

### Jamaica petroleum exploration second round - the reports & data

This brochure holds some details for the latest available data and reports obtainable from a variety of sources for the  $2^{nd}$  Jamaican Licence Round which is scheduled to close on March 31 2011.

# 1. The realisation of the hydrocarbon potential of Jamaica - an overview of the second edition (2010) of the JEBCO Alliance 2004 report, volumes I & II

Of the eleven wells drilled in Jamaica, all but one encountered oil and or gas shows.

There are onshore gas seeps. Three Petroleum Systems have been identified, the most important of which was sourced from a middle Eocene pro-delta sequence. Hydrocarbons from this high quality source, which is both oil- and gas-prone and occupies a 700 metre interval, are present in the Content-1 well. Southwards extension into the Walton Basin immediately to the south of Jamaica is predicted. A related source sequence is developed along the Caribbean margin of Honduras and Nicaragua. Associated reservoir objectives are sands within a middle Eocene, delta-associated sequence, and, more especially, newly defined reef systems and their detrital products. 50% fill of the carbonate targets mapped so far would imply reserves of 2.8 BBO or 10.6 TCF gas.

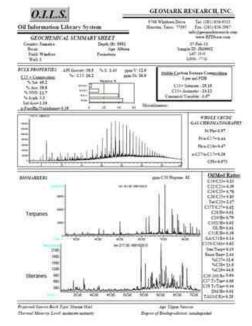
Geological reconstructions suggest that the delta and pro-delta sequences were associated with a major river that flowed eastwards from Central America. Excellent analogies exist with the now prolific Talang Akar (sand) and Baturaja (carbonate) plays of western Indonesia. Regional gravity suggests that this play extends westwards through the shallow waters along

#### In this brochure details for:-

- 1. PCJ JEBCO Alliance 2<sup>nd</sup> edition report
- 2. PCJ December field trip
- 3. PCJ MDOil Supplementary report
- 4. PCJ MDOil Morant 2D seismic (reconstructed)
- 5. PCJ JEBCO reconstructed data
- 6. PCJ JEBCO reprocessed 2D seismic
- 7. PCJ Data Pack

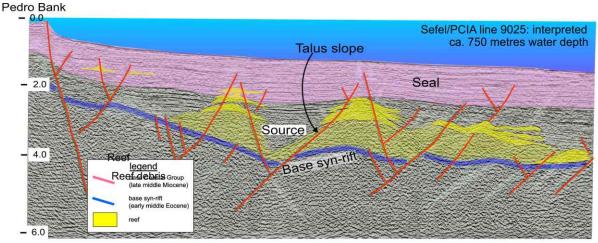
the crest of the Nicaragua Rise to the limit of the Jamaica EEZ.

The South Coast of Jamaica and the onshore Montpelier-Newmarket Trough also offer possibilities. A related, but older delta play involving Paleocene source rocks is expected to emerge in the John Crow Belt in the extreme east of the island. Additional



potential is offered by a newly identified oil-prone Cretaceous source.

Smackover-type (Oxfordian) oils that were encountered in wells in the Windsor area of the North Coast resemble those from Belmopan in Belize. A review of the regional geology suggests that the block on which these wells lie was accreted onto Jamaica from Yucatán in the late Cretaceous.



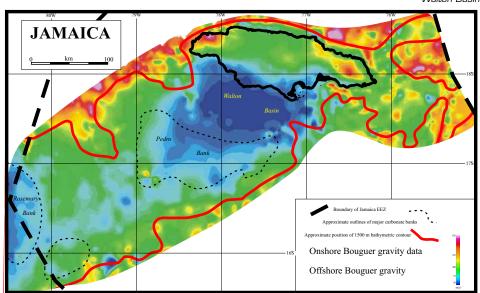


TWT

#### Report contents

Walton Basin

- 1. Introduction
- 2. Mapping and the MapInfo database
- 3. Evolution of the Caribbean
- 4. The geology of Jamaica
- 5. Wells, onshore coreholes and hydrocarbon seeps
- 6. Seismic surveys
- 7. Gravity data
- 8. Magnetic data
- 9. Geochemical data and basin modelling
- 10. Play controls and concepts



Available via MDOil Limited on behalf of JEBCO and the Petroleum Corporation of Jamaica, licence fee US\$ 25,000

#### 2. Field trip, 7-8 December 2010

Following the Petroleum Corporation of Jamaica's sucessful 2006 industry field trip, a second field excursion is planned for December this year.



