

Gaffney
Cline

Project Investment Risk Management Expertise



The Issue

Over recent years, the oil & gas industry has progressed to larger and more technically-challenging projects across the spectrum of producing territories, coupled with the challenge of developing smaller (near marginal) fields in the more mature oil and gas provinces. At the same time there has been a trend towards outsourcing of key project definition and execution management functions, as well as increased risk to project commerciality and delivery.

GaffneyCline has observed through direct experience, that these trends frequently lead to underestimation of investment risk appreciation as well as gaps and inconsistencies in the owner's decision-making process. Such underestimations, gaps and inconsistencies develop into unrealistic expectations, particularly around project risks associated with project budgets, low operational flexibility and the inability to react to project changes. These project risks can in turn quickly invalidate key aspects of the entire asset business plan.

The traditional response to mitigation of these project risks is to appoint a Project Management Contractor (PMC), who is typically a sub-division of an Engineering, Procurement, Construction (EPC) contractor. However a PMC does not typically have any subsurface experience or risk appreciation. Moreover, a PMC contractor is generally appointed to the project at a relatively late stage, possibly even after Final Investment Decision (FID), where substantial deviations from an optimum plan may already be occurring resulting in unmitigated project risk events. The PMC is usually focused on the details of facilities project execution, not the risk to the overall business plan.

Achieving the original business plan and expected commercial returns requires early, active, informed and experienced project management: anything less risks serious project value leakage. This view is supported by a review of current global megaprojects: CAPEX overshoot and delays are commonplace and risk to project investment is high.

The Solution

It is essential that project stakeholders regain the initiative and retake full control of the management of the project, identify and mitigate the project risks and thereby defending the stakeholders' investment. Improved Project Investment Risk Management is a prerequisite and should be applied through the lifespan of a project.

GaffneyCline employs many experienced professionals who cover all the technical, key operational and regulatory disciplines across the entire hydrocarbon spectrum. Our professionals use their considerable experience and training to look for weaknesses, gaps and inconsistencies in asset evaluations, development plans and project execution strategies. GaffneyCline covers in depth, through in-house expertise: exploration; geology; geophysics; petrophysics; geo-modelling; reservoir modelling, field development and management; wells and completions engineering; deep-water, onshore and offshore production; as well as transportation and downstream gas monetization technologies of all types. We are practised in conducting discussion across the specifics of each discipline and can claim a unique level of integrated evaluation skills.

In our due diligence work, GaffneyCline is exposed to both the excellence and the shortcomings of many project evaluations, contracting and execution strategies, and witnesses the dire absence of connection from subsurface risk through to operational management.

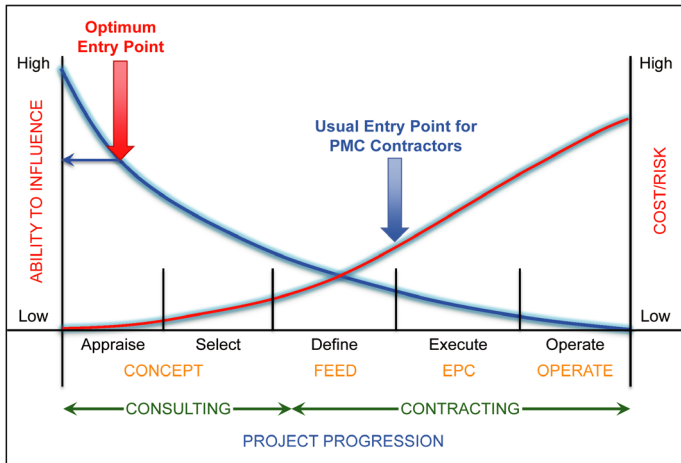
GaffneyCline understands and has developed the processes needed to identify and manage the business plan risks associated with these common project issues. We offer an independent structured approach as well as a depth of technical expertise combined with global experience that is unmatched by any other company. GaffneyCline is able to use that experience and expertise to evaluate and manage any business plan through the investment life cycle and value chain - from acquisition and appraisal through evaluation to concept definition and ultimately execution.

