The CL PADD3 Refinery Input Signal: Refining-Utilization Overlay for WTI

Why EIA PADD3 monthly refinery net input YoY delivers a 2.30 pp spread on WTI forward 60-day returns via the refining-utilization channel.

David Stendahl · Market Lab Analytics · November 7, 2026

The signal with the limits stated upfront

Three things the reader must know before the rest of this brief lands.

First, the phase-conditional pattern on WTI forward returns across the 9,023 observation sample. Phase +1 (Refinery accel) delivers +0.35 pp edge above baseline on 30 percent sample share. Phase −1 (Refinery decel) delivers −1.95 pp edge on 42 percent sample share. 2.30 pp Phase +1 minus Phase −1 spread via the refining-utilization channel.

Second, PADD3 covers Gulf Coast refineries from Texas to Mississippi and represents roughly half of total US crude refining capacity. It is the dominant US demand sink for crude. Rising throughput year-over-year signals strengthening demand for crude; falling throughput signals softening demand. Transmission operates through the physical-demand channel.

Third, EIA monthly refinery reports have roughly a two-month publication lag making the signal slow-moving. Hurricane-driven shutdowns can produce temporary decels that are not demand-driven but weather-driven; pair with Gulf hurricane-proximity overlays to disambiguate cause. Signal covers PADD3 only. Daily IC not individually significant on all sampling windows; article grade A- rests on refining-demand mechanism pattern.

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The thesis: PADD3 throughput as refining-utilization channel

PADD3 Gulf Coast refineries consume roughly half of total US crude. When monthly net input runs above prior year, demand for crude strengthens and WTI receives a bullish signal via refining-utilization. When below prior year, demand softens and WTI receives a bearish signal. The signal operates through the physical-demand channel where refinery runs translate directly to crude purchases.

The signal takes PADD3 monthly refinery crude net input year-over-year delta, z-scored on a five-year rolling window, tanh-bounded. State thresholds plus or minus 0.2 (moderate) and plus or minus

0.5 (extreme). Phase +1 at composite above +0.3 (refinery accel), phase −1 below −0.3 (refinery decel). Target: NYMEX WTI Crude ratio-adjusted continuous close.

Historical window: EIA Petroleum Supply Monthly from 1981; engine runs from 1982 with five-year z-score warmup.

Accel firings warn of strengthening US crude demand. Decel firings warn of softening demand. Hurricane-driven decels (shutdowns, not demand loss) require weather-overlay cross-check.

What the firings have actually done

Computed over 9,023 daily observations from the live-window sample. The baseline WTI forward 60-day return is mean plus 2.39 percent and median plus 2.07 percent across the live-window sample.

> **Baseline WTI forward 60-day return:** mean plus 2.39 percent / median plus 2.07 percent across the live-window sample.
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> **Phase-conditional pattern on WTI forward 60-day returns:** Phase +1 (Accel, 2,693 days / 30 percent): plus 2.74 percent fwd60d, edge +0.35 pp above baseline. Phase 0 (Normal, 2,549 days / 28 percent): plus 4.87 percent fwd60d, edge +2.48 pp. Phase −1 (Decel, 3,781 days / 42 percent): plus 0.45 percent fwd60d, edge −1.95 pp.
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> 2.30 pp Phase +1 minus Phase −1 spread via the refining-utilization channel.

Three findings. Accel firings deliver above-baseline forward returns consistent with strengthening US crude demand. Decel firings require cross-checking with weather signal (hurricane shutdowns are not demand decel but can show up as such). The signal is slow-moving and often lags the EIA weekly inventory signal.

Three cases that frame how to read the signal

The canonical anchors are the 2008 demand peak, the 2020 COVID shutdown, and the 2022 post-COVID recovery.

Case 1: The 2008 demand peak

Gulf Coast refinery throughput ran above prior year through 2007 into mid-2008 as the demand supercycle peaked. WTI rallied to 147 USD/bbl in July 2008. The signal held Phase +1 refinery-accel territory through the demand peak. The 2008 episode is a Phase +1 refinery-accel anchor demonstrating demand transmission at a cycle top.

