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## **Use of Probabilistic Methods to Assess a Portfolio of Conventional and Unconventional Resources**

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### **Abstract**

Recoverable hydrocarbon resource assessments underpin decision making and business planning in the oil and gas industry. Understanding the uncertainty associated with the resource assessments are key to sound decisions that are robust against low or high outcomes. This paper outlines a probabilistic approach to resource assessment in order to characterise resource uncertainty in a portfolio containing primarily Coal Seam Gas resources.

The Probabilistic Resource Assessment (PRA) process outlined in this paper allows calculation of risked and unrisked probabilistically derived commercially recoverable resources at a field or permit level as well as at a portfolio level. This process incorporates Undiscovered (“Prospective”) resources and Contingent Resources as well as resources that are producing or are under development. The key steps in this process include: definition of input distributions, probabilistic calculation of technically recoverable resources at a field level, estimation of economic chance of success, probabilistic estimate of commercially recoverable resource and aggregation of resources to a portfolio level.

This process has been applied within an integrated joint venture supplying Liquefied Natural Gas (LNG) and domestic gas markets. The process has been used primarily to understand the uncertainty range of the total resource as well as the production profile within the upstream portfolio. Sensitivities to product prices or development costs can be investigated to enable a deep understanding of the key drivers and variables of the resource assessment.

Various methods for determining recoverable hydrocarbon resources have been well documented. Broadly speaking, these methods can be categorised as probabilistic methods and deterministic methods. Typically, unconventional resources are assessed using deterministic methods. The process presented here is a robust probabilistic approach to determine a risked view of recoverable resources within an entire portfolio including both unconventional and conventional resources.