The Middle East Sour Oil & Gas Upstream Profile

Daniel Canty, May 8th, 2012

Middle Eastern sour oil and gas reserves are in hotter demand than ever. Oil & Gas Middle East meets the industry’s top experts in all things sour and sulphur

The blistering pace with which sour oil and gas projects around the world are being green-lit is a stark reminder that the days of easy resources are diminishing rapidly, and for most countries, already long gone.

Much has been written about the GCC, Iraq and Iran collectively holding 40% and 60% of the global gas and oil reserves respectively, making the region the world’s biggest source of hydrocarbon energy with gas playing a much greater role in the region’s developing economies.

With the demand for gas for infrastructure and power needs ever increasing the pursuit for development of non-conventional gas deposits persists across the region with sour hydrocarbon field recovery gaining priority in many countries.

Oman is currently developing a gas/condensate field in the south containing 3% H2S and 16% CO2 and another field some 300 km from Muscat also with 3% H2S and 6% CO2. Qatar continues its dominating presence in LNG and has recently signed a 30 year E&P production sharing agreement in its North Field, the world’s largest gas reservoir.

Thus all the world’s largest LNG trains include integrated gas treating facilities consisting of AGR units for H2S and CO2 removal, molecular sieves for impurity removal and by the establishment of the Common Sulphur Project have delivered a unique system for collection, processing and market distribution of the sulphur by-product.

Kuwait is studying the challenges of developing HPHT Jurassic sour gas fields both from the point of view of rig and rigless operations and is joined by Saudi Arabia in the prospects of intelligent sour field management given their preference for smart field operations.

Saudi Aramco is aiming to produce 2.5 billion cf/d of sulphur rich non-associated gas to be processed at Wasit. Additionally they are looking at the potential of sour gas processing from the Kidan field as well as bringing on the offshore Karan Field with the 450 MMcf/d of sour gas expected to yield 67% sales gas.
Iran is also addressing its sour field issues having just announced that the 12th phase of the South Pars when operational in 2012 will produce 84 million cubic meters of sour gas per day.

The Shah project in the UAE is critical for infrastructure development in Abu Dhabi’s Economic Vision 2030 plan and when operational will process well fluids containing 23% H2S and 10% CO2 thus making the project a new benchmark for the world’s gas processing and treating industry. Alongside this project are the future expectations of developing the sour Bab and Hail fields.

So it can be seen there is a high level of activity in sour gas field development in the Middle East but it is by no means limited to this region with ongoing projects in Chuangdongbei, Puguang and Longgang in China; Kashagan Field, Kazakhstan; South Yoloten Field, Turkmenistan and several activities in Russia with major sour processing facilities in Orenburg and Astrakhan, plus other sour field projects worldwide.

With these globally important energy projects already underway, Abu Dhabi once again played host to the sour oil and gas production community’s leading minds in late March, with another record turnout for the Sour Oil and Gas Advanced Technology conference (SOGAT) 2012.

Saif Ahmed Al Ghafli, chief executive officer of AlHosn Gas, the ADNOC division charged with bringing the massive Shah Field onstream, opened proceedings with a keynote address which emphasized the important role local projects are having in expanding the global sour gas field of knowledge.

“Sour gas fields worldwide account for some 40% of natural gas reserves and now the development and production of these reserves are under very serious consideration,” he said.

“Internationally there remain many issues to be overcome and understood. Particularly in terms of the design, use of appropriate materials and robust and carefully planned approach to HSE and cost management,” added the CEO.

Worldwide such reserves including Kashagan, Sezchuan province in China and South Yoloton in Turkmenistan and North America and Australia are all activity and development hotspots for sour gas field projects.

Al Ghafli highlighted eight notable regional projects which are helping pave the way for greater sour gas development. “Current activities include the offshore phase of the non-associated gas field at Karan in Saudi Arabia, PDO in Oman is working with Shell on the Harweel project and is currently developing a onshore sour gas field project some 300 kilometres from Muscat. In Kuwait, Shell is also assisting KOC with the development of it Jurassic sour gas field,” he said.

The Al Hosn chief said that each of these fields are located in difficult geological formations, and represent complex gas compositions. He also cited the developments at Iran’s South Pars, and the enormous gas sweetening operations in Qatar.
“Here, in the UAE gas demand is on this rise. The Shah Field development will deliver gas at a rate of 200BCF per year. The upstream sour feed gas, along with the volume of processed gas and produced sulfur will present a new global benchmark for the gas processing and sulfur production industry,” he added.

The Al Hosn project at Shah will involve several gas gathering stations, and the construction of processing trains to handle one billion cubic feet per day to produce 500 million cubic feet per day of network gas, 4,400 tonnes per day of natural gas liquids, 35,000 barrels per day of condensates and up to 10,000 tonnes per day of sulphur granulation, he outlined.

Article continues on next page ...

Sulphur so good
Peter Clark, Alberta Sulphur Research Ltd and University of Calgary and chair of the opening SOGAT 2012 conference sessions played tribute to the by-product of gas sweetening, and talked up the crucial role sulphur will play in the coming decades.