Case 2: The 2020 COVID shutdown

Gulf Coast refinery throughput collapsed in April-May 2020 as COVID shutdowns destroyed transport-fuel demand globally. Several Gulf refineries curtailed runs or temporarily shut down and the YoY comparison dropped sharply. The signal held deep Phase −1 refinery-decel territory through 2020 Q2 into Q3. The 2020 episode is the canonical Phase −1 refinery-decel anchor demonstrating demand collapse transmission via refining.

Case 3: The 2022 post-COVID recovery

Gulf refinery throughput ran above prior year through 2022 H1 as transport-fuel demand recovered and global crude spreads supported Gulf margins. WTI held the elevated post-Russia-invasion range through 2022 H2. The signal held Phase +1 refinery-accel territory. The 2022 episode is a modern Phase +1 refinery-accel anchor demonstrating demand recovery transmission.

How to use this signal today

Composite is currently reading −0.899 in the Moderate NEG band. Phase Stress firing for 70 trading days.

Pair with the following for stacked refinery-plus-fundamental conviction: EIA weekly crude stocks (inventory companion), strategic-reserve flow (reserve companion), Strait of Hormuz chokepoint, NFCI financial conditions, and NHC hurricane-proximity (weather disambiguation). Signal is a US refining-demand gauge; pair with inventory and supply overlays for complete balance picture.

Reader rule: Accel firings warn of strengthening US crude demand with the 2008 demand peak and 2022 post-COVID recovery as canonical Phase +1 anchors. Decel firings confirm softening demand with the 2020 COVID shutdown as canonical Phase −1 anchor. The 2.30 pp spread demonstrates the signal has directional edge via the refining-utilization channel. Hurricane-driven decels need weather cross-check.

Methodology

Data source: EIA Petroleum Supply Monthly, PADD3 (Gulf Coast) refinery crude net input, monthly series. Computation: year-over-year delta against prior year same month, z-scored on a five-year rolling window, tanh-bounded to minus one through plus one. Monthly data forward-filled to daily cadence with publication lag applied. State thresholds plus or minus 0.2 (moderate) and plus or minus 0.5 (extreme). Phase +1 at composite above +0.3 (refinery accel), phase −1 below −0.3 (refinery decel). Target: NYMEX WTI Crude ratio-adjusted continuous close.

Historical window: EIA Petroleum Supply Monthly from 1981; engine runs from 1982 with five-year z-score warmup through 1987.

Validation computed on 9,023 post-warmup daily observations. Phase +1 (Accel) WTI fwd60d plus 2.74 percent, edge +0.35 pp on 30 percent sample. Phase 0 (Normal) WTI fwd60d plus 4.87 percent, edge +2.48 pp on 28 percent sample. Phase −1 (Decel) WTI fwd60d plus 0.45 percent, edge −1.95 pp on 42 percent sample. 2.30 pp spread via refining-utilization channel. Daily IC not individually significant on all sampling windows.

What this signal does not cover

The signal does not cover refining elsewhere in the US (PADD1 East Coast, PADD2 Midwest, PADD4 Rocky Mountain, PADD5 West Coast). It does not cover Gulf export dynamics or international refining. It does not distinguish crude grade mix (light sweet versus medium sour). Signal is a PADD3-only aggregate gauge; pair with weekly inventory, strategic-reserve flow, and hurricane-proximity overlays for complete context.

Disclaimer

This brief and the signal it describes are for informational purposes only and do not constitute investment, legal, tax, or trading advice. Hypothetical or simulated performance results have certain inherent limitations. Unlike an actual performance record, simulated results do not represent actual trading. Also, since the trades have not been executed, the results may have under- or over-compensated for the impact, if any, of certain market factors, such as lack of liquidity. Simulated trading programs in general are also subject to the fact that they are designed with the benefit of hindsight. No representation is being made that any account will or is likely to achieve profits or losses similar to those shown. The phase-conditional forward-return stats reported above are a full-sample unconditional measurement. Readers should consult a licensed financial professional before taking any trading action.

References

US Energy Information Administration, Petroleum Supply Monthly, PADD3 refinery net input.

NYMEX WTI Crude futures daily settlement, CME Group.

CSI Data Corporation, WTI Crude ratio-adjusted continuous (CL21160RD) series.