Bahrain opened its doors to the international oil industry in March when it hosted the 5th Middle East Oil Show and Exhibition, organized by the Society of Petroleum Engineers. The show was claimed to be the best for years and attracted almost 800 delegates, 21% of whom travelled by road from Saudi Arabia across the newly-opened Bahrain-Saudi Arabia Causeway.

Three conference rooms were needed to cope with the 93 papers which were presented in 18 technical sessions between 7-10 March at the Exhibition Centre in Manama. As usual, a wide range of oil industry topics were covered, from reservoir engineering, geology, geophysics, to formation evaluation, well completions and field development.

Top-level speakers from the world’s major oil companies dominated the conference proceedings. Representatives from organisations such as ARAMCO, BANOCO, BP, CFP, GUPCO, IFP, KOC, Mobil, Pakistan Petroleum, PDO, QGPC, TPAO and Zadco all presented papers at the meeting.

The exhibition also reflected the international nature of the Middle East Oil Show and featured more stands than ever before, with a particularly strong presence from Saudi Arabian exhibitors. According to the exhibition organisers, 3,353 people visited the four-day event.

Bahrain’s Prime Minister, His Excellency Shaikh Khalifa Bin Salman Al Khalifa, took considerable interest in the stands during his inaugural tour of the exhibition.

His Excellency Yousuf Al-Shirawi, Bahrain's Minister of Development and Industry, presided at the opening ceremony and welcomed the visitors to Bahrain. In his keynote address he commented on how the fall in the world price of oil has meant that all producing countries have had to make maximum use of the latest technological developments in production and refining to ensure the highest level of returns.

Conference Chairman, Faisal J. Al-Kazmawi, Deputy Managing Director of Operations for the Kuwait Oil Company, also emphasized the need to embrace new technology in his keynote speech to the conference delegates.

“Though we are confident that oil will continue to meet a considerable part of world energy requirement until the middle of next century, the enormous decline in oil reserves calls for concentration on research and development, devising suitable applied technologies for reservoir development, rationalizing consumption of various types of energy and development of natural gas fields so as to meet the anticipated shortage in world oil production by the turn of this century.”

SPE President, Lyn Arscott, made a reply to Mr. Kazmawi’s speech in which he looked at the significance of the Middle East in terms of world oil reserves. He said that proven world oil reserves total 760 billion barrels with an expected ultimate recovery of 1.5 trillion barrels. "This expected ultimate recovery for world oil reserves will last for 75 years at current consumption rates. About 75% of the world’s proven reserves are here in the Middle East. Also of interest is that of the 40 or so supergiant fields in the world (those containing more than 5 billion barrels), the Middle East holds about 70%," said Arscott.

Arscott highlighted how the recent instability in oil prices had a significant and worrying effect on the education of petroleum engineers. “Petroleum
engineer enrollment in universities decreased from about 10,000 in 1982 to 3,000 today. This is a matter of some concern to us when we consider the need for professional skills through the '90s.

The SPE President urged the industry to continue training engineers and carry on its "glorious historical record of petroleum technology development". He pointed out that we still need to obtain a much clearer picture of the geological character of reservoirs so that we can improve recovery. Arscott also said there was a need for improved logging techniques while drilling to measure abnormal situations ahead of the bit.

According to Arscott, about 4,000 SPE members work in the Middle East and, because of the area's vast resources, he expected the influence of the region to grow. "I am hopeful that when we review the technical accomplishments of the '80s and '90s we will count many of the natives of this area among the distinguished contributors to the development of petroleum engineering."

Speakers from the Middle East made a considerable impact at the March meeting. Conference delegates attending the geological sessions were brought down to earth, so to speak, by J. A. Samahiji and A. N. Chaube (Paper No. SPE 15697) of the Bahrain National Oil Company, who explained the evolution of the oilfield a few thousand feet under the conference hall - the Bahrain Field. The field was discovered in 1932 and the large volume of data that has been collected in the intervening 55 years offers some fascinating aspects for study. Samahiji and Chaube placed the Bahrain Field in the context of the geological framework of the Western Gulf and showed how the hydrocarbons are located in a salt-related anticline at the edge of the stable Arabian Platform.

