ATTENDANCE AT THE
FIFTH CIRCUM-PACIFIC ENERGY AND
MINERAL RESOURCES CONFERENCE AND EXHIBITION

29 July - 3 August 1990
Honolulu, Hawaii

Howard Johnson
Techsec
EDITOR'S NOTE

This report was prepared by Howard Johnson after attending the Fifth Circum-Pacific Energy and Mineral Resources Conference and Exhibition in Honolulu during his return to the UK after two years with SOPAC. His work on SOPAC's Hydrocarbon Programme was funded by the Commonwealth Fund for Technical Co-operation. Appended to the report are written questions submitted to Howard Johnson and Bob Gatliff by Mobil, and their written answers. Copies of the pre-registration directory of participants and the Programme (with abstracts) were lodged with SOPAC and are available on request.
The Fifth Circum-Pacific Energy and Mineral Resources Conference was held at the Mid-Pacific Conference Centre, Hilton Hawaii Village, Honolulu, Hawaii, from 29th July to 3rd August 1990. The technical programme was conducted from Monday, 30th July until Friday, 3rd August. Details of the Conference timetable, with abstracts of the papers and posters presented, are contained in the Official Programme. About 300 delegates had pre-registered for the conference and attendance was substantially lower than at previous Circum-Pacific Conferences.

Following on from SOPAC correspondence with Mobil New Exploration Ventures Company, I met Mr George Kerns (Geophysical Advisor) prior to the Icebreaker Cocktail Party on Sunday, 29th July. I gave Mr Kerns copies of the following recently completed documents:

*Petroleum Potential of the Kingdom of Tonga, Southwest Pacific, by R W Gatliff (Promotional brochure)*

*Petroleum Geology of Fiji, by H Johnson journal "Marine Geology"
(Draft paper submitted to the )

*Potential Mio-Pliocene Reef Traps in the Iron Bottom Basin, Solomon Islands, by H Johnson and J Pflueger (Paper accepted by "Marine Geology")*

On Sunday evening, I introduced Mr Kerns to Mr R W Gatliff, Government Geologist and Mr S Helu, Assistant Geologist, Kingdom of Tonga. Mr K Havard, former SOPAC Petroleum Geologist, was also introduced to Mr Kerns.

Mr Kerns presented Mr Gatliff and me with a list of technical questions on petroleum prospects in Tonga, Solomon Islands and Fiji. The list had been prepared by Mr Barry Stephen Smith, Senior Staff Geophysicist Far East, Mobil New Exploration Ventures Company. We agreed that Mr Gatliff would answer Mobil's queries on Tongan prospectivity and I would deal with the questions regarding the Solomon Islands and Fiji. The complete list of questions and my written replies are attached as appendices 1 and 2.

Mr Kerns presented Messrs Gatliff and Helu with details of Mobil's recent analysis of the Tonga oil seep. The analysis confirmed again that the oil is biodegraded crude oil. Mr Gatliff suggested the Mobil analysis be placed in the Tonga confidential archive.
At the opening of the Technical Session on Monday, 30th July, Mr Saimone Helu represented SOPAC, which is one of the sponsors of the Circum-Pacific Conference. Technical presentations on the following topics were conducted:

Ocean Drilling Project
International Programmes and New Geological and Geophysical Mapping Techniques.
SEATAR
Non Marine Minerals
Marine Minerals
Circum-Pacific Tectonics
Hydrocarbons
Pacific Marine Frontiers
Remote Sensing
Submarine Landslides
General

Three or four technical sessions were commonly run concurrently. During the afternoon, the technical presentations adjourned for delegates to study the poster presentations. An exhibition of circum-Pacific maps and of Trade Booths was open during the morning technical sessions and details of these are listed in the official programme (appendix 1)

On behalf of SOPAC, I presented the following poster papers at the Conference:

Potential Mio-Pliocene Reef Traps in Iron Bottom Basin, Solomon Islands, Southwest Pacific, by H Johnson and J Plueger

Petroleum Geology of Shallow – Water Basin around Viti Levu, Fiji, Southwest, by H Johnson

The poster papers attracted a lot of interest and Mr K Havard was kind enough to assist me in explaining the posters to delegates. It was not possible to keep track of all the people that viewed the SOPAC displays, but they included:
George Kerns  Geophysical Advisor
Mobil New Exploration Ventures Company
Mobil Place
3000 Pegasus Park Drive PO Box 650202
DALLAS, TEXAS
Phone: (214) 951-2000

