

Black Sea, Caspian, Mediterranean bustling with exploration but still has much to prove

By **Jeremy Cresswell**, contributing editor

AMONG THE tantalizing offshore provinces are surely the Mediterranean, Black Sea and Caspian. What is the real petroleum potential? Has it been talked up too much or will patience and persistence eventually pay off for this sprawling region linking Europe with Africa, the Near East and Asia?

Of the three, the land-locked Caspian is the most talked up and clearly the most productive; moreover, it is where the modern oil industry began.

In the Mediterranean, Egypt is leading the way, though Libya is intent on making up for lost time, while others like Italy and Montenegro still struggle.

In the Black Sea, Bulgaria and Turkey informally vie for the top slot while others struggle to get anywhere.

In geopolitical terms, all of these regions offer challenges. But it's especially so in the Caspian, given the still unresolved all-inclusive parceling of this important aquatory between its littoral states, though various sub-agreements are in place. The potential for conflict particularly exists in the Eastern Mediterranean, bearing in mind that uneasy neighbours Egypt and Israel are both active offshore.

That the current mobile drilling unit population for the Mediterranean and Black Sea is just 26 units tells its own story. They comprise mostly jackups, with a further six or so MODUs due into the region, according to the **Stewart Group's** tracking service.

Stewart's October 2008 listings include nine offshore Egypt and five units working in Libyan waters, plus two each offshore Romania and Ukraine.

As for the Caspian, the limited population of rigs has been growing slowly by dint of limited rebuilds, plus the **Maersk Explorer** semisubmersible, **Transocean's** Trident 20 jackup and the Iran Alborz semi that is currently commissioning. **Maersk Explorer** is a Lider-type rig whilst the Trident-20 would be at home in the North Sea.

In terms of which petroleum companies are active in this trio of sub-regions, it really is a mixed bag. Independents



The number of rigs in the Caspian is limited but has been growing, such as with Maersk Drilling's Maersk Explorer. Azerbaijan and Kazakhstan still dominate the Caspian scene.

like **Lundin Petroleum** and **Melrose Resources** are prominent; a notable mid-ranker is **BG Group**, while **BP** and **Eni** tend to have the highest public profile among the majors.

A number of minnows are also attempting to carve niches for themselves, of which **Petroceltic** is one example. However, such companies are at great risk in the current global financial turmoil and some may not survive, or be forced into shotgun marriages through the lack of money.

To quote **Richard Griffith**, director of equity research at **Evolution Securities**: "Right now, if you are a pure exploration play in need of cash, then you have no hope. You are in dire straits. It will be

like a forest fire, with only the stronger trees left standing in a few months time."

If that turns out to be the case, then the drilling scene for the Mediterranean will simplify somewhat – and rapidly.

There has been at least one notable exit, namely **ExxonMobil's** decision to shut down its Azerbaijan office in 2006 following a number of high-profile failures, including the Zafar-Mashal and Nakhchivan oilfields.

On the other hand, **ExxonMobil** is back in Libya big time, having secured a number of promising offshore concessions, which is the cue for taking a peek at what appears to be happening in the aquatory of this key North African energy player.

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LIBYA

The political and social changes over the last decade or so have clearly had a positive impact on investment, and when sanctions by the UN were suspended in 1999, many foreign companies returned to the country, with large tracts of acreage made available for exploration. Initially they were onshore, but increasing attention has been paid by the **Libyan National Oil Corp (NOC)** to encourage exploration offshore.

The offshore push is helped by the fact that the Sirte Basin extends into the Gulf of Sirte. There is also the Gulf of Gabes, where oil has been found in shallow waters. Here Eni is producing the El Bouri field, currently the largest oilfield in the Mediterranean, though it peaked at 110,000 bbl/day in 1997.

It is perhaps also useful to note that, in 1988, Libya and Tunisia settled a long-standing territorial dispute over an area on the Libya/Tunisia border in the northern part of the Gulf of Gabes, also known as the November Seventh concession. The area is estimated to contain 3.7 billion bbl of oil and some 12 trillion cu ft of gas. The neighbouring states then agreed to exploit the area through the 50:50 joint venture **Libyan-Tunisian Joint Oil Company**.

