



Experts in North West Europe

**Gaffney,
Cline &
Associates**

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Gaffney, Cline & Associates (GCA) is a global technical, strategic and advisory consultancy that has provided solutions to clients in the oil and gas industry for over 50 years.

GCA has developed an enviable reputation within the industry for the quality, insightfulness, impartiality and independence of that advice. GCA offers a full range of upstream, midstream and downstream consultancy services. These include seismic interpretation, petrophysical analysis, static and dynamic reservoir modelling, field development planning, facilities and pipeline engineering, gas monetisation, LNG/GTL, mergers and acquisitions, asset evaluations, project finance, reserves and resources assessments, unitisation and redetermination, and expert witness work.

GCA operates worldwide from three main offices in London, Houston and Singapore, supported by regional offices in Argentina, Australia and elsewhere.

North West Europe

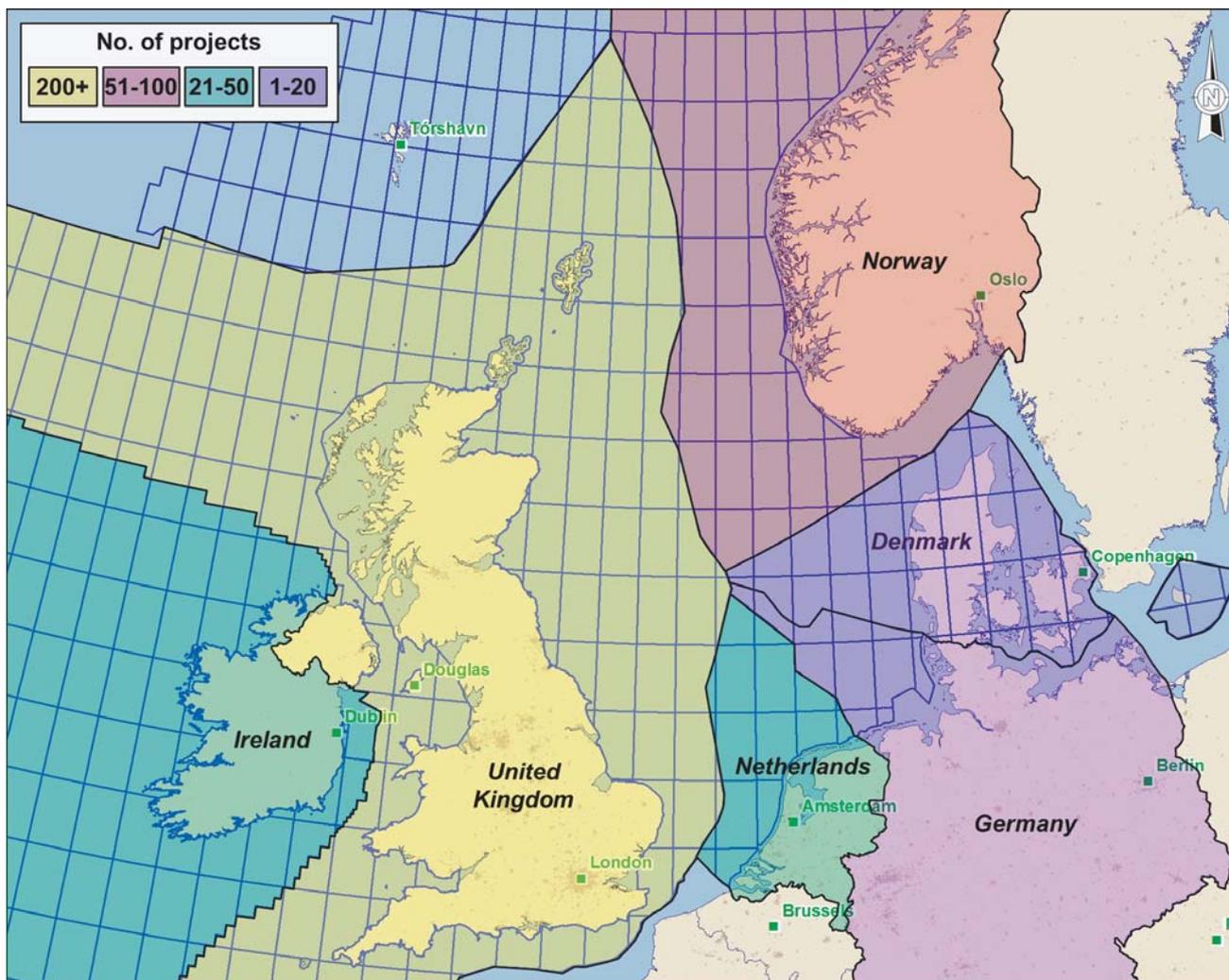
GCA has provided advice on several hundred technical and commercial advisory projects in all sectors of the North Sea and North West Europe (Figure 1). Our studies have ranged across: hydrocarbon types; onshore and offshore; conventional and unconventional including coal bed methane (CBM) and heavy oil.