GaffneyCline Scope of Services

Strategy	Acquisition	Appraisal	Concept Selection	Technical Definition	Sanction	Development	Operation
Growth Strategies	Valuations, Due Diligence	Transaction Support & Integration		CPRs, IPOs and Divestments			
Opportunity Identification	HIIP Estimates	Geological Modelling		Reservoir Depletion Planning	Production Enhancement		
Opportunity Screening	GCoS Assessment	Reservoir Modelling		Reserves and Resources Estimates	Reservoir Management		
Exploration Strategy	Production Forecasts	Resources Estimates & Audits		Reserves Audits, Unitisation.			
Development Strategy	Development Plans & Costs	Feasibility Studies, CAPEX, OPEX, Development Schedule		Design Audits	Budget Review & Audit	Operations Planning	OPEX Optimisation
Technology Assessment	Infrastructure & Logistics	FDP Audits	Conceptual Design	Execution Planning	Regulatory Compliance	Cost Recovery Audits	Abandonment
LNG Strategy & Markets	Gas Conversion Options	Gas Commercialisation Plans		Technology Selection	License Agreements	Performance Monitoring	
Gas Master Plans	Markets and Prices	Gas Sales & Purchase Agreements			Commercial Agreements	Market Options	
PSC Terms	Fiscal Terms	Cashflows, Economics, NPVs					
License Rounds	JOAs and Partnerships	Decision Support Packages (FDP, PEP, WBS, EIA), TCMs & OCNs				Execution Support	Operations Support
Policies & Processes	Risk Identification	Risk Mitigation	Appraisal Baseline	Risk Management	FID Baseline	Project Surveillance	

 Strategic Advisory	 Subsurface Technical & Commercial	 Surface Technical & Commercial	 Gas Commercialisation
 Commercial & Economics	 Operations & Planning Advisory	 Risk Management	

Influence - Optimum Entry Point



The Process

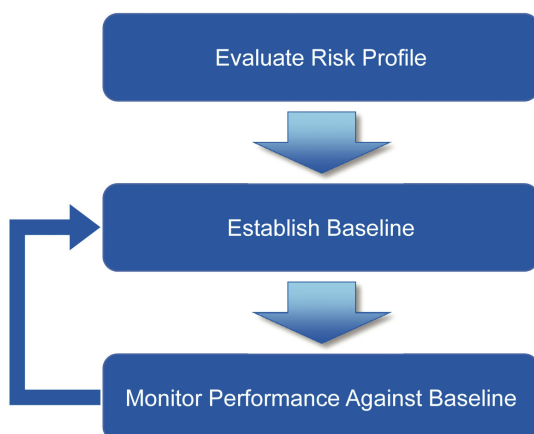
The core of GaffneyCline's Project Investment Risk Management service lies in two separate but connected activities with the intent to create a Project Investment Baseline:

- Evaluation (and quantification) of the full spectrum of subsurface and surface risk; and
- Evaluation and advisory support of all investment decisions, both technical and commercial, in the light of the subsurface and surface risk.

The Project Investment Baseline is driven by consistent, independent interrogation and reporting of the whole project investment risk profile, and comprises the integrated assessment of:

- **Subsurface risk** (hydrocarbon) assessment based on over 50 years as the world's leading integrated geological and reservoir engineering consultant, providing resource evaluation services to the widest range of institutions, with expert input from technical, legal, commercial and economics professionals.
- **Technical risk** assessment drawing on the capabilities of GaffneyCline's field development and engineering advisors. These professionals bring very considerable collective experience of managing major projects, engineering design, onshore and offshore construction, and high level technical audit and due diligence services to bear on the construction of project budgets and schedules as well as on execution planning.
- **Project Execution risk** assessment is based on the GaffneyCline's ability, practised over many years, in the independent evaluation and supervision of project execution and progress, regulatory approvals, through value measurement and forecasting techniques.

Once evaluation of the project or asset development risk profile is complete, GaffneyCline creates this "Project Investment Baseline" document - in effect, an enhanced Stage Gate Decision Package



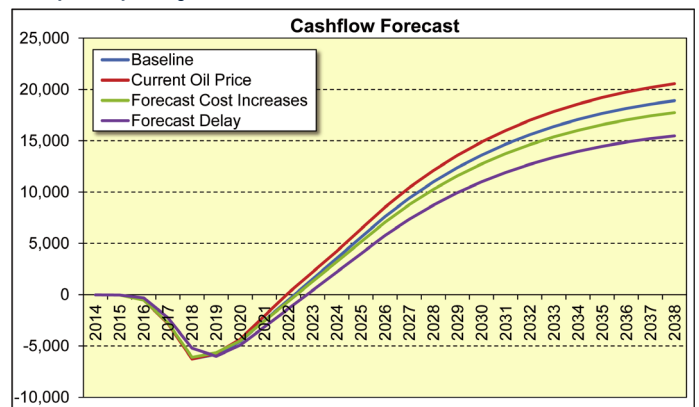
which fully describes all project components and assesses the associated project risk, impact and the mitigations.

The Project Investment Baseline document is appropriate for the specific project stage but could comprise geological and reservoir models, production forecasts, field development plans (FDPs), cost estimates (including project contingency funding), contract documentation, the development schedule and the economic model, and typically form the basis for acquisition, project sanction and project funding.

