

BHC3 Reliability

Take Early Action to Identify and Prevent Anomalies

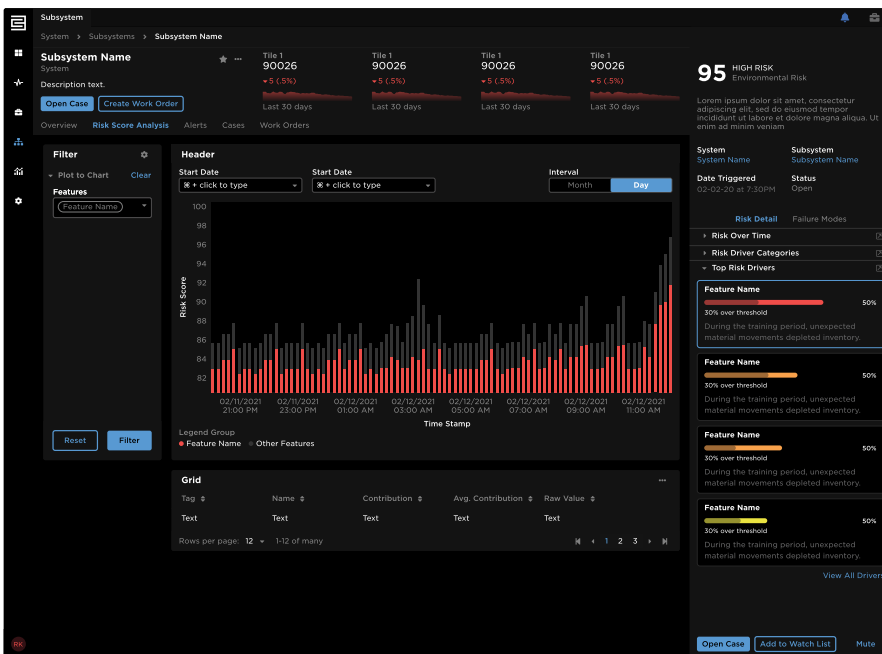
BHC3™ Reliability is an AI application that provides reliability engineers, process engineers and maintenance managers with AI-enabled insights to address process and equipment performance risks. The application identifies anomalies across systems, provides prioritized alerts to operators, recommends prescriptive actions, and enables collaboration across the enterprise. The application delivers value through increased revenue from recovered production, reduced costs of unplanned downtime, extended equipment life, and improved safety in operations.

BHC3 Reliability uses unsupervised and supervised machine learning algorithms to identify issues that can lead to equipment downtime and process upsets. The application leverages a rich failure mode library and failure mode analyses to help reliability engineers diagnose and resolve failure risks quickly.

BHC3 Reliability leverages the BHC3 AI Suite to integrate enterprise-scale data from disparate sources such as individual sensors, operational systems, and enterprise-data historians into a unified data image. The application builds on the unified data image with predefined asset templates and ingested P&ID diagrams to create a foundational BHC3 Reliability asset hierarchy data model that leverages a system-of-systems approach to construct a digital representation of actual asset hierarchies and operational dependencies.

Feature Summary

- **System-of-systems AI approach** - Leverage AI to identify equipment and process issues that impact system-level health and operational performance. Understand how individual tags across independent systems are related to overall system health.
- **Unsupervised anomaly detection** - Utilize cutting-edge deep learning and machine learning technology to identify anomalies in process, equipment and sensor performance and to estimate time-to-failure or remaining useful life.
- **Root cause identification** - Provide failure mode recommendations to guide reliability engineers to enable faster, more consistent, and traceable root cause investigations.
- **Continuous learning** - Continuously learn and improve AI models based on new data and user feedback. Increase the accuracy of failure mode recommendations and anomaly detection alerts over time.
- **Asset templates** – Leverage pre-defined templates to rapidly construct a digital representation of your facility’s asset hierarchy and calculate KPIs & KOPs.
- **Diagram Parsing** - Generate machine-readable asset hierarchies and sensor-to-tag mappings. Users can ingest and parse P&ID diagrams using machine vision, NLP and graph search to detect tags, tag names and connections to equipment.
- **Prioritized alerting and case management** - Focus operations on prioritized, actionable alerts and reduce the number of unnecessary alerts through AI-enabled detection and categorization of equipment and process risks.
- **Visualization across process equipment** - View and traverse unified process data at the aggregate system or facility level or drill down to understand individual equipment performance.
- **Seamless integration with existing tools** - Create work orders and launch investigation cases directly from the application. Integrate with existing systems to enable a seamless digital reliability program.