It is clear, however, that NOC is now heavily dependent on foreign companies for exploration, project funding and new-generation technologies, especially for extended oil recovery.

So what is the offshore future for Libya?

Basically, the emphasis is on assuring output from current assets such as Bouri and Al Jurf, pending the outcome of initial exploration of acreage awarded under the EPISA IV (E&P sharing agreement) program. There have been four rounds under Libya's EPISA IV program, each of which has had an offshore element.

Round 1 offered 57 blocks, Round 2 offered 44, Round 3 offered 41 and Round 4 offered 41. All had an offshore

content; for example, Round 4 offered 22 such blocks. Only four companies out of 13 applicants were awarded in that round – **Shell, Gazprom, Polski and Sonatrach**.

This is in sharp contrast to Round 3, which attracted 70 applications, of which 47 were chosen to bid for the 12 offshore and 29 onshore blocks.

Companies that have secured offshore positions range from BP, ExxonMobil, BG and **StatoilHydro**, to various Chinese, Indian and Japanese companies, plus Gazprom, which was the only company to secure offshore acreage in Round 3, in return for a \$10 million signature bonus.

BP, a traditional pre-sanctions player in Libya, was not initially lucky under EPISA IV, though shuttle diplomacy between the UK and Libya later helped land the UK group a huge offshore prize in 2007, though this was not ratified until early 2008.

The essence of the \$900 million BP bilateral agreement is that the company will drill 17 exploration wells in an onshore area in the Ghadames Basin – this is an area larger than the whole of Kuwait – and in the offshore sector of the Sirte Basin, an area equivalent to the size of Belgium – some 54,000 sq km.

BP has also committed to about 20 appraisal wells and to acquiring 30,000 sq km of 3D and 5,500 km of 2D seismic data over the Ghadames and Ghadames South acreage and the Sirte offshore acreage. The first seismic contract has been awarded.

ExxonMobil has built a sizable holding over the various rounds.

Most recently, in November 2007, the company secured an exploration and production sharing agreement for Block 21, offshore Sirte Basin. The initial agreement runs for five years and covers exploration in water depths to 2,000 m.

Like BP, ExxonMobil committed to a signature bonus, as well as to a training program for Libyan professionals, in

addition to its previously agreed funding of educational facilities in Libya.

In February 2007, ExxonMobil secured E&P sharing licences covering four blocks in Contract Area 20, offshore Sirte Basin in water depths to 2,000 m.

ExxonMobil is also in the very early stages of an exploration program on Contract Area 44 of the offshore Cyrenaica Basin, which was awarded to the company in Round 2 in 2005. To date, the supermajor has completed an environmental impact assessment, met with local stakeholders, and is conducting a 2D seismic acquisition campaign.

Neither BP nor ExxonMobil have got to the stage of having MODUs on hire.

EGYPT

With nine MODUs on contract and the jackup JP Bussell scheduled to arrive and go to work for Shell, offshore Egypt is buzzing with activity, primarily development-related, though exploration continues to generate results.

The most prolific area remains the West Delta Deep Marine (WDDM) concession, operated by BG in partnership with **Petronas** and **EGPC**, collectively working as the **Burullus Gas Consortium**.

They have made nine gas discoveries on the concession: Scarab, Saffron, Simian, Sienna, Sapphire, Serpent, Saurus, Sequoia and Solar. It has been suggested that the recoverable reserves on West Delta total 14 trillion cu ft of natural gas.

WDDM is being developed in phases. Phase 1 covered the Scarab and Saffron fields; Phase 2 Simian and Sienna; Phase 3 Sapphire; and Phase 4 Scarab, Saffron and Simian. The other fields will be developed as gas production from these existing fields decline. Other current developments include: Denise (BP, operator), Taurt (BP) and Asad/Zaref.

There are likely to be some major developments in the period to 2012. In particular, BP and its partners have made large discoveries on the North Alexandria A and North El Burg concessions. The largest appears to be Raven, with reports of up to 7 trillion cu ft recoverable reserves. Others include Giza and Satis.

