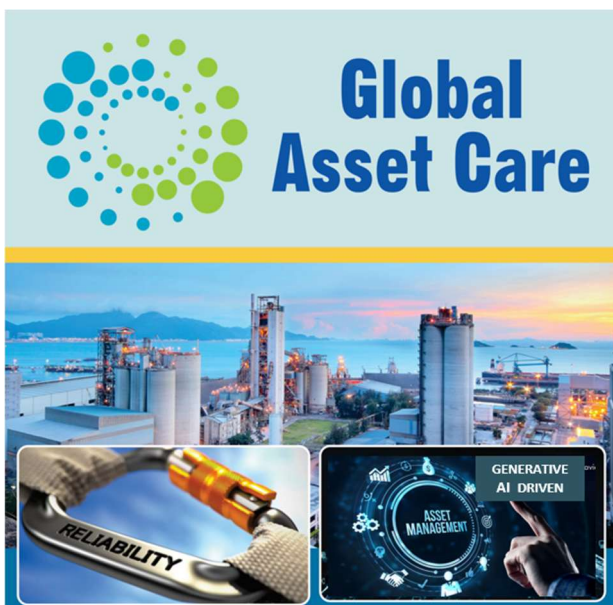


Breakthrough in APM Deployment: Generative AI Successfully Generates Asset Strategies



We are excited to announce that Global Asset Care has successfully validated a groundbreaking proof of concept: using Generative AI to automatically generate detailed Asset Strategies in seconds, a process that traditionally takes skilled engineers' days or weeks. This marks an exciting milestone—but it's only the beginning of a much longer journey.

The APM Adoption Challenge

The path to a successful, large-scale Asset Performance Management (APM) deployment is often hindered by the need for dedicated resources, deep expertise, and a long wait for a return on investment. Many organizations, lured by promises of quick wins, become disillusioned and abandon the process, leading to a costly cycle of switching platforms or abandoning their APM vision entirely.

While adoption challenges are multifaceted, longer deployment time is one critical one.

A Critical Accelerator: The AI Interface

A key solution to this challenge is to drastically reduce deployment time. To the best of our knowledge, no existing APM platform currently offers a native, generative AI capability that allows users to create asset strategies through a simple natural language interface—a "ChatGPT or DeepSeek for APM."

Our Proof-of-Concept

Global Asset Care has taken the lead in testing this capability. We used our ISO 14224-based failure library, along with fictional Root Cause Analysis (RCA) reports and failure history logs. We then



provided two different operating contexts to a public natural language AI platform and requested it to generate actionable maintenance recommendations, including:

- **Operator Rounds:** Specific checks, frequencies, and standards.
- **Planned Maintenance (PM):** Time-based restoration and replacement tasks.
- **Condition-Based Maintenance (CBM):** Monitoring techniques and thresholds.
- **Predictive Maintenance (PdM):** Advanced diagnostics and forecasting.
- **General Improvement Opportunities.**

The Results: Impressive Accuracy and Insight

The AI platform exceeded expectations. Within seconds, it produced comprehensive risk mitigation recommendations (asset strategy actions) for both operating scenarios and an additional report comparing the differences between the two. Typically, this process would require skilled engineers several days—or even weeks—of manual effort using APM tools, ERP data, and document searches to generate asset strategy for one asset.

We carefully reviewed the AI-generated outputs to verify accuracy and effectiveness, and the results were both surprising and exciting. Key observations include:

- **Focused Analysis:** While our failure library contained an extensive list of potential risks (based on ISO 14224 and experience), the AI selectively focused on the most probable failure modes using the provided ERP history, RCA data, and public information.
- **Actionable Insights:** It identified specific reliability and process improvements directly from the RCA reports.
- **Context-Aware:** It produced a concise summary highlighting how recommendations changed between the two operating contexts.
- **Technical Comprehension:** It correctly interpreted technical details from sketches within the reports, recommending actions specific to components like Mechanical Seal Plan 53B.

Conclusion and Next Steps

Our test confirms that a natural language AI interface can generate precise and accurate asset strategies almost instantaneously. This has the potential to reduce large-scale APM deployment times from years to mere weeks or months.

However, we are not yet at the finish line. Achieving this vision requires a collaborative effort:

1. **APM Software Developers** must work with Generative AI Developers to integrate these generative AI capabilities directly into their platforms.
2. **Operators** must provide secure access to ERP and Operational Technology (OT) historical data.



3. **Reliability Subject Matter Experts (SMEs)** are essential to validate, refine, and certify the AI's recommendations before widespread use.

