GaffneyCline 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 elsewhere.

GCA has a comprehensive knowledge of all internationally recognised Reserves and Resources classification systems and considerable experience in the independent assessment of Reserves and Resources. GCA has a long standing commitment to the development and use of industry standard procedures, through direct involvement in major professional bodies. Indeed GCA currently has two members (including a past Chairman) on the Oil and Gas Reserves Committee (OGRC) of the Society of Petroleum Engineers (SPE), which is tasked with drafting revisions to the SPE Petroleum Resource Management System (PRMS) framework (Figure 1). Utilizing its expertise, GCA regularly provides independent Reserves and Resources reports in line with the SPE PRMS, which is accepted by many Stock Exchanges including London (Main Board and AIM), Australia (ASX) and Singapore (SGX), the requirements of the US Securities and Exchange Commission (SEC), or Canadian National Instrument (NI) 51-101 as required for the Alberta and Toronto Stock Exchanges. GCA also has extensive experience of the former Soviet Union system and its various successors.

Figure 1: PRMS Framework

Reserves & Resources Classification Systems
Over more than 50 years, Gaffney, Cline & Associates (GCA) has undertaken many thousands of Reserves and Resources assessments covering all types of reservoirs and hydrocarbons and all the world’s major petroleum basins. An assessment may take the form of an audit, which involves a review of estimates of Reserves and Resources proposed by the client in order to form an opinion on the adequacy of the data relied upon and the methods used, and ultimately on the reasonableness of the resulting estimates. Alternatively, GCA may undertake an independent estimation of Reserves and Resources based on the data supplied by the client. In addition to assessments and reporting, GCA provides training courses and workshops in the application of the above standards. GCA’s experience is too extensive to provide in detail here, but Figure 2 provides a colour-coded map summarising GCA’s Reserve and Resource experience since 2000, which illustrates the truly global coverage. As most of GCA’s work is confidential, it is not possible in many instances to name clients and specific fields. However, to illustrate further the breadth and depth of GCA’s work, brief summaries of some projects recently undertaken by GCA have been provided on the following pages.
Our Experience

GCA has 50+ years of consulting experience across the breadth of the energy industry in every major sedimentary basin worldwide. Reserve and Resource audit and assessment is the foundation from which GCA has built a truly comprehensive oil and gas consultancy. As it moves towards its 60th year, GCA continues to support its clients by providing unparalleled and independent technical and commercial advice.

<table>
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<tr>
<th>Independent Technical and Commercial Evaluation - Kazakhstan</th>
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<tr>
<td>For many years GCA has provided year end Reserves and Contingent Resources reports for both Sonangol DPRO (the Concessionaire) and P&amp;P (the Operating company). This has involved the independent assessment of oil and gas fields and discoveries; both onshore and offshore in the Lower Congo Kwanza basins of Angola. The Reserves and Contingent Resources reporting is in accordance with SPE PRMS. In addition to annual reporting, GCA has supported Sonangol DPRO and P&amp;P with training and workshops in the audit and independent assessment of Reserves and Resources.</td>
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<th>Reserves and Technical Advisor - Kazakhstan</th>
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<tr>
<td>GCA has been regularly retained by the Turkmen State Corporation, Turkmengeologiya and State Concern Turkmengas to provide independent assessments of the Gas in Place, Reserves and Contingent Resources for the super giant onshore Galkynysh gas field as well as other fields in Turkmenistan. These projects have involved comprehensive subsurface evaluations including geophysical and petrophysical interpretations which were integrated into detailed static and dynamic reservoir models combining all available geoscience and engineering data.</td>
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<th>Review of CO2 EOR in Middle East Reservoirs</th>
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<td>For a Middle Eastern Wealth Fund, and for four consecutive years, GCA audited the client’s Reserves and Contingent Resources estimates in a large, undeveloped, fractured carbonate oil reservoir in Iraq, for year end reporting purposes. In the most recent case, additional wells and a significant volume of production testing had been performed since the previous audit. The new work integrated static and dynamic reservoir models which were used to estimate STOIIP 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 SPE PRMS.</td>
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<td>For a major Indian operator, GCA undertook a detailed analysis and independent assessment of the Reserves for a major development offshore Eastern India. GCA’s Reserves opinion was based on all available geoscience, reservoir engineering and production data. This analysis confirmed a reduction in ultimate recoverable volumes of gas, and highlighted the importance of onshore gas compression to continued field life. Following this assessment, GCA evaluated other nearby gas discoveries that the client is considering for tie back to the field infrastructure. GCA estimated In Place volumes and Contingent Resources for these discoveries.</td>
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<tr>
<td>Review of CO2 EOR in Middle East Reservoirs</td>
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<tr>
<td>For an independent operator, GCA prepared a Technical Specialist Report for a Target Statement to shareholders, following an acquisition of shares. The report included an assessment of the Reserves and exploration potential in and around Coalbed Methane assets in Queensland, Australia.</td>
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<tr>
<td>Review of CO2 EOR in Middle East Reservoirs</td>
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<tr>
<td>GCA recently prepared a comprehensive year end Reserves update for a portfolio of fields in the UK North Sea operated by the client, a mid sized independent company with a strong UKCS focus. This assessment led to an overall increase in Reserves.</td>
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<tr>
<td>Review of CO2 EOR in Middle East Reservoirs</td>
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<tr>
<td>On behalf of an independent Middle Eastern oil company GCA prepared a report on the Reserves and Contingent Resources of an Egyptian onshore Eastern Desert asset which contained several producing oil fields. The majority of the fields are very mature; however opportunities for infill drilling and water injection were identified. Production profiles were estimated predominantly through decline curve analysis and the Operator’s reservoir models were used to underpin the estimates for the water injection project. Reserves and Contingent Resources were estimated in line with the SPE PRMS and GCA prepared cash flows and Net Present Values for each Reserves case.</td>
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For more information about GaffneyCline’s integrated services, please contact your local GaffneyCline office.

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