That Egypt holds an allure is demonstrated by the fact that **Amerada Hess** and partners recently offered a signature bonus of over \$1 billion for the area, including the Abu Sir fields.



The Songa Saturn is on charter to Amerada Hess to work offshore Libya.

While the pace of discovery appears to have slowed, this may have more to do with the need for Burullus and others to develop what they have found to date, rather than a decline in prospectivity, witness the latest find by **Gaz de France** in 50-50 partnership with **Dana Petroleum** of Aberdeen early in 2008.

The exploration well WEB-1X was drilled on the West El Burullus concession and, according to Dana, the area also contains numerous additional prospects at both shallow and deeper horizons.

WEB-1X was drilled in just 19 m of water by the jackup Ocean Spur to a total vertical depth of 2,403 m (7,884 ft), targeting a Pliocene prospect consisting of a turbidite sandstone channel system.

According to Dana, the well encountered good quality gas-bearing sands and, during a multi-flow rate drillstem test, flows of up to 27 million cu ft/day were achieved. WEB-1X has been suspended for potential re-entry and future use as a producer.

Dana CEO **Tom Cross** was cock-a-hoop when the results were disclosed early February. He said at the time: "The WEB-1X flow test results are very encouraging. Making a discovery with our first well highlights the outstanding exploration potential of West El Burullus and significantly increases the likelihood of success for additional prospects which are being identified."

While not strictly within the remit of this review, it is important to point out that Egypt's original offshore province, the Red Sea, is still generating new finds. In April, it emerged that BP had made a significant oil discovery on the Northern Shedwan Block. **Egypt Kuwait Holding**, a partner in **Tri Ocean Energy**, BP's

partner in the concession, reported that the new find has been tested to indicate it is capable of producing some 10,000 bbl/day of oil.

BP was awarded a nine-year license for the concession in 2004, for which it pledged to invest a minimum of \$20 million in E&P activities, including the drilling of at least four exploration wells.

Rigs currently noted as working the BP account in Egyptian waters are the jackup GSF Constellation II and the semisubmersible Pride North America.

ISRAEL

The emergence of Israel as an offshore player in the Mediterranean merits inclusion in this whistle-stop tour.

Until drilling started in the late 1990s, Israel had no confirmed offshore oil and gas resources. But three gas discoveries – Mari, Noa and Or – changed that and pointed to proven offshore gas reserves of at least 3.5 trillion cu ft – not large on the grand scale of things, but a start, especially given that Israel's Petroleum Commission believes that a proportion of the state's estimated 5 billion bbl of oil reserves could lie beneath the offshore gas resources.

The now developed Mari and Noa (1.5 trillion cu ft combined reserves) are the largest gas discoveries to date. They were located by the **Yam Tethys Joint Venture** comprising **Samedan Mediterranean**, **Avner Oil Limited Partnership**, **Delek Drilling Ltd Partnership** and **Delek**.

The dominant player offshore Israel has unquestionably been BG, though their relationship has been a rocky one. A few years back there were threats and counter-threats regarding Matan/Michal,

despite the promising 2.4 trillion cu ft potential of the Tamar target for which the estimated exploration cost was touted as being some \$40 million in 2003 money. BG (25% interest) had tried to find an investor to purchase 39% of the drilling rights, but failed after an extensive sweep of the market.

Today, Israel has just the Mari-B and its Noa satellite in production, and BG is pulling out altogether and focusing on the Gaza Marine discovery offshore neighbouring Palestine instead.

That 1 trillion cu ft discovery was proven in 2001, since when the company has struggled to get it developed. The idea had been to sell the gas to Israel, but negotiations collapsed at the end of 2007. A concrete outcome was pending at the time of writing, with rumours circulating that a deal may yet be clinched with **Israel Electric Corp**.

Meanwhile, although BG has given up on offshore Israel, **Noble Energy** is pressing ahead with plans to drill the Tamar 1 wildcat in the Matan (309) Block during Q4 2008 using the semisubmersible Atwood Hunter. The company is also bringing in the new drillship Aban Abraham.

