

HYDROCARBON EXPLORATION AND PRODUCTION ACTIVITIES

**INDIA
2012- 13**



**Directorate General of Hydrocarbons
Under Ministry of Petroleum and Natural Gas**

DISCLAIMER

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HYDROCARBON EXPLORATION AND PRODUCTION ACTIVITIES



201 -1



DIRECTORATE GENERAL OF HYDROCARBONS
Under Ministry of Petroleum & Natural Gas, Govt. of India



डॉ. एम. वीरप्पा मोइली
Dr. M. VEERAPPA MOILY



मंत्री
पेट्रोलियम एवं प्राकृतिक गैस
भारत सरकार
नई दिल्ली-110 001
MINISTER
PETROLEUM & NATURAL GAS
GOVERNMENT OF INDIA
NEW DELHI-110 001

MESSAGE

India is one of the fastest growing economies in the world, and the demand for oil and gas is rising at a matching rate. Not only is India's market potential huge, but in recent years, India has emerged as one of the most prospective regions in the world with major oil and gas discoveries, both onshore and offshore.

When the economy and the population are growing, demands for energy grow and this, in turn, drives the growth of the energy sector. I envisage that the kind of robust energy growth that was seen in India in the last one decade will continue as well in the years to come. It does pose challenges, though. It poses challenges for people of India; especially for the poor and the middle class in terms of easy access to affordable energy. It is a challenge for policy makers as to how to develop the right set of regulations which will allow energy economy to grow in an environment friendly, affordable and secure manner. Finding ways to embrace modern technologies which promote energy efficiency is the key area of importance.

The Government has taken all possible steps to bring in healthy competition and public participation by way of the New Exploration and Licensing Policy (NELP). It has not only accelerated the quest for hydrocarbon exploration, but has brought the state of the art technology to the country. NELP has so far seen an investment of over USD 20 Billion besides creating job prospects for the young and experienced in this industry.

I am pleased to state that the Directorate General of Hydrocarbons has been successful in facilitating operations in the risky business of Hydrocarbon Exploration by extending all possible help within the ambit of the existing contractual terms and conditions. Its role in the Oil and Gas Sector needs to be acknowledged and as the technical arm of this Ministry, I feel that they have done a commendable job.

The report titled "Hydrocarbon Exploration and Production Activities 2012-13" is an annual publication which updates the readers of all ongoing activities in the upstream sector. My heartiest congratulation to the Director General and his team for this extensive compilation.


(Dr. M. Veerappa Moily)



श्रीमती पनबाका लक्ष्मी
Smt. PANABAACA LAKSHMI



राज्य मंत्री
पेट्रोलियम और प्राकृतिक गैस एवं वस्त्र
भारत सरकार
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PETROLEUM AND NATURAL GAS & TEXTILES
GOVERNMENT OF INDIA
NEW DELHI-110 001

MESSAGE

India's rapid economic expansion has seen its energy consumption skyrocket, with the South Asian country ranked as the fourth largest energy consumer, behind only the US, China and Russia.

This Ministry has set targets to reduce energy import dependency. To translate this into reality, the upstream sector needs to accelerate its pace of exploration and expedite to monetise the "Yet to find" reserves of the Oil and Gas in the country.

I am pleased to know that the Directorate General of Hydrocarbons is publishing its Annual Report titled Hydrocarbon Exploration and Production Activities 2012-13. I compliment DGH on this publication and appreciate DGH's endeavour for the effective implementation of Government policies and efficient management of the country's vital resources.

(Panabaaka Lakshmi)



VIVEK RAE, IAS
Secretary



भारत सरकार
पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय
शास्त्री भवन, नई दिल्ली – 110001
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Government of India
Ministry of Petroleum & Natural Gas
Shastri Bhawan, New Delhi-110 001
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MESSAGE

Energy drives our societies and industries. The growth of a nation, encompassing all sectors of the economy and all sections of society, is contingent on meeting its energy requirements adequately.


Due to accelerated economic growth, consumption of refinery products, especially for transport sector, is increasing at a rapid pace. The dependence on oil and gas is expected to continue and even increase in the foreseeable future.

Increasing domestic production of oil and gas by attracting investments, both private and public, in the upstream sector is the need of the hour. An investor friendly E&P investment regime is clearly an urgent imperative for India's energy security.

The coming years are challenging as we make concerted efforts to reduce the ever-increasing demand-supply gap. This can only be done with an increased pace of exploration, coupled with strong emphasis on unconventional resources like CBM and Shale gas.

The Directorate General of Hydrocarbons has an extremely vital role to play in India's search for energy security. I am certain that as a team, such challenges can be met to take our country closer to energy self- sufficiency.

“Hydrocarbon Exploration and Production Activities 2012-13” as always is an eagerly awaited document published by the DGH that keeps stakeholders in this sector up to date. I am sure all stakeholders will find this publication informative and useful. I congratulate DGH for bringing out this excellent publication.


(Vivek Rae)



आर.एन. चौबे, आई.ए.एस
महानिदेशक
R. N. CHOUBEY, IAS
Director General



हाईड्रोकार्बन महानिदेशालय
पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय
भारत सरकार
Directorate General of Hydrocarbons
Ministry of Petroleum & Natural Gas
Government of India

From the Director General's Desk



The Indian Oil and Gas (O&G) sector is dominant among the eight core industries of India and contributes over 15 per cent to the Gross Domestic Product (GDP). The country is the fourth largest consumer of energy in the world.

The sector is of immense importance to the economy owing to its significant impact on many other sectors. India is committed to boosting its economic growth in the years to come and this progress would translate into country's energy needs growing many times. The need of the hour, therefore, is to channelize all efforts in exploration of new blocks, effectively as well as efficiently, and to look for unconventional hydrocarbons.

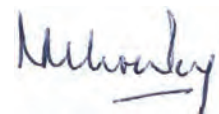
The rising demand for crude oil and gas in the country coupled with policy initiatives of the Government of India promoting accelerated E&P activity has given a great impetus to the growth of this sector.

The Directorate General of Hydrocarbons has been successfully shouldering the responsibility mandated by the Government through its team of highly skilled technical staff. The efforts have been brought to fruition in the form of 28 hydrocarbon discoveries in the year 2012-13. There has been an accretion of 242.19 MMT of O+OEG In-Place reserves out of which 76 MMT are Ultimate recoverable reserves in 2012-13.

The dependence on fossil fuels is likely to continue in the foreseeable future and therefore, efforts in addressing our energy security concerns need an urgent relook. DGH has been instrumental in implementing the New Exploration Licensing Policy (NELP). The Government has already put in place the policy for the exploration and exploitation of Coal Bed Methane (CBM) and DGH has assisted the Government in framing the policy for Shale gas and oil.

The role of R&D to reduce the ever widening gap between the supply and demand in this strategic sector becomes all the more important. The DGH spearheads various R&D efforts especially in the area of Gas Hydrates and encourages various other R&D Institutes of academic nature to take up research in areas of Industrial concern through OIDB funding.

“Hydrocarbon Exploration and Production Activities 2012-13” is not only a document showcasing the yearly activities carried out in the Indian Hydrocarbon sector but is also a handbook for ready reference for all those who wish to study the progress made in this important sector. It is an earnest endeavour to update the reader on the current E&P scenario in India and also to create an awareness and interest among our valued stakeholders.



