



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 Vernova's 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 Vernova's site representative, email via GE Vernova's 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 GE Vernova's MyFleet Portal <https://myfleet.gepower.com/>



Figure 1: M&D Center Atlanta

GE Vernova'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).

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.

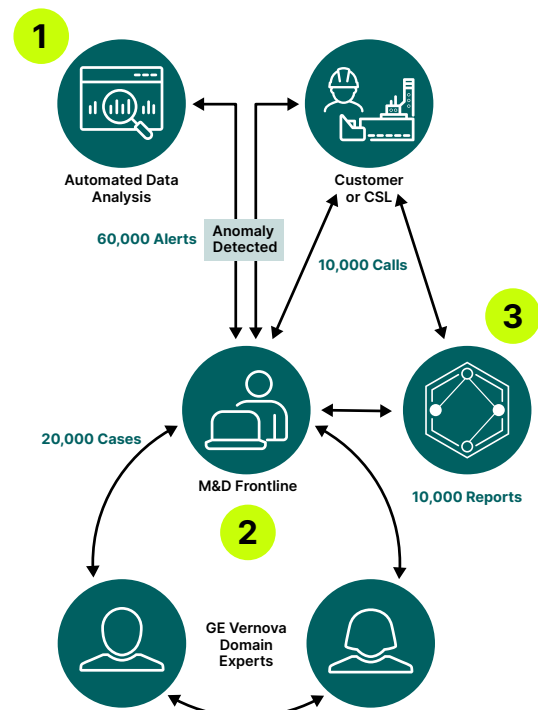


Figure 2: HRSG anomaly detection process

Fleet Applicability and Cycle

The HRSG Anomaly Detection solution is available on any HRSG in a GE Vernova combined cycle plant. Users with an existing GE Vernova gas turbine or steam turbine Monitoring and Diagnostics Service will benefit from leveraging 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 Market Support Services

Users will receive an early warning indication to the customer via their chosen method of communication (GE Vernova's site representative, email via GE Vernova's 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 GE Vernova's 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

To learn more about this offering, contact your GE Vernova representative or visit governova.com/gas-power

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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 identification 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 Vernova 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.