This successful test marks the beginning of an exciting journey. We have proven the concept; now, the work begins to make it a practical, trusted tool for the industry.

Attachments:

- **Appendix A:** Chat log between a GAC SME and the AI platform.
- **Appendix B:** Snapshot of the AI-generated output file.



APPENDIX- A

Conversation log between GAC professional & Natural Language Interface /AI virtual agent

=====

Please develop asset strategies for the below High-Pressure Boiler Feedwater pumps. The final deliverable should provide specific, actionable recommendations for each element of the maintenance program, including:

- **Operator Rounds:** What to check, how often, and what standards to use.
- **Planned Maintenance (PM):** Time-based restoration and replacement tasks.
- **Condition-Based Maintenance (CBM):** Techniques and thresholds for monitoring asset health.
- **Predictive Maintenance (PdM):** Advanced diagnostics and forecasting to enable just-in-time intervention.
- **Improvement opportunities** if any.

Details are as follows

1. Asset Overview & Criticality

We have three identical, highly critical assets:

- **Asset Type:** Centrifugal Between Bearings Type 3 (BB3) Pumps
- **Service:** High-Pressure Boiler Feed Water
- **Asset IDs:** 1023G100A, 1023G100B, and 1023G100C
- **Criticality Rating: High** (Direct impact on production capacity and plant availability).

2. Operating Context & Performance Target

- **Availability Target:** 95% for the boiler feed water system.
- **Operating Scenario:** To meet production targets, the system requires **2 out of 3 pumps running at full capacity**, with one pump as a standby unit.
- **Business Impact:** The failure of a second pump, while one is already down, would result in a significant production shortfall.

3. Objective: Develop a Comprehensive Asset Strategy

The objective is to build a robust, risk-based asset management strategy for pumps A, B, and C that ensures the required 95% availability.

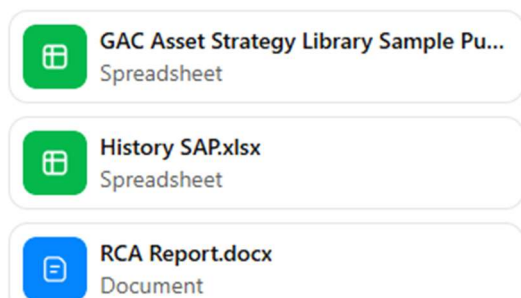


The strategy will address all credible failure modes and define specific maintenance tasks to mitigate them.

4. Inputs for Strategy Development

The analysis will be based on the following sources:

1. **Global Asset Care Failure Mode Library:** To ensure a standardized , best-practice approach (ISO 14224).
2. **SAP Failure History Extract:** To perform a data-driven review of historical failures and maintenance costs for these specific assets.
3. **Existing RCA Reports:** To understand the root causes of any previous significant failures and ensure the strategy addresses them.



Chat-AI platform agent said:

Excellent — you’ve provided everything needed for a full **risk-based asset strategy** for the three BB3 Boiler Feed Pumps (1023G100A/B/C).

Here’s how I’ll proceed next:

1. **Integrate all three data sources:**
 - The **GAC Library Sample Pump.xlsx** (best-practice failure modes, ISO 14224 format).
 - The **SAP History.xlsx** (real-world failure frequency, downtime, cost).
 - The **RCA Report.docx** (root causes and systemic issues).
2. **Develop a structured, actionable strategy** covering:
 - **Failure Mode–Effect analysis (FMEA)** summary
 - **Maintenance tactics:** Operator Rounds, PM, CBM, PdM
 - **Risk & mitigation mapping** to availability target ($\geq 95\%$)
 - **Recommended improvements** (design, monitoring, procedural)



Before I generate the final output, please confirm one detail:

Would you like the deliverable in **tabular Excel format** (ready for upload into SAP/Maximo) or as a **narrative report (Word/PDF)** summarizing the strategy, with tables embedded?

Once you confirm the preferred format, I'll create the complete asset strategy for the BB3 pumps using your data and RCA findings.

You said:

yes, excel format

Chat-AI platform agent said:

Perfect — I'll build the final deliverable as an **Excel-based Asset Strategy Workbook** for the three BB3 Boiler Feed Pumps (1023G100A/B/C).

Here's what it will contain (4 worksheets):

1. **Asset Summary & Criticality** – overview of duty, redundancy, and performance targets.
2. **Failure Modes & Effects (FMEA)** – consolidated from GAC library, SAP history, and RCA findings (e.g., seal failure, bearing failure, casing crack, etc.).
3. **Maintenance Strategy Matrix** – clear mapping of each failure mode to mitigation task type:
 - Operator Rounds (checks, frequency, criteria)
 - Time-Based PM (interval, task details)
 - Condition-Based / Predictive Maintenance (monitoring techniques, thresholds).
4. **Improvement Actions & Recommendations** – systemic and design-level actions (e.g., install temperature alarm on barrier fluid return, enforce PM deferral control).