St. Ann's Great River gas seep

#### **DAY 1:**

#### Tuesday, December 7, Kingston

- PCJ Core Repository in Hope Gardens -view core sections from past wells.
- Geology of the Wagwater Belt, eastern Jamaica –
   Paleocene to Eocene rift system four locations

#### **LUNCH**

**Buff Bay Valley** 

- 2 stops at selected localities along the north coast. (Richmond Formation & Coastal Formations)
- St Ann Gas Seep

#### DAY 2:

#### Wednesday, December 8, Ochos Rios

Central Jamaica

- Guys Hill sandstones (Reservoir potential) 2 stops
- Guys Hill shales (source rocks) 2 stops
- Yellow Limestone (Stettin Limestone, Swanwick Formation) 2 stops

#### **LUNCH**

- Cretaceous Rudist limestone (reservoir) 1 stop
- Shales of the Thomas River Formation 1 stop
- 6:30 p.m. Return to Kingston Spanish Court Hotel

#### 3. Supplementary report

## Petroleum potential, offshore southern Jamaica updated, an explorationist's guide (2010)

Jamaica's petroleum potential was revealed following the comprehensive documentation in 2004 of Petroleum Systems related to Lower Tertiary, Upper Cretaceous and Upper Jurassic source rocks. Acreage was subsequently awarded in the Walton Basin and Pedro Bank area.

Seismic acquired in 2009 has enabled this potential to be

substantially extended southwards into the Lower Nicaragua Rise region where multiple traps capable of yielding super-giant sized discoveries have been mapped. The objectives are Tertiary to middle Cretaceous limestones and Upper Cretaceous sandstones. Geological correlations with wells, DSDP / ODP coreholes and onshore outcrops suggest Upper Cretaceous and Lower Tertiary source rocks are present. Basin modelling places the shallower source horizons in the Oil Window. Seal is provided by shales / claystones. Some traps require fault seal, others are dip closed. Water depths are mostly in the range 1500 to 2500 metres with shallower opportunities related to the banks and cays. Nineteen blocks are on offer offshore and four onshore.

#### Contents

Introduction

New potential field data and basin architecture

Geological background

The source rocks, oils and hydrocarbon gases of Jamaica

Lower Nicaragua Rise basin modelling

References

Available via the Petroleum Corporation of Jamaica, licence fee US\$ 15.000



Figure 3.13 Paleogene turbiditic sandstones of Jamaica

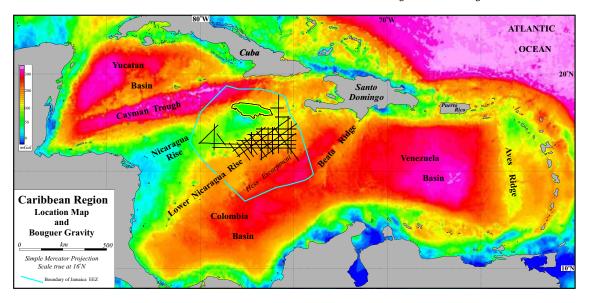


Figure 2.2 Bouguer gravity map of the Caribbean, based on satellite altimetry and showing the approximate boundary of Jamaica's EEZ and the locations of the lines of the CGGVeritas grid

## **4. Digitally reconstructed seismic data -** Morant, Formigas and Albatross regions, offshore eastern Jamaica

The Petroleum Corporation of Jamaica (PCJ) has recently made available for license 1,044 line km of digitally reconstructed data for Morant, Formigas and Albatross areas of Eastern Jamaica. The data was acquired in 1983 by Sefel as part of a Canada International assistance project and is the only seismic data available for this region.

The data is available by licence, through PCJ's UK Agent (MDOIL Limited, cjmd@mdoil.co.uk) for a fee of US\$7,500 for a single user with a 50% discount for partners.

Petroleum geochemical analysis has indicated the presence of both terrestrially and marine derived oils. The origin of the thermogenic gases remains uncertain.

