

#### Knowledge

D&M has evaluated feedstock gas reserves for almost every major LNG plant constructed.

#### Integrity

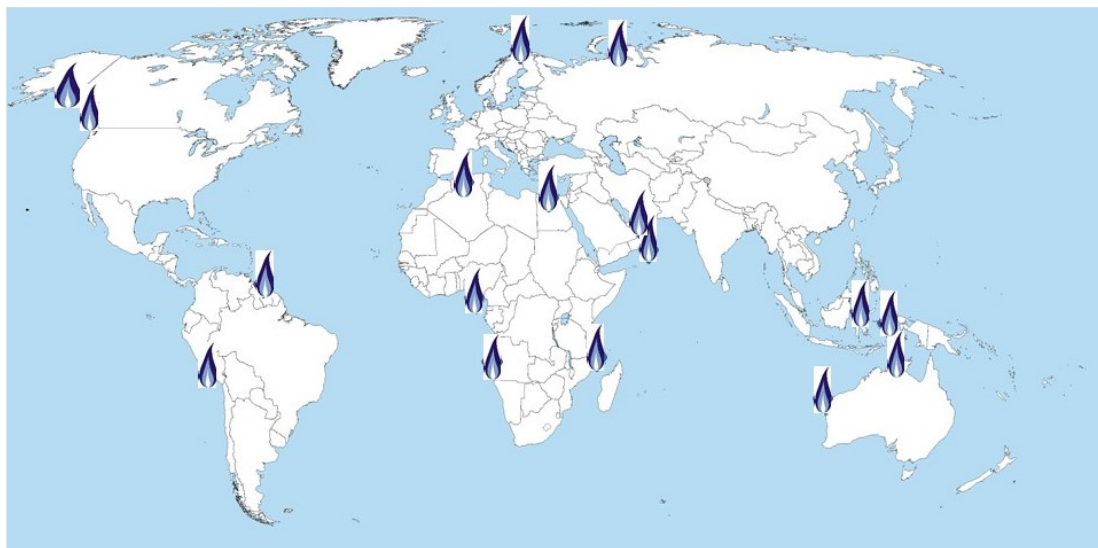
D&M reserves and resources reports have been used to guide development plans and financial plans for multi-billion dollar LNG plants around the globe. D&M has even helped clients understand LNG opportunities connected with prospective resources so companies can develop long-term plans.

#### Service

The firm uses industry-standard methodology and the latest technology tools to quantify and evaluate opportunities for LNG development projects.



## LNG Expertise That is Hard to Beat



*Across the globe, LNG export plants are being constructed and planned, and many of the partners in these projects are tapping into DeGolyer and MacNaughton's expertise to help them understand the volume and composition of the gas reservoirs to feed pipelines and plants.*

### Fifty Years of LNG Expertise

DeGolyer and MacNaughton (D&M) is an industry leader in the evaluation of oil and gas reservoirs, and since the late 1970s has been involved in nearly every major initiative to evaluate reserves and resources for LNG plants. With a deep history in LNG plant projects and a large team of seasoned professionals to support this work, D&M is well positioned to engage one of the fastest-growing energy markets. Some estimates predict global LNG production capacity could more than double by the end of the decade. According to the IEA, this growth will require a \$250 billion investment in liquefaction plants, coastal regasification import terminals, and special LNG tankers over the next 30 years.

D&M is working with clients who are deeply involved in the LNG market across the globe. Our expertise encompasses the following:

- Supply analyses to support LNG plant planning
- Economic and commercial assessments of fields that will be incorporated into LNG projects
- Petrophysical and geological analyses as part of reserves and resources evaluations

With the largest independent consulting staff in the petroleum industry, D&M has a high level of expertise estimating potential hydrocarbon volumes and values. D&M has completed these types of analyses for LNG projects in key centers of gas supply worldwide.

D&M incorporates its expertise in estimating recovery and deliverability from gas reservoirs into its analysis of long-term supply and production profiles for LNG plants. This can increase understanding of the commercial risks for LNG plant operators. D&M is also able to use its sophisticated simulation-modeling resources to simulate flow rates and reservoir performance under different development plans. This enables D&M to provide valid perspectives on total gas in place, estimated recoverable gas volumes, and the life of a field.

Economic modeling of each gas reservoir incorporates various economic factors and development practices based on the potential resources quantities estimated. These economic factors include the following:

- Operating expense/capital expense
- Deliverability profiles
- Facility limitations
- Depreciation and taxes
- Development well and facility costs
- Development timing
- Abandonment costs

The firm's history with LNG projects began in Algeria in the late 1970s. It has provided support for projects in Angola, Australia, Egypt, Indonesia, Nigeria, Norway, Peru, Russia, the United States, and Yemen. Today, D&M is most active with LNG projects in Africa and Australia.

#### Support

D&M's personnel travel around the world to provide one-on-one support to clients, and D&M staff can be available 24/7 for conference call consultations.

#### Advanced Technology

D&M has made significant investments in computing resources to ensure that it can help clients evaluate gas reservoirs.

#### Solutions

D&M's reports are preferred by the financial and petroleum industry because of consistency in approach, application of unique tools and experienced exploration staff, technical objectivity, and compliant reporting formats.

## D&M Validates Platform for Kitimat LNG Plant

The Kitimat LNG facility in British Columbia will play a central role in the future of the energy export business in North America when it comes on line. Over the past several years, as the project moved through its planning stages, D&M performed multiple evaluations of the fields in British Columbia and Alberta that will feed this plant. These evaluations gave the initial partners in the Kitimat venture the confidence they needed to invest, pursue additional partners, and create the business model for the plant, which could one day process as much as 10 million metric tons of LNG per year.



Serving multiple oil company investors, D&M not only performed the reserves studies, but also provided economic data that were used to build the financial performance models for the plant. D&M's reports carried enough weight with the regulators, the investment community, and the oil company operators to enable these parties to move more confidently as they examined development plans to bring the facility on line.

## Ichthys LNG Project

The Ichthys field, located in the Browse Basin off the coast of Western Australia, will provide the feed gas for the Ichthys LNG Project. The planned initial capacity for the facility is 8.4 million tonnes of LNG per annum and 1.6 million tonnes of liquefied petroleum gas per annum. The project is currently under construction and slated for first production in late 2017 to early 2018. D&M served as the independent technical advisor tasked with certifying the reserves for the project. Initially D&M was engaged by the working interest owners, and later D&M was hired on behalf of the lenders for project.

In the process of estimating the reserves attributable to the field discovery, D&M incorporated independent interpretation of 3-D seismic data; evaluated the log analysis of the available wireline data, calibrated to core data; prepared a geomodel for use in estimating original gas in place volumes; evaluated the future estimated production deliverability based on the plan of development; and evaluated the various product streams at points downstream of the wellhead. D&M's technical expertise and wealth of experience in performing gas certifications provided confidence not only to the working interest owners seeking an independent opinion on reserves, but also to the financial advisors tasked with performing due diligence. With D&M as an advisor, the business partners connected with the Ichthys Plant were able to make smarter decisions.

### SERVICES AVAILABLE

- Volumetric estimations
- Petrophysical and geological studies
- Reserves and resources studies
- Economic modeling



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