Before I generate the file, please confirm:

✓ Do you want me to include **cost/impact scoring** (likelihood × consequence × risk priority) in the FMEA sheet?

✓ Should I include **standard task intervals** from ISO 14224 / Global Asset Care library (e.g., quarterly, annual) or keep them blank for your review?

You said:

yes

Chat- AI platform agent said:

Excellent — confirmed ✓ to include:

- **Cost/impact (risk priority scoring)** in the FMEA sheet, and
- **Standard task intervals** from the Global Asset Care (ISO 14224) library.

I'll now create an **Excel workbook** with these four structured tabs:



1. **Asset Summary & Criticality**
2. **Failure Modes & Effects (FMEA)**
3. **Maintenance Strategy Matrix (Operator / PM / CBM / PdM)**
4. **Improvement Actions & Recommendations**

All information will be integrated from:

- The GAC Library sample (best practices),
- SAP History (failure frequency / downtime / cost), and
- RCA Report (seal cooling system failure, PM deferral process gaps, etc.).

Would you like the file name to be:

“BB3 Boiler Feed Pump Asset Strategy.xlsx”,

or do you prefer a specific project or site tag (e.g., *CRC BB3 Strategy 2025.xlsx*)?

You said:

is okay

Chat AI platform agent said:

The complete Excel-based asset strategy for your BB3 Boiler Feed Pumps has been generated. You can download it here:

 [Download BB3_Boiler_Feed_Pump_Asset_Strategy.xlsx](#)

It includes:

- **Sheet 1:** Asset Summary & Criticality
- **Sheet 2:** Failure Modes & Effects (FMEA) with risk scoring
- **Sheet 3:** Maintenance Strategy Matrix (Operator, PM, CBM, PdM)
- **Sheet 4:** Improvement Actions & Recommendations

Would you like me to add a fifth sheet for **performance KPIs and tracking template** (e.g., MTBF, availability, PM compliance, cost per pump)?

=====

Second Scenario

You said:

keeping everything, same only change is operating context Operating Scenario 2: To meet production targets, the system requires 3 out of 3 pumps running at full capacity, with no standby unit. Develop asset strategy again for operating context scenario 2

Chat AI platform agent said:



Here's your updated asset strategy for the **3-of-3 operating scenario (no standby pump)**:

 Download BB3_Boiler_Feed_Pump_Asset_Strategy_Scenario2.xlsx

This version updates:

- **Criticality** → “Very High” (no redundancy).
- **FMEA** → Increased risk priority due to higher operational exposure.
- **Maintenance Strategy** → Added strict “no-deferral” and rapid-response notes.
- **Improvement Actions** → Added “Zero PM Deferral Policy” under the new operating condition.

Would you like me to generate a **comparison summary table** highlighting the key differences between Scenario 1 (2-of-3) and Scenario 2 (3-of-3)?

You said:

Yes

Chat AI platform agent said:

Here's a clear comparison of the **recommended actions** between **Scenario 1 (2 of 3 pumps running, 1 standby)** and **Scenario 2 (3 of 3 pumps running, no standby)** — focused on what changed in your asset strategy recommendations:

◆ 1. Overall Maintenance Governance

Aspect	Scenario 1	Scenario 2	Key Difference
PM Deferral Policy	Allowed with risk review (improvement action introduced)	Zero-deferral policy – no PM delay permitted	Much stricter; PM cannot be postponed under any circumstance.
PM Scheduling	Standard intervals (quarterly, semi-annual, annual)	Same intervals but with mandatory completion	Emphasis shifted from planning to enforcement.

◆ 2. Criticality & Risk Level

Aspect	Scenario 1	Scenario 2	Key Difference
Criticality Rating	High	Very High	Any single failure = production loss.



Aspect	Scenario 1	Scenario 2	Key Difference
FMEA Likelihood/Consequence	Moderate-to-high (L 3–4, C 3–5)	Increased by 1 level for most modes (L 4–5, C 4–5)	All risks elevated due to no redundancy.
Risk Priority (L×C)	6 – 20	16 – 25	Higher overall RPN drives tighter controls.

◆ 3. Monitoring and Alarms

Aspect	Scenario 1	Scenario 2	Key Difference
Seal System Monitoring	Add barrier fluid temperature alarm	Maintain alarm + continuous trending and strict alarm response	From installation focus → operational vigilance.
Predictive Tools	Thermography, vibration analysis, oil analysis	Same tools, but require online/real-time monitoring	Shift from periodic to continuous condition tracking.

