CAPABILITY PAPER 03 / UPSTREAM OIL AND GAS

Recognize the pattern. Act before the trip.

Turn resolved operating problems into live pattern watches and evidence-backed corrective actions.

An upstream operator runs a central production facility where separator-level instability can disrupt gas compression. An earlier event has already been investigated: cycling level, inconsistent liquid discharge and rising compressor suction-scrubber level preceded a shutdown.

The value of that incident extends beyond its repair record. The team labels the outcome and saves the episode as a pattern rule. Valak watches for the developing combination of signals during live operation. When the pattern returns, the agent connects the new event with the earlier resolution and prepares a focused response.

THE VALAK APPROACH
Plant experience becomes an active watch across every shift.

Powered inside the operation

A fleet of AI agents works across live signals, operating history and plant context. Valak’s specialized models run on-premises, keeping the intelligence close to the operation with no external AI API fees.

Inside this paper: operating context, agent workflow, a sample deliverable and a worked value model.

UPSTREAM OIL AND GAS / OPERATING CONTEXT

Start with the operating question

Does this developing behavior resemble a known failure, and what action should the team prepare now?

Operating scope	Connected context
Critical assets	Production separator V-120, liquid discharge control valve LV-120, suction scrubber V-220 and compressor C-220.
Pattern inputs	Level behavior, valve command/feedback, discharge flow, scrubber level and compressor operating state.
Stored experience	The resolved episode, outcome label, inspection finding, corrective work and associated downtime.

Connect the systems already in use

Use the existing automation and historian connections as the live-data foundation. Add equipment relationships and relevant operational records so each agent can relate a change in one asset to the process around it. Read-only connections leave the control system in charge of the process.

Give every finding an operating context

Equipment identity, units, timestamps and operating state travel with the evidence. Comparable running conditions matter: an intentional rate change, a startup and a steady production run tell different stories. The agent follows the asset in its process context, while the team receives the evidence needed to act.

UPSTREAM OIL AND GAS / WORKFLOW

A coordinated fleet of agents

The episode agent preserves the original event and its connected context. A team member labels the outcome and activates its pattern rule. The live-watch agent compares incoming behavior with the saved pattern. On a match, an action agent drafts the response, attaching the earlier incident, current evidence and estimated cost of inaction.

Stage	From incident memory to operational action
Resolve	Investigate a separator instability event and record the inspection finding and corrective work.
Label	Assign the failure or degraded-operation outcome to the pattern group.
Arm	Save the known pattern as a rule for continuous watch.
Recognize	Identify a live recurrence across the separator, discharge path and compressor suction system.
Prepare	Draft a corrective action with the matching evidence, previous resolution and economic priority.
Verify	Track the original symptoms after intervention and add the new outcome to the pattern history.

Specialized models, continuous responsibility

The models power the reasoning and tool use; the agents carry the workflow across the event. They retrieve data, connect context, maintain the case and prepare the next useful output. On-premises execution supports continuous coverage without external AI API charges.

UPSTREAM OIL AND GAS / DELIVERABLE

What the team receives

PATTERN-WATCH ACTION / SEPARATOR INSTABILITY

Live behavior is matching the saved separator-instability pattern associated with the earlier compressor interruption. Review LV-120 response and the liquid discharge path. Compare current observations with the attached prior episode before choosing the intervention.

Action field	What the team receives
Pattern identity	The active rule, prior outcome and linked incident group.
Current match	The aligned level, valve-response and downstream scrubber trends.
Corrective-action draft	A focused inspection request with asset identity, suggested checks and the previous resolution.
Priority	Affected production, available response window and the configured cost of a repeat interruption.
Recovery watch	Whether cycling settles, discharge behavior improves and downstream level stabilizes.

The case stays with the work

The rule makes a specific piece of operating experience available on every shift. It follows the combination of behaviors that mattered in the original event. When the new event differs, the investigation remains linked to its evidence and the team can refine the recorded outcome and rule.

UPSTREAM OIL AND GAS / VALUE MODEL

Make the value visible

Use the operating inputs below to translate the workflow into engineering capacity or production opportunity. Substitute the site's own volumes, time and economics when applying the model.

Calculation input	Worked operating example
Production contribution	Affected output contributes $8,000/hour.
Repeat interruption	A 2-hour shutdown represents $16,000 of production contribution at risk.
Planned response	A 20-minute production interruption represents about $2,667 at the same rate.
Net opportunity per event	$16,000 - $2,667 = about $13,333, before incremental inspection or repair costs.

Reading the calculation

This compares two operating paths for the same event: a repeat trip versus a shorter planned response. At four such interventions, the arithmetic is about $53,333 of production opportunity. Track actual throughput, response duration and incremental costs for each intervention; do not count deferred production as permanently lost sales.

Put the workflow to work

Start with a recurring problem that has a well-understood resolution. Preserve its evidence, label its outcome and activate its pattern rule. Valak turns that experience into a continuous watch and a concrete action when it matters again.

See this workflow on your plant data.
valak.ai/contact

Valak | 24/7 critical-asset monitoring. Automatic investigation packages. Pattern rules. OEE and Bad Actors.