The marine oils are interpreted to be derived from a marl dominated source rock and both an Upper Cretaceous and Late Jurassic Marine sources could be responsible for the seeps and shows found throughout Jamaica (on and offshore).

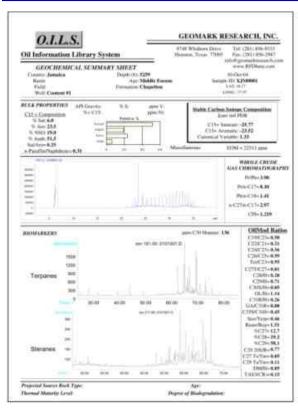
The oil shows in the Eccleston core hole, eastern Jamaica and gas at Yallahs Point have yet to be analysed.

#### Morant seismic database

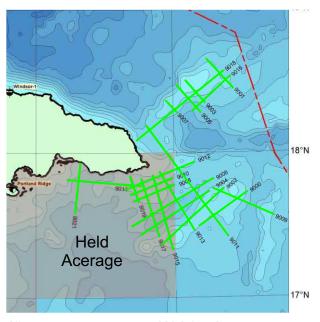
DOCUMENT ID	LINE NAME	STACK / MIGRATION	RECONSTRUCTED DIRECTION	START TIME	END TIME	DATA LENGTH	TRACES/SP	LEFT SHOTPOINT	RIGHT SHOTPOINT	SP Interval	Kilometers	TRACE COUNT
1	9000	М	R-L	0	6	6000	1	1793	-68	25	46.525	1862
2	9001	М	L-R	0	6	6000	1	-67	1243	25	32.75	1311
3	9002	М	L-R	0	6	6000	1	-66	1403	25	36.725	1470
4	9002A	М	L-R	0	6	6000	1	2276	3052	25	19.4	777
5	9002B	М	R-L	0	6	6000	1	4636	3934	25	17.55	703
6	9003_9003A	М	R-L	0	6	6000	1	1918	-67	25	24.625	986
7	9004	М	R - L	0	6	6000	1	2519	-66	25	64.625	2586
8	9005	М	L-R	0	6	6000	1	-67	1149	25	30.4	1217
9	9006	М	L-R	0	6	6000	1	-67	2012	25	51.975	2080
10	9006A	М	L-R	0	6	6000	1	2953	3919	25	24.15	967
11	9007	М	R - L	0	6	6000	1	520	-67	25	14.675	588
12	9008	М	R - L	0	6	6000	1	1338	-66	25	35.1	1405
13	9009	М	R-L	0	6	6000	1	1948	-67	25	50.375	2016
14	9010	М	L-R	0	6	6000	1	-66	1333	25	34.975	1400
15	9011	М	L-R	0	6	6000	1	-65	4218	25	107.08	4284
16	9012	М	R-L	0	6	6000	1	752	-67	25	20.475	820
17	9012A	М	R-L	0	6	6000	1	2292	1636	25	16.4	657
18	9012B	М	R-L	0	6	6000	1	4314	3173	25	28.525	1142
19	9013	М	R-L	0	6	6000	1	352	13	25	8.475	340
20	9013A	М	R-L	0	6	6000	1	3184	1234	25	48.75	1951
21	9014	М	L-R	0	6	6000	1	193	2511	25	57.95	2319
22	9015	М	L-R	0	6	6000	1	-67	768	25	20.875	836
23	9015A	М	L-R	0	6	6000	1	1643	3392	25	43.725	1750
24	9016	М	L-R	0	6	6000	1	-67	1595	25	41.55	1663
25	9017	М	R-L	0	6	6000	1	1857	-66	25	48.075	1924
26	9018	М	R-L	0	6	6000	1	3467	-66	25	88.325	3534
27	9019	М	L-R	0	6	6000	1	-67	814	25	22.025	882
28	9021	М	L-R	0	6	6000	1	-67	1205	25		
29	9021 9021A	М	L-R	0	6	6000	1	-67	2467	25	38.325	1534
30	9021A	М	L-R	0	6	6000	1	1970	2465	25		
	·									Totals	1074.4	43004

There are also minor gas anomalies offshore (Inter Ocean sniffer survey image) and SAR indications of hydrocarbons from the recent work by Finder Petroleum Limited in its acreage.