GCA has provided independent due-diligence at all stages of asset maturity from Prospect Evaluation to Field Abandonment and Carbon Capture and Storage (CCS).

GCA can execute turnkey evaluations on a long term basis for clients in need of an integrated solution or alternatively brief audits on an ad-hoc basis. GCA is well versed in providing techno-commercial support for unitisation and redeterminations as well as arbitrations and Expert Witness to deliver a successful outcome for our clients.

Our editorial Focus Articles discuss industry activity and trends in E&P and are published on GCA's website and through GCA's various social media accounts, details of which can be found at www.gaffney-cline.com.

Figure 1: GCA Projects in North West Europe



As most of GCA's work is confidential, GCA does not have the liberty to name most clients and specific assets. A brief summary of recent GCA projects is provided below:

Competent Person's Report (CPR):

Ireland/Norway/UK

Client: Atlantic Petroleum

GCA provided an independent technical and economic assessment of the oil and gas Reserves and Resources, for Atlantic Petroleum's portfolio in UK, Irish and Norwegian waters. GCA's CPR is publically available and was commissioned by Atlantic Petroleum to fulfil Copenhagen Stock Exchange requirements and for use in its Annual Report.

Facilities Due Diligence: UK

Client: European Operator

As part of a potential acquisition of North Sea Assets, GCA was commissioned by a European Operator to evaluate the condition of existing infrastructure, and review projections of CAPEX and OPEX. With such a large number of facilities - over twelve structures - an important aspect of the acquisition was the potential decommissioning costs. GCA also commented on existing plans and recommended plans and costs for the new developments.

Exploration Potential and Prospectivity Review:

Ireland

Client: Independent Operator

GCA was commissioned by a small independent to review two exploration licenses, offshore Ireland, in preparation for a possible AIM Listing. GCA's review considered the hydrocarbon potential of three prospects and an opinion of in-place and recoverable hydrocarbon volumes in addition to an independently derived assessment of the risk or Geological Chance of Success for each prospect.

Technical Advice to Carbon Capture & Storage

(CCS): UKCS

Client: DECC

The UK Department of Energy and Climate Change's office of Carbon Capture and Storage (OCCS) required support to cover the full CCS chain from generation to storage and to consider project development, construction, operation and decommissioning. GCA acted as Technical Adviser during the FEED stage providing commercial and technical support up to contract close on the Peterhead and White Rose CCS projects. GCA's technical support ensured that DECC had technical assurance to take a Financial Investment Decision.

Reserves Audit: East Irish Sea

Client: Major International E&P Company

GCA performed an audit of oil and gas Reserves, under SEC Rules, and Contingent Resources, under SPE PRMS, for three producing fields in the East Irish Sea. The audit included subsurface review, economics and tax modelling. GCA identified areas of additional value for the client which resulted in an increase in the Resource base in certain categories.

Refinery Valuation: Germany

Client: US Law Firm

GCA provided an expert opinion on the value of a German refinery in relation to a dispute between the former owners. A full valuation was provided, based upon a detailed review of operating expenses, capital requirements and likely revenues, all in the context of the status of the refining industry at that time. An appraisal of other refinery transactions at the time was also conducted.

Reserves and Resources Audit: Netherlands

Client: Middle Eastern Wealth Fund

GCA has audited, for several consecutive years, the Reserves and Contingent Resources for a Middle Eastern Wealth fund in their Dutch North Sea portfolio for year-end reporting. This was a diverse portfolio of both operated and non-operated oil and gas fields in the Netherlands. Reserves and Contingent Resources were reported in accordance with SPE-PRMS guidelines. GCA audited geological conceptual models, production data and audited costs and economic limit calculations.