According to **IHS**, the drilling of this well was originally proposed in 2003 when costs were estimated at up to \$40 million versus some \$145 million today. It says the Tamar structure may hold recoverable reserves of some 2.6 trillion cu ft of gas, rather more than the original BG estimate.

Noble became an offshore Israel player by securing a 33% interest in and operatorship of the 318 sq km Matan deepwater block in July 2006.

BLACK SEA

Shifting to the Black Sea, the programs that are perhaps attracting the most attention and delivering results are offshore Bulgaria, which is largely the preserve of UK company Melrose Resources and the Turkish sector, where significant progress appears to have been made over the past couple of years by **Toreador Resources**.

First, Bulgaria, where Melrose continued to make cautious progress with its offshore concessions, reporting in January 2008 that it had made a shallow-water gas field discovery on Galata Block.

The Galata-E3, Kaliakra probe was drilled using the Atwood Southern Cross and tested an analogue of the nearby



Noble Energy plans to drill the Tamar 1 wildcat offshore Israel using the semisubmersible Atwood Hunter.

Galata gas field, with the main reservoir target in a Palaeocene-aged formation. In essence, open-hole log data pointed to a 10-m (33-ft) net pay interval with an average porosity of 31% and high gas saturations. Due to the high quality of the reservoir, flow-testing was not required, and Melrose suspended the well as a future producer.

Indeed, further drilling started early October with Melrose taking on hire the rig **Prometeu**.

Melrose financial director **Munro Sutherland** explained that the Kavarna well was spud on trend with the prior discovery and that it was likely to be a 30-day probe. The rig will now test the Kaliakra discovery, most likely running a 10- to 11-day trial.

Mr Sutherland said too that Kaliakra reserves were estimated to be up to 47 billion cu ft, but that, with other targets, the trend could have 120 billion cu ft (upside case).

Further, he revealed that Melrose was preparing to convert its virtually exhausted Galata gas field for storage purposes next year.

“Galata has a robust formation suited to gas storage,” he said. “The two existing production wells and compression facilities will form the focus and the plumbing revised to allow metering and filtration of gas prior to injection. A third well that was drilled and suspended in eastern part of the field will be tied back to the Galata platform.”

He added that it would not be necessary to use a rig to overhaul the two core wells but that the suspended well would require one.

Crossing to the Turkish sector, Toredor has also reported a 10-m net pay gas discovery. It was late 2007 when the company said that the Bati Eskikale-1 exploration well drilled in the deeper waters of the South Akcakoca Sub-basin (SASB) by operator **Türkiye Petrolleri Anonim Ortaklığı** had been successful.

All told, a 37-m (121-ft) interval was perforated and tested, yielding a flow rate of approximately 8.8 million cu ft/day.

Toredor said too that Bati (West) Eskikale-1 confirmed that a natural gas trend in the deeper reaches of the SASB project extends to the northwest of the Akcakoca-3, and is the 14th well to successfully encounter gas in the project area.

This glimpse at the Black Sea also includes the **Sterling Resources** two-well program offshore Romania using the Prometeu jackup – initially the Doina-4 well before moving on to a well on the Ana field discovery (formerly Doina Sister).

Doina-4 came in as a success, with initial results confirming the northerly extension of the gas-bearing Doina Main Sand reservoir, some 1.6 km north of the previously drilled Doina wells. In addition, prospective gas-bearing intervals were noted both above and below the main reservoir body.

Ana-2 was drilled as a follow-up appraisal following the Ana-1 discovery well, which was drilled and tested earlier this year. It too was a success and confirmed the presence of a 39-m gas column in high-quality reservoir sands.

The Ana-2 well also encountered a 5-m gas-bearing reservoir in a shallower horizon at 766 m TVDss. This shallower horizon was also present in the Ana-1 well and will be further evaluated in order to determine its feasibility as a new reservoir.

Another company **Chermomor** is also active in the Black Sea using a pair of jackups to drill offshore Ukraine. However, it was not possible to glean any details of the current program.

CASPIAN

Unquestionably the heartland of upstream petroleum in Eurasia, the Caspian continues to generate worth-

while discoveries in spite of the lack of full cohesion between its littoral stakeholders – Azerbaijan, Iran, Kazakhstan, Russia and Turkmenistan.

