

Gaffney  
Cline

Experts in North American Energy



## What makes GaffneyCline Different?

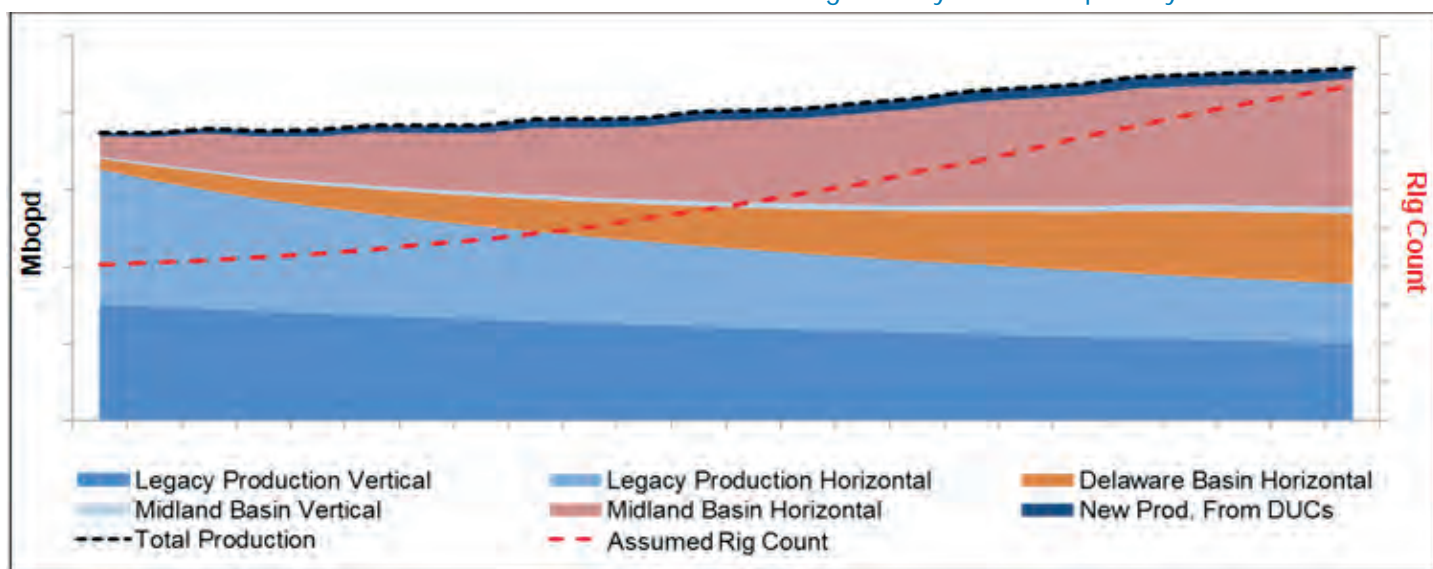
GaffneyCline provides broad-based and detailed technical and commercial advice to our clients across the upstream, midstream and downstream sectors of the oil and gas industry using a multi-disciplined approach. It is our integrated nature that differentiates GaffneyCline from our competitors. GaffneyCline's experienced staff provides all the capabilities found in an integrated oil company, and our methods are specifically designed to meet our clients' technical, strategic, and commercial objectives.

## North American Unconventional Shale Resources

GaffneyCline has undertaken a wide range of projects across all unconventional basins in the US and Canada. In addition, our North American teams' experience and expertise has been leveraged by our clients to evaluate the Vaca Muerta shale play in Argentina as well as other shale plays globally.

GaffneyCline has developed its own proprietary Unconventional Basin/Play Project Economic model. This model has been used effectively to develop key insights related to potential production scenarios for both oil and gas from US shale basins. These insights, coupled with GaffneyCline's expert analysis, enable our clients such as equity investors, midstream utilities and E&P companies to make informed decisions on project acquisitions and investments with a reservoir to market perspective.