The authors studied the structural growth of the field and made some interesting comparisons between the distribution of hydrocarbons within the Bahrain Field and those of nearby fields. They also outlined the possible sources and times of generation of hydrocarbon in the field for various reservoir zones and said that the information generated by the study had implications for exploration of areas surrounding the Bahrain Field.

The general geology of The Gulf region was also considered in a paper given by P. R. A. Wells of the Qatar General Petroleum Company (Paper No. SPE 15683). Wells explained how a hydrodynamic model has been used to account for oil and gas occurrences in the Cretaceous, offshore Qatar. He pointed out that variable and inconsistent fluid levels, formation water potentials and salinities could not be explained by combinations of stratigraphic and structural trapping. Wells believes that a vigorous hydrodynamic system pervades the Cretaceous of the The Gulf region. High water
Kuwait’s stand was one of the largest at the exhibition. Eleven authors from Kuwait also presented conference papers.

According to Wells, the location and shape of the oil and gas accumulations in the Nahr Umr and North Areas are strongly determined by this hydrodynamic activity. In a more general conclusion, Wells stated that the region where hydrodynamic trapping may occur extends from Iraq to Oman. “The location and shape of oil and gas accumulations within the Cretaceous in this region are likely to be influenced to a greater or lesser extent, depending on the local structure and vigour of flow, by hydrodynamic activity. Exploration and appraisal of this region should consider the possible effects of this hydrodynamic activity on the distribution of hydrocarbons”, states Wells.

Two other authors from QGPC, D. Munn and A. F. Jubralla, considered Qatar’s oil resources in detail. In their paper (Paper No. SPE 15699) they explained how the development of a sophisticated geological model of the Arab D Reservoir in the Bul Hanine Field—the most important of Qatar’s offshore fields—had led to a greatly improved permeability profile of the reservoir.

The geological model was constructed by subdividing the reservoir into 52 rock/pore type layers for which sets of petrophysical parameters could be defined (porosity versus permeability relationships, capillary pressure curves, formation resistivity factors and resistivity index).

Several of the conference papers concentrated on recent studies carried out on hydrocarbon-bearing areas of Abu Dhabi, UAE. G. Loutfi and M. M. Abdel Sattar of the Abu Dhabi National Oil Company,
considered the geology of the Abu Dhabi area (Paper No. SPE 15698). The authors reviewed the geology of the Triassic formations in Abu Dhabi based on data from deep drilling tests. So far, no hydrocarbon production is associated with the Triassic succession in Abu Dhabi, although it does produce oil and gas in neighboring countries. The authors gave a tentative evaluation of the hydrocarbon potential of the Triassic in Abu Dhabi and concluded that, although less promising than the Jurassic and Cretaceous formations, the Ghalayn Formation holds the best prospects. The Triassic Miranj Formation also has some potential as its sedimentary pattern and characteristics could develop hydrocarbon traps.

S. R. Azer and A. M. Borai of the Abu Dhabi Marine Operating Company gave an overview of the formation evaluation of recent discoveries in the Thamama, Arab and Azaej reservoirs, offshore Abu Dhabi (Paper No. SPE 15744). They pointed out that there appeared to be drastic discrepancies in some areas between well logs and the results of well testing. In some cases, wells which tested water-free hydrocarbons were indicated to be water-bearing on well logs. In an effort to improve water saturation calculations, Azer and Borai examined several anomalous results to determine the factors which affected log measurements. They concluded that the discrepancies between log interpretation and test results are mainly due to the presence of non-connected porosity, the deep invasion of mud filtrate, the presence of thin beds, and the use of an improper cementation factor.

I. A. Al-Jishal of the Arabian American Oil Company gave an excellent paper in which he described the detailed geological and reservoir characteristics of the Khuff Formation in the supergiant Ghawar field, Saudi Arabia (Paper No. SPE 15745). He showed that the Khuff Formation is complex, having a very irregular porosity distribution. Some wells, located in the most promising structural positions, found rock of low porosity. He showed that the irregular nature of the Khuff means that prediction of reservoir characteristics should only be made short distances from wells.

J. Zemanek of Mobil R&D Corp., USA, concentrated on the production of water-free hydrocarbons from sandstone reservoirs in the Gulf of Mexico but said his work had relevance to similar reservoirs in the Middle East (Paper No. SPE 15743). He explained that significant amounts of water-free hydrocarbons can be produced from sandstone reservoirs which have water saturations exceeding 50%. Zemanek said that core and log analyses showed that the sands had high surface areas which immobilize large amounts of water. The high water saturations might be high, but water-free hydrocarbons will be produced.