There is a strong familiarity with the Caspian scene throughout much of the offshore upstream fraternity. Basically it is dominated by Azerbaijan and Kazakhstan because of the Azeri-Chirag-Guneshli and Shah Deniz projects (Azerbaijan) and Kashagan (Kazakhstan), while Turkmenistan plods along behind the leaders and is followed by the Russian sector, where there has yet to be production, and Iran, which is generating excitement because the Iran Alborz semisubmersible is in the final throes of commissioning.

Azeri sector

Azeri-Chirag-Guneshli (ACG) remains the backbone oil producer, the development of which is a protracted affair.

The ACG Production Sharing Agreement signed in September 2004 covers the 30-year development of a resource that could eventually reach 5.4 billion bbl of recoverable oil.

Chirag has been producing since 1997 as part of the Early Oil Project (EOP). This was followed by Azeri Project Phase 1 – Central Azeri production in early 2005. Successive phases include West Azeri, which started production in 2006, and East Azeri, on-stream in 2007, as Azeri Project Phase 2, with ACG Phase 3 – Deepwater Guneshli, under way and expected to begin production this year.

By 2010, ACG should be producing over 1 million bbl/day of oil plus 212 billion trillion cu ft/day of gas. The estimated development cost is \$8.6 billion to date, with a further \$10 billion mooted for the future. And, running like a silver thread throughout the project for the past 11 years is **KCA DEUTAG**, which holds the drilling services contract.

That same silver thread runs through the BP-operated Shah Deniz field, whose recoverable reserves are estimated at up to 30 trillion cu ft of gas and 1.7 billion bbl of condensate.

The first phase of the field's development comprises a fixed offshore platform, two subsea pipelines and a new onshore gas-processing plant. First gas was in December 2006.

Discussions are under way about Phase 2 of Shah Deniz, which could more than double production to over 700 billion trillion cu ft/year.

On the exploration front, late 2007 saw BP report a major new gas-condensate discovery on the Shah Deniz concession. Its SDX-04 appraisal and exploration encountered a new high-pressure reservoir in a deeper structure below the currently producing reservoir. It was drilled to a Caspian-record depth of more than 7,300 m (23,951 ft) in the southwestern part of Shah Deniz.

The company said that this discovery represents a potentially significant find. There will be appraisal to fully delineate the new structure in the next few years.

Kazakh sector

This remains a one-pony show in offshore terms, with Kashagan continuing to catch the headlines as delays mount and the Eni-led KCO consortium put on the spot on more than one occasion than the Kazakh government.

This is a huge project of which Phase 1 alone includes the construction of artificial islands, seven processing barges, pipelines and onshore facilities. The hulls of the barges are being built in Romania, and they will be outfitted in Norway.



The first exploration well on the Morskaya structure was a major oil discovery, according to Lundin Petroleum. The shallow-water depth has necessitated the construction of a mobile drilling complex, said Lundin CEO Ashley Heppenstall.

Phase 1 output is expected to begin at 75,000 bbl/day and is ultimately expected to reach 1.2 million bbl/day. The overall capital cost is estimated at up to \$30 billion, and KCA DEUTAG has the drilling contract.

Other development prospects in Kazakhstan include Kurmangazy, Tsentralnoye and Khvalynskoye,

all of which discoveries straddle the Kazakhstan/Russian border in the Caspian Sea. **KazMunaiGaz** of Kazakhstan and **Rosneft** of Russia signed a production sharing agreement for Kurmangazy in July 2005. **Lukoil** of Russia and KazMunaiGaz have agreed to establish a joint venture to develop Khvalynskoye.



The Russian sector of the Caspian has generated the most news in 2008, with Tsentrkasneftegaz making a large oil, gas and condensate discovery on the Severniy Block. Above, derelict Russian-built jackups are laid up in the Caspian south of Baku.

Russian sector

It is the Russian sector that has generated the most news in 2008, with **Tsentrkasneftegaz**, the Lukoil-Gazprom joint venture, making a large oil, gas and condensate discovery on the Severniy Block. Lukoil and Gazprom have said nothing about the size of the find, but speculation points to some 730 million bbl of oil alone.

