



Experts in The Middle East - Iraq

**Gaffney,
Cline &
Associates**

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Gaffney, Cline & Associates (GCA) is a global consultancy that has been offering technical, commercial, and strategic advice to the oil and gas sector for more than 50 years. GCA is well known as one of the leading suppliers of Reserves and Resources assessments, which are required for many purposes including statutory reporting, stock exchange listing, development planning, project finance, and asset valuation. In addition, GCA offers a full range of upstream, midstream and downstream consultancy services. These include seismic interpretation, static and dynamic reservoir modelling, field development planning, facilities and pipeline engineering, gas monetisation, LNG/GTL, mergers and acquisitions, economics and project finance, unitisation and redetermination, and expert witness work. GCA operates worldwide from three main offices in London, Houston and Singapore, supported by regional offices in Buenos Aires, Sydney and Dubai.

The Middle East and Specifically Iraq

Claiming >38% of the World's Proved Oil reserves and >24% of the Proved Gas reserves, The Middle East has been a region in which GCA has conducted significant business for many years. Our clients range from small exploration companies to major oil companies, NOC's and Banks. Within this region GCA has undertaken some 50+ projects specifically in Iraq in recent years. These have been varied in nature; from Strategy advice to the Ministry, Independent Reserves Estimations and Asset Reviews to Evaluation Studies, Field Development Plans through to Contractual advice, Arbitrations, Acquisitions and Gas Utilization.

Petroleum Contracts and Licensing Directorate, (PCLD):

GCA was engaged by the PCLD of the Iraq Ministry of Oil (MoO) to provide contractual, commercial, strategic and technical advice. GCA supported the MoO in its four successive hydrocarbon bidding rounds, where a world class competitive and transparent bidding approach was designed to maximize the value of the country's hydrocarbon resources. The rounds focused on large discovered oil and gas fields, as well as several exploration blocks.

GCA's assistance to the PCLD in the design and implementation of these first four upstream licensing rounds has resulted in seventeen contracts contemplating over US\$150 billion in investment in the country's oil and gas sector. Since their instigation, Iraq's peak crude oil production has increased significantly, making this series of license offerings by far one of the largest in the history of the oil industry. Other phases of GCA's work with the PCLD/MoO included providing continuous commercial, strategic and contractual advice and relevant analysis in the support of the bidding rounds contracts, carrying out field development plans reviews, and providing advice on specific projects. These included: negotiation assistance on Basra Gas; the Nasiriya Integrated Project; the Combined Seawater Supply Project (CSSP) that was conceived by GCA; the subsequent Southern Iraq Integrated Project (SIIP); and a study of Dry gas pricing for Petrochemical Projects.

Nasiriya Integrated Project, PCLD: GCA provided assistance in development of the Nasiriya Integrated Project - a project to develop a 4+ billion barrel field in conjunction with a new-build 300,000 bopd refinery. GCA was tasked with a wide range of technical and managerial responsibilities, from preparing data packages and communications with prospective bidders, to assisting PCLD in determining appropriate contractual terms, award criteria and bidding procedures.

Pipeline Fee Advice, Iraq State Company for Oil

Projects: GCA advised SCOP within the MoO on the per barrel fee that should be considered as payment to potential investors for construction of a proposed 1 million barrel per day crude oil export pipeline from Basra to Aqaba in Jordan. As part of this work, a bespoke economic model was prepared to enable a range of sensitivities to be analysed.

Southern Iraq Integrated Project (SIIP) Southern Oil Company (SOC)/MoO:

GCA acted as advisor to SOC/Iraq MoO regarding the contractual terms proposed by international oil companies for this major integrated project aimed at boosting output from the country's smaller southern oil fields. Four primary elements were involved namely: 1) Common Seawater Supply Project (CSSP); 2) Southern Export Project (SEP); 3) Bin Umr Field Development; and 4) Ratawi Field Development.

Dry Gas Pricing Advice for Petrochemical Projects, Iraq Ministry of Oil:

On behalf of the Ministry of Oil, GCA carried out an assessment of a reasonable price range for the sale of Dry Gas by the South Gas Company (SGC) at the Battery Limits of potential foreign investment petrochemical projects in Iraq. GCA focused its analysis on the derivation of Dry Gas sales prices necessary to achieve a range of post-tax internal rates of return (IRR) for a petrochemical project consisting of an ethane cracker, plus plants to produce ethylene derivatives. In assessing possible impacts on the project's profitability and the resultant Dry Gas price, GCA considered at a high level potential global market-oriented trends that may have had an influence on future petrochemical feedstock and product prices, plus evaluated project economics sensitivities due to variations in project base assumptions and prices.

Expert Witness and Arbitration: GCA provided expert witness advice in arbitration cases on behalf of an estate entity and on behalf of a private investor.

