

HGS International Explorationists Dinner Meeting, November 20, 1995

Prospect Risk Assessment: Past, Present, and Future

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The foundation for exploration prospect risk assessment was established in the late 1960s and early 1970s by work in the planning or research departments of the majors. The 1986 oil price collapse caused an industry-wide reassessment of exploration performance. Exploration departments found that their ability to predict results was poor, or varied from area to area, and that post-appraisal schemes were weak or non-existent. As a result, many companies established risk assessment systems. At Amoco, we built a robust, open computer system and database that has stood the test of time. After developing this stable platform, we focused our efforts on the process of risk assessment. The foundation of our process is the description of the complete petroleum system. We consider the risks associated with 11 components of the system, and the effect of 13 factors on resource size. In practice, the focus on particular aspects of the petroleum system changes as the prospect matures.

The complete process consists of four steps: Early Risk, Decision Risk, Drill Risk, and Post-well Appraisal. Early Risk is an assessment of play and/or prospect quality at the concept or lead stage. The hydrocarbon charge elements and broad structural trends are particularly important at this stage. The

assessment is focused on risk identification and the technologies and data required to clarify the risks. Decision Risk is an assessment of the prospect or play risk just before we make an investment decision. Internationally, this often happens when a prospect is evaluated in a competitive bid round. The focus is on the level of technical risk, the range of possible resource sizes, and the risk-weighted economics of the opportunity. The output of decision-risk assessment is used to compare the opportunity to the company's current portfolio and strategic goals. Drill Risk is the final assessment of risks and resource size. The focus is on the integration of all data into the risk assessment. These days we often incorporate exploration 3-D surveys into the drill-risk assessment. Accurate mapping of the trap and detailed fault plane or seal analysis are important considerations at this stage. Post-well Appraisal reviews the results of all exploration wells, both the successes and failures. We establish the main reasons for failure and the sources of error in the measurement of resources. We post-appraise the technologies and logic that led us to a particular level of risk. The risk characteristics from the drilling results are fed back to the Exploration Technology group to establish areas for research and development. The post-appraisal data is critical

in our effort to become and remain calibrated on a portfolio basis. These four steps, as well as the future of prospect risk assessment, will be discussed fully in the presentation, and examples from Amoco's database will be shown.

Biographical Sketch



Pete Carragher is the Manager of Prospect Quality for Amoco's Worldwide Exploration Business Unit. He has been involved in Amoco's risk assessment process since its inception

in 1989, and currently leads Amoco's Prospect Quality Team. Previous responsibilities at Amoco include the Director of Basin Analysis in Amoco's New Ventures group, Exploration Supervisor positions in West Africa and Far East operations, and North Sea projects, ranging from license rounds to field equity studies. Pete graduated from King's College, London in 1974, after which he worked for three years in a small UK consulting firm, V.C. Illing & Partners, on a wide variety of projects. ■