

An interview with Barry Goldstein

— Director, PIRSA Petroleum Group



Interviewed by Colin Thomas, Mineral Promotions, PIRSA

Introduction

Barry Goldstein has worldwide experience in the petroleum industry. Prior to becoming Director, Petroleum Group in PIRSA in January 2002, Barry was Exploration Manager and Chief Geologist, Santos Ltd, Adelaide, for Australia, Indonesia, Papua New Guinea, New Zealand, and the Gulf of Mexico (1996–2001); Chief Geologist, Bridge Oil and Parker & Parsley, Sydney, for Australia, Indonesia, Papua New Guinea, the Philippines, Argentina and onshore Texas; Chief Geologist (1986–95), IEDC/Kuwait Foreign Petroleum Exploration Corp., Perth, for Australia, Indonesia and China; and Geologist (1982–85), Phillips Petroleum, Okalahoma, Stavanger and London, for North Sea and deep water plays in Leeward Antilles offshore Venezuela, Rockall Plateau and offshore East Africa regions (1976–81). Barry was elected PESA Federal President at the society's AGM on 23 March 2003.

Transcript

Could you discuss the current forecasts for investment in onshore and offshore petroleum and geothermal resource exploration and development in South Australia?

Investment in onshore and offshore petroleum and geothermal resource exploration and development in the term 2003–07 is forecast to exceed \$1.3 billion. That's based on forecasts of \$250 million for additional pipelines, \$526 million for petroleum field development, \$315 million for onshore petroleum exploration, at least \$200 million for offshore petroleum exploration, and \$16 million for Geodynamics 'proof of concept' project for geothermal energy.

Could you elaborate on recent milestones in petroleum and geothermal resource exploration and development in the state?

Truly significant milestones in petroleum and geothermal resource exploration and development taking place in South Australia include:

- trend-setting, conjunctive native title access agreements for 27 exploration areas in the Cooper Basin
- 50% success rate (three of six) sustained by new entrants in oil exploration drilling in the South Australian sector of the Cooper Basin in 2002
- first production payments to registered native title claimants in South Australia in 2002
- construction of the high-capacity SEA Gas Pipeline from the Otway Basin to South Australian markets — roughly doubling capacity to supply gas to the state — with the first gas due in the first quarter of 2004
- proof-of-concept 'hot dry rocks' geothermal energy project in the Cooper Basin
- deep-water drilling to test frontier petroleum systems in the Bight Basin
- offer of two new offshore Bight Basin exploration licences as a result of work program bidding in 2003
- tendering for competitive bids for five offshore Bight and Otway Basin exploration licences close on 25 September 2003
- bidding for two additional areas in the Bight Basin closes on 25 March 2004
- last but not least, PIRSA's Petroleum Group has developed world-class legislation and regulatory regimes for upstream petroleum and geothermal investment in the state.

Picking up on your first point, what have been the positive outcomes associated with the granting of Native Title Access Agreements in this state?

Exploration in the Cooper and Eromanga basins will increase in 2003 with the expected grant of 16 additional (CO 99 and CO 2000) licences that have been made possible by successful negotiations between native title claimants, explorers and the State Government. Exploration in the 'CO98' PELs got off to an excellent start in 2002 with three oil discoveries from the six exploration wells drilled, and 100% success in two development–appraisal wells. Oil sales from these discoveries have, pursuant to the native title agreements, resulted in production payments to the registered native title claimants, as well as generating royalties.

In addition, the work programs for the 27 CO 98, CO 99 and CO 2000 areas includes geological and geophysical studies, ~6400 km of 2D seismic, 320 km² of 3D seismic and 184 exploration wells corresponding to an estimated aggregate \$275 million investment.

Stuart Petroleum (the operator) and Beach Petroleum found oil with the very first exploration well drilled by new entrants to exploration in the Cooper Basin (in Acrasia 1, PEL 90). The Acrasia 2 and 3 wells successfully appraised and developed the field in 2002, with extended production tests commencing within six months of finding this new oil field, representing a world-class cycle-time from discovery to product sales. Stuart reports the recoverable reserves in Acrasia to be ~1.5 million barrels of oil.

Beach Petroleum (the operator) and Cooper Energy also discovered oil with Sellicks 1 in PEL 92, flowing oil at a rate of 1780 barrels/day, the highest-ever recorded oil flow from Permian reservoirs anywhere in the Cooper Basin. The Sellicks Field also commenced

extended production tests within six months of its discovery. Cooper Energy has stated that the possible recoverable oil reserves at Sellicks may be as much as 1.5 million barrels.

Oil sales from extending production testing of the Acrasia and Sellicks Fields have provided much-welcomed benefits to the community in the form of royalties, development investment (e.g. jobs) and both acknowledgement and production payments to registered native title claimants.