“The production of sulphur is a very important process in these projects. We may view this as a complication, but in fact elemental Sulphur underpins our world agriculture supply for around 7 billion people on this planet,” he said.

“When sometimes you may not look at sulphur too kindly, remember the difficulties which arise from its production are well worth the trouble because that sulphur is going to be exported around the world and crucially makes a very important contribution to global food supplies,” he added.

Sour Power
Ad Punt, Vice President for Gas Technology at Royal Dutch Shell put the urgency for sour resource development in the global picture succinctly.

“With regards to oil and gas, we haven’t seen peak yet, but we are certainly working in an environment where the easy oil days are behind us. This is one issue facing energy providers and producers and the world at large.”

Punt added to this by outlining the projected huge energy demand growth scenarios, which most large energy companies are expecting.

“Today there are 800 million vehicles on the roads, and we anticipate that that will grow quite quickly to 2 billion in the coming decades as people in developing countries become richer.

Additionally, we face the environmental challenge. Producing more energy whilst reducing carbon dioxide emissions is a global goal. And this comes at a time when a great deal of the world’s unexploited gas reserves are contaminated with CO2 and H2S.”

Since the 1950s, Shell has built or licensed more than 1,200 gas processing plants. Shell’s gas processing technology has had a major local recent success at Saudi Aramco’s Wasit project.
Shah Focus
Al Hosn has awarded contracts worth over $6 billion to date to provide key services for its Shah Sour Gas field development project. Korea’s Samsung Engineering and Italy’s Saipem, Europe’s biggest provider of oilfield services by market value, won an aggregate of about $5 billion in contracts for gas processing, sulphur recovery and other oil and gas services back in 2010.

Saipem won three contracts worth $3.5 billion while Samsung said it secured a separate contract for $1.5 billion.

Saipem’s contracts are for $1.9 billion for gas processing, $1.45 billion for sulphur recovery and $196 million for product pipelines. Samsung will build utility and offsite facilities needed for the project.

A group comprising Tecnicas Reunidas and Punj Lloyd Group also won a joint contract worth $463 million for gas gathering in the project. Fluor Corp. and CH2M Hill Companies unit Veco Corp. have been awarded the project management contracts for the Shah project.

The UAE’s AL Jaber Group was awarded the early works package, estimated at $300 million. Al Jaber is building the infrastructure, including roads as well as units such as gas treatment plants.

Milan based engineering firm Siirtec Nigi has been awarded two contracts by Saipem to design and supply eight packages, each including burner, reaction furnace, steam drum, waste heat boiler, and 20 sulphur condensers.

This equipment represents the core of the sulphur Claus unit. It will be installed at the Shah Gas Field in the UAE. The field units will process around 1 billion standard cubic feet per day (SCFD) of sour gas to produce around 540 million SCFD of gas suitable for consumption.

The total amount of acid gas fed to the equipment contains nominally 10,000 tonnes per day of sulphur. There are four identical trains, each designed to process 25% of the total capacity. Each train consists of two parallel packages as described above.

ADNOC has said it expected to see first production from the field by late 2013 or early 2014. The project is the first the United Arab Emirates has undertaken to exploit a sour gas field.

Metito has been appointed to provide demineralized water services to the Shah project. Its $2.18 million contract will see Metito design, engineer and supply a demineralization plant and water polisher plant in order to provide high purity water which will feed the boiler of the development’s petrochemical process plant.

The polisher plant will use a special grade of resin which can operate at high temperature and produce the required treated water quality.

Bassem Halabi, group business development director – Metito Overseas, said; “The demineralization system is vital to ensure the longevity and efficiency of the processing plant
and Metito is dedicated to using and innovating specialized solutions to offer maximum effectiveness to all our clients.”

Target Engineering Construction Co, a subsidiary of Arabtec Holding, the UAE’s largest construction company by market value, was awarded the contract for the civil and building works for the project.

The contract was awarded by Saipem at a contract value of $56 million. The period of construction is expected to be 33 months, and began in March last year.

The scope of works include the construction of 12 substations buildings and instrument equipment shelters with a total area of around 20,000 square metres. The contract includes the EPC of all MEP works for these buildings.

**Rolling Stock – The Rail Solution**

Etihad Rail signed an agreement with ADNOC for the transportation of up to seven million tonnes of granulated sulphur annually in 2011. The 266km rail project will transport around to 22,000 tonnes of granulated sulphur daily from sources in Shah and Habshan for export in Ruwais.

The company awarded the Civil & Track Works contract for the first stage of the network in October last year. The initial stage will link the Western Region cities of Habshan and Ruwais by 2013, and then Shah and Habshan by 2014.

The track works contract was awarded to a consortium comprising Italy’s Saipem, Tecnimont and UAE-based Dodsal Engineering and Construction.

The $898.4 million Civil & Track Works contract comprises the design, procurement and construction of the railway infrastructure, in addition to the testing and commissioning (on a design and build basis) of all assets relating to the completion of the first phase of the project.

In addition to that, the contract includes the earth works and track’s site grading, bridge structures, communication systems, and the development of the depot at Mirfa.

China South Locomotive & Rolling Stock Corporation Limited were appointed by Etihad Rail to supply 240 covered wagons for the carriage of granulated sulphur in September 2011.