### Illustrative Permian Basin Production Forecast using GaffneyCline's Proprietary Model



## Global Gas & LNG - From North America to the World

GaffneyCline's Global Gas and LNG team is headquartered in Houston, ideally placed to gauge the impact that North American gas production and exports are having both domestically and globally. The Gas and LNG team assesses the global price setting implications of US Gulf Coast exports and the near to medium term opportunities to monetize said exports. GaffneyCline's team also assesses the scalable solutions that emerging markets require. The team has also evaluated the commerciality of numerous West Coast LNG projects.

## Strategic Analysis of Break-Evens in Bakken, Eagle Ford and Permian

A Middle Eastern NOC needed to understand short-term US oil output to guide its own production decisions, so it engaged GaffneyCline to evaluate production for these three plays.

GaffneyCline modeled costs, rig counts, production and break-even economics and also presented a short-term view on conventional oil production from Alaska, the Gulf of Mexico and the Lower 48.

## Utica/Marcellus US Country Entry

A NOC looking for its first international venture sought a non-operated, onshore, midstream opportunity in the Utica/Marcellus shale play and requested GaffneyCline's assistance.

## North American Shale Development Plan Review

An international operator requested GaffneyCline to review its portfolio in North America focusing on three unconventional shale basins. Our client had questions related to the performance of its shale portfolio. Specifically, the field development plans presented to the Board of Directors were not meeting the expected targets in relation to return on capital.

GaffneyCline was tasked with commenting and opining on four elements in each of the basins where the company was active:

- 1) Resource estimation and characterization
- 2) Development/depletion planning (pace/profile)
- 3) Costs estimations
- 4) Valuation

GaffneyCline accomplished its review in time for a Board of Directors meeting where the results were presented. Confident in the rigor of GaffneyCline's advice, the client made several strategic adjustments to its portfolio.

### Multi-billion Dollar Midstream Acquisition

A client considering midstream and downstream investments in the Eagle Ford, Denver-Julesburg, Williston and Permian basins turned to GaffneyCline for advice on which unconventional play would be most resilient to hydrocarbon price fluctuations.

GaffneyCline identified key operators, most productive areas within each play, historical production data (to create type curves), forecasted full-field production and determined break-even economics.

GaffneyCline forecasted future midstream infrastructure demand under several development scenarios within each shale play and confirmed the supply of feedstock required for investment decisions.

The client went on to capture two opportunities worth \$3 B and \$1 B.

GaffneyCline assessed the resource potential around the midstream asset, risks, expected production activity and worked with other consultants to provide the client with a comprehensive study.

### Buy-side Due Diligence

GaffneyCline's client wanted to value a JV offering for approval by its Board and engaged GaffneyCline to perform an independent technical due diligence.

GaffneyCline's analysis helped the client make a successful investment in a Permian basin JV. GaffneyCline's approach had been to review historical performance, planned productivity, and subsurface properties of five intervals, then identify sweet spots, performance and cash flow models.

## Illustrative Project Case Studies – Gulf of Mexico

### Due Diligence and Peer Review of GOM Assets

GaffneyCline conducted a high-level due diligence to aid a client's investment evaluation. In less than one month, GaffneyCline performed a 'red flag' review of reserves and resources, development plans, and costs for multiple assets (producing fields, discoveries and prospects), identifying key risks and uncertainties, and reasonableness of reserves and resources.

### Deepwater Due Diligence

Over a six-week period, GaffneyCline delivered full assessments covering 78 properties. Activities included creating development scenarios for 26 discoveries and prospects, deriving operating costs, estimating production start dates of each field, and creating volume profiles using "defining" parameters. GaffneyCline identified gross recoverable oil volumes for four new discoveries at 1.4 billion BOE.

### Haynesville Feedstock Peer Review

A utility company purchasing equity in gas feedstock for its LNG facilities asked GaffneyCline to review an operator's technical work on its 100,000+ acres to value the asset.

GaffneyCline modeled hundreds of PDP wells, created type curves and modeled liquid loading and other production issues, development plans and costs. GaffneyCline went on to model low, best and high type wells, which allowed the client to plan and redefine cash flow for the asset.