(R.N. CHOUBEY)
Director General

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PRELUDE

- **DGH and its activities**
- **Contribution to Government Exchequer**
- **Sedimentary Basins of India**

DGH - At a Glance

OBJECTIVE

To promote sound management of the Indian petroleum and natural gas resources having a balanced regard to the environment, safety, technological and economic aspects of the petroleum activity.

ROLE AND FUNCTIONS

- Formed in 1993 by Govt. resolution.
- A nodal agency under Ministry of Petroleum & Natural Gas for implementation of NELP and CBM policy.
- An agency to advise Ministry of Petroleum & Natural Gas on Exploration strategies & Production Policies.
- To provide technical advice to the Ministry of Petroleum and Natural Gas on issues relevant to the exploration and optimal exploitation of hydrocarbons in the country.
- To review the exploration programmes of companies operating under Petroleum Exploration Licences granted under the Oilfields (Regulation and Development) Act, 1948 and the Petroleum and Natural Gas Rules, 1959 with a view to advising Government on the adequacy of these programmes.
- To evaluate the hydrocarbon reserves discovered and estimated by the operating companies.
- To advise the Government on the offering of acreages for exploration to companies as well as matters relating to relinquishment of acreage by companies.
- To review the development plans for commercial discoveries of hydrocarbon reserves proposed by the operating companies and advise Government on the adequacy of such plans and the exploitation rates proposed and matters relating thereto.
- To review and audit concurrently the management of petroleum reservoirs by operating companies and advise on any mid course correction required to ensure sound reservoir management practices in line with the optimal exploitation of reserves and the conservation of petroleum resources.
- To regulate the preservation, upkeep and storage of data and samples pertaining to petroleum exploration, drilling, production of reservoirs etc. and to cause the preparation of data packages for acreage on offer to companies.
- All other matters incidental thereto and such other functions as may be assigned by Government from time to time.
- Assist Govt. in Contract management functions.
- Exploration & Development of unconventional hydrocarbon resources like Gas Hydrate, Shale gas/oil and oil shale.

ADVISORY & ADMINISTRATIVE COUNCIL OF DGH

In view of the need to establish an agency that could effectively supervise the activities of all E&P companies from the private & joint sectors in the national interest, Directorate General of Hydrocarbons was set up through GOI resolution No. O-20013/2/92/ONG-III, on 8th of April, 1993 under the administrative control of the Ministry of Petroleum and Natural Gas. The objective of DGH is to promote sound management of the Indian Petroleum and Natural Gas resources having a balanced regard for the environment, safety, technological and economic aspects of the petroleum activity.

The Directorate General has an Advisory Council, which has been appointed by Government on 31.05.1993 comprising a Chairman and members, who are eminent persons in the field of hydrocarbon exploration and production. The Advisory Council is serviced by the Directorate which will be headed by a Director General who is also the Member Secretary to the Council. In the year 2012-13, the composition of Advisory Council was :

S. No.	Name	Designation
1.	Shri. P. Shankar	Chairman
2.	Dr. B. B. Bhattacharya	Member
3.	Dr. I. B. Singh	Member
4.	Dr. E. Desa	Member
5.	Director General, Directorate General of Hydrocarbons	Member-Secretary

In order to guide and take care of all administrative aspects of the functioning of DGH, an Administrative Council has been set up by GOI through Office Memorandum No. O-32012/1/95-ONG-III dated 2.2.2001. The Administrative Council, in particular, takes decisions on various matters concerning establishment, budget and also undertakes periodical review of the functioning of DGH and submits the reports to Ministry. It is headed by Secretary (P&NG) and had the following composition in 2012-13 :

S. No.	Name	Designation
1.	Secretary, MOPNG	Chairman
2.	Additional Secretary, MOPNG	Member
3.	AS&FA, MOPNG	Member
4.	JS(E), MOPNG	Member
5.	Secretary, OIDB	Member
6.	DG, Directorate General of Hydrocarbons	Member-Convener

AWARD OF BLOCKS / FIELDS FOR EXPLORATION / PRODUCTION OF OIL& GAS

India has an estimated sedimentary area of 3.14 million sq km. comprising 26 sedimentary basins, out of which, 1.35 million sq km. area is in deepwater and 1.79 million sq km. area is in onland and shallow offshore. At present 0.78 million sq km. area is held under Petroleum Exploration Licenses in 19 basins by national oil companies viz. Oil and Natural Gas Corporation Limited (ONGC), OIL India Limited (OIL) and Private/Joint Venture companies. Before implementing the New Exploration Licensing Policy (NELP) in 1999, 11% of Indian sedimentary basins were under exploration, which has now increased significantly.

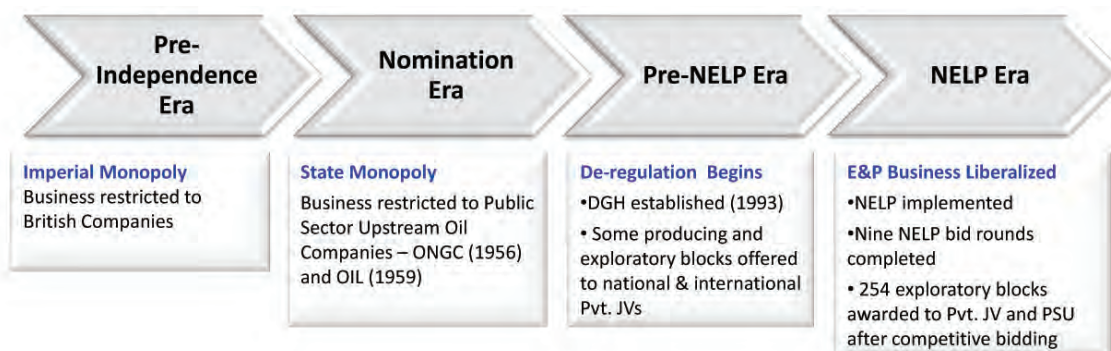
There have been four different regimes in the matter of mining lease/ licenses for exploration/production of oil and gas, namely:

A) Petroleum Exploration License (PEL) and Petroleum Mining Lease (PML) granted to National Oil Companies [Oil and Natural Gas Corporation Ltd.(ONGC) and Oil India Ltd. (OIL)], on Nomination basis.

B) Mining Licences granted under small / medium size discovered field Production Sharing Contract (PSCs),

C) Petroleum Exploration License and Petroleum Mining Lease granted under Pre-NELP PSCs, and

D) PEL and PML granted under the New Exploration Licensing Policy (NELP).