BHC3 Reliability provides a comprehensive set of visualization, diagnostic, and collaboration tools to investigate and act against equipment and process-related risks.



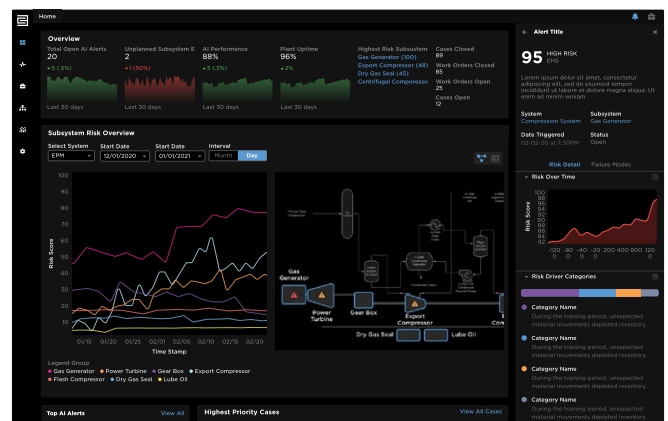
BHC3 Reliability is a foundational application in the Open AI Energy Initiative (OAI), the first open ecosystem of AI-based solutions for the energy industry, and is interoperable with current and future OAI solutions from other members of the OAI such as Shell. Shell has made available several add-on OAI modules for BHC3 Reliability that provide specialized functionality in areas such as Control Valves, Rotating Equipment, and Subsea ESPs. Find out more at <https://bakerhughesc3.ai/products/bhc3-oai/reliability-solutions/>.

Anticipate Equipment and Process Risks, Investigate Issues, Prioritize Actions, and Enable Closed-Loop Feedback

- **Respond to risks and anomalies** in process flow and equipment performance, along with failure process upset scenarios.
- **Investigate and take action** using AI-recommended failure mode assessments for each identified risk. Conduct RCAs and failure mode effects analysis with all relevant data.
- **Assess system and subsystem health** trends over varying time intervals across configurable risk indicators.
- **Collaborate across the enterprise** with case management tools, including data investigations, messaging, user tagging, file upload, and external messaging (e.g., email or text).
- **Aggregate process data** to view all relevant data for interdependent process equipment. Understand how tags from independent systems correlate to distinct process steps.
- **Track, benchmark, and rank performance** of regions, facilities, systems, and equipment based on configurable health and reliability metrics.
- **Optimize operations and capital** expenditures by proactively planning reliability improvement projects and minimizing unplanned downtime.
- **Scale swiftly across the enterprise** to large fleets and multiple types of assets using pre-defined the asset templates and diagram parsing capabilities.
- **Codify and Leverage Subject Matter Expert knowledge** through proven and customizable domain-specific libraries (e.g., failure mode & thermodynamics), KPIs, and KOPs.
- **Enable end-to-end Model Ops** to automate model tracking, review inference statistics, identify model drift and monitor feature relevance over time.

BHC3 Reliability Delivers Value Across Entire Value Chain

- **Reduce unplanned downtime** by proactively addressing process and equipment reliability issues. Arm operators with prescriptive actions to change operating conditions and reduce upset risks.
- **Improve recovered production** due to early identification, prioritization, and resolution of equipment and process risks.
- **Extend equipment life** by improving operating conditions and turnaround decisions with data-driven history and risk predictions.
- **Improve safety** with reduced high-risk emergency repairs.



BHC3 Reliability is designed to help oil and gas operators anticipate, prioritize, and take action to address equipment risks and process upset conditions.

Proven Results in 8-12 Weeks

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