### Overriding Royalty Interest (ORRI)

A client was considering buying an ORRI in the oil window of the Eagle Ford shale. GaffneyCline benchmarked well and operations costs and asset production against peers to determine KPIs, and evaluated the FDP. The operator was found to be performing below competitors because of poorer reservoir characteristics, rendering the FDP uneconomic.

GaffneyCline advised a search for a different opportunity instead. Subsequently, the operator in question experienced significant revenue losses, was bought out and delisted from the NYSE.

### Major E&P Company Seeking Investment Targets

GaffneyCline advised the newly-formed US upstream arm of an E&P company on JV offerings in the Marcellus and Utica shales, providing commercial due diligence on a series of JV offerings with major US operators.

GaffneyCline used its proprietary models and basin experience to develop future cash flows for each asset, and to evaluate and compare each operator's performance.

In the process, GaffneyCline helped a client unfamiliar with the US unconventional sector to develop a comprehensive process and methodology for evaluating unconventional assets.

### Field Study on Deepwater Atwater Field

GaffneyCline performed a full reservoir characterization study, assisting reservoir management, reserves allocation and classification. This included building 3D static/dynamic reservoir models that history matched to-date production data and provided guidance for future activities. The results provided a forward exploration program that targeted resources that had not previously been recognized.

### Extensive Analysis of Deepwater GOM

GaffneyCline's basin/play studies, due diligence, and reserves and resources audits/assessments have covered various assets including Perdido, Delta House Complex, Kodiak, Mad Dog, Neptune, Shenzi, Holstein, Heidelberg, Marlin, Horn Mountain, Thunderbird, Tahiti, Danzler, Tubular Bells, Pegasus, Big Bend, Nakika, Big Foot, and Galapagos.



## Illustrative Project Case Studies – Alaska

### Seller's Due Diligence

A publicly traded oil & gas exploration company asked GaffneyCline to provide a seller's due diligence on a multi-prospect portfolio in Brookian Play Fairway in North Slope Alaska, mapped on 3D seismic data, with inversion / AVO, supported by field analogs.

### Provision of Standalone Report

To determine value and strategic possibilities by evaluation of a major oil & gas company's interests in Prudhoe Bay and TAPS.

### Petroleum Engineering Consulting

Support in examining reservoir studies and development for the Pt. Thompson Unit.

### Fair Market Valuation

Of certain properties in the Cook Inlet region of Alaska.

### Competent Persons Report (CPR)

For certain oil and gas leases in the Cook Inlet.

### Alaska North Slope Acquisition Due Diligence

GaffneyCline provided a reservoir engineering and geoscience team to attend a data room, and conduct a technical evaluation and review of assets on offer through a review of production profiles, forecasts, cash flow, geological maps and other available data.

### Fiscal System Analysis

Of Alaska oil and gas structure and the potential impact of changes to the tax system on various oil and gas projects, including the Alaska natural gas development concepts.

### LNG Risk Assessment

In relation to LNG markets, pricing formulae and indexation with reference to recent developments in Asia Pacific.

### Assessment of Trans Alaska Pipeline System

GaffneyCline projected oil throughput.

## Illustrative Project Case Studies – Canada

### British Columbia Gas Opportunities

For a private E&P company looking at assets being offered for a JV, GaffneyCline provided a technical/commercial assessment, including: subsurface volumes, resources, production/-cost profiles and cash flows. GaffneyCline's advice: due to the large resource potential but changing market conditions, the bid should target a more strategic asset. GaffneyCline also advised the client on Canadian regulations pertaining to HSE, drilling/fracturing and CO<sub>2</sub>, and guidance on Canadian fiscal regime.

### \$1.5 B Investment in Duvernay Shale

An NOC and IOC looking at a 325,000 acre JV opportunity in west-central Alberta needed a third-party peer review and process audit on the resources and commercial potential of this emerging play.

GaffneyCline's technical and commercial team reviewed production and subsurface data and identified existing capacity constraints along with several 'red flags' on methodology. Based on their improved understanding, the client made a successful bid valued at \$1.5 B.

### Additional Information

For more information about GaffneyCline's integrated services, please contact your local GaffneyCline office.

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