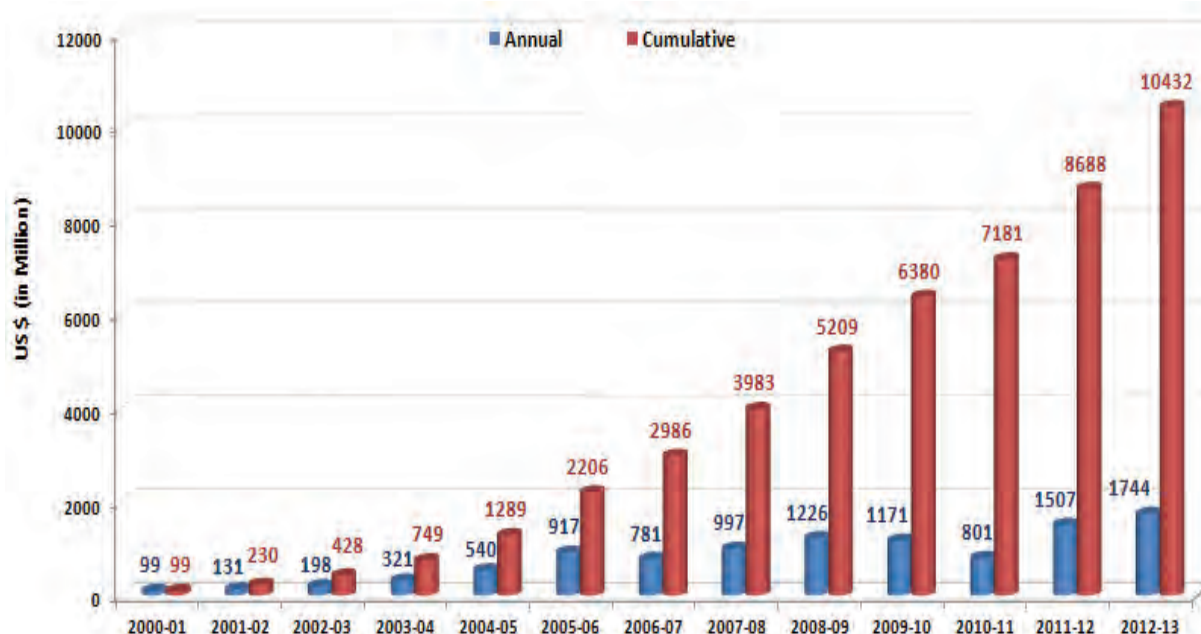
- Under the first regime, exploration blocks were offered to national oil companies on **nomination basis**. These companies are required to pay full statutory levies viz. royalty to the state government/ central government for onland/offshore areas and cess to the central government.
- Some of the **small and marginal fields** discovered by ONGC and OIL were offered to other parties for rapid development under two rounds of bidding during the year 1991 to 1993. In the PSCs relating to those fields, the rates of royalty and cess were frozen with a view to providing fiscal stability i.e. a stable tax regime to the contractors.
- Prior to 1997, **in the pre-NELP exploration blocks**, the two national oil companies as licensees, were required to bear all the liability of statutory levies, but the exploration blocks were offered to various companies in order to attract private investments in exploration and production of oil. The private companies were selected through a bidding process during six round of bidding between 1993 to 1995.
- The system of offering exploration blocks to various parties was modified in **1997** with the introduction of the **NELP**, under which the national oil companies and private players are treated at par and are required to compete with each other for acquiring exploration acreages under uniform contractual and fiscal framework. As regards PSCs entered into under NELP, the policy was announced by the government in 1997 and it became effective in **1999**. Under NELP, the net revenue remaining after deduction of royalty and costs (i.e. pre-tax profit) is to be shared between the contractor and the government of India on the basis of an investment multiple system. The contractor is allowed full cost recovery on all costs incurred in an exploration block.

CONTRIBUTION TO GOVERNMENT EXCHEQUER

The following are earnings of Government of India from Profit Petroleum and Royalty.

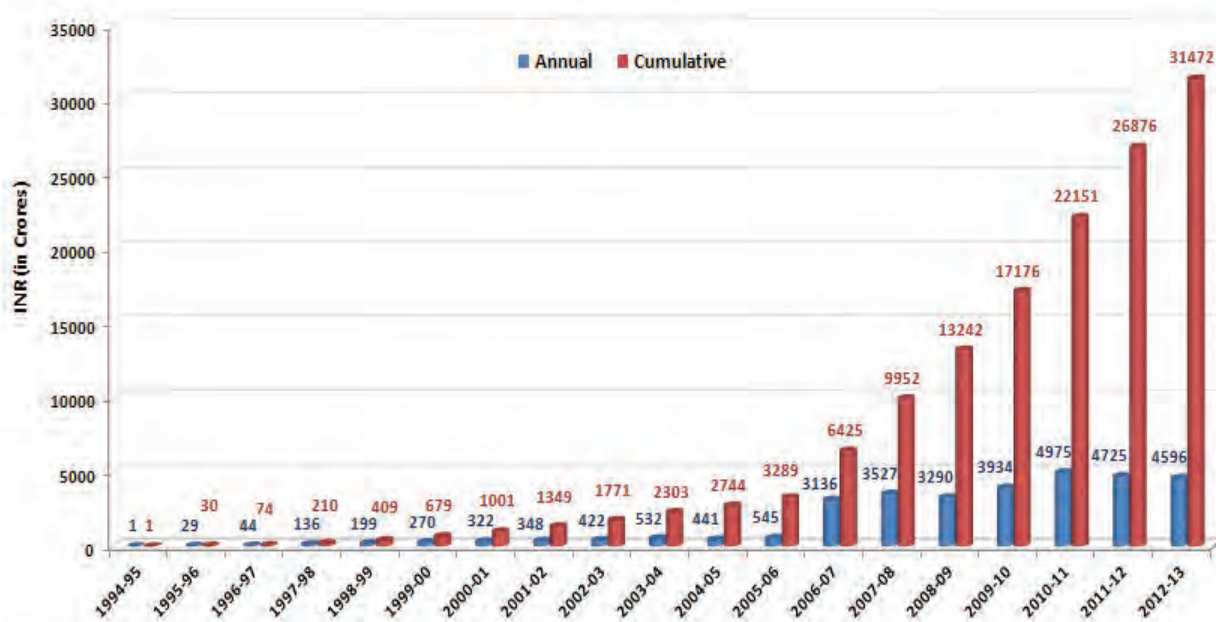
Profit Petroleum

During the Financial Year 2012-13, Profit Petroleum of US \$ 1744.11 Million was contributed to Government Exchequer. The cumulative Profit Petroleum earned as on 31st. March 2013 is US \$ 10432.11 Million.



Royalty

During the Financial Year 2012-13, Royalty paid to Central Exchequer was Rs. 4596 crores. The cumulative Royalty contributed is Rs. 31,471.69 crores.

