



Experts in Kazakhstan

**Gaffney,
Cline &
Associates**

Who is Gaffney, Cline & Associates?

Gaffney, Cline & Associates (GCA) is a global consultancy that has been offering technical, commercial and strategic advice to the oil and gas industry for over 50 years. GCA's reputation is for advice and insight which is high-quality, impartial, technically based and commercially astute. GCA is often referred to as one of the leading 'Reserves consultants', but in reality GCA offers the full range of upstream, midstream and downstream, technical and commercial consultancy services. These range from seismic interpretation, static and dynamic reservoir modelling, field development planning, gas monetization, LNG/GTL, mergers and acquisition, economics and project finance. GCA operates worldwide from three main offices in London, Houston and Singapore, and from 12 regional offices located in 11 countries around the world.

Kazakhstan

GCA has provided the above consulting in Kazakhstan continuously since 1991, and has maintained an office in Almaty since 2002. Since that time, GCA has completed close to 200 projects in the country for over 70 different clients. These clients range from small exploration start ups to major oil companies, NOC's and the Government. The projects completed over the past ten years (see Table 1) have been similarly varied in nature; including Independent Reserve opinions, Asset Valuations for acquisition, Exploration studies, Field Development Plans, Gas Utilisation studies, Pipeline Export studies, Independent Expert for Arbitrations and a wide range of other assistance. Brief summaries of a limited selection of these projects are provided below.

Stock Exchange Listing of KazMunaiGas E&P: For the Initial Public Offering (IPO) of KazMunaiGas E&P on the London and Kazakh Stock Exchanges in 2007, GCA provided the Competent Person's Report (CPR) in support of that listing. This work involved the provision of an independent Reserve and Value opinion on the entire KMG EP portfolio, together with considerable coordination between the Banks, the Stock Exchange and KMG E&P. The listing raised nearly \$2.5 billion, and GCA has undertaken annual reserve updates for many years since that time.

Technical audit of the Kashagan Field: As part of a potential corporate re-organization of KMG, GCA was appointed as KMG's Reserve and Technical Advisor to review the reserves, resources and field development plans of the giant Kashagan field and four smaller satellite discoveries. The field is the subject of one of the largest international oilfield investments, located offshore in the northern Caspian Sea. Working closely with the clients' Financial Advisers, GCA reviewed the operator's static and dynamic models, and the main project risks, including gas sales versus injection, construction, operations and sulphur disposal. The scope of work included site visits during facilities construction.

Independent Technical and Commercial Evaluation of Karachaganak Field: GCA provided a detailed assessment of the giant Karachaganak field on behalf of KMG and the Lenders, in support of an equity acquisition. The work included an audit of the Operator's static and dynamic models, to determine future production potential under a range of potential redevelopment options, an analysis of future Capex and Opex and development schedules for each of these options, plus preparation of appropriate cashflow forecasts to support the Lender's valuation of the asset. This involved close cooperation with the Operator, including site visits, discussion and analysis of future development potential, assessment of export constraints and examination of alternative gas utilisation options. GCA provided independent cost estimates for each option as a check on the operator's own estimates.

Reserves Update: GCA conducted an updated assessment of the Proved, Probable and Possible Reserves estimates for the Airankol onshore field located in the south-eastern part of the Pre-Caspian Depression and of the South Emba Petroleum Region, Kazakhstan. GCA utilized an analytical performance driven methodology (DCA) to estimate the volumes for the three reserves categories. GCA's production forecasts were based on scenarios derived from a review of the supporting data.

Subsurface Technical Analysis: On behalf of a non-operating independent company, GCA reviewed the geology, seismic interpretation, petrophysics, fluid analysis and production test results for a thermal pilot in two deep heavy-oil deposits in eastern Kazakhstan. The review resulted in alternative interpretations for the seismic analysis and static model, and identified petrophysical factors which helped to explain the production test results. Recommendation for improved testing and alternate production technologies were made.