Contingent Resources Assessment: For an independent Middle East operator GCA performed an independent estimation of the Contingent Resources attributable to a giant oil discovery in Iraq. The assessment was made shortly after the discovery well had been drilled and was based mainly on log data and maps provided by the Operator. It was therefore of a preliminary nature but suggested that oil in place in this platform carbonate reservoir could amount to several billion barrels. GCA's report was used by the client in support of Stock Exchange reporting.

Audit of Reserves/Resources, Iraq: For a Middle East Wealth Fund and for the fourth consecutive year, GCA audited Reserves and Contingent Resources in a large, undeveloped, fractured carbonate oil reservoir in Iraq, for year-end reporting purposes. Two new wells had been drilled since the previous audit, and a significant amount of production testing had been performed. The new data integrated static (Petrel) and dynamic (Eclipse dual-porosity) reservoir models that were used to estimate STOIP and production profiles. GCA audited the models and the resulting estimates, as well as costs and economic limit calculations. Reserves and Contingent Resources were reported in accordance with the definitions and guidelines of the SPE PRMS.

Acquisition Due Diligence: For an East European client, GCA was tasked with providing its independent opinion regarding an investment in some Kurdistan assets in North Iraq. GCA attended a data room where all assets' relevant data were provided. GCA's work provided an opinion regarding the Confidence in the planned production profiles, the Confidence in the Exploration upside and any significant gaps in the cost profiles.

Assistance in Drilling Planning: For a European oil company, GCA carried out a review of material provided by the client on a North Iraq project and relating to significant circulating fluid losses during delineation drilling. GCA concluded that there was little likelihood of reservoir damage. GCA also made recommendations as to the likely causes of the losses and further work which the client might undertake.

Gas Resource Estimates: GCA prepared an estimate of in-place volumes and potentially recoverable volumes on two fields in Northern Iraq as an initial study to obtain investment in the projects.

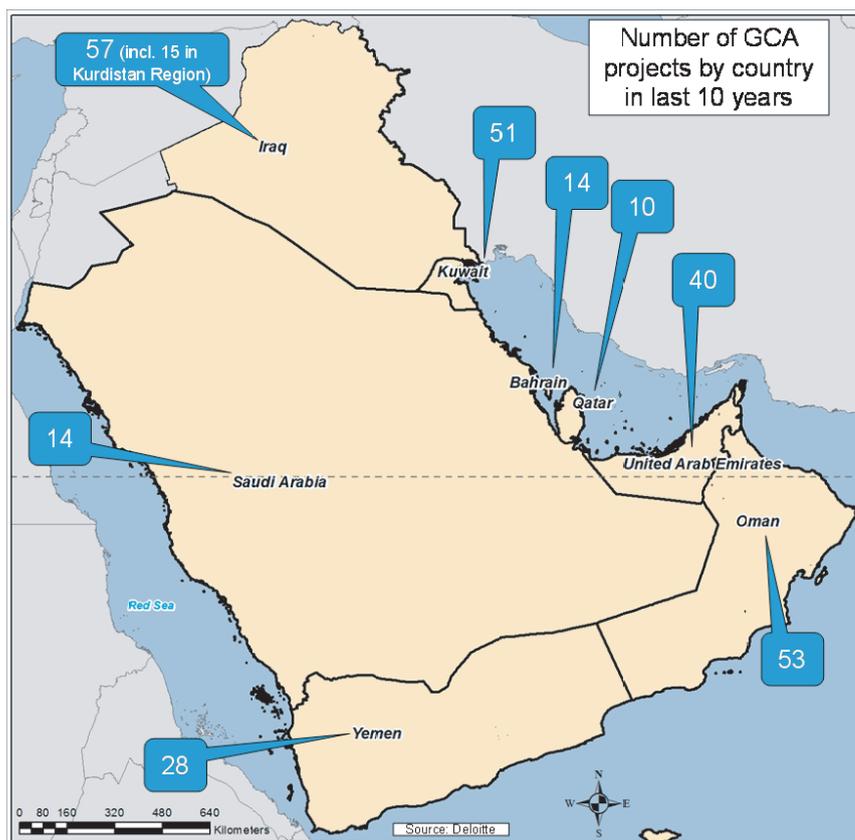
Prospective Resource Audit, Iraq and Worldwide:

GCA was engaged to perform an evaluation of the Prospective Resources and associated Geological Chance of Success for a 'Drill Ready' portfolio. The portfolio consisted of more than 40 prospects and leads (some with multiple reservoir levels) located in proven and productive basins in Iraq, Africa, Latin America and Australia. The Prospects and Leads ranged from near field wildcat opportunities close to existing infrastructure to frontier exploration prospects with the potential to significantly alter the perception of the hydrocarbon prospectivity of the Basin in which they occur.

