Decisions and Optimal Appraisal Planning for LNG Gas Supply: A Case Study

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A 5 MMtpa LNG plant is going to be built in West Africa. This multi-billion dollar project will receive associated gas from existing oil fields, oil fields which have been discovered but are as yet undeveloped, and future discoveries. The LNG facility is sized to take near-term associated gas at rates that will not impede oil production, but not too large so as to retain a reasonable probability of continued full capacity for as long as possible. Unfortunately, as the current associated gas fields decline the plant will fail to maintain liquefaction at full capacity without sources of additional gas. Four non-associated gas sources of uncertain size are known to exist within the gas supply area for the LNG plant. An appraisal and development plan was required that maximized throughput of the LNG facility while providing sustained domestic gas supply and a foundation for infrastructure development. Questions remained as to the order, number, and extent of appraisal required to ensure adequate production capability.

Each non-associated gas field requires appraisal, development, facility design, and tie-in prior to being able to contribute to gas supply. Factors taken into consideration for the decision on the appraisal order and specific appraisal location included specific field learnings and risk reduction, contribution to gas supply uncertainty reduction, ease of tie-in, ability to delay significant capital investment, and most significant of all, the extent of demand from the LNG plant. Qualitative and quantitative decision methods were used.

An integrated multi-disciplinary decision-based approach allowed a plan that will maximize value to the project and provides a certainty of supply sufficiency.