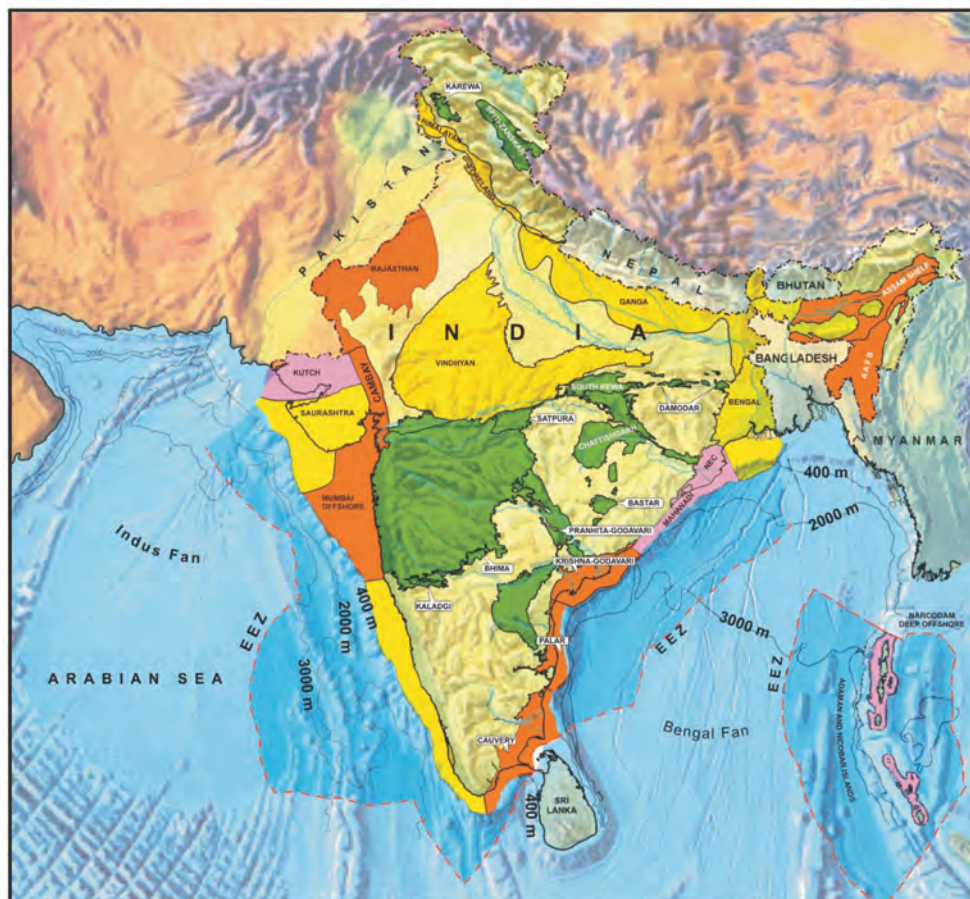


* **Note:** The royalty data of ONGC (nominated blocks) have been incorporated w.e.f. 2006-07.

SEDIMENTARY BASINS

- The sedimentary basins of India, onland and offshore up to the 200m isobath, have an areal extent of about 1.79 million sq. km. So far, 26 basins have been recognized and they have been divided into four categories based on their degree of prospectivity as presently known. In the deep waters beyond the 200m isobath, the sedimentary area has been estimated to be about 1.35 million sq. km. The total thus works out to 3.14 million sq. km.
- Since the launch of NELP, there have been significant forward steps in exploring the hydrocarbon potential of the sedimentary basins of India. Credit for this achievement goes in large measure to surveys carried out by DGH in unexplored/ poorly explored areas of the country including Deepwaters off west coast, east coast and in Andaman sea and accreages awarded for exploration under NELPs. Concerted efforts are continuously being done to reduce the unexplored area further.

SEDIMENTARY BASINS OF INDIA



LEGEND

 CATEGORY-I BASIN (Proven commercial productivity)	 CATEGORY-IV BASIN (Potentially Prospective)
 CATEGORY-II BASIN (Identified prospectivity)	 PRE-CAMBRIAN BASEMENT/ TECTONISED SEDIMENTS
 CATEGORY-III BASIN (Prospective Basins)	 DEEP WATER AREAS WITHIN EEZ

HISTORICAL CATEGORIZATION OF SEDIMENTARY BASINS

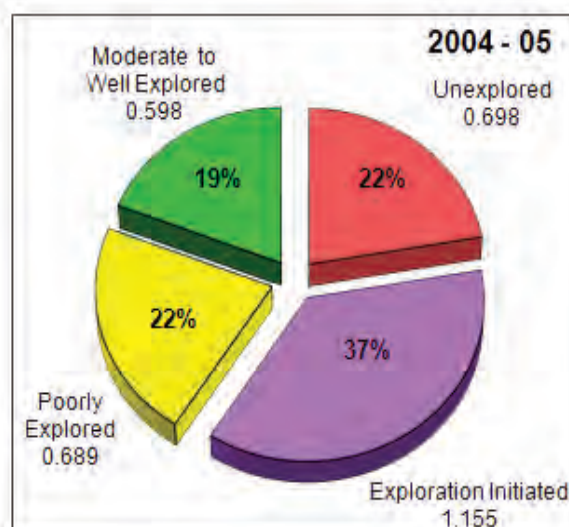
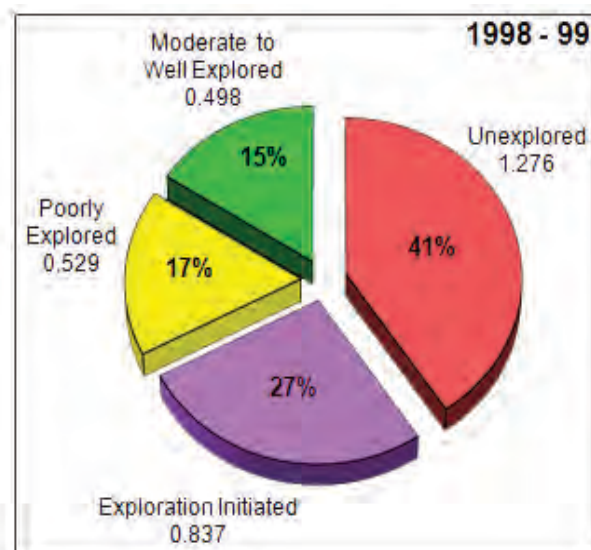
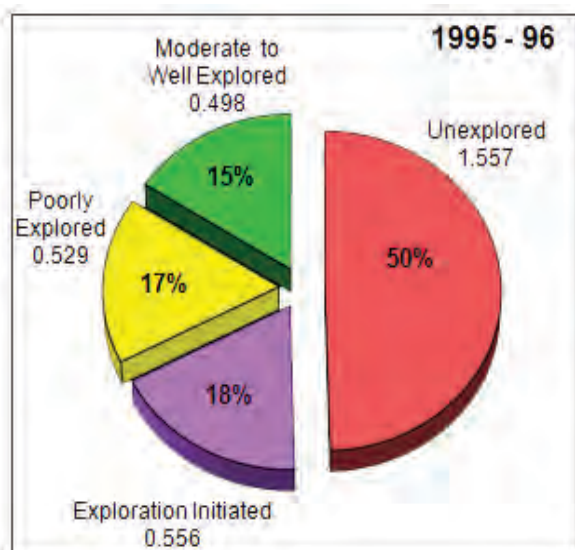
Basinal Area (Sq. Km.)

Category*	Basin	Onland	Offshore	Total
UP TO 200M ISOBATH				
I	Cambay	51,000	2,500	53,500
	Assam Shelf	56,000	----	56,000
	Mumbai offshore	----	116,000	116,000
	Krishna Godavari	28,000	24,000	52,000
	Cauvery	25,000	30,000	55,000
	Assam-Arakan Fold Belt	60,000	----	60,000
	Rajasthan	126,000	----	126,000
SUB. TOTAL		346,000	172,500	518,500
II	Kutch	35,000	13,000	48,000
	Mahanadi-NEC	55,000	14,000	69,000
	Andaman-Nicobar	6,000	41,000	47,000
SUB. TOTAL		96,000	68,000	164,000
III	Himalayan Foreland	30,000	----	30,000
	Ganga	186,000	----	186,000
	Vindhyan	162,000	----	162,000
	Saurashtra	52,000	28,000	80,000
	Kerala-Konkan-Lakshadweep	----	94,000	94,000
	Bengal	57,000	32,000	89,000
SUB. TOTAL		487,000	154,000	641,000
IV	Karewa	3,700	----	3,700
	Spiti-Zaskar	22,000	----	22,000
	Satpura-South Rewa-Damodar	46,000	----	46,000
	Narmada	17,000	----	17,000
	Deccan Syneclise	273,000	----	273,000
	Bhima-Kaladgi	8,500	----	8,500
	Cuddapah	39,000	----	39,000
	Pranhita-Godavari	15,000	----	15,000
	Bastar	5,000	----	5,000
	Chhattisgarh	32,000	----	32,000
SUB. TOTAL		461,200	----	461,200
TOTAL		1,390,200	394,500	1,784,700
DEEP WATERS				
	Kori-Comorin 85° E Narcodam	----	----	1,350,000
GRAND TOTAL		----	----	3,134,700

* `Categorization based on the prospectivity of the basin as presently known. The four recognized categories are basins which have :

- I Established commercial production
 - II Known accumulation of hydrocarbons but no commercial production as yet
 - III Indicated hydrocarbon shows that are considered geologically prospective
 - IV Uncertain potential which may be prospective by analogy with similar basins in the world.
- This categorization will necessarily change with the results of further exploration.