John Thomas   Wilson Vice President, International Exploration
Anderman/Smith Operating Company
Suite 500
1776 Lincoln Street
DENVER, COLORADO 80203
Phone: (303) 839-5013
Fax: (303) 863-1040

Matthias D Peterson  Geological Advisor
Worldwide Exploration Services
Conoco Incorporated
PO Box 1267
PONCA CITY, OKLAHOMA 74603
Phone: (405) 767-3826

Lloyd S Grearson  President
Pan Energy Resources, Incorporated
PO Box 26471
HONOLULU, HAWAII 96825
Phone: (808) 395-5886
Fax: (808) 395-1257
<table>
<thead>
<tr>
<th>Name</th>
<th>Company/Position</th>
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<tbody>
<tr>
<td>David A C Clark</td>
<td>President, Albion International Resources, Incorporated (Oil and Gas Exploration)</td>
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<tr>
<td>Gerald p Salisbury</td>
<td>Unocal</td>
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<tr>
<td>John H Silcox</td>
<td>Chevron (retired)</td>
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<td>Gerard Messin</td>
<td>Petroconsultants</td>
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<td>Hans R Katz</td>
<td>Pacific Geo Consultants</td>
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<td>Michael Lloyd</td>
<td>Roxanna Oil Company</td>
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<td>John Baines</td>
<td>Unocal, International Oil and Gas Division</td>
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<tr>
<td>Gary Kirby</td>
<td>Lemigas</td>
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<td>David Scholl</td>
<td>United States Geological Survey</td>
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<td>Tracy Vallier</td>
<td>United States Geological Survey</td>
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<td>Gary Greene</td>
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<td>Terry Bruns</td>
<td>United States Geological Survey</td>
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<tr>
<td>Phil Jarvis</td>
<td>University of Hawaii</td>
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<td>John Milson</td>
<td>University College-London</td>
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In addition to presenting the posters, I also distributed to delegates copies of the following documents:

Abstracts of the two SOPAC poster displays on Solomon Islands and Fiji (10 copies of each abstract)

Petroleum Potential of Solomon Islands, SW Pacific, by P J Coleman  
(20 copies plus additional copies given by Dr Terry Bruns, of the USGS)

Fiji as a Petroleum Prospect, by R A Eden and R Smith (10 copies)

SOPAC publicity leaflets giving an outline of SOPAC funding, and contact details 
activities

Several oil industry representatives expressed the opinion that the typical exploration expenditure levels set out in 'Fiji as a Petroleum Prospect', Section 11 (Legal and Administrative Arrangements) are very high and a disincentive to further petroleum exploration. I stressed that the brochure was only intended as a broad introduction and is due for updating. I commented that in my view the Fiji Government would welcome further commercial interest in petroleum exploration and that more favourable terms and conditions could probably be negotiated with Government. I explained that SOPAC is to hold a Southwest Pacific Hydrocarbon Policy Seminar in 1991 to discuss and recommend suitable terms and conditions for petroleum exploration and development in the Southwest Pacific region. Mr Lloyd S Grearson, President of Pan Energy Resources, Incorporated, indicated that he would be willing to attend the regional seminar and contribute the viewpoint of small oil companies. I indicated that Mr Grearson's contribution would be most welcome.

Mr Grearson also stated that his associates were formerly involved with the Oceanic Oil Exploration Company (OXOCO) when Oxoco shot multi-channel seismic data to the west of the Yasawa Group, Fiji, in the early 1970s. He
suggested that he might be able to geophysical data from the survey for any assistance in locating and
SOPAC region.

assist SOPAC with the retrieval of raw I indicated that SOPAC would be grateful retrieving basic
geophysical data from the

Mr Gerard Messin of Petroconsultants was particularly interested in the status of petroleum exploration in
Fiji. I outlined the current exploration licence situation and recommended that he contact SOPAC for copies
of recent SOPAC petroleum prospectivity reports and publications.

On Thursday, 2nd August, Mr Robert Gatliff presented a talk 'Structure, Seismic Stratigraphy and Petroleum
Potential of the Tongatapu -'Eua area of the Kingdom of Tonga'. On Thursday afternoon Mr Gatliff
presented a poster on the same topic and this was derived from the SOPAC poster that was prepared for the
1989 AAPG San Antonio Convention. At the Circum-Pacific poster session Mr Gatliff distributed 70 copies
of the new Tonga petroleum brochure
that I had carried from Fiji. Mr Gatliff kept 30 copies of the brochure for distribution to oil companies in the
UK.

