CAPABILITY PAPER 02 / PETROLEUM REFINING

Every trip comes with its evidence

Automatic investigation packages that turn a process interruption into an organized engineering workflow.

A refinery experiences an interruption when a critical charge pump trips. Operations has the alarm view. Maintenance has the equipment history. Engineering needs the process trends and the sequence leading into the event. The first task is usually to bring those records together.

When P-310A stops, Valak opens an event-centered investigation package. Agents collect the relevant pre-trip and post-trip window, organize connected equipment behavior, and attach recent maintenance and similar episodes. The package becomes the shared starting point for operators, rotating-equipment engineers and maintenance planners.

THE VALAK APPROACH
Less reconstruction. Faster handoffs. One shared incident record.

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.

PETROLEUM REFINING / OPERATING CONTEXT

Start with the operating question

What happened before the stop, what evidence explains it, and what should engineering check next?

Operating scope	Connected context
Critical assets	Charge pump P-310A, standby P-310B, suction vessel, discharge header and downstream process unit.
Live and historical data	Pump state, speed/current, suction and discharge pressure, flow, vessel level, valve feedback and timestamped alarms.
Supporting records	Maintenance closeouts, operating changes, equipment relationships, prior episodes and line economics.

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.

PETROLEUM REFINING / WORKFLOW

A coordinated fleet of agents

An event agent identifies the downtime interval. Evidence agents retrieve relevant trends and records. A context agent links the stopped asset to upstream and downstream behavior. An investigation agent separates observations from candidate explanations and builds a targeted check list. A production-impact agent attaches duration and configured economics.

Event window	Package assembly
Before the trip	Collect the operating baseline, relevant trends and recent changes around the asset.
Trip detected	Open the incident and record the equipment state transition.
Evidence gathered	Align alarms, process signals and connected equipment behavior using source timestamps.
Context attached	Bring in prior episodes, maintenance findings and equipment relationships.
Engineering review	Present candidate explanations, supporting evidence and the next discriminating checks.
After recovery	Attach operator findings, confirmed resolution and observed downtime.

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.

PETROLEUM REFINING / DELIVERABLE

What the team receives

INVESTIGATION PACKAGE / P-310A UNIT INTERRUPTION

The charge-pump stop coincides with loss of unit feed. Review the pre-trip suction-pressure and flow behavior alongside the pump trip record. The package includes the source trends, connected vessel conditions, standby response and recent maintenance history.

Package section	Contents
Event summary	Asset, operating state, event window, affected process and observed downtime.
Sequence	Time-aligned observations before, during and after the stop; links to the original records.
Evidence	Pressure and flow trends, motor data, vessel conditions, alarms and maintenance context.
Investigation paths	Candidate explanations paired with evidence and the checks that distinguish them.
Resolution record	Inspection findings, completed work, recovery trends and the final outcome label.

The case stays with the work

The operator can open the package, ask a question in plain language and drill into the evidence. Engineering adds findings to the same record. Maintenance receives the asset context rather than an isolated alarm description. A recurring event can be compared with this package instead of reconstructed from scratch.

PETROLEUM REFINING / 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
Manual preparation	2 engineers x 2 hours assembling evidence = 4 person-hours per event.
Package review	2 engineers x 30 minutes reviewing the assembled package = 1 person-hour.
Preparation time released	4 - 1 = 3 person-hours per event. At 12 events/month: 432 hours/year.
Capacity value	432 hours x $100/hour = $43,200/year of engineering capacity.

Reading the calculation

The calculation isolates evidence preparation and review. Diagnosis, field inspection and repair remain separate activities. Any reduction in production downtime is measured against the event timeline and valued separately, avoiding double counting.

Put the workflow to work

Begin with one process unit and a defined set of downtime events. Establish the evidence window and the records engineering uses most often. Valak then delivers a consistent investigation starting point, event after event.

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.