

Realizing the Potential of Decision-Making Under Uncertainty

Mackie, Steven I., Chris Smith, and Matthew Welsh, University of Adelaide, Adelaide, Australia

Over the past few decades there has been strong uptake, at the exploration end of the oil and gas industry stream, of probabilistic decision-making. This has not, however, been reflected at the more downstream development and production end of the oil and gas decision-making spectrum. Improving decision-making relies on understanding the types of decisions being made in the oil and gas industry and ensuring that optimal decision processes are implemented in these real world decisions so as to maximise the chances of good outcomes.

There has been much work carried out, within cognitive psychology, in observing how people actually make decisions. Little work, however, directly relates these findings to the specific decision-making circumstances of the upstream oil and gas industry. Nor has there been work on how the insights stemming from psychological research might be used to improve decision-making in the industry.

This paper documents the theoretical differences between exploration, development and production decision-making and marries this with observations as to how decisions in these fields are currently being made and suggests how decisions of the observed types should be made.

A primary observation is that different types of decisions require different decision-making approaches in order to achieve optimal outcomes. The implications of this conclusion are examined in relation to the question of the application of deterministic versus probabilistic tools, data and processes to a variety of oil and gas decisions including reserves calculations.