



Chapter I

An Experiential Case Study in IT Project Management Planning: The Petroleum Engineering Economics Evaluation Software Imperative

Charles K. Davis, University of St. Thomas, USA

EXECUTIVE SUMMARY

The case covers key issues in information technology project management. It deals with developing a full set of project plans, including milestones, tasks, schedules, staffing, deliverables, and projected costs, for a complex software development project (Gido & Clements, 2003; Kerzner, 2003; Schwalbe, 2002). The essence of this case is the analyzing of a specific organizational setting with critical software needs and the developing of the needed plans. As in many similar situations, this organization is relatively complex, and the situation is not entirely clear. By reviewing the facts of the case, collecting outside information, conducting role playing interviews, analyzing requirements, and estimating schedules and costs, one can collect the information needed to develop baseline project plans for the software development envisioned in this case.

ORGANIZATIONAL BACKGROUND

This case is set in the oil and gas industry, in a family-held engineering consulting firm. This firm is a leader in its markets and wants to develop and extend its competitive advantage, and profitability, by developing sophisticated applications software for its engineers to use to leverage and extend their work product.

Petroleum engineers are professional engineers who evaluate the potential yields of oil and gas properties around the world. Petroleum engineering is essentially a branch of chemical engineering in which the principles of chemistry, chemical engineering, and geology are applied to the study and understanding of discovered petroleum deposits in the ground. Because the petroleum products reside in pockets or strata in the underground rock formations called *reservoirs*, petroleum engineers are also often referred to as reservoir engineers.

This analysis of petroleum deposits under the ground, generally referred to as oil and gas reserves, is extremely important to the companies in the oil and gas industry. Obviously, in the petroleum business, companies view their level of reserves as a critical asset. The process of extracting the petroleum from the ground once it has been found is called *producing*. The value of an oil or gas field is determined by the volume of oil and gas it will produce. It is, therefore, of the utmost importance to be able to estimate with a high degree of accuracy both the rate of production over time and that point in the future when a given producing property will stop producing.

The value of an oil or gas field is a function of two factors, how much oil and gas the field will produce and prices, the price per barrel of crude oil and the price per million cubic feet of natural gas, over the life of the field. One way an oil or natural gas company can assess its economic health is by analyzing its producing properties, estimating the amount of producible reserves it has in the ground, and forecasting the selling price of these reserves in the future when they are expected to be produced. By doing this, companies can project the dollar value of their petroleum reserves, a crucial indicator of their ongoing business viability. This process is called a *reserves economics evaluation*.

The value of a firm's petroleum reserves affects everything from its stock price to its ability to borrow money from banks to fund the unending search for new oil fields. Clearly, the companies have a vested interest in convincing the world outside that they are holding large reserves of high value. So the pronouncements by the oil and gas companies about their levels of reserves are generally viewed skeptically by the banks and financial markets without the *opinion* of an objective, highly credible, outside agent that can attest to the value of the reserves on hand for a given company. This is a case about a company that provides as a service just these kinds of assessments of the economic value of petroleum reserves and its need to develop a sophisticated software system to support and enhance its work. This case focuses on the project costing, work-breakdown scheduling, and humanpower loading needed for this software system.

Hopkins & Associates is a consulting engineering firm. It consists of oil and gas reservoir engineers who provide independent evaluations of the reserves for oil and gas properties. Like a major accounting firm auditing the books of a client on the NY Stock Exchange, Hopkins "audits" the oil and gas reserves for a given company and issues an opinion as to their value. For example, if an oilman who is short on cash wants to borrow money to drill new wells, a bank might come to Hopkins to assess the oilman's properties to determine if he would be able to pay back the loans if he did not strike oil with the new

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