Table 1.

| Kazakhstan Projects in the Past 10 Years | |
|--|----------------|
| Job Category | Number of Jobs |
| Reserves | 34 |
| Block/Asset Review | 29 |
| Field Development Studies | 20 |
| Arbitration/Expert Opinion | 5 |
| Geoscience Assistance | 3 |
| Gas Utilization | 3 |
| Other | 3 |
| Total | 97 |

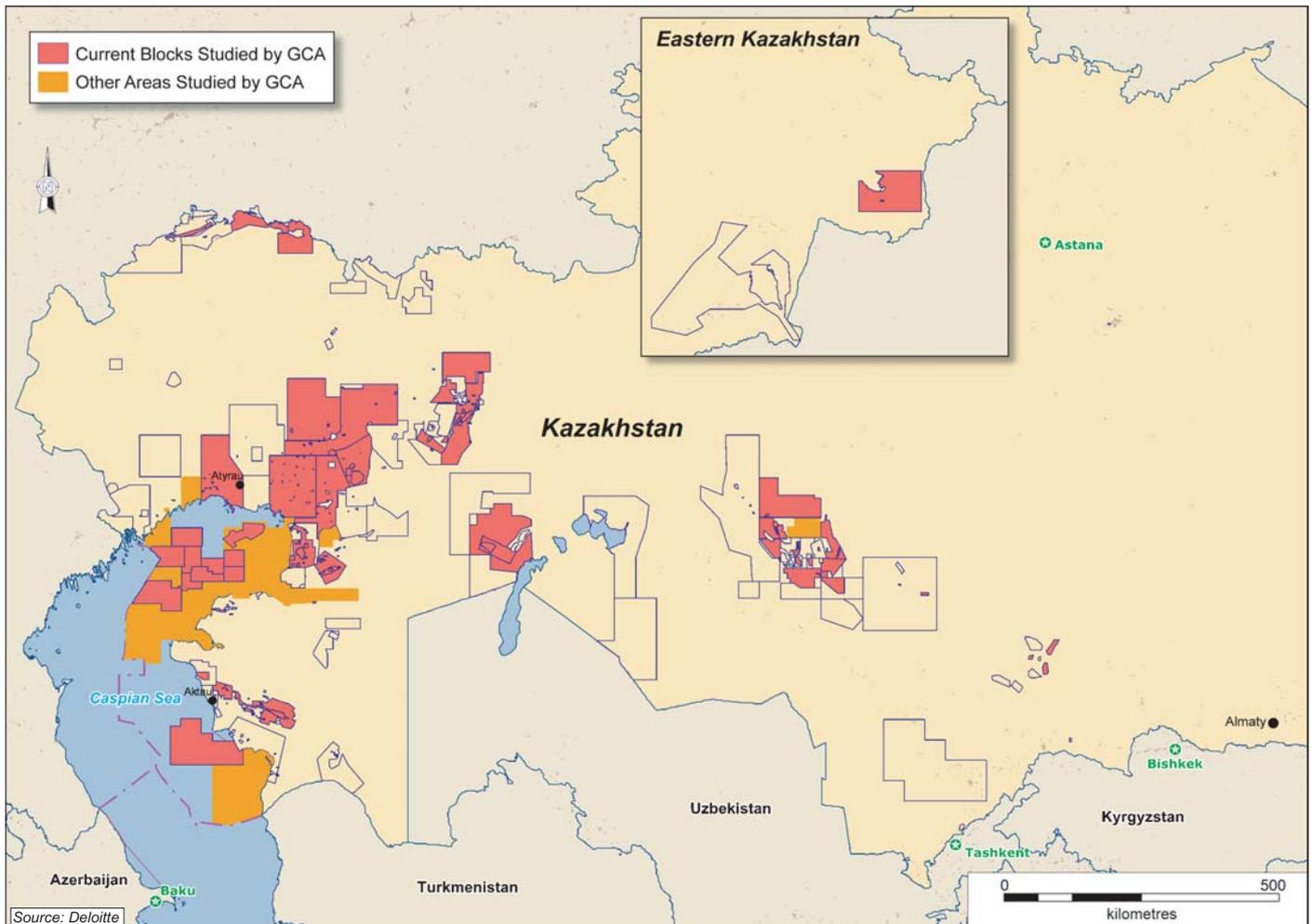
Technical Opinion Acquisition: On behalf of a Private Equity Fund, GCA reviewed the Prospective Resources of a block in the Pre-Caspian Basin from a geological and economic perspective, with a view to a possible acquisition. The work included an assessment of the validity of previous seismic interpretations, prospects and leads generated, as well as volumetric assessments. An economic analysis was then undertaken on the Prospective Resources, with a range of assumptions applied. Recommendations concerning the commercial viability of these prospects were made based on this analysis.