SEDIMENTARY BASINAL AREAS (HISTORICAL DATA)

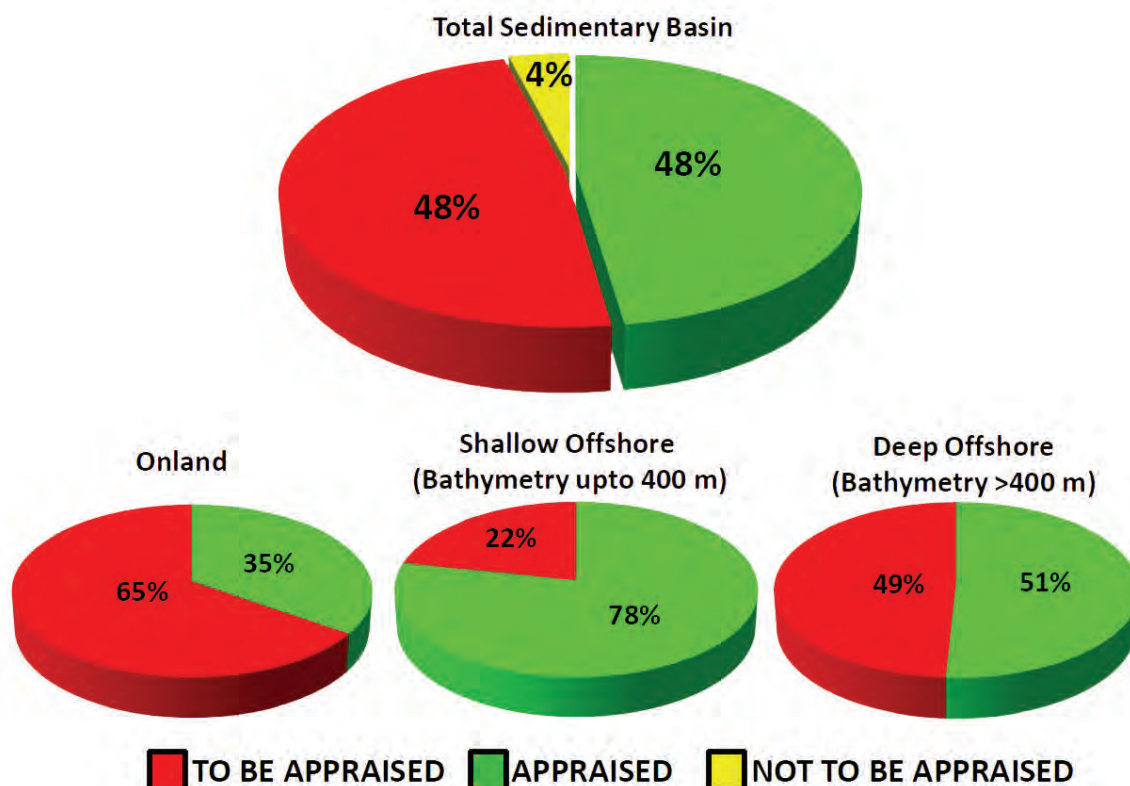


Total Sedimentary Area : 3.14 Million Sq. Km.

LEVEL OF EXPLORATION	AREA (Million Sq.Km.)		
	1995-96	1998-99	2004-05
UNEXPLORED	1.557	1.276	0.698
EXPLORATION INITIATED	0.556	0.837	1.155
POORLY EXPLORED	0.529	0.529	0.689
MODERATE TO WELL EXPLORED	0.498	0.498	0.598

APPRAISAL OF INDIAN SEDIMENTARY BASINS

(AS ON 01.04.2013)



a) Definition

Appraisal of a sedimentary basin has been defined as the status of knowledge building efforts for evaluating hydrocarbon prospectivity of the basin through Geological studies, Geophysical surveys and exploratory drilling.

Methodology Adopted:

- A standard grid pattern of 10'X10' (approx. 310 Sq Kms) has been used for evaluation purpose for the existing 26 sedimentary basins for the onland-and shallow offshore (bathymetry <400 m.) areas.
- For the deep water areas (bathymetry > 400m), a grid pattern of 20'X20' (approx. 1243 Sq Kms) has been used due to its large spatial extent.

The following criteria have been used for determining the appraisal status for every 10'X10' grid area of onland and shallow offshore areas.

- ✓ Minimum 50 LKM 2D seismic lines, or
- ✓ One exploratory well, or
- ✓ Available 3D data, or
- ✓ Geological knowledge developed through data integration with adjacent blocks.

For the Deep Water areas, the following criteria has been considered for every 20'X20' grid area

- ✓ Minimum 200 LKM 2D seismic lines, or
- ✓ One exploratory well, or
- ✓ Available 3D data, or
- ✓ Geological knowledge developed through data integration with adjacent blocks.

b) Sedimentary basin areas are considered **Appraised** where data as defined above is available.

Areas which do not have the above required data are considered as **To be appraised**. This also include areas where exploration activities cannot be carried out in view of our present knowledge about regulations/directives and restrictions and are considered as **Not to be appraised**.



SYNOPSIS OF ACTIVITIES TILL 2012-13

- Award of acreages - Pre-NELP to NELP-IX
- Producing fields of Pvt./JV under PSC
- Geoscientific studies by DGH

AWARD OF ACREAGES - NELP

New Exploration Licensing Policy (NELP):

New Exploration Licensing Policy (NELP) was formulated by the Government of India, with Directorate General of Hydrocarbons (DGH) as a nodal agency, during 1997-98 to provide a level playing field to both Public and Private sector companies in exploration and production of hydrocarbons. Government of India's commitment to the liberalization process is reflected in NELP, which has been conceptualized keeping in mind the immediate need for increasing domestic production. To attract more investment in oil exploration and production, NELP has steered steadily towards a healthy spirit of competition between National Oil Companies and private companies. This has been a landmark event in the growth of the upstream oil sector in India. The foreign and Indian private companies are invited to supplement the efforts of National Oil Companies in the discovery of hydrocarbons. The development of E&P sector has been significantly boosted through this policy of Government of India, which brought major liberalization in the sector and opened up E&P for private and foreign investment, where 100% Foreign Direct Investment (FDI) is allowed.

