

## STOS' Pohokura Development To Provide NZ Energy Relief



Chris Beath, STOS General Manager.

When production testing revealed the Pohokura Field in New Zealand's Taranaki Basin had more than doubled pre-drill estimates, the operator, Shell Todd Oil Services (STOS), realised the discovery had the potential to be one of the country's largest ever hydrocarbon finds after the Maui Field.

Since the discovery wells were drilled in early 2000, one of the company's primary focuses has been to bring the field, which is located immediately off the west coast of New Zealand's North Island within permit PEP 38459, into production in 2005. Pohokura's current estimated reserves of 900 Bcf of gas and 50 MMbbl of condensate demand considerable planning and infrastructure - a challenge which STOS has happily embraced.

STOS' base-case scenario, drawn up for use in applying for resource consents, now involves up to three unmanned platforms, about 20 production wells and a 70,000 m<sup>3</sup> LPG storage facility. The plan also includes an onshore production plant adjacent to the Methanex Motunui industrial complex, located onshore.

STOS General Manager, Chris Beath, explained that six production wells would be drilled from each of the towers, located about 4, 8 and 12 km off the Motunui coast. An additional six wells would be drilled from an onshore location.

Beath said the Pohokura development could cost up to (NZ)\$900 MM, depending on the number of platforms decided on and the size of the associated production station.

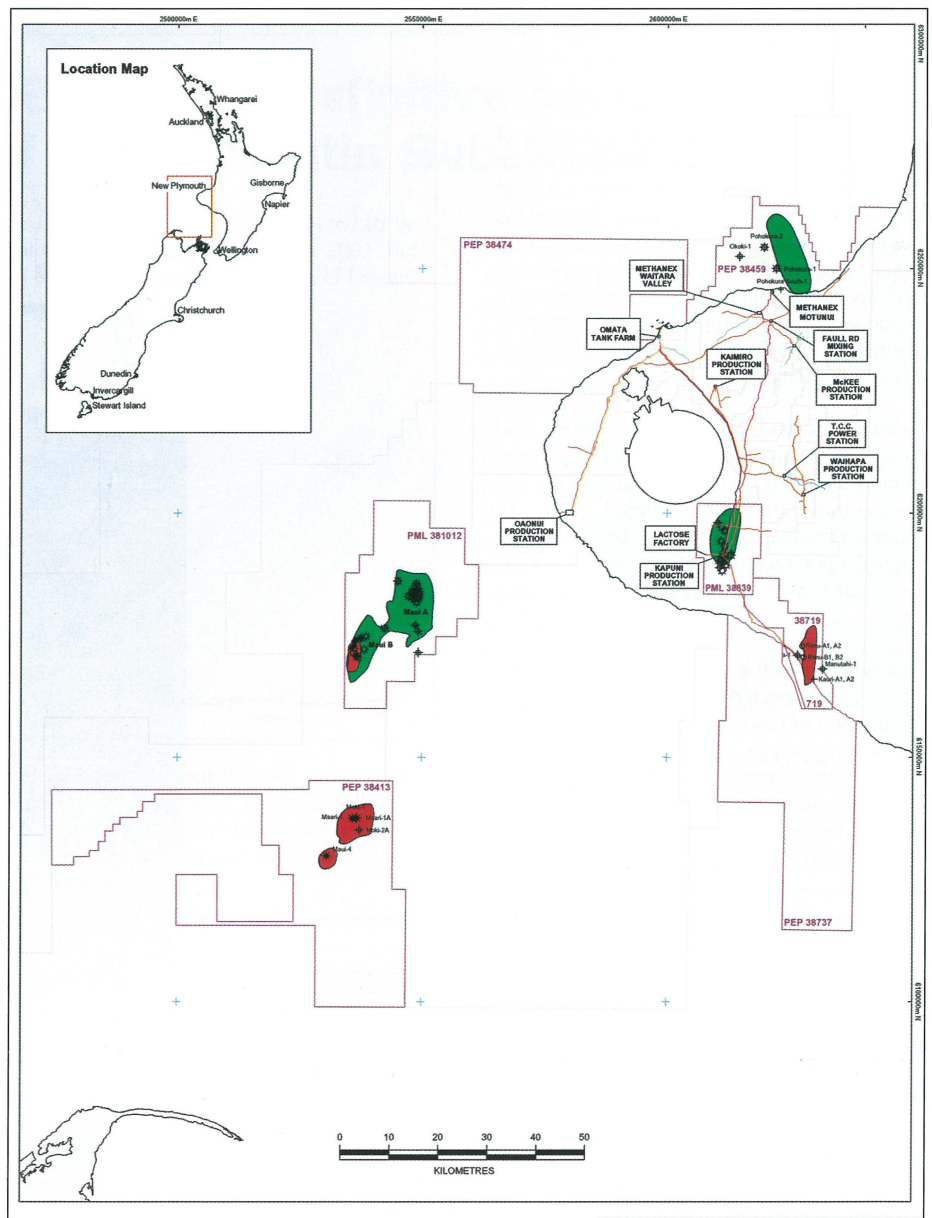
2002 will see a surge in activity surrounding the project, with appraisal drilling scheduled for the second and third quarters and commencement of the design phase. Design will involve input from local and overseas consultancy firms, with the two-year construction phase commencing in early 2003.