On Thursday, 2nd August, Dr T Bruns of USGS presented a talk 'Petroleum Prospects for Offshore
Sedimentary Basins in the Eastern New Guinea and Solomon Islands Region'. Dr Bruns took the opportunity
to advertise the brochure "Petroleum Potential of Solomon Islands, SW Pacific".
APPENDIX 1

Questions from Mobil New Exploration Ventures Company
TONGA

1. WHAT DO THEY CONSIDER TO BE THE AREA OF HIGHEST POTENTIAL AND WHY?
   SHELL'S ANSWER AS WELL AS THE TWO OTHER EXPLORATION GROUPS FELT THE
   WATERS EAST OF TONGATAPU AND THE DEEPER AREAS SOUTH OF THERE WERE MOST
   PROSPECTIVE BUT DIDN'T COMPLETELY RATIONALIZE IT IN A REGIONAL SENSE.

2. HAS DMO OR FX FILTERING PERFORMED ON ANY OF THE RECENTLY
   REPROCESSED SEISMIC WOULD WE HAVE ACCESS TO ANY OF THE FIELD TAPES OR
   STACK TAPES FOR REPROCESSING OR LANDMARK ANALYSIS?(1988 SOPAC
   REPROCESSING EFFORT)

3. WHAT DEDUCTIONS CAN BE MADE ON THE BASIS OF OUR SOURCE ANALYSIS,
   WHAT TYPE OF DEPOSITIONAL ENVIRONMENT MIGHT HAVE A NON-SHALY
   PHOSPHATIC OR MARLY SOURCE ROCK? SHELL SUGGESTED PELAGIC LIME
   !1UDSTONES MAY HAVE BEEN DEPOSITED BETWEEN BASEMENT FAULT BLOCKS
   UNDER EUXINIC CONDITIONS.. DOES THIS TIE IN?

4. DO THEY THINK SHELL AND WEBB'S FAILURES ONSHORE AND THE VERY THICK
   VOLCANOCLASTIC SECTION PRECLUDE ANY FURTHER ONSHORE EFFORT?

5. WHAT IMPLICATIONS, IF ANY, ARE THERE REGARDING THE SOURCE SEEP OR
   SEEPS REPORTED IN NEW CALEDONIA TO THOSE ON TONGA FROM A
   PALEOGEOGRAPHIC PERSPECTIVE? (HYPOTHESIS SUGGESTS TONGA WAS PROXIMAL
   TO NEW CALEDONIA IN THE TERTIARYJ..WHAT ABOUT ASSERTIONS BY SCHOLL AND
   HERZER THAT SOURCE ROCKS FROM THE GONDWANA MARGIN MAY UNDERLIE THE
   MIDDLE EOCENE ARC BASEMENT OF THE TONGA AND LAU RIDGES.

6. THE AVERAGE GRADIENT FOR THE FIVE TONGATAPU WELLS IS REPORTED TO
   BE 1.65 DEGREES FAHRENHEIT/100 FEET. WHAT DO YOU THINK OF THE WARPET
   EXPLORATION ASSUMPTIONS ON GENERATIVE POTENTIAL BASED ON THE
   FOLLOWING: LOWER TERTIARY SECTION WAS DEPOSITED UNDER LOCALLY
   RESTRICTED AND POTENTIALLY EUXINIC CONDITIONS, OIL IN SEEPS WAS PROBABLY
   GENERATED IN RESTRICTED TROUGHS. LOWER OLIGOCENE TO UPPER EOCENE
   ISOPACH WAS USED TO QUANTIFY "POTENTIAL FOR GENERATION" ;BASED ON A)
   OFFREEF SHALE FACIES B) DEPTH BELOW 5000 FEET(COULD THIS BE TOO OPTIMISTIC
   FOR UPPER LIMIT OF GENERATIVE SECTION) C) ASSUME IX TOC, TYPE II KEROGEN D)
   MATURITY IS 25 X OF ULTIMATE PRODUCTION E) 50 X OF THAT IS AVAILABLE TO
   SOURCE LOCAL A CCUM U L A T ION S A N D
   THEREFORE. TROUGH OR TROUGHS WOULD HAVE PRODUCED SOME 2.5 BILLION
   BARRELS OF OIL;;;;;; AND.. THE SURROUNDING AREA THAT MUCH
   AGAIN.