Data available via MDOil Limited as agents of the Petroleum Corporation of Jamaica, licence fee US\$ 7,500



Eocene source rock extract



Offshore seismic metadata: the 1983 Sefel/PCIA surveys (Walton Basin, Morant Basin and Formigas Bank).

#### 5. Digitally reconstructed seismic data (11,100 line Km)

As part of JEBCO's review of the Walton Basin and Pedro Bank for the Petroleum Corporation of Jamaica for the 1st licence round, JEBCO digitally reconstructed 11,100km of 2D data from four seismic surveys (see Table 1). The navigation data was also investigated, corrected and inserted into this reconstructed SEGY files. The data is available on DVD via MDOil Limited on behalf of JEBCO and the

1978	Prakla Seismos / GECO for PCJ	Formigas Bank / Pedro Bank / Negril / Montego Bay ( <i>Prefixed</i> G78)	4,065
1980	CGG for Union Texas / Agip	Pedro Bank (Prefixed UTJ80)	1,100
1982	GSI (speculative)	South Coast regional ca. 10 x 10 km ( <i>Prefixed JA82</i> )	4,165
1983	Sefel for Petro-Canada International Assistance Corp. (PCIA) / PCJ	Walton Basin (Prefixed 90)	1,770
		Total	11,100

Table 1 Petroleum Corporation of Jamaica. Block 1 Block 2 Block 3 **PROTEAM** Block 4 International Boundary Windso KINGSTON Portland 18°N Block 25 **PROTEAM** FINDER Block 8 PROTEAM FINDER Block 17 PROTEAM Legend Block 10 Block 11 Block 9 Block 12 Block 26 Block 29 minor oil show EINDER SAGRES minor oil & gas show Block 18 Block 19 minor gas show Block 13 Block 14 Block 16 Block 15 Block 27 Block 30 SAGRES SAGRES no shows moderate oil & gas show DSDP/ODP corehole Block 20 Block 21 Block 22 Block 23 Block 24 Block 28 Block 31

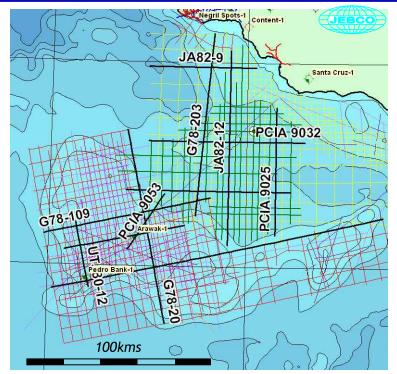
11,100 line Km of data digitally reconstructed data by JEBCO for PCJ, available via MDOil Limited, licence fee  $\,$  US\$40,000  $\,$ 

#### 6. Reprocessed data by JEBCO

Shot records, geometry and PSTM gathers with radon transform are available for: G78-024, G78-04, G78-105, G78-109, G78-20, GA-203, G78-27, JA82-12, JA82-9, PCIA-9024, PCIA-9025, PCIA-9026, PCIA-9032, PCIA-9053 & UTJ80-12 [1,026km] and Radon migration and Radon stacks for G78-024, G78-04, G78-105, G78-109. G78-20, GA-203, G78-27, JA82-12, JA82-9, PCIA-9024, PCIA-9025, PCIA-9026, PCIA-9032, PCIA-9053.

DLT and DVD for reprocessed data and copies and Radon Stacks on  $2\,\mathrm{x}\,\mathrm{CDs}$ .

Data reprocessed by Geocentre in Houston available via JEBCO, licence fee US\$40,000



Reprocessed seismic data

#### 7. Data Pack

#### Seismic data: (Scanned)

Prakla/GA 4,065 km CGG/UT 1,100 km GSI 4,165 km Sefel/PCIA 1,770 km Shot point map. Available acquisition reports

Seismic scanned to DVD / CD at minimum resolution of 400 dpi

#### Well data (LAS files)

Negril spots #1 1955
Santa Cruz #1 1956
Cockpit #1 1957
West Negril #1 1957
Pedro Bank #1 1970 (offshore)
Portland Ridge #1 1971
Content #1 1972
Hertford #1 1981
Arawak #1 1982 (offshore)
Windsor #1 1982
Retrieve #1 1982

The following data for each of the specified wells where available will be included in the Data Package:-