In addition, the Santos-operated joint venture has and will continue to sustain significant development programs for their Cooper and Eromanga Basin oil and gas fields for years to come. Santos drilled 46 wells in its Cooper Basin PPLs in 2002, and plans to drill 40 gas and oil appraisal and development wells in 2003. This investment will be aligned with the Santos-operated joint venture's focus on oil production and contracts to sell gas, including the recently secured (additional) contract to sell 505 PJ of sales gas from the Cooper Basin to AGL over the 14-year term from 2003 to 2016. More than half that additional gas will emanate from the South Australian sector of the Cooper Basin. More than \$100 million in royalties will be paid to the state (in the term 2003–16) as a result of just that additional AGL contract.

Picking up on the milestone you mentioned, how does the regulatory regime in South Australia build trust in the community that the petroleum industry is well regulated so that outcomes are ecologically sustainable?

The *Petroleum Act 2000* has been nationally and internationally recognised as leading-edge legislation for resource management, and best practice in environmental regulation for the petroleum industry. It is objective based to foster good environmental outcomes. Companies are required to develop Statements of Environmental Objectives (SEOs) prior to any field activities taking place — and these SEOs result from an open and transparent consultation process that enables stakeholders to contribute to the establishment of environmental protection objectives. Initially, stake-holders and other regulatory agencies were unsure of the outcomes of this innovation, but as the SEO process gathers a track record,

many are beginning to understand its significant benefits. In effect, SEOs set standards for environmental compliance meeting requirements under all legislation that comes into play in relation to field activities such as drilling and recording seismic surveys. In doing so, SEOs can provide one window to all government regulation and drive industry to meet community standards. Those undertaking drilling and seismic operations not measuring up to the standards set in SEOs are in breach of the Petroleum Act, and can be penalised.

Petroleum operations offshore are regulated in accordance with Commonwealth health, safety and environmental legislation. Monitoring programs for marine life are now routine for marine seismic surveys offshore South Australia. There are significant restrictions on seismic survey and drilling operations in South Australian waters to protect marine life in general, and to protect the Southern Right and Blue Whales in particular. It is worthwhile noting that seismic surveys conducted as a necessary part of petroleum exploration have, and will continue to provide, a wealth of baseline information on marine life — and that baseline information is very useful in setting regulations to protect marine environments and conserve biodiversity.

Has long-term gas supply security for South Australia been enhanced as a result of recent announcements concerning the SEAGas consortia?

Emphatically, yes. Construction of the high-capacity (140 PJ/y) SEAGas Pipeline commenced in 2002 and is on track to be operational from January 2004. This pipeline will link gas in the Otway and Gippsland Basins with South Australian markets, roughly doubling the capacity to flow gas into South Australia and, in doing so, enhance the security of the state's supply. With commercial operation planned to commence in the first quarter of 2004, gas markets will undoubtedly change to reflect the availability of gas and transmission capacity, creating challenges and opportunities for both upstream and downstream industry sectors.

In addition, a strategic assessment of the gas supply and demand concluded by PIRSA's Petroleum Group indicates

that existing contracts and uncommitted proven gas reserves are likely to suffice to meet demand through to at least 2016. It also concluded that it is reasonable to expect exploration in the Cooper, Otway and Gippsland Basins to yield yet more gas reserves to extend demand cover for some additional years, to at least 2019. Thereafter, gas alternatively produced from the Timor Sea, the Northwest Shelf, Papua New Guinea and/or coal seam methane can plausibly supply southeastern Australian gas demand beyond 2019 as well. This bodes well for competitive gas supplies through roughly 2020, and does not account for gains made from more efficient use of electricity or the innovative use of alternative sources of energy, including 'clean coal', geothermal, wind, wave, solar, biomass, etc.

Does South Australia have the potential to generate zero-emission 'green' power from geothermal resources?

Exploration for a new source of 'clean, green and sustainable' energy in South Australia commenced when the Habanero 1 geothermal energy well commenced drilling in February this year. This is the first phase of Geodynamics' \$16 million 'proof of concept' hot dry rocks (HDR) program in Australia's premier geothermal energy province — hot (250–300°C) granite underlying the Nappamerri Trough in the Cooper Basin. A step-change in base-load electricity supplies for Australia is possible from success in this geothermal energy proof-of-concept project.

The hot granite encountered in Habanero 1 will be artificially fractured using compressed water. The location of the fractures will be established by triangulating the propagation of cracking with very sensitive surface seismic detection arrays, so a second well can be drilled to intersect the fractures. Water will be injected down one well, flowed across the fractures in the hot granite and then returned to surface up the second well, passing through a heat exchanger at the surface, before being recirculated down the first well again. At surface, the geothermally heated water will pass under a vessel filled with a liquid with a low boiling point. The liquid will boil into a gas that will drive a turbine to

generate electricity. The gas will then cool, recondense and be recirculated in this closed heat exchange system.