Under NELP, which became operational in February 1999, acreages are offered to the participating companies through the process of open global competitive bidding. The terms and conditions of this open and transparent policy rank amongst the most attractive in the world. The first round of offer of blocks was in the year 1999 and the latest ninth round in 2010. The Government of India has so far completed Nine rounds of offer of acreages under NELP where in 360 exploration blocks have been offered and 254 blocks have been awarded till 31.03.2013. (Oil and Oil-Equivalent Gas (O+OEG) in place reserve accretion under NELP is approximately 745 MMT).

- In the first round of NELP (NELP-I), 24 blocks were awarded for hydrocarbon exploration, which include 7 blocks in east coast deep water, 16 blocks in shallow water of east and west coasts and 1 onland. 17 blocks have been relinquished / surrendered. 7 exploration blocks are presently under operation.
- Under NELP-II, 23 blocks were awarded for exploration including 8 in the deep waters off the west coast, 8 in the shallow water of both east and west coasts, and 7 onland. 18 blocks have been relinquished / surrendered. 5 exploration blocks are presently under operation.
- Under NELP-III, 23 blocks were awarded for exploration including 9 in the deep waters off the west and east coast of India, 6 in the shallow water of both east and west coasts, and 8 onland. 9 blocks has been relinquished and presently 14 blocks are under operation.
- Under NELP-IV, a total of 20 blocks were awarded, of which 10 blocks are in onland and 10 in the deep water of the west coast, east coast and Andamans. Blocks in Andaman offshore were awarded for the first time. 3 blocks has been relinquished and presently 17 blocks are under operation.
- Under NELP-V, a total of 20 blocks were awarded, of which 6 blocks in the deepwater, 2 in the shallow water and 12 in onland. 6 blocks has been relinquished and presently 14 blocks are under operation.
- Under NELP-VI, a total of 52 blocks were awarded of which 21 blocks fall in deepwater, 6 blocks in shallow water and 25 blocks fall in onland. All 52 blocks are presently under operation.
- Under NELP-VII, a total of 41 blocks were awarded of which 11 are deepwater, 7 shallow offshore and 23 onland blocks.

- Under NELP-VIII, a total of 32 blocks, were awarded of which 8 deepwater, 11 shallow offshore and 13 onland including type S blocks.
- Under NELP-IX, a total of 19 blocks, were awarded of which 1 deepwater, 3 shallow offshore and 15 onland including type S blocks.

Progressive modifications of terms & conditions in different NELP rounds

Sl. No.	NELP-I to V	NELP-VI	NELP-VII	NELP-VIII & IX
1.	<ul style="list-style-type: none"> Blocks categorized as Deepwater blocks, shallow offshore blocks and onland blocks. No sub categorization of blocks. 	<ul style="list-style-type: none"> Each category is sub categorized as Type A and Type B. 	<ul style="list-style-type: none"> Sub categories Type A and Type B continued New category Type S with small onland blocks of size less than 200 sq. km. introduced. For Type S blocks, Technical capability is not considered for pre-qualification or evaluation. 	<ul style="list-style-type: none"> Type A & B classification among onland, shallow water and deep water blocks removed. Category Type S continued.
2.	Three exploration phases	Two exploration phases	Two exploration phases	Two exploration phases
3.	No mandatory work programme	Mandatory work specified in the NIO for some of the blocks.	Mandatory work specified in the NIO for some of the blocks.	Mandatory work specified in the NIO for some of the blocks.
4.	Bid Evaluation Criteria <ol style="list-style-type: none"> Technical capability Financial capability Work Programme Fiscal Package 	Bid Evaluation Criteria <ol style="list-style-type: none"> Technical capability Work Programme Fiscal Package 	Bid Evaluation Criteria <ol style="list-style-type: none"> Technical capability Work Programme Fiscal Package 	Bid Evaluation Criteria <ol style="list-style-type: none"> Technical capability Work Programme Fiscal Package
5.	Stair-step based system of Investment multiple for GOI Share	Stair-step based system of Investment multiple for GOI Share	Linear based system of Investment multiple for GOI Share	Linear based system of Investment multiple for GOI Share
6.	Part area relinquishment, after phase-I and after phase-II	Part area relinquishment, after phase-I	Part area relinquishment, after phase-I	No part area relinquishment after phase-I
7.	No Liquidated damages (LD) specified. Penalties for unfinished work programme computed case-to-case basis.	No Liquidated damages (LD) specified. Penalties for unfinished work programme computed case-to-case basis.	No Liquidated damages (LD) specified. Penalties for unfinished work programme computed case-to-case basis.	Liquidated damages (LD) specified upfront for unfinished work programme
8.	Bank Guarantee @ 35% of Annual work programme.	Bank Guarantee @ 35% of Annual work programme.	Bank Guarantee @ 35% of Annual work programme.	One time BG introduced @ 7.5% of total committed work programme.
9.	No Bid bond to be furnished at the time of submission of bids.	No Bid bond to be furnished at the time of submission of bids.	No Bid bond to be furnished at the time of submission of bids.	Bid bond to be submitted at the time of submission of bids.