7. THERE ARE SUGGESTIONS THAT A FACIES CHANGE EXISTS IN LATERALLY
   EQUIVALENT STRATIGRAPHIC UNITS WHICH RANGE TO VOLCANOCLASTIC IN THE
   NORTH TO SHALY IN THE SOUTH. DO THE SEQUENCE STRATIGRAPHERS HAVE ANY
   DEFINITIVE EVIDENCE THAT THIS IS INDEED THE CASE?
8. HAVE THEY TRIED TO USE SEISMIC ATTRIBUTES TO DISTINGUISH BETWEEN INGNEOUS AND CARBONATE SEISMIC ANOMALIES

9. WHAT DO THEY THINK OF THE ANALOGY MADE BETWEEN THE AREA OFF TONGA-TAPU AND THE SULAWATI BASIN?

10. SHELL SUGGESTED THE PROBABLE MIGRATION PATH FOR THE OIL SEEPS IN THE TENSIONAL FAULT PLAINS; DO THEY AGREE?

11. SHELL HYPOTHESESIZED EOCENE SOURCE WAS TRAPPED ALONG THE FLANKS OF A BASEMENT RIDE RUNNING REGIONALLY FROM EUA, NORTH TOWARD NOMULA. IS THIS A GOOD IDEA?

12. DO THEY THINK SOURCE ROCKS WERE DEPOSITED DURING A TIME OF VOLCANIC QUIESCENCE IN THE MIDDLE TO LATE EOCENE?

SUMMARY.

POSITIVES: CONFIRMED OIL SEEPS, AND AN ABUNDANCE ANOMALIES, OF SEISMIC POSSIBILITY OF CONDUITS FOR MIGRATION.

NEGATIVES: GEOGRAPHIC LOCATION AND WATER DEPTH EQUATE TO A NEED FOR LARGE POTENTIAL RESERVES. ALL WELLS DRILLED TO DATE WERE FAILURES. THE VOLUME OF MATURE HYDROCARBONS AVAILABLE FOR ENTRAPMENT IS SUSPECT. NO SUITABLE RESERVOIR HAS BEEN TESTED.

DISCUSSION: PLEASE DISCUSS ANY IDEAS YOU HAVE REGARDING OUR PLANNED VISIT IN THE AUTUMN OF THIS YEAR TO ENHANCE OUR UNDERSTANDING OF THE AREA.

SOLOMON ISLANDS

LIMITED INFORMATION IS AVAILABLE.

1. HAS ANY SEISMIC ATTRIBUTE WORK BEEN DONE ON THE SEISMIC ANOMALIES?

2. (WITH REFERENCE TO THE IRON HORSE BASIN) HAS ANY VOLUMETRIC WORK BEEN DONE ON EITHER SPECIFIC ANOMALIES OR THE GENERATIVE CAPACITY OF THE BASIN AND IF SO, WHAT ASSUMPTIONS HAVE BEEN MADE REGARDING THE COMPUTATIONS AND THE AREA'S GEOTHERMAL GRADIENT?

3. WHAT DO THEY SEE AS THE MOST OPTIMISTIC CASE FOR THIS AREA AND WHAT OTHER AREAS IN THE SOLOMONS APPEAR TO HAVE SIMILAR POTENTIAL? [KEEPING IN MIND REALISTIC WATER DEPTHS FOR PRODUCTION FACILITIES AND THE SIZE OF SEISMIC ANOMALIES NEEDED TO WARRANT EXPLORATION IN A DEEP WATER PROVINCE. WOULD AND OF THE POTENTIAL PROSPECTS LISTED IN THE SOLOMON'S BROCHURE "FALL OUT" BECAUSE OF UNREALISTIC LOGISTICAL PROBLEMS?]
4. PLEASE DISCUSS ANY IDEAS OR SUGGESTIONS FOR EXPLORATION STRATEGY IN THIS AREA.

FIJI

LIMITED INFORMATION IS AVAILABLE.

1. HOW WOULD SCHOLL AND HERZER'S SPECULATIONS REGARDING GONDWANA MARGIN SOURCE ROCKS UNDERLYING THE MIDDLE EOCENE ARC BASEMENT OF THE TONGA AND LAU RIDGES RELATE TO FIJI?