Technical and Commercial Due Diligence: Netherlands

Client: Norwegian Operator

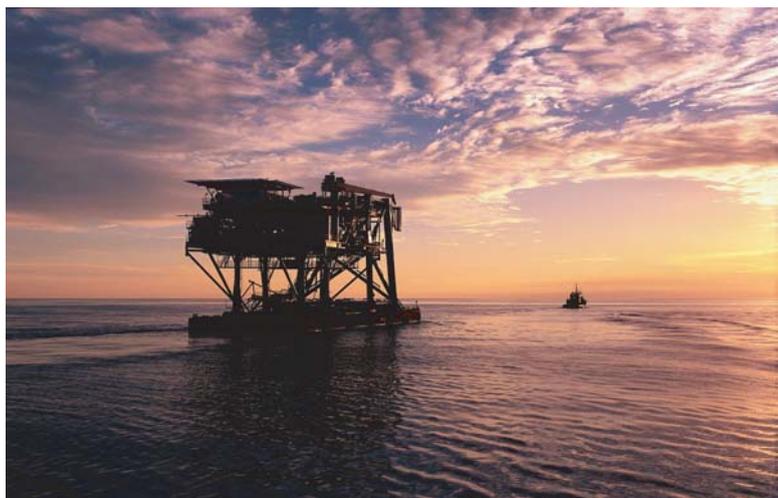
On behalf of a mid-sized independent company, GCA was commissioned to undertake the technical and commercial due diligence of a potential acquisition of five mature Norwegian oil/gas fields. GCA staff accessed a virtual and physical data room in Norway in order to evaluate seismic data, static and dynamic reservoir models and production data. A Red Flag Review was provided, followed by a detailed evaluation on the two main fields for which infill drilling locations, production optimisation and cost management were reviewed along with the abandonment risks and costs.

Unconventional Potential of Seismic Attributes:

Denmark

Client: Legal Company

On behalf of a legal firm, GCA generated seismic attribute volumes on 3,000 km² of 3D seismic data in the Danish sector of the North Sea. These Data were used to delineate zones of high fracture intensity and fault and fracture orientation in the Farsund Formation as part of an investigation into the unconventional reservoir potential of this formation.



Numerical Simulation for Miscible CO2 Flood: UKCS

Client: Non Operated Partner

GCA carried out simulation studies for a Joint Venture Partner in a large, mature North Sea oil field to determine the viability of CO2 flood as a tertiary recovery mechanism. A compositional simulation model had been constructed by the Operator, and GCA's client required a technical assessment of the reliability of the forecasts generated. GCA carried out a fine scale numerical simulation of the slim-tube experiments to understand water-after-gas (WAG) processes under reservoir conditions and how this implicated the proposed injection plans.

Expert Witness Dispute: Onshore UK

Client: Landowner

As Subsurface Technical Expert, GCA represented the defendant at the High Court during a dispute concerning directional drilling and land ownership onshore UK. The technical basis for the dispute related to the Operator's necessity to drill using deviated wells under land not owned by the Operator in order to maximize production from the field. GCA was required to analyse and interpret historical field data, to review the field development over time and to determine the public availability of selected technical data. The analysis indicated that wells were optimally located as a consequence of directional drilling. A Witness Statement was prepared for the High Court and GCA's Project Manager represented the case and achieved a successful outcome for the Client.

Tight Gas Resource Assessment: Poland

Client: Small Independent Operator

GCA was commissioned to assess the Contingent Resources of in a tight gas discovery in Poland. GCA interpreted subsurface, petrophysical data from the discovery and well test results from the first appraisal well and advised on the well test programme for future appraisal wells. GCA evaluated prospectivity and calculated the prospective resource potential and associated risks for prospects on block.

Additional Information

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

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Preparation for Redetermination: UKCS

Client: Major International Operator

GCA provided independent analysis for an equity re-determination for a major Independent with significant equity in a large North Sea oil field. Using the field's Unit Operating Agreement (UOA), the work involved rigorous data management and quality control of all information and data. The UOA procedures had not been re written since the early 1980's and many of the specified procedures used were obsolete compared with current industry best practice. GCA develop procedures and routines compliant with both UOA requirements, and current industry best-practice. In parallel, GCA used the same dataset and current industry modelling approaches to derive alternative STOIP estimates for the field. This allowed GCA to develop a clear understanding of the effect on the distribution of STOIP as a consequence of the UOA method versus industry best practice.

Discovery Commerciality Review: France

Client: Small Operator

GCA assisted a small operator in developing a plan for its license in the Aquitaine Basin following the drilling and discovery of sub-commercial volumes by the first exploration well. GCA reviewed the well results and the remaining prospectivity potential of the block. The well did not encounter the primary reservoir target and displayed oil saturations in overlying intervals with reservoir properties. GCA prepared a post-well analysis and how this impacted the understanding of the petroleum system, the prospectivity potential in the licence and for the Board, prepared a forward plan for the Operatorship of the license.

Heavy Oil Field Development Plan: UKCS

Client: Non Operated Partner

GCA was commissioned to review the feasibility of the field development plan (FDP) of a North Sea heavy oil field on behalf of a non-operating partner for financing. The project focussed on the production assumptions and engineering elements of the FDP specifically an unusual FPSO configuration. In addition, the project required an audit of the subsurface static and dynamic modelling. The engineering review included the hydraulic submersible pumps, flow assurance, separation of high water-cut heavy oil and the overall FPSO system design. The objective for GCA was to audit low and mid case scenarios and also comment on project schedule, capital and operating cost assumptions.

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