

ABOUT THE FACILITY

Industry:

Petroleum Refining

Processing Capacity:

350 kbpd crude oil capacity

Deployment Scope:

18 unit models, 100+ critical equipment assets

Major Prevented Failure:

\$1.3M feed pump failure

Annual Cost Savings:

\$9M

PETROLEUM GIANT ACHIEVES \$9M ANNUAL SAVINGS WITH UPTIMEAI REASONING ENGINE

Early fault detection, reduced downtime, and improved maintenance planning deliver measurable results

The Challenge: Variable Feed Slates and Complex Interdependencies

A leading national petroleum refiner with crude oil processing capacity of 15.5 million tons per year, 350 kbpd operates in a market importing 90% of total crude supplies. Growing demand means refiners must accept increasingly variable feed slates and all the operational implications that come with them.

The variable composition, quality, and contaminants present in crudes often manifest in refineries as:

- Throughput limitations bumping up against quality and heat transfer constraints
- Increased wear and tear and frequent repair of rotating machinery
- Alert fatigue from false alarms caused by shifting operating windows

When this variability is paired with competing priorities amongst planning, operations, and reliability teams, unforeseen equipment issues and outages commonly occur.

The Solution: AI That Reasons Like Expert Teams

Recognizing that their traditional approach of assembling domain experts had become unsustainable, this leading petroleum refiner deployed UptimeAI Reasoning Engine. Rather than relying solely on human experts to connect the dots between disparate systems, AI reasoning agents now analyze operations the way their expert team does—but continuously, across all units, 24/7.

How It Works

System-Level Analysis

UptimeAI connected the dots between the refinery's unit operations and functional silos, uncovering a process issue that was causing a reliability headache. The model took a system-level, rather than equipment-level, approach looking at the feed pump in the context of the upstream and downstream process units.

Expert-Level Reasoning

UptimeAI's software was thinking about problems like their team of experts always had; reasoning between process indicators like heat transfer and polymerization and machinery indicators like required electrical load to get to the resolution.

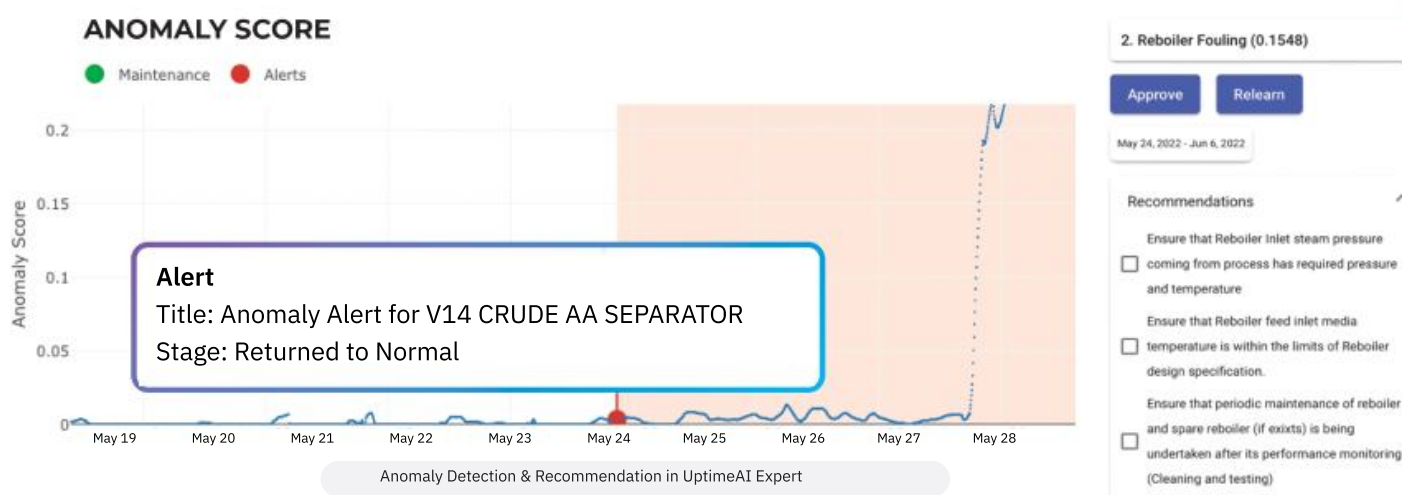
Continuous Learning

The continuously learning model captured the failure mode and associated action, codifying it into domain intelligence linked to the company's data, reducing their reliance on a single individual.

The Breakthrough: Feed Pump Failure Detected Over a Week Early

A \$1.3 million feed pump failure was avoided thanks to an accurate, timely anomaly alert on the crude separator reboiler. The alert triggered over a week before the effects of polymerization caused by fouling in the reboiler would manifest as high amps on the pump, demonstrating the impact of taking a system-level rather than equipment-level approach.

This early detection provided the operations team with time to address the issue before it cascaded into a major equipment failure.



Rapid Expansion: Success Built to Scale

The avoided feed pump failure helped accelerate the transition from the initial feed pump pilot to full production roll-out. They set an ambitious target, working with the UptimeAI team to expand from a single unit model to 18 unit models covering over 100 critical equipment assets in just 6 months.

Results: \$9M Annual Savings and Operational Transformation

The implementation delivered measurable results that transformed operations:

Quantifiable Gains

- \$1.3M feed pump failure prevented through early anomaly detection
- Over \$9M in annual savings from early fault detection, reduced downtime, and improved maintenance planning
- 18 unit models deployed covering 100+ critical equipment assets
- 6-month expansion from pilot to full production roll-out

Transformational Results

- System-level approach connecting upstream and downstream process units
- Continuously learning models that codify domain expertise
- Reduced reliance on individual experts through AI-preserved institutional knowledge
- Proactive maintenance planning replacing reactive problem-solving

About UptimeAI

UptimeAI provides AI reasoning agents that help industrial operations teams make goal-oriented, real-time optimal decisions. Our solutions achieve 90%+ pilot-to-production success rates and are trusted by leading companies in cement, oil & gas, power generation, chemicals, and metals industries.

Backed by industry leaders including ABB, Yokogawa, and Mitsubishi.

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