The subsequent performance of all project components is then monitored against this Project Investment Baseline and all reporting is referred back to the Project Investment Baseline documentation which is revised accordingly through to successful project completion.

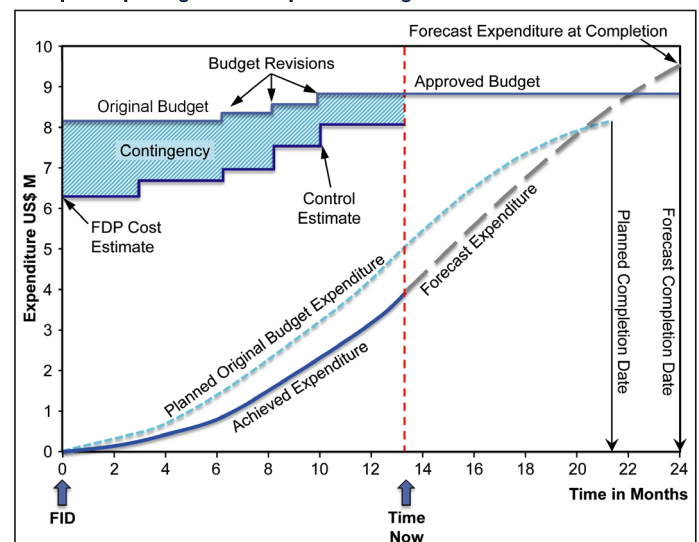
As the project progresses through the next Decision Gate phase, GaffneyCline scrutinises all new data, new documentation as well as all project modifications and augmentations to ensure that the revised project investment risk is understood, minimised and controlled. The intent ultimately is that all cash flow is consistent with plans, construction commitments and achievements, to ensure that the overall business plan aims are being preserved. GaffneyCline works as an integral part of the project management alongside the owner or stakeholders to ensure the protection of the Project Investment.

Sample Reporting - Variance to Business Plan



Event (example)	NPV(15) \$ MM	NPV(15) Variance from Baseline \$ MM
Baseline (FID)	5,341	
Current Oil Price Variance	7,575	2,233
Forecast Cost Increases	4,436	-905
Forecast Delays	2,169	-3,172

Sample Reporting - Cost Report showing Variances



The GaffneyCline Track Record

The following examples provide a brief overview of GaffneyCline experience in the area of project management, technical and commercial due diligence. In all cases, GaffneyCline's role has focused on risk minimisation, value retention and operational improvement where applicable.

- **Due Diligence and Project Surveillance for Gas Storage Project:** GaffneyCline acted on behalf of a consortium of financial institutions relating to the development of a gas storage facility in Europe. GaffneyCline personnel were seconded to the client's office to monitor, evaluate and report on: design development and project planning; project delivery milestones for drilling and construction; offshore and onshore scope compliance as well as cash call/fund release trigger.
- **Independent Development Assessment, Kuwait:** GaffneyCline prepared an independent technical and commercial assessment of development plans for four multi-billion barrel 'Northern Fields'. GaffneyCline carried out a fully-integrated analysis covering subsurface potential, drilling, FDP and facilities construction as well as field operations. Subsequent work involved critical technical evaluation of Front End Engineering Design (FEED) progress at critical design milestones and advice on risk mitigation/corrective action.
- **Mumbai High Field Redevelopment:** GaffneyCline has been retained by the Indian Oil and Natural Gas Corporation (ONGC) since 1998 to provide commercial and technical assistance with the operation and management of the giant Mumbai High field offshore western India. This has entailed intimate project involvement culminating in progressing new technologies, advanced reservoir pressure management direction, facilities maintenance, mechanical reliability evaluation, planning and overall operational asset management for the assets. GaffneyCline provided direct support and advice to ONGC Board and Senior Management.
- **Sakhalin II - Project Review:** GaffneyCline has provided a continuous review in the form of technical due diligence of the Sakhalin II project to the client and financial investors over last 5 years.
- **Field Development Review, Azerbaijan:** GaffneyCline was retained by the European Bank for Reconstruction and Development (EBRD) to undertake a due diligence of the subsurface, development plans and commerciality of an asset as well as the issuing of statements on the project's technical feasibility and economic viability.
- **Annual Work Programme and Budget Audit, Former Soviet Union (FSU):** GaffneyCline was contracted to provide technical and commercial advice to a State Oil Company with respect to the annual work programme and expenditure budget for an offshore project. The due diligence audit involved a review of the proposed capital and operating expenditure within the budget relating to the work programme for a large integrated phased project.

Additional Information

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

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