GCA reviewed all of the data and interpretations provided by the Client and worked closely with the Client's staff in a series of workshops to ensure that the latest interpretation and ideas were included into the analysis. This allowed GCA staff to access all of the ideas and concepts being used to develop this broad portfolio.

GCA undertook a review of the base interpretation (seismic interpretation and depth mapping, seismic amplitude analysis etc) to derive an independent assessment of the prospects and leads. In the evaluation of Prospective Resources, GCA used bespoke Probabilistic evaluation tools (provided by the Client) to generate ranges of resource estimates and to estimate Geological Chance of Success. This generated an alternative assessment to that already derived by the Client. The portfolio developed by GCA through its independent analysis was calibrated to suitable analogs.

Independent Resource Assessment: For an independent Asian oil company, GCA prepared a Reserve, Contingent Resource and Prospective Resource report on its oil and gas assets in Kurdistan. GCA audited the client's geological models plus production statistics and budget



Gas Resource Estimation: For a Middle East client, GCA carried out a review of the available data pertaining to the gas resources of the Kurdistan Region of Iraq with the focus on two known major gas fields. GCA provided volumetric estimates and potential production profiles.

Heavy Oil Field Evaluation: For an African national oil company considering signing a Service Agreement to develop a heavy oilfield in Northern Iraq, GCA was retained to undertake an independent evaluation of the field, focusing on a review of the proposed Service Contract terms and the development of an economic model that incorporates these terms; creation of a number of potential development scenarios with appropriate profiles (production, Capex & Opex) to populate this economic model; and the analysis of the project economics for these potential development scenarios.

CPR for Listing: For a Middle East National client, GCA audited reserves and resources of assets in Russia, Ukraine, Pakistan and four Middle Eastern countries including Iraq. Reserve and Resource reports were prepared for each asset in the form of a Competent Person's Report for an Initial Public Offering on the Main Board of the London Stock Exchange. Prospective Resources were included in the audit, which had a mid-year Effective Date. Resource estimates provided by the company were audited by GCA in accordance with the definitions and guidelines of the SPE PRMS 2007. Most of the assets were oil fields at various stages of development from appraisal to near the end of field life, and the majority in license areas were governed by Production Sharing Agreements and/or Service Contracts. In addition, the company held interests in four gas fields with some previous drilling and production activity, which the company was planning to develop. A new audit was subsequently undertaken by GCA with a year end Effective Date, and GCA continues to provide annual updates.

Reserves Audit, North Sea & Iraq: For the sixth consecutive year, GCA audited Reserves and Contingent Resources of the North Sea and Iraqi assets of a Middle East-based company for year-end reporting purposes. The assets comprised several large, mature oil and gas/condensate fields in the UK sector, mostly operated by the company, a diverse portfolio of mostly non-operated oil and gas fields in the Netherlands, and a large, undeveloped, fractured carbonate oil reservoir in Iraq. Reserves and Contingent Resources were reported in accordance with the definitions and guidelines of the SPE PRMS. GCA audited production profiles prepared mainly using decline curve analysis, and also geological concepts and models for some of the less mature or undeveloped assets, as well as costs and economic limit calculations.

Service Company Assistance: For a major Service Company working for South Oil Company, GCA has provided advice and recommendations on the risk assessment, the determination of potential mitigation measures and quality assurance for some of its projects in southern Iraqi oil fields.

Additional Information

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

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Development Feasibility, Iraq: For a European oil company, GCA undertook an initial review of the available data and documentation to assess the development feasibility of a discovery in northern Iraq. This work was undertaken in conjunction with engineers and geoscientists from both the client and the Iraqi Ministry. GCA's report reviewed the interpretation of all the re-processed seismic data, the interpretation of the digital well logs and of the well test results. These interpretations were integrated to produce an assessment of the oil in place, recoverable oil and recommendations for future work.

Market Assessment: For a Middle East investor wishing to explore the potential for expanding its investment reach into Iraq's oil and gas equipment and services sector, GCA provided an overview of upcoming oil and gas development activities in Iraq, along with an analysis of the likely key activities that would need to be undertaken by developers of southern Iraqi fields, in terms of scope and scale of expenditure. In addition, GCA helped to identify currently active companies in the country's service sector and, in particular, firms who were Iraq-based. For these latter companies, GCA also investigated at a high level the 'fit' of each company's service sector offerings, when compared with the expected requirements of both the client (from an investment potential perspective) and purchasers of oil field services in Iraq.

Full Reservoir Study: For an Iraqi Regional Oil Company, GCA carried out a reservoir study of the Nahr Umr Reservoir in one of its partially developed fields. The scope of work comprised, seismic processing and interpretation, reservoir characterization, static and dynamic modeling, the design of a horizontal side track from an existing well and forecasting for a set of field development scenarios to identify the optimum development option for the field of its projects in southern Iraqi oil fields.

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