

# NOTES

## EXPLORATION FOR HYDROCARBONS ALONG EAST COAST OF INDIA

*We had requested Dr. S.N. Visvanath, formerly of Oil India Ltd. to provide a note regarding the status of oil exploration along the east coast of India for the information of the readers of the Journal. Because of his preoccupation with other urgent work he has pleaded inability to assemble latest authentic information but has however furnished a brief summary which will be helpful in getting a rough idea of the oil and gas potential of the region. We reproduce this summary for the information of our readers - Ed.*

There has been a welcome upsurge of exploratory interest in the offshore east coast and Andaman basins in 1996-97. This new effort could quite conceivably change or confirm our views on the nature and magnitude of hydrocarbon entrapment and any figures given now could be outdated by the end of the year. The above mentioned upsurge has five elements:

1. The performance of Ravva Field in offshore Krishna-Godavari basin has been unexpectedly good at 4000 tonnes per day (tpd). It is expected to rise even further.
2. 2-D seismic data of 11,035 line-kms were acquired in the deep waters of the east coast and the Andamans under a speculative survey agreement between the Directorate General of Hydrocarbons(DGH) and Western Geophysical. This has opened up 0.25 million km<sup>2</sup> of hitherto unexplored sedimentary area. This may reveal new structures with suitable traps.
3. Additionally, satellite gravity surveys covering 1.28 million km<sup>2</sup> of western and eastern mainland offshore and Andaman offshore were carried out in a collaboration venture between DGH and Petroscan.
4. Fortified by the above preliminaries and in line with the APEX (Accelerated Programme of Exploration) policy, deep water drilling has been accorded top priority and is being implemented.
5. Considerable interest is now focussed on gas hydrates which is an important source. Although traditionally associated with the sub-permafrost of Siberia and Alaska, gas hydrates have also been found in ocean sediments, a few metres below the sea-bottom. One estimate says that there could be 200 trillion cubic feet of gas entrapped in gas hydrates along the Indian continental shelf/slope. If even 50% of this estimate is correct, it would have a sizable impact on the fossil fuel economy of the country.

Results from all of the above five developments could substantially affect resource estimates. Till then we have to accept the very tentative figures indicated in Appendix-I. The resources so far established along the east coast and Andaman Islands are negligible in relation to the requirements of the country but the picture can be expected to change perceptibly with the implementation of the exploration/development plan given above.

It is important to note that in 1997 both ONGC and DGH (Directorate General Hydrocarbons) have taken decisive forward steps in two exciting frontier areas of oil/gas exploration:

- Deep water drilling (our definition of 'deep' keeps changing but we have, for the moment, accepted 200 metres water depth. ONGC have already drilled two deep water wells in the Krishna-Godavari basin.
- Gas Hydrate investigation

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## Appendix - I

**A. Krishna-Godavari**

Offshore basinal area :	24,000 km <sup>2</sup>
Offshore Mining Lease:	333 km <sup>2</sup> (Ravva Field)
Prognosticated Resources:	960 million tonnes (MMT) of oil and oil equivalent of gas (o.e.g) of which about 500 MMT offshore
Geological Reserves:	150 MMT of oil and o.e.g. of which about 90 MMT offshore
General:	Onland, gas and subordinate gas accumulations in sandstone, limestones and fractured volcanics of Cretaceous and Paleogene age Offshore, accumulation in Miocene and Pliocene sandstone, generally in growth fault oriented roll-over features. Ravva field is the most important, producing from mid-Miocene Sandstone.

**B. Cauvery Basin**

Offshore basinal area :	30,000 km <sup>2</sup>
Offshore Mining Lease:	75 km <sup>2</sup>
Prognosticated Resources:	700 million tonnes (MMT) of oil and oil equivalent of gas (o.e.g) of which about 250 MMT offshore
Geological Reserves:	100 MMT of oil and o.e.g. of which about 35 MMT offshore
General:	Onland, the exposed Phanerozoic sequence consists of continental Late Jurassic to Early Cretaceous sediments overlain by a marine sequence of Cretaceous and Paleocene sediments. Offshore, the sedimentary sequence is more continuous. The Cretaceous contains mature source rocks in most of the sub-basins. Commercial oil and gas accumulations have been established in Oligocene, Eocene, Paleocene and Cretaceous age as also in weathered basement.

**C. Andaman Islands**

Offshore basinal area:	41,000 km <sup>2</sup> No specific PELS or MLS, only speculative seismic surveys and exploratory drilling.
General:	Of the 14 exploratory wells drilled so far, only one on the east coast produced 192,000 cubic metres of gas per day from a mid-Miocene Limestone reservoir.

Note: Basin areas indicated above are upto 200 metres isobath.

**GAS HYDRATE - A MAJOR ENERGY SOURCE FOR THE FUTURE**

Gas hydrate is a unique chemical compound containing a vast amount of methane which could possibly be a future source of energy. Great deal of interest is being evinced in recent years to locate significant concentrations of this compound in deeper sections of ocean floor sediments specially along continental margins. Extremely high pressures and cold temperatures are stated to create conditions favourable for accumulation of such hydrates. Hydrate cemented sediments are believed to act as gas traps, indicating a reservoir of gas below.

Most gas in hydrate is considered to be biogenic methane, getting concentrated at places where there is rapid accumulation of detritus leading to quick burial protecting it from oxidation. The hydrates are known to bind immense amounts of methane in ocean sediments. The location of gas hydrates is stated to be dependent on temperature and pressure changes since the last ice age.