Woodside Petroleum's renewable energy subsidiary, Metasource, is the largest shareholder (31.6 %) in Geodynamics. Separately, Santos has signed a memorandum of understanding for the supply of power to the Moomba Production Plant. If the proof of concept project is successful, Geodynamics' demonstration geothermal power plant will be operating by mid-2005.

Geodynamics estimates the stored thermal energy in a 1000 m thick slab of granite in GEL 97 and 98 to equal to 50 billion barrels of oil, compared to Australia's current proven oil reserves of approximately three billion barrels.

What do you believe holds the most potential for enhancing the economic prosperity of this state?

It is perilous to predict winners. That said, offshore petroleum exploration is one of the sectors that has a realistic chance of creating vast additional wealth in the state of South Australia. In 2003, Woodside (operator), Anadarko and Encana have drilled Gnarlyknots 1 to 4736 m (below mean sea level) in 1313 m of water in the Bight Basin at an estimated cost of \$56 million dollars. Gnarlyknots targeted but one of many prospects identified by the Woodside-operated joint venture. These explorers

would not be risking that sort of money unless they perceive a realistic chance for giant oil accumulations. Success in offshore South Australian basins could also drive economic expansion in regional coastal centres.

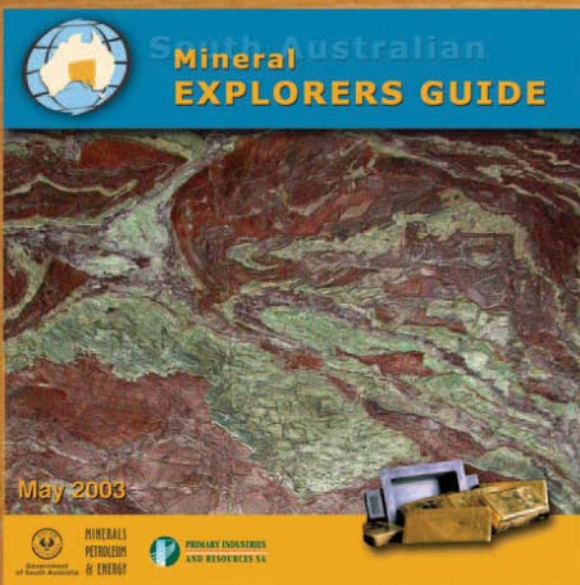
Interest in South Australia's offshore basins is now at its highest level since the early 1980s with seven current exploration permits, two of which were awarded last year, and another two to be offered following competitive work program bidding in 2003. The work programs currently forecast in our waters in the term 2000-07 correspond to 'a spend' exceeding \$200 million. This forecast excludes competitive work program bids anticipated for seven prospective offshore areas in the South Australian Otway and Bight Basins for which bids close in 2003-04. The offshore Otway areas up for bids are particularly exciting as giant oil exploration targets have been recognised.

Hence, by mid-2004, most areas considered prospective for petroleum offshore South Australia could be covered by exploration permits, each with significant work programs. There is a realistic chance the number of exploration licences and the forecast work programs in waters offshore South Australia could be double the current levels by mid-2004.

Are there any final points you wish to make?

Sure, South Australia's two largest established resource projects — the world-class Olympic Dam Mine and, of course, the Cooper Basin oil and gas fields — are major contributors to the state's economy. Of particular note are the discovery of Olympic Dam style mineralisation at Prominent Hill by Minatour Resources, planned expansion at Olympic Dam, and commencement of production at Dominion Mining's Challenger Gold Mine. Capital expenditure for mineral exploration and development in South Australia was ~\$300 million in 2002. New and expanded mineral development and production projects will inevitably be part of the expanding gas market in South Australia.

Without a doubt, South Australia has abundant unrealised petroleum, geothermal energy, coal seam methane and mineral potential. PIRSA's Minerals and Petroleum Groups have an ongoing commitment to facilitating access to land and exploration data, reducing critical exploration uncertainties and providing objective-based regulatory frameworks to foster ecologically sustainable field operations. Resultant private sector investment will inevitably discover more resources and provide net benefits for the people of South Australia.



South Australian Mineral Explorers Guide

is available from PIRSA Customer Services, ground floor 101 Grenfell Street, or ordered via the PIRSA website: www.minerals.pir.sa.gov.au

The cost is \$20 (plus \$5 postage)

The CD also contains the 2003 edition of Minerals and Petroleum South Australia and MESA Journals 1-27