Beath said a team of about 100 staff and consultants was currently dedicated to the Pohokura project but, depending on final investment decisions, numbers could swell to 600 workers at the height of the construction phase at the end of 2003, when construction of production gathering pipelines, utility-

control lines and gas cycling injection pipelines is underway.

The production system will involve separating condensate at the 30 hectare production station and piping it to the Omata tank farm near Port Taranaki. LPG will be piped either to a new LPG storage facility near Port Taranaki or an offshore mooring buoy. There will also be a new tie-in to the Maui gas pipeline near Waitara in Taranaki.

The Pohokura development will play a crucial role in meeting the country's gas needs, which are currently about 220 PJ/a. STOS'



Taranaki Basin Exploration Activities.



The Kapuni processing plant. The Kapuni field has been in constant production since 1969.

Maui and Kapuni fields currently supply 90% of the country's gas, along with significant quantities of condensate, LPG and oil. Declining production from Maui will necessitate alternate supply sources, such as Pohokura, if New Zealand is to avoid energy shortages, such as those encountered during the winter of 1992.

The Pohokura Field is a low relief anticline, approximately 16 km long and 5 km wide, extending offshore in a northwest direction. In January 2001, 400 km<sup>2</sup> of 3D marine seismic helped STOS fully define the structural configuration of the field, with a detailed bathymetry survey enabling marine data acquisition to come within 2 km of the shoreline in water depths of 10 m. The survey was followed up with 70 km<sup>2</sup> of transitional 3D seismic that overlapped and linked with existing onshore seismic.

The Pohokura-1 exploration well was drilled in February and March 2000, 4.3 km offshore in water depths of 30 m. A gas/condensate accumulation was discovered in the Kapuni

Group at a subsea depth of 3480 m. The well encountered a 130 m gross hydrocarbon column and tested at stabilised rates of up to 17 MMscf/d and an average condensate of 68 bbl/MMscf of gas with an average CO<sub>2</sub> content of 8%.

Following the Pohokura-1 discovery, a back-to-back Pohokura-2 appraisal well was drilled in May and June 2000, to investigate a stratigraphically equivalent reservoir 5 km further offshore. Wireline logging and testing confirmed a 115 m gross hydrocarbon column. Pohokura-1 tested at stabilised rates of up to 31 MMscf/d with an average condensate yield of 73 bbl/MMscf with 6% CO<sub>2</sub>.

Simon Eaton, STOS' Chief Geoscientist, commented that the Taranaki Basin is STOS' primary region of focus, and is the only area in New Zealand with commercial production. In addition to their operatorship of the Pohokura Field, STOS will undertake significant activities in other permits within the basin during 2002.



Oil produced from the deeper sands below Maui-B (foreground) is fed to the FPSO vessel, Whakaaropia, for storage and processing.