◆ 4. Procedural Controls

Aspect	Scenario 1	Scenario 2	Key Difference
PM Deferral Approval	Required Plant Mgr + Reliability Mgr sign-off	No deferral allowed	Process upgraded to zero-tolerance.
Alarm Management	Install new sensors/alarms	Immediate actions on installing sensors and maintenance action required on any alarm	Preventive → proactive/reactive control.

◆ 5. Design & Engineering Improvements

Aspect	Both Scenarios	Difference
Upgrade raw-water cooling to closed-loop treated system	✓ Same	No change; remains a top design priority.

◆ 6. Training & Culture



Aspect	Scenario 1	Scenario 2	Key Difference
Training	General awareness of seal system criticality	Re-training emphasizing zero-deferral and alarm response discipline	Adds behavioral expectations tied to uptime risk.

◆ 7. New Action in Scenario 2

New Action	Description	Priority	Department
Policy Update	"Implement zero-deferral policy for all critical BB3 pump PM tasks under 3-of-3 operation."	High / Immediate	Maintenance & Reliability

✓ Summary

- **Scenario 1** → Balanced, risk-based approach allowing managed PM deferrals.
- **Scenario 2** → **No-tolerance reliability regime**: zero PM deferrals, immediate alarm response, mandatory completion of all tasks, continuous monitoring emphasis.
- The additional **Policy Update** is the key differentiator ensuring system reliability when no standby pump is available.

Would you like me to format this comparison table as a one-page summary sheet in Excel or Word for inclusion with your asset strategy files?

Chat platform can make mistakes. Please verify.



APPENDIX- B

Snapshot of output files

Asset Summary & Criticality

Asset ID	Asset Type	Service	Criticality Rating	Availability Target (%)	Operating Requirement	Failure Impact
1023G100A	Centrifugal Pump (BB3)	High-Pressure Boiler Feed Water	Very High	95	3 of 3 required for full production (no standby)	Any single pump failure results in immediate production loss
1023G100B	Centrifugal Pump (BB3)	High-Pressure Boiler Feed Water	Very High	95	3 of 3 required for full production (no standby)	Any single pump failure results in immediate production loss
1023G100C	Centrifugal Pump (BB3)	High-Pressure Boiler Feed Water	Very High	95	3 of 3 required for full production (no standby)	Any single pump failure results in immediate production loss

FMEA

Failure Mode	Functional Effect	Possible Causes	Likelihood (1-5)	Consequence (1-5)	Risk Priority (LxC)	Related RCA/History Notes
Mechanical seal failure	Leakage, pump trip, forced outage	Dry running, cooling loss, barrier fluid overheating	5	5	25	RCA: catastrophic seal failure due to fouled HX (Plan 53B)
Bearing wear or seizure	Noise, vibration, loss of efficiency	Lubrication degradation, contamination, misalignment	4	5	20	Common SAP failure: bearing overheating
Casing crack/leak	Leakage, pressure loss	Thermal stress, corrosion, fatigue	3	4	12	Rare; no major history

Maintenance Strategy Matrix

Planned Maintenance (PM)	Condition-Based Maintenance (CBM)	Predictive Maintenance (PdM)	Standard Interval	Notes (Scenario 2)
Quarterly clean Plan 53B HX; annual seal replacement	Seal leak rate, barrier fluid pressure and temperature trend	Infrared thermography, seal wear model prediction	Quarterly	No redundancy – strict adherence to PM schedule, immediate action on any alarm
Quarterly bearing inspection; 6-month oil change	Vibration and temperature trending for bearings	Bearing vibration FFT analysis	Quarterly	No redundancy – strict adherence to PM schedule, immediate action on any alarm
Annual pressure and NDT inspection of casing	Pressure deviation and vibration monitoring	Acoustic emission analysis (if applicable)	Annual	No redundancy – strict adherence to PM schedule, immediate action on any alarm

Improvement Actions

Action Type	Description	Priority	Target Completion	Responsible Department
Design Improvement	Upgrade cooling system to closed-loop treated water circuit	High	6-12 months	Engineering
Procedural Control	Revise PM deferral process with mandatory risk assessment and approval	High	3 months	Maintenance
Monitoring Upgrade	Install temperature gauge and high-temp alarm on Plan 53B return	High	1 month	Instrumentation/Controls
Training	Conduct training on seal and barrier fluid system criticality	Medium	7 months	Operations & Reliability