A. R. M. Ataya, also of ADCO, presented the results of an assessment of the Cement Evaluation Tool (CET*) and looked at its applications to communication testing (Paper No. 15757). Ataya gave field examples to show how the CET can indicate, with a high degree of confidence, whether primary cementing or subsequent operations are the reasons for communication and whether subsequent cement squeezes will cure communication problems.

The use of wireline logs in the identification of source rocks was the theme of the paper given by F. A. Hussain of the Kuwait Oil Company (Paper No. SPE 15747). She studied complete logging suites from eight wells in Jurassic rocks and three from Cretaceous rocks in Kuwait. Density, resistivity, gamma ray and sonic log data were used in the study as these indicated some distinctive characteristics of source rocks. Hussain showed how a source rock computer model had been devised which helped in the evaluation of log data and also provided a method of quantifying organic matter. She suggested that the source rock model constituted a major step towards wireline evaluation of source rocks and also enabled organic rich zones of special interest to be identified.

Improving the picture of formations using computer software was also the theme of a paper by M. Charara of Schlumberger and N. Rabadi of the Natural Resources Authority of Jordan (Paper No. 15731). They outlined how two computerized interpretation programs had been applied to a well in Jordan which had penetrated formations with different lithological and sedimentological characteristics. The first program involved the automatic identification of lithologies and was based on comparing log responses to a lithologies data base derived from geological knowledge. The second program proved to be reliable, and had given an insight toward a better understanding of the geological and petrophysical aspects of formations in the Hamza area.

I. Maycock of Yenmen Hurri Oil Company improved everyone's understanding of the petroleum geology of the Alif Field in Yemen Arab Republic in his excellent presentation. He outlined the steps leading to the discovery of Alif and other fields which, to everyone's surprise, produced oil from Jurassic sandstone. Maycock did not publish a paper for the meeting but in his oral presentation he led everyone to believe that new and untapped areas of hydrocarbon may still await discovery in the Middle East.

E. F. Chiburis of the Arabian American Oil Company gave a paper in which he described how the relatively new technique of analysing seismic amplitude versus offset had yielded useful information on the physical properties of reflecting horizons in Saudi Arabia (Paper No. SPE 15686). He analysed five seismic lines and concluded that the offset patterns can be directly correlated with known fluid contacts in the area.

Preliminary correlation of reflectors by Vertical Seismic Profiles and well log data was the subject of a paper presented by D. L. Rodrick of the Dubai Petroleum Company and C. Post of Schlumberger (Paper No. SPE 15743). They showed how the study of VSP data and complex trace analysis had helped delineate structures and identify oil reservoirs in the Fathah oilfield, offshore Dubai, UAE, which had been missed by the delineation well. A sidetrack well was subsequently drilled and confirmed the interpretation.

In the conference session on field developments, J. M. Willetts and R. A. M. Hogarth of Petroleum Development Oman gave an overview of the progress on the Lekhwair Pilot Waterflood Project in North Oman (Paper No. 15761). The authors showed that the project is progressing very satisfactorily and there have been no serious declines in injectivity. Injection water breakthrough into the producing wells was not expected for 10 years and therefore a monitoring programme, using two observation wells close by the injectors, was set up. Induced gamma ray spectrometry and induced logging tools have been used to distinguish between the low salinity injection water and oil. The logging has shown a recovery efficiency of 42%.

F. M. Ghazali and F. Khalil of the Gulf of Suez Petroleum Company, presented an interesting paper in which they examined GUPCO's use of Tubing Conveyed Perforators and compared the results against more conventional perforating methods (Paper No. SPE 15770). They showed how the technique of perforating underbalance with a TCP system had proved to be very successful in the Gulf of Suez operations over the past three years.

The conference and exhibition organizers are hopeful that the next Middle East Oil Show will be even bigger and better than this year's. By the time the 1989 show comes along, Bahrain should have opened its new exhibition complex and be able to provide fully equipped conference halls. A call for papers is now being made and so any author keen to present his or her work should be putting pen to paper. No doubt there will be competition!