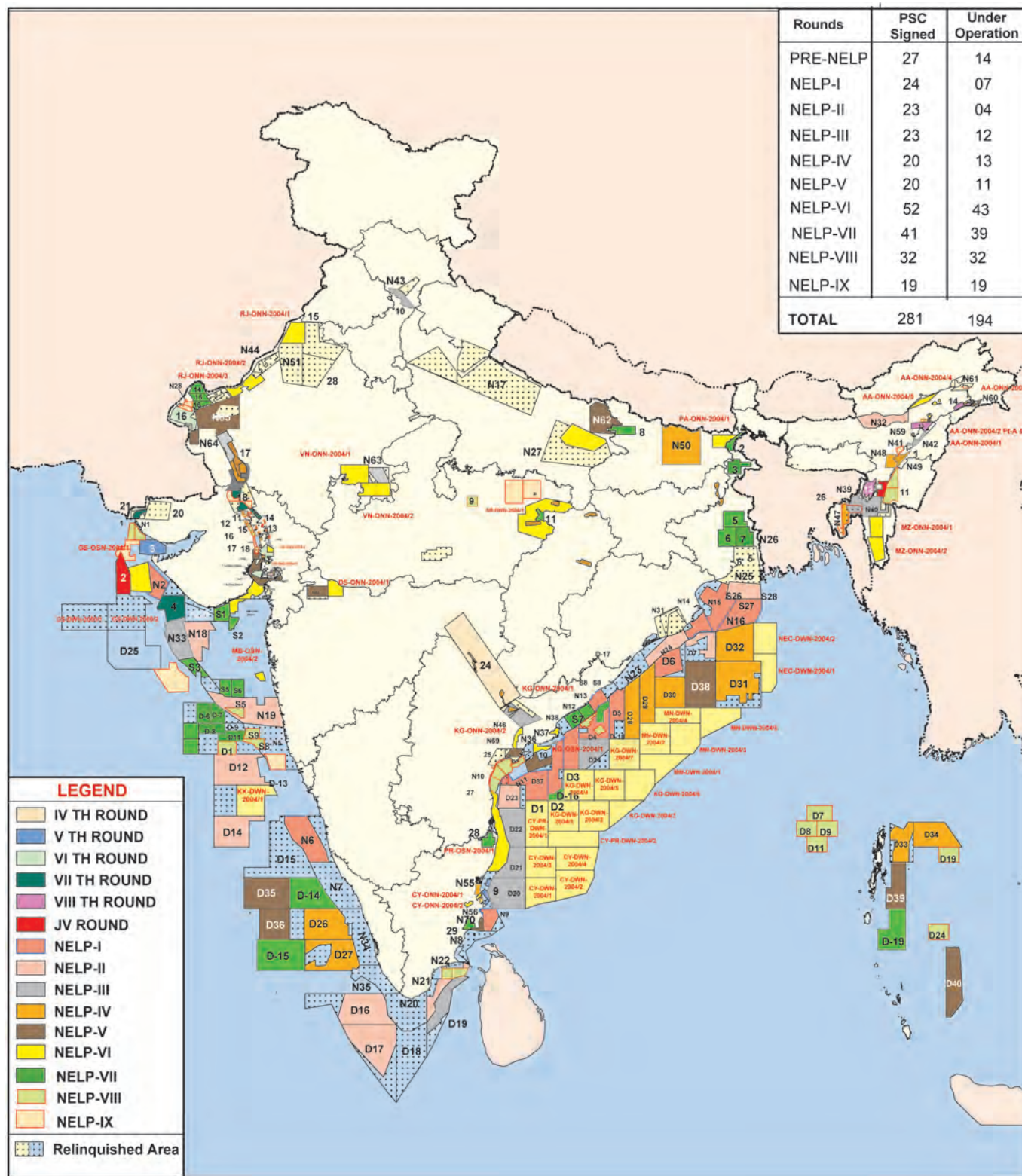
Chronology of NELP Bid Rounds

Round	Launch Year	Signing Year
PRE-NELP	1993	1993-2003
NELP-I	1999	2000
NELP-II	2000	2001
NELP-III	2002	2003
NELP-IV	2003	2004
NELP-V	2005	2005
NELP-VI	2006	2007
NELP-VII	2007	2008
NELP-VIII	2009	2010
NELP-IX	2010	2012

Status of Blocks under NELP

Round	Offered	Awarded				Relinquished	Operational
		Deep Water	Shallow Water	Onland	Total		
NELP-I	48	7	16	1	24	17	7
NELP-II	25	8	8	7	23	19	4
NELP-III	27	9	6	8	23	11	12
NELP-IV	24	10	-	10	20	7	13
NELP-V	20	6	2	12	20	9	11
NELP-VI	55	21	6	25	52	9	43
NELP-VII	57	11	7	23	41	2	39
NELP-VIII	70	8	11	13	32	-	32
NELP-IX	34	1	3	15	19	-	19
TOTAL	360	81	59	114	254	74	180

PRE-NELP & NELP EXPLORATION BLOCKS UNDER OPERATION BY NOC'S & Pvt/JV COMPANIES



SYNOPSIS OF ACTIVITIES TILL 2012-13

EXPLORATION BLOCKS AWARDED UNDER PRE-NELP

(As on 01.04.2013)

SL. NO.	BASIN	BLOCK NAME	REF. NO ON MAP	CONSORTIUM (PARTICIPATING INTEREST)	DATE OF SIGNING CONTRACT	AWARDED AREA	RELINQ. AREA (in sq.km)	PRESENT AREA
CURRENT ACTIVE BLOCKS (14 BLOCKS)								
ONLAND								
1	PG	GN-ON-90/3	24	HOEC(75)& MIL(25)	29-03-1993	29200	7350	21850
2	RJ	RJ-ON-90/1	17	CIL(35), CEHL (35) & ONGC (30)	15-05-1995	11108	7996.73	3111.27
3		RJ-ON/6	16	FEL(10), ISIL(65) & NOCL(25)	30-06-1998	5378	1351.84	4026.16
4	CB	CB-ON/7	22	HOEC(50) & GSPCL(50)	-	525	517.36	7.64
5		CB-ON/2	23	GSPC(80), GGR(20)	12-04-2000	1618	408	1210
6		CB-ON/1*	18	RIL(40), TIOL(50) & OOHL(10)	16-07-1998	7390	5857	1533
7		CB-ON/3	19	EOL (100)	16-07-1998	510	390.95	119.05
8	GK	GK-ON/4	21	FEL(100)	30-06-1998	1550	775	775
9	AA	AAP-ON-94/1	14	HOEC(40.32), OIL(16.12) & IOC(43.56)	30-06-1998	870	565	305
10		AA-ON-07**	13	CRL(65) & ACL(35)	19-02-1999	1934	1615	319
11		AA-ONJ/2	11	ONGC(100)	07-11-2003	1595	318	1277
SHALLOW WATER								
12	CB	CB-OS/1	6	ONGC(55.26), HOEC (38.07) & TPL(6.7)	19-11-1996	3290	2444	846
13		CB-OS/2	7	CIL(40), ONGC(50) & TPL(10)	-	3315	3110	205
14	GK	GK-OSJ/3*	2	RIL(60), ONGC(25) & OIL(15)	06-09-2001	5725	0	5725
RELINQUISHED BLOCKS (13 BLOCKS)								
15	AA	AA-ON/3	26	OKLAND(100)	-	3000	3000	0
16		CR-ON-90/1	12	PONEI(29), EOL(16), IOC(35) & OIL(20)	-	2570	2570	0
17	RJ	RJ-ON-90/5	15	ESSAR (75) & POGC(25)	-	16030	16030	0
18		RJ-ON-90/4	28	EOL (100)	-	16600	16600	0
19	GK	GK-ON-90/2	20	OKLAND(100)	-	11820	11820	0
20		GK-OS/5	3	RIL(40), TOIL(50) & OKLAND(10)	-	5000	5000	0
21		GK-OSJ/1	1	RIL(50), TULLOW(25) & ONGC(25)	-	1275	1275	0
22	KG	KG-ON/1	25	RIL(40) & TOIL(60)	-	4180	4180	0
23		KG-OS/6	10	CAIRN(50) & VIDIOCON(50)	-	8775	8775	0
24		KG-OS-90/1	27	HARDY	-	3720	3720	0
25	MB	BB-OS/5	5	ESSAR (79) & PETROM SA(21)	-	9095	9095	0
26	CY	CY-OS/2	9	HEPI(75) & GAIL(25)	19-11-1996	5010	5010	0
27	GS	SR-OS-94/1	4	RIL(100)	12-04-2000	9150	9150	0
TOTAL AREA :						170233	128923.88	41309.12

NOTE : * PROPOSED FOR RELINQUISHMENT

**** SUBJUDICE**

AA - Assam Arakan
 AN - Andaman Nicobar
 PG - Pranhita Godavari
 CB - Cambay
 RJ - Rajasthan
 GK - Gujarat Kutch
 GS - Gujarat Saurashtra
 GV - Ganga Valley
 HF - Himalayan Foreland
 KG - Krishna Godavari
 CY - Cauvery

MB - Mumbai
 MN - Mahanadi - NEC
 KK - Kerala Konkan
 SR - South Rewa
 WB - Bengal
 VN - Vindhyan
 DS - Deccan Syneclise
 PR - Palar
 PA - Purnea
 MZ - Mizoram

EXPLORATION BLOCKS AWARDED UNDER FIRST ROUND OF NELP (NELP-I)

(As on 01.04.2013)

