

AAPG HEDBERG CONFERENCE
“Paleozoic and Triassic Petroleum Systems in North Africa”
February 18-20, 2003, Algiers, Algeria

Optimising The Development of a Multi-field Gas Resource: The In Salah Gas Project, Algeria

Tourqui, A. (Sonatrach) & Bishop, C.D (BP Algeria)

In Salah Gas is a joint venture project between Sonatrach and BP that will deliver 9 billion cubic metres par annum (bcm/a) from eight gas discoveries in the Ahnet-Timimoun Basin of Central Algeria. Prior to the sanction of this project in early 2000, an Exploration and Appraisal (E&A) program was undertaken during 1996-99 to reduce uncertainty in gas volumes and deliverability, prove additional reserves, and demonstrate commerciality of the development.

During the development drilling phase in 2002 and 2003, continued optimisation of the well designs and placement will ensure delivery of the ISG production profile, with a high level of assurance and in a cost effective manner.

Prior to the E&A program, sub-surface uncertainties were identified and ranked by quantitative assessment of alternative appraisal options and their impact on project value established through a value of data exercise and analysis. This analysis was used directly to define objectives for the E&A program that comprised acquisition of 2D and 3D seismic data plus the drilling of 9 wells

Key objectives of the appraisal activity were to assess the connectivity of conventional Devonian reservoir intervals, evaluate tight gas reservoirs, assess the contribution of fractures to well deliverability and gain an understanding of Carboniferous reservoir distribution using 3-D seismic imaging. Four Extended Well Tests (EWTs) were a key part of this program.

Optimisation of the exploitation and sequencing of the 7 fields' development led to significant cost savings. This work was guided by an in-house cost-based optimisation tool, which captured pipeline , facilities, wells and subsurface performance and behaviour . This tool provided the means for screening multiple development configurations and allowed these to be ranked for both cost and assurance on deliverability.

The produced CO₂ (450bcf) will be re-injected and stored in the subsurface as part of Sonatrach and BP's commitment to reduce greenhouse gas emissions. Two or three dedicated horizontal injection wells will be drilled and infrastructure will be put in place to facilitate storage of CO₂ produced from all eight fields.

The ISG development plan includes a diverse set of well designs, to exploit the range of reservoir configurations present and obtain the maximum cost benefit from use of existing appraisal wells. Data and experience gained during the development drilling is being used to optimise subsequent well designs to ensure safe and cost-efficient delivery of the required production profile.

The authors acknowledge the substantial contribution to material contained in this paper by colleagues at In Salah Gas notably Rachid Froukhi, Abdekader Aissaoui, Fred Riddiford, Brian Taylor, Erik Hulm, Neil Davis, and Mark Smith.