and increased unplanned maintenance costs.

HRSG Anomaly Detection is a remote monitoring service (Monitoring & Diagnostics) that can be offered to HRSG users It collects real-time data to detect small process anomalies during operation which triggers an investigation into the root cause by GE SMEs (subject matter experts). The output of this process is an early warning indication to the user via their chosen method of communication (eg. GE's site representative, email via GE M&D specialist or/and Operational Assessment Report). Users of HRSG Anomaly Detection will also have the capability to view M&D cases and pull historical data for their own units via the GE MyFleet Portal https://myfleet.gepower.com/

GE's M&D Center, located in Atlanta, USA provides 24/7 technical support and remote monitoring of over 2500 Gas Turbine, Steam Turbine and HRSG assets using advanced analytics configured for site specific conditions. With support from regional and global engineering expertise, analytic alarms are reviewed and actionable recommendations are provided to users (Figure 2).

Figure 1: M&D Center Atlanta

Benefits

Short-term operational optimization Data-driven pro-active maintenance enables opex planning and reduces total O&M cost.

By monitoring changes in operation between major HRSG inspections, users can adapt the scope of repair work for the next planned shutdown.

Medium/Long-term risk mitigation Increase reliability by reducing risk of failures.

Early detection of process anomalies during operation help prevent forced and extended unplanned outages.
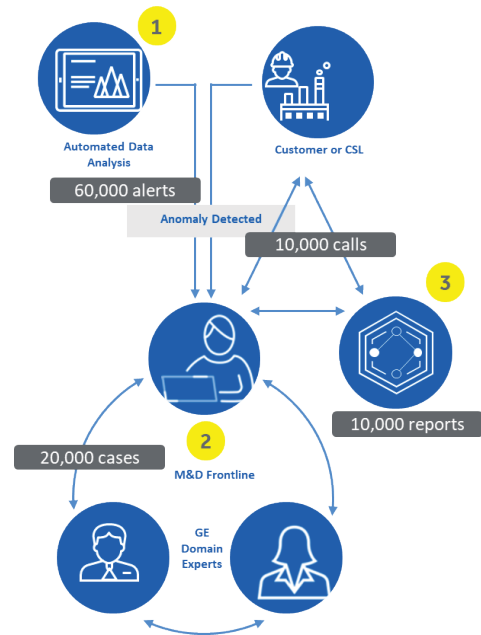

Automated Data Analysis
60,000 alerts
Anomaly Detected
Customer or CSL
10,000 calls
10,000 reports
20,000 cases
M&D Frontline
GE Domain Experts

Figure 2: HRSG Anomaly Detection Process

Fleet Applicability and Cycle

The HRSG Anomaly Detection solution is available on any HRSG in a GE combined cycle plant. Users with an existing GE gas turbine or steam turbine Monitoring and Diagnostics Service will benefit from the existing hardware on site. The typical installation cycle is 6 months.

Product Scope

Hardware and Instrumentation:
HRSG Anomaly Detection uses standard DCS instrumentation to detect process anomalies.

After Sales Support Services:
Users will receive an early warning indication to the customer via their chosen method of communication (GE's site representative, email via GE M&D specialist or/and Operational Assessment Report). Users of HRSG Anomaly Detection will also have the capability to view M&D cases and pull historical data for their own units via the GE MyFleet Portal https://myfleet.gepower.com/

Analytic Coverage

Analytic coverage supports HRSG users to prevent their top pain points

Feedwater, Attemperator and Bypass control

HP, IP and LP feedwater valves
Monitors feedwater flow coefficient falling outside normal operating bounds. Flow coefficient vs. valve position curves are developed for each feedwater control valve to support detection of valve wear or blockage.

HRH and HP attemperator valves
Monitors attemperator control valve position vs demand. Calculates attemperator mass flow to determine if feedwater is leaking past attemperator control valve. Identifies attemperator valve issues that can lead to overspray and/or ability to control final steam temperature.

LP HRH and HP bypass valves
Monitors bypass valve downstream temperatures to determine potential valve leakages.

User Value: Supports planning inspections and/or replacement of control valves parts (plugs, seats, cages) during next outage

HP, IP and LP Pressure Section performance loss and early leak detection

Efficiency, mass flow, and steam temperature
Monitors deviation between gas and steam side efficiency, mass flow, and actual outlet steam temperature vs. model based on operating conditions. Detects pressure section efficiency decrease, mass flow imbalance and/or high steam outlet temperatures.

User Value: Supports identifcation of HRSG performance loss and is an early indicator for flow meter issues, drains failure and/or early signs of tube leakages

Water Chemistry
Monitors HP, IP and LP water chemistry - pH, conductivity, silica, sodium, phosphate, dissolved O2 content. Detects readings outside of GE recommended ranges or established range for the plant.

User Value: Supports prevention of corrosion (FAC), affecting lifetime and integrity of pressure parts (typically in HP, IP, LP Economiser and LP Evaporator) and steam quality issues for components downstream of the HRSG.

Hot Gas Path issues

GT back pressure
Monitors GT exhaust pressure and/or HRSG Inlet pressure vs. expected back pressure. Identifies decreased efficiency and performance, potentially caused by HRSG gas side fouling

User Value: Supports HRSG cleaning planning

Duct burner operation
Monitors duct burner inlet/outlet temperatures and gas flow. Identifies supplemental duct burners problems leading to uneven heat distribution downstream of duct burners

User Value: Supports prevention of deformation of tubes downstream of duct burners.

SCR and CO Catalyst
Monitors differential pressure across SCR and CO Catalyst. Identifies pressure differential, potentially caused by fouling and/or degradation of CO Catalyst and SCR

User Value: Supports inspection planning of Hot Gas Path

HRSG Stack
Monitors HRSG Stack Temperature. Identifies decreased temperature potentially caused by fouling or blockage in gas path

User Value: Supports inspection planning of Hot Gas Path

Drum Level trips
Monitors drum level deviation between redundant logic transmitters. Identifies sensor issues which can lead to a plant trip

User Value: Supports planning instrumentation testing and replacement