2. WHAT IS YOUR BEST ESTIMATION FOR THE PRESENCE OF SOURCE MATERIALS?

3. WHAT TYPES OF ENTRAPPED HYDROCARBON VOLUMES DO YOU EXPECT TO FIND UNDER YOUR MOST OPTIMISTIC EXPECTATIONS?

4. VOLCANOCLASTIC RESERVOIRS AREN'T BELIEVED TO BE ADEQUATE FOR PRODUCTION. PLEASE SPECULATE ON THE BEST CARBONATE RESERVOIRS WHICH COULD BE PREDICTED. HAVE ANY OF THESE ANOMALIES BEEN SEISMICALLY DELINEATED AND HAVE VOLUMETRIC MEASUREMENTS BEEN PERFORMED ON THEM?

5. THE "FLAT-SPOT" IDENTIFIED ON SEISMIC DATA IN THE BAU WATERS BASIN IS LIMITED TO 1 SEISMIC LINE. ARE THERE ANY LINES NEARBY? WHAT IS THE HYPOTHESIZED DEPOSITIONAL ENVIRONMENT FOR THE AREA? HAS THE GENERATIVE CAPACITY OF THIS AREA BEEN MODELLED?

6. PLEASE DISCUSS A SUGGESTED FORMAT FOR OUR PLANNED VISIT IN THE AUTUMN OF THIS YEAR.
APPENDIX 2
Replies to Mobil's Questions H Johnson
SOLOMON ISLANDS

1. No seismic attribute work has been conducted on the seismic anomalies in Iron Bottom Basin. SOPAC is endeavouring to retrieve (on behalf of the Solomon Islands Government) the digital seismic tapes for the 1978 Pacific Energy and Minerals Limited survey in Iron Bottom Sound, so that trial seismic reprocessing could be carried out.

2. No volumetric work has been conducted on either the buried reefs in Iron Bottom Basin. A large amount of reconnaissance seismic reflection, refraction and other geophysical data has been collected by the USGS over the Solomon Islands region. The results of this work and a geological synthesis of the Solomon Islands region are presented in Volume 4 and 12 of the Circum Pacific Council Earth Science Series (see my paper for full references). Geothermal gradients are discussed in volume 12.

3. The most promising play is buried reefs. The reefs would provide reservoir and trap and the thick volcanic section would provide a seal. The major uncertainty is the presence of adequate source material. Large volumes of sediments have accumulated in the offshore sedimentary basins and these are probably largely of volcanic composition. Their organic content is unknown, but the possible presence of stagnant back reef and fore-reef environments and of mangrove-fringed coastlines (ie. High organic productivity) suggests that some sedimentary sequences may have source potential. Most near-term prospects would be buried reefs that probably fringe the basins. Only in Iron Bottom Basin is there sufficient seismic data to evaluate a reef play. It is highly that oil has been generated. Thick late Miocene sequences with terrigenous organic matter would presumably be mainly a source for gas. No volumetric analysis of generative potential in the basins has been conducted.

4. The best carbonate reservoirs are probably buried reefs. Subsurface mounds that resemble reefs are present in Bligh Water Basin and one is illustrated in my papers. No volumetric measurements have been conducted for the potential reef traps.

5. Adjacent seismic lines do not show the flat spot, but the extent of the seismic coverage is limited. The location of seismic coverage is limited. The location of seismic profiles across the Bau Waters Basin is illustrated in my papers.

Seismic resolution in the Bau Waters area is limited to late Miocene and younger deposits. Late Miocene and Early Pliocene strata are similar to the varied shallow and deep water tuffaceous sediments and minor limestones that crop out on eastern Viti Levu. The character of middle Miocene and older rocks is uncertain, but may include volcanics and shallow water limestones. No generative capacity has been modelled for this area. A suggested first step would be acquisition of digital seismic tapes and seismic reprocessing, followed by reinterpretation of structure, sedimentary thickness and depositional environments.

6. Suggest that you request a computer plot of seismic line locations and an update of the licence situation from the Fiji Mineral Resources Department. MRD may also be able to advise on the latest position with regard to retrieval of digital seismic tapes from former licence holders.

Seismic reprocessing and source book geochemistry may be a useful strategy for further exploration.

For your visit to Fiji I suggest that you arrange to review seismic reflection and other geophysical, geochemical and geological data in the Fiji MRD Archive. Mr Neville Ebbsworth would be able to advise you on Petroleum Legislation. SOPAC are planning a regional workshop on Hydrocarbon policy in 1991 and Jim Eade can give you details. Your main contacts are:

Mr Jim Eade Deputy Director SOPAC
Mr Abdul Rahiman Director MRD
Mr Alfred Simpson Assistant Director MRD
Mr Neville Ebbsworth Principal Inspector Mines, MRD
Miss Cristelle Pratt Graduate Trainee, Marine Geology