Associated Gas Utilization Study: GCA conducted an associated gas utilization concept and feasibility study for a new field development on behalf of an independent oil company. GCA assessed various options for the handling of gas volumes which exceeded requirements for in-field needs and offtake via limited sales gas exports. The study also focused on short-term utilization for peak gas production with flaring not an option. The work involved identification and screening of gas utilization options; pure commercialization options were considered, as were hybrid options which might improve on-site gas management, including in-field and utility load demands. Options considered included: local community schemes, product exports (including power generation, GTL and domestic industrial fuel), as well as gas storage to conserve gas for use later in the PSA's life.

GCA used a series of screening and analysis steps to filter unsuitable gas utilization options, leading ultimately to one proposed recommendation that best satisfied agreed selection criteria. Throughout the work, progress on narrowing down possible gas utilization solutions was facilitated by regular workshops with the client to discuss solutions and shortlist options.

Acquisition Due Diligence: A major international Joint Venture retained GCA to undertake due diligence on three Kazakh assets, including an exploration block, a producing licence and a major pipeline, in order to support the client in a possible acquisition. GCA visited the data room and carried out a range of sub-surface, engineering, cost and economic reviews of all assets in order to generate asset valuations for use by the client in their bid process.

Insurance Assessment: GCA was commissioned by a firm of insurance underwriters to carry out an independent well site survey. The survey included a review of drilling and producing wells to assess blowout and pollution risks for insurance underwriting purposes. GCA also evaluated the operating conditions, the type and specification of well equipment, and the procedures and practices utilised to ensure safe operating conditions.



Improved Productivity Assessment: GCA was engaged by a Russia-based international oil company to benchmark their operations in Kazakhstan in terms of reservoir characteristics and performance. GCA reviewed the operational and reservoir information for the three assets in question and then benchmarked these assets against other international fields based on GCA's experience and databases. GCA provided guidance and recommendation as to potential improvements in operation and development of the fields based on the assessment and concluded the study with a workshop to the client explaining in detail potential improvements to their technical personnel.

Field Redevelopment and Rehabilitation, Uzen Field:

Although over 10 years ago, a significant project reflecting GCA's country expertise was undertaken by GCA for the national oil company and under World Bank funding, to provide a 20-man team of staff to work both in the UK and in Kazakhstan to develop plans for, and to supervise the implementation of, a pilot rehabilitation of a block in the giant Uzen oil field. This resulted in a doubling of oil production, a major review of all operating procedures that has been transferred to the rest of the oil field.

Additional Information

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

Europe, Africa & Russia Caspian

United Kingdom
Bentley Hall, Blacknest,
Alton, Hampshire
GU34 4PU, United Kingdom
Tel: +44 (0)1420 525366
+44 (0)1420 526700
GCA.BD.London@gaffney-cline.com

Americas

Houston
5555 San Felipe Street
Suite 550
Houston, TX 77056
USA
Tel: +1 713 850 9955
GCA.BD.Houston@gaffney-cline.com

Argentina
Edificio Puerto León
Juana Manso 205, piso 3
Dique 4, Puerto Madero
C1007CBE
Buenos Aires,
Argentina
Tel: +54 11 4378 6497
GCA.BD.BuenosAires@gaffney-cline.com

Asia Pacific

Singapore
80 Anson Road, #31-01C
Fuji Xerox Towers
Singapore 079907
Tel: +65 6225 6951
GCA.BD.Singapore@gaffney-cline.com

GCA PROJECTS IN KAZAKHSTAN OVER PAST 10 YEARS:

- 97 Projects
- 70 Different Clients

The work involved joint GCA/client teams to re-map selected parts of the field as a prelude to redesigning the water-flood scheme and to planning a major work-over programme. In addition, a significant programme of overhaul and rehabilitation of the surface facilities was designed.

Annual Reserve Update: For an independent operator, GCA conducted multiple year end independent evaluations of the client's reserve estimates for a series of fields in Western Kazakhstan. GCA's work was based on well and reservoir data plus field performance and the client's five year business plan.

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