Gamma ray log, caliper log, shallow, medium and deep resistivity logs, neutron log, density log, sonic log, composite well log, mudlog, final well report. Scanned to disk by Adams Consulting

#### Core hole reports

Windsor # 1 Ecclesdown # 1 Blowfire Hill # 1

#### Library Reports

DVD copy available

AVAILABILITY: direct from the Petroleum Corporation of Jamaica



MDOIL Limited
43 High Street,
Marlow,
Buckinghamshire,
SL7 1BA, UK
t +44 1628 876 437
f +44 1628 481546
cimd@mdoil.co.uk
www.mdoil.co.uk



Petroleum Corporation of Jamaica 36 Trafalgar Rd, Box 579 Kingston 10 Jamaica, W.I. t +1 876-929-5380/9 f +1 876-929-2409 raymond.wright@pci.com

#### Summary of the history of exploration:

Date Activity 1955 124 km of onshore seismic acquired for Canadian Base Met 1955 Nigril Spots #1 drilled by Stanolind	
·	
1955 Nigril Spots #1 drilled by Stanolind	al
. and in appear in a mad by dourioning	
1956 Jamaican Stanolind acquired airborne magnetic survey	
1956 Santa Cruz #1 drilled by Canadian Base Metals	
1957 Cockpit #1 drilled by Stanolind	
1957 West Negril #1 drilled by Stanolind	
1958 100 km of onshore seismic acquired by Western Geophysica	al for
Stanolind (First seismic acquisition)	
1967 900km of offshore seismic acquired by Delta Exploration for	Signal
1968 900km of offshore seismic acquired by Delta Exploration for	Signal
1968 600km of offshore seismic acquired by Mobil	_
1969 500km of offshore seismic acquired by GSI for Signal	
1969 700km of offshore seismic Engineering for Occidental 700	
1970 Pedro Bank #1 drilled by Occidental and Signal	
1971 Portland Ridge #1 drilled by Occidental and Signal	
1972 Content #1 drilled by Kirby Weaver	
1976 256km of offshore seismic acquired Western Geophysical fo	or Exxon
1978 Windsor corehole drilled by Petroleum Corporation	
1978 4,065km of offshore seismic acquired by Prakla Seismos / 0	GECO
for PCJ	
1979 Petroleum Corporation of Jamaica established by Petroleum	Δct
1979 147km onshore seismic collected by Horizon for	1700
Petroleum Corporation	
1980 Tidelands Geophysical acquired onshore gravity and magneti	ic eurvev
1980 1,100 km of offshore seismic acquired by CGG for Union Texa	
1981 Hertford #1 drilled by PCJ	as / Agip
1981 Ecclesdown core hole drilled by PCJ	
1982 Arawak #1 drilled by Union Texas Petroleum, Agip and PCJ	
1982 Windsor #1 drilled by PCJ	
1982 Retrieve #1 drilled by PCJ	
1982 4,165 km of offshore seismic acquired by GSI as speculative	CHEVOV
1983 2,940 km of offshore seismic acquired by Sefel for Petro-Ca	
	IIaua
International Assistance Corp. (PCIA) and PCJ  1984 Blowfire Hire corehole drilled by PCJ (End of Phases 1 and 2	,
2004 PCJ commissions JEBCO Seismic review of oils, well, report	-
	and
seismic database	
2005 PCJ hold 1st formal round	
2006 Finder and partners Gippsland, now Flow Energy awarded	
blocks 7, 10, 11 and 12	
2006 Fugro acquire 6,968 line km long offset seismic data for Fine	aer
2006 Finder acquire 23,974 line km of Falcon gradiometry data	
2006 Rainville awarded blocks 9, 13 and 14	
2007 PCJ Open informal offshore round	
2007 Proteam awarded blocks 1, 5, 8 and 17	
2008 PCJ and ANP agree to joint regime area	
2009 Wavefield-Inseis (now CGGVeritas) acquire 6,118 km long of	
seismic, gravity and magnetics over the lower Nicaraguan R	
2009 CGGVeritas acquire 3,000 km long offset seismic, gravity ar	nd
magnetics for Rainville	
2010 PCJ opens second formal licence round	
2010 Re-evaluation of new geology completed	
2011 2nd Round closes, March 1 2011	

Ref PCJ Supplementary report, 2010