

How Hess Midstream Achieved Near-Zero Non-Routine Flaring Without Adding a Dollar of Capex

Physics-informed AI that eliminated flaring, unlocked 5–10% production uplift, and transformed weeks of simulation into decisions made in under a minute.

Near-Zero

NON-ROUTINE
FLARING ACHIEVED

>\$1M/yr

AVOIDED PENALTIES &
RECOVERED GAS

~3 mo

TIME TO VALUE

+5–10%

PRODUCTION UPLIFT,
ZERO NEW CAPEX

20,000+

SCENARIOS EVALUATED
IN <1 MIN

6X SCF

GAS RETURNED (18M WITH
GEMINUS VS. 3M WITHOUT)

THE CHALLENGE

A Network Too Complex to Optimize by Hand

Hess Midstream operates one of the most hydraulically complex low-pressure associated-gas networks in the Bakken — hundreds of well pads, multiple compressor stations, and third-party offload points under strict commercial commitments.

When a compressor went offline, pressure cascaded. Operators had minutes to act — but their simulation tools took hours per run. The only available lever was shutting down well pads: a blunt fix that piled lost production on top of flaring penalties.

- Traditional simulators took hours per scenario, which is too slow for real-time use
- Compressor outages changed network topology, breaking model assumptions
- Pure ML could not enforce pressure constraints or handle unseen outage conditions
- Decisions defaulted to gut feel, spreadsheets, and reactive curtailments

THE GEMINUS APPROACH

Physics-Informed AI — Not a Shortcut, a Breakthrough

Geminus doesn't replace engineering simulators — it operationalizes them. Our platform learns from existing network models and encodes mass balance, pressure feasibility, and flow constraints directly into the AI architecture. The models don't approximate physics; they internalize it.

Three hard problems required original solutions:

COMPRESSOR OUTAGES: Models remain accurate across all operating states — including worst-case shutdown configurations — without losing predictive fidelity

REVERSE FLOW CONDITIONS: Encoded non-standard flow behavior at offload points into the physics model, eliminating the need for hardware changes

IN-SITU CALIBRATION: Compare models against live data, detect drift, and use operational data to tune parameters within the deployed model.

WHY THIS IS DIFFERENT**Physics-Aware Architecture**

Neural networks enforce mass balance and pressure constraints by design — not as post-processing. Results are physically feasible, not just statistically plausible.

**1,000× Faster Than Simulation**

From hours per Pipesim run to milliseconds per surrogate evaluation. 20,000+ routing scenarios explored in under a minute — something impossible with traditional tools.

**Models That Stay Accurate**

In-situ calibration continuously tunes models against live operational data. When network topology changes, Geminus Forge retrains and redeploys — no manual intervention.

SCALE & EXPANSION**Already Scaling. Not a Roadmap.****6+** LP NETWORKS ACTIVE

Deployed and optimizing across multiple Hess gathering networks — collectively spanning hundreds of well pads and compressor stations across the Bakken.

100s PADS & WELLS OPTIMIZED

The platform manages routing and pressure decisions across a network of this scale in real time — a level of complexity no human operator or traditional simulator can match operationally.

→ CO₂ COMPRESSOR EFFICIENCY & EMISSIONS

Expansion to compressor efficiency optimization and CO₂ reduction is active — applying the same physics-informed framework to new objectives across the same networks.



Prior to Geminus, maximizing throughput and minimizing flaring while getting wells online or shutting them down was a decision made from gut feeling. Now we have a recommendation in under a minute.”

— PRODUCTION ENGINEER,
HESS MIDSTREAM

Identify your gas network. See the impact in 90 days.

Complimentary network model review included. Zero ops disruption. Little to no training required. • Start Your Pilot →