Tsentrkasneftegaz was formed in 2003 to carry out the development of Tsentralnoye as well as the Khvalynskoye field on the Russian side of the border with Kazakhstan, while KazMunaiGaz is to operate the Kurmangazy development in partnership with Lukoil.

Also in the news is Swedish independent Lundin, whose Morskaya-1 discovery well on the Lagansky Block has been successfully tested at a combined flow-rate of 2,500 bbl/day of 32° API oil.

Lundin said in July that two drillstem tests were conducted using the marine drilling complex from which the well was drilled. The Neocomian formation was perforated over a 7-m (23-ft) interval and tested at a stabilized rate of 1,700 bbl/day of oil at a 56/64-in. choke. The Aptian formation was perforated over a 21-m interval and tested at a stabilized rate of 800 bbl/day at a 36/64-in. choke.

The company said recently that Morskaya-1 in fact encountered a major oil accumulation in the Aptian and

Neocomian sandstone reservoirs and that a preliminary estimate indicates gross recoverable resources between 110 million and 450 million bbl.

In September, Lundin embarked on drilling the Laganskaya-1 exploration well, also on the Lagansky Block.

The well, with a planned total depth of 2,000 m (6,562 ft), is targeting Cretaceous and Jurassic sandstone reservoirs. The Laganskaya structure is situated towards the southwest of the recent Morskaya discovery but on a different structural trend associated with existing onshore fields.

Lundin CEO **Ashley Heppenstall** told DRILLING CONTRACTOR: "The first exploration well early this year on the Morskaya structure was a major oil discovery which is estimated to contain mid case 230 million bbl of recoverable oil within the Lagansky Block. The whole structure, which stretches into adjoining acreage, is estimated to contain double this amount.

"The second exploration well, currently being drilled, will be followed up by a third exploration well in 2009.

"The operational environment is challenging in the northern Caspian due to winter ice and fish breeding seasons, which restricts the windows for drilling activity. In addition, the shallow-water depth of around 2 m has necessitated the construction of a mobile drilling complex which can operate in this environment."

Laganskaya-1 well is the second in a four-well drilling program planned for 2008-09. The gross unrisks prospective resources for the Laganskaya prospect are estimated at 106 million bbl oil equivalent.

It may come as a surprise, but there has been no offshore production from the Russian Federation's sector of the Caspian.

However, the first field, Yuri Korchagina, is scheduled to go on-stream in 2010. The recoverable reserves have been estimated at 353 billion cu ft gas and 32 million bbl of oil. Another discovery on the Severny block, Yuzhno-Rakushechnaya, is expected to be developed as a satellite of Korchagina. Lukoil has also stated that the Filanovskogo discovery, made in 2005, could be on-stream in 2011.

Turkmeni sector

Turkmenistan's offshore patch is mostly associated with a modest Irish company imaginatively name **Dragon Oil**, one of many minnows to have taken a hammering in the current financial crisis. However, there is little to report other than that Dragon is reportedly looking to secure the jackup Trident 20 (aka Gurtulush) for further drilling. The rig has lately been drilling for **Petronas** in Turkmeni waters (Block 1).

Iranian sector

We end this rapid cruise with arguably the most exciting piece of news to hit the Caspian in some years – the commissioning of and first contract for Iran's semisubmersible self-build, Iran Alborz, which is to start drilling for the Iranian company **Khazar Oil** on Block 6 offshore Iran.

North Drilling Co will manage the project, and technical support is to come from **China Oilfield Services Ltd** (COSL).

The plan is to drill the first on Block 6 (named Alborz) to a total depth of 700 m (2,297 ft) below seafloor. Having cut its teeth on Block 6, Khazar Oil said that it intends to move the rig to the Chalous Block (Block 29) for further exploratory work.

Iran claims that its part of the Caspian Sea holds 17-44 billion bbl of oil and 232 trillion cu ft of gas. However, it is virgin territory, and it will be many years before the true resource capability of the Iranian sector in fact is. ♠