Located in PML 38839, 85 km from New Plymouth, Kapuni is New Zealand's second largest gas and condensate field. Kapuni is the only producing field with reserves that will outlast Maui's production even though Kapuni has been in constant production, since 1969.

Fifteen wells are distributed around the surrounding farmland from where the gas and condensate is fed to the Kapuni processing plant, which contains 5 MW gas compression units that allow processed gas to be re-injected into the underground reservoir for later use, while separated liquids are utilised immediately.

STOS has identified several amplitude-defined potential Miocene turbidite prospects above the Kapuni Field. The first of these, Ngarewa-1, will be drilled in mid 2002, with the possibility of drilling follow-up prospects.

Eaton said that if a discovery was made in the Ngarewa prospect, the close proximity to existing infrastructure in place for development of the Kapuni Field would enable rapid development and early production.

2002 will also see STOS acquire additional 3D seismic over the Maui Field in offshore PML 381012. The survey, to be undertaken in early 2002, will replicate the acquisition parameters of the original 3D survey and will be used to image movement of hydrocarbon contacts since production began in 1991, providing valuable information to optimise the future management of the field.

The Maui Field is located 35 km off the Taranaki coastline and comprises two production platforms: Maui A, which began full production in 1979 from 14 wells drilled

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The ENSCO-50 jack-up rig drilling Pohokura-1, with a backdrop of Mt Egmont/Taranaki.

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in water depths of 110 m, and Maui B, which was installed in 1992 to allow full drainage of hydrocarbons from the field, and later to allow deeper production of oil from the deeper reservoirs.

Gas and liquids from Maui A are piped to the Maui Production Station onshore at Oaonui where gas is processed and treated to pipeline specifications. LPGs and associated gases are removed for further processing and sale. A naphtha plant, established in 1996, also operates to remove the naphtha component from condensate for sale in the premium Asian market.

Maui B is connected to Maui A via an undersea pipeline through which gas and condensate are transported. Oil is also produced from deeper sands in the Maui B areas and the oil is fed directly to an FPSO vessel, *Whakaaropai*, for storage and processing. The *Whakaaropai*, a 137,000 tonne tanker was installed in 1996 and is moored 2 km from Maui B.

As New Zealand's largest producing field, Maui produces 70% of the country's hydrocarbons, much of which is used either for electricity generation or for methanol production. Gas is sold to the Crown, who on-sell it to Methanex, Contact Energy and the Natural Gas Corporation.



One of two platforms in the Maui field, Maui A has been in production since 1979.

Additional activities in 2002 include further assessment of PEP 38413 which contains the Maari oil discovery. 2D seismic data acquired in 2001 extended an existing 3D survey over the Maari field and covered near field exploration prospects that would potentially add value to Maari Field commercialisation. STOS is also currently involved in interpreting seismic to establish drillable exploration prospects within PEP 38737. The permit, located offshore and south of the Rimu and Kauri discoveries, lies in the Taranki Thrust Belt Trend and contains the Kaheru structure. Transition zone seismic has been acquired along with an extensive programme of reprocessing of pre-existing seismic data

using prestack depth migration. Should potential be established, STOS anticipates exploration drilling by July 2002.

STOS is one of New Zealand's leading exploration and production companies and was formed in 1955.

Backed by the technology, experience and resources of the global Shell group, STOS has been behind many firsts for New Zealand's petroleum industry, including the first offshore crude oil discovery (Maui) and the country's first floating production, storage and offloading installation (*Whakaaropai*).

Shell's acquisition of Fletcher Challenge Energy in

2001 brought new assets into Shell's exploration portfolio, some of which have been placed under the operatorship of STOS. PEP 38474, immediately west of Pohokura, is one such permit that will receive STOS' attention in 2002. The work programme requires additional seismic acquisition throughout the year and an exploration well by February 2004 if an attractive prospect is identified.

Based in New Plymouth, New Zealand, STOS has a staff of 360 and is jointly owned by Shell Petroleum Mining (50%) and Todd Petroleum Mining (50%).