

HFPME

Operator-Side Frac Diagnostics

At a Glance

The Core Question

When the pressure pumping contractor both performs and evaluates the stimulation, where does the operator obtain independent verification?

Positioning

HFPME — the operator's independent technical witness on every frac stage, structurally separated from the pumping contractor.

Three Operator-Side Outcomes

1	Independent verification of every stage and every cluster.
2	Contractor accountability — pay for results, not for activity.
3	Audit-grade evidence for JV reviews, partner audits and contract re-negotiations.

Track Record

400+ wells deployed 5,000+ stages monitored

Trusted by CNPC, Sinopec, CNOOC and Yanchang Petroleum · Halfaya Field, Iraq (CNPC overseas)

Deployment Profile

Wellhead install < 1 hour · No downhole cable · No tracers · Zero operational downtime

Applicable to sand fracturing and acid fracturing operations. Not applicable to matrix acidizing below fracture pressure.

Full Value Proposition

Value Proposition

Today, the pressure pumping contractor both performs the stimulation and evaluates its outcome — a structural conflict of interest. HFPME removes this conflict.

As a contractor-agnostic diagnostics platform, HFPME delivers stage-level evidence on fracture geometry, cluster efficiency and stimulated reservoir volume (SRV) directly to the asset team — unfiltered by the contractor's self-reporting. The result is a single, defensible source of truth for stimulation performance: one that holds up in partner audits, JV reviews and contract renegotiations.

HFPME derives its diagnostics through an integrated three-method architecture: (1) cepstral analysis of

water-hammer signatures for fracture-hit identification, (2) well-testing interpretation of pressure-decline transients for reservoir deliverability, and (3) unstructured-grid reservoir numerical simulation for stimulated reservoir volume (SRV) quantification. This multi-method convergence yields a single, cross-validated result per stage — not a single-algorithm output.

The Governance Principle

Independent verification is not a matter of distrust; it is a baseline requirement of sound governance.

HFPME is non-intrusive by design — no downhole tools, no downhole cables, no radioactive tracers, and zero interruption to the fracturing schedule. Unlike microseismic monitoring (which requires downhole receiver arrays and often dedicated observation wells) or DAS/DTS fibre-optic systems (which require cable deployment inside the wellbore), HFPME clamps onto the wellhead and operates entirely outside the well, eliminating HSE exposures associated with downhole interventions.

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For NOCs and JVs operating in regions with strict HSE governance (Middle East, North Africa, deep offshore), this is a material risk-reduction benefit, not merely a convenience.

Five Pillars of Operator-Side Value

1	Contractor Accountability	Objective conformance metrics — design vs. actual fracture geometry, cluster efficiency, SRV — become the basis for performance KPIs, pay-for-performance clauses and contract renewals. The operator stops paying for stages that did not meet objectives.
2	Independent Verification	Fracture results validated by a party with no financial stake in the pumping job. No conflict of interest, no self-reporting bias — only objective data.
3	Audit-Grade Evidence	Defensible, time-stamped documentation for partner audits, JV reporting, regulatory review and post-mortem investigations. When stakeholders ask "how do you know the frac worked?", the answer is no longer the contractor's own summary.
4	Direct Operational Visibility	Stage-level and cluster-level diagnostics delivered to the operator in real time — unfiltered, not weeks later in a contractor-edited post-job summary.
5	Cost Discipline	Quantified per-stage SRV and productivity let the operator pay for results rather than activity. Underperforming designs are identified and corrected early — before the same mistake is repeated across multiple wells.

Applications by Operator Type

The same operator-side value proposition translates into three distinct entry points, depending on the operator's ownership structure, capital discipline and decision speed.

	NOC National Oil Company	Independent Independent Operator	IOC International Oil Company
Core Pain	Service-contractor monopoly on technical evidence; JV partner scrutiny; sovereignty over field data.	Capital-intensive completion spend with limited real-time visibility into per-stage ROI.	Inconsistent diagnostics across global asset bases; regional service-provider lock-in.
HFPME Hook	Operator-side, contractor-agnostic evidence chain — restores asset team's authority over stimulation outcomes. On-site or private-cloud deployment ensures full data sovereignty; no field data leaves the operator's infrastructure.	Real-time per-stage SRV and cluster efficiency — pay-for-performance basis for next contract.	Standardised, vendor-neutral diagnostics — apples-to-apples performance comparison across assets.
Typical Use Case	JV operating committee, partner audit, regulatory review, deepwater / sour-service governance, data-sovereign deployment for national security compliance.	Tight oil / shale completion optimisation, frac-hit early warning between parent and child wells.	Global completion benchmarking, technology transfer between operating units, A&D due diligence.
Opening Line	"Independent verification is the same governance principle behind your JV reserves audit."	"Stop paying for stages that did not produce — make every stage measurable."	"One standard, every basin — diagnostics independent of whichever pumper you contract."

Governance Analogies & Recommended Opening

Three Industry Analogies

Stimulation governance is not a novel idea — it is the same principle behind three well-established practices that every senior operator already accepts.

1. Owner's Engineer Principle

Every major EPC project retains an Owner's Engineer to supervise the contractor. Stimulation operations deserve the same level of independent governance.

2. Independent Audit Principle

No company is permitted to audit its own financial statements. The same governance principle should apply to fracturing diagnostics — the pumper should not evaluate its own job.

3. Reserves Audit Principle

In any joint venture, partners commission an independent reserves audit before booking. HFPME applies the same standard to stimulation — ensuring what went into the ground matches what the invoice says was delivered.

Recommended Opening Statement

For senior operator meetings, technical reviews and JV-level discussions. Adapt as needed.

HFPME is positioned squarely on the operator's side. As an independent frac diagnostics platform, structurally separated from the pumping contractor, it delivers stage-by-stage and cluster-by-cluster results directly to the asset team — applying the same governance principle behind JV reserves audits and Owner's Engineer appointments. Independent verification is not about distrust — it is a baseline requirement of sound governance.

Track Record · Technical Specifications · Next Step

Track Record

Wells deployed	400+ wells
Stages monitored	5,000+ stages
Major domestic clients	CNPC, Sinopec, CNOOC (incl. Weizhou), Yanchang Petroleum
International reference	Halfaya Field, Iraq (CNPC overseas)
Institutional background	USTC laboratory lineage (origin of China's nuclear-grade pressure-pulse instrumentation)

Technical & Deployment Specifications

Deployment time	< 1 hour at the wellhead
Downhole intervention	None — entirely non-intrusive, wellhead-mounted only
Downhole cable / tracers	None — no downhole cable, no tracers, no downhole tools
Operational downtime	Zero
Equipment portability	Carry-on luggage size
Data delivery	Real-time, stage-by-stage, cluster-by-cluster
Deployment model	On-site private cloud / data-sovereign
Sampling rate	1–20 kHz
Maximum pressure range	175 MPa
Accuracy	0.0001 MPa

For each stage: design-vs-actual fracture geometry, cluster-by-cluster contribution rate, SRV estimate with simulation parameters, water-hammer cepstral signature, pressure-decline diagnostic plot, and frac-hit detection (if applicable). Delivered as a structured digital report — with per-stage comparison tables and trend charts — plus an executive-level operator dashboard. Both are ready for partner-audit

submission and JV operating-committee review.

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Next Step

Pilot Entry	Three wells minimum, comparative deployment alongside existing service provider for baseline calibration.
Pilot Timeline	Preliminary stage-level report within 24-72 hours per well; consolidated pilot review within 4 weeks of last well.