SL. NO.	BASIN	BLOCK NAME	REF. NO ON MAP	CONSORTIUM (PARTICIPATING INTEREST)	DATE OF SIGNING CONTRACT	AWARDED AREA	RELINQ. AREA	PRESENT AREA
						(in sq.km)		
CURRENT ACTIVE BLOCKS (7 BLOCKS)								
DEEP WATER								
1	KG	KG-DWN-98/1*	D1	RIL(70) & BPEAL (30)	12-04-2000	10810	4110	6700
2		KG-DWN-98/2	D2	ONGC(100)	12-04-2000	9757	2462	7295
3		KG-DWN-98/3	D3	RIL(60), BPEAL (30) & NIKO(10)	12-04-2000	7645	0	7645
4		KG-DWN-98/5	D5	ONGC(85) & OIL(15)	12-04-2000	8980	4490	4490
5	MN	MN-DWN-98/2*	D6	RIL(70) & BPEAL	12-04-2000	9605	2410	7195
6		MN-DWN-98/3	D7	ONGC(60) & PIB-BV(40)	12-04-2000	10005	5017	4988
SHALLOW WATER								
7	MN	NEC-OSN-97/2	N-15	RIL(60), BPEAL(30) & NIKO(10)	12-04-2000	14535	5074	9461
RELINQUISHED BLOCKS (17 BLOCKS)								
8	MN	NEC-OSN-97/1	N-16	GAZPROM(100)	12-04-2000	10425	10425	0
9	MN	MN-OSN-97/3	N-14	ONGC(85) & GAIL(15)	12-04-2000	5420	5420	0
10	KG	KG-DWN-98/4	D4	ONGC(55), BG(30) & OIL(15)	12-04-2000	9940	9940	0
11		KG-OSN-97/4	N-10	RIL(100)	12-04-2000	4020	4020	0
12		KG-OSN-97/31	N-11	RIL(100)	12-04-2000	2460	2460	0
13		KG-OSN-97/2	N-12	RIL(100)	12-04-2000	4790	4790	0
14		KG-OSN-97/1	N-13	ONGC(100)	12-04-2000	2785	2785	0
15	CY	CY-OSN-97/1	N-9	Mosbacher(20)** & HOEC(80)	12-04-2000	4940	4940	0
16	CY	CY-OSN-97/2	N-8	OIL(100)	12-04-2000	5215	5215	0
17	KK	KK-OSN-97/2	N-6	RIL(100)	12-04-2000	19450	19450	0
18		KK-OSN-97/3	N-7	ONGC(100)	12-04-2000	15910	15910	0
19	MB	MB-OSN-97/2	N-3	RIL(100)	12-04-2000	5270	5270	0
20		MB-OSN-97/3	N-4	RIL(100)	12-04-2000	5740	5740	0
21		MB-OSN-97/4	N-5	ONGC(70) & IOC(30)	12-04-2000	18870	18870	0
22	SR	SR-OSN-97/1	N-2	RIL(100)	12-04-2000	5040	5040	0
23	GK	GK-OSN-97/1	N-1	RIL(100)	12-04-2000	1465	1465	0
24	GV	GV-ONN-97/1	N-17	ONGC(40),IOC(30),CEIL(15) & CEEPC(15)	12-04-2000	36750	36750	0
TOTAL AREA :						229827	182053	47774

NOTE : * PROPOSED FOR RELINQUISHMENT

** Shutdown India Operations

EXPLORATION BLOCKS AWARDED UNDER SECOND ROUND OF NELP (NELP-II)

(As on 01.04.2013)

SL. NO.	BASIN	BLOCK NAME	REF. NO ON MAP	CONSORTIUM (PARTICIPATING INTEREST)	DATE OF SIGNING CONTRACT	AWARDED AREA	RELINQ. AREA (in sq.km)	PRESENT AREA
CURRENT ACTIVE BLOCKS (4 BLOCKS)								
SHALLOW WATER								
1	GS	GS-OSN-2000/1*	N18	RIL (90) ,HEPI (10)	17-07-2001	8841	2951	5890
2	MN	MN-OSN-2000/2	N24	ONGC (40) , GAIL (20), IOC (20), OIL (20)	17-07-2001	8330	4269	4061
ONLAND								
3	CB	CB-ONN-2000/1	N29	GSPC (50) ,GAIL (50)	17-07-2001	1424	999	425
4		CB-ONN-2000/2	N30	NIKO (100)	17-07-2001	419	394.75	24.25
RELINQUISHED BLOCKS (19 BLOCKS)								
5	KK	KK-DWN-2000/1	D12	RIL 100%	17-07-2001	18113	18113	0
6		KK-DWN-2000/2	D13	ONGC 85%, GAIL 15%	17-07-2001	20998	20998	0
7		KK-DWN-2000/3	D14	RIL 100%	17-07-2001	14889	14889	0
8		KK-DWN-2000/4	D15	ONGC 100%	17-07-2001	26149	26149	0
9		KK-OSN-2000/1	N20	ONGC 100%	17-07-2001	16125	16125	0
10	CY	CY-OSN-2000/1	N21	ONGC 100%	17-07-2001	5920	5920	0
11		CY-OSN-2000/2	N22	ONGC 100%	17-07-2001	3530	3530	0
12	GS	GS-DWN-2000/1	D8	ONGC 100%	17-07-2001	13937	13937	0
13		GS-DWN-2000/2	D9	ONGC 85%, GAIL 15%	17-07-2001	14825	14825	0
14	MB	MB-DWN-2000/1	D10	ONGC 85%, IOC 15%	17-07-2001	11239	11239	0
15		MB-DWN-2000/2	D11	ONGC 50%, GAIL15% IOC 15%, OIL 10%, GSPC 10%	17-07-2001	19106	19106	0
16		MB-OSN-2000/1	N19	ONGC 75%, IOC 15%, GSPC 10%	17-07-2001	18414	18414	0
17	MN	MN-OSN-2000/1	N23	ONGC 100%	17-07-2001	6730	6730	0
18		MN-ONN-2000/1	N31	ONGC 20%, GAIL 20%, IOC 20%, OIL 25% SUNTERA 15%	17-07-2001	7900	7900	0
19	WB	WB-OSN-2000/1	N25	ONGC 85%, IOC 15%	17-07-2001	6700	6700	0
20		WB-ONN-2000/1	N26	ONGC 85%, IOC 15%	17-07-2001	12505	12505	0
21	GV	GV-ONN-2000/1	N27	ONGC 85%, IOC 15%	17-07-2001	23500	23500	0
22	RJ	RJ-ONN-2000/1	N28	OIL 60% SUNTERA 40%	17-07-2001	2535	2535	0
23	AA	AS-ONN-2000/1	N32	RIL 90%,HARDY 10%	17-07-2001	5754	5754	0
TOTAL AREA :						267883	257482.75	10400.25

NOTE : * PROPOSED FOR RELINQUISHMENT

EXPLORATION BLOCKS AWARDED UNDER THIRD ROUND OF NELP (NELP-III)

(As on 01.04.2013)

SL. NO.	BASIN	BLOCK NAME	REF. NO ON MAP	CONSORTIUM (PARTICIPATING INTEREST)	DATE OF SIGNING CONTRACT	AWARDED AREA	RELINQ. AREA (in sq.km)	PRESENT AREA
CURRENT ACTIVE BLOCKS (12 BLOCKS)								
DEEP WATER								
1	KK	KK-DWN-2001/2*	D17	RIL(70) & BPEAL (30)	04-02-2003	31515	8000	23515
2		KK-DWN-2001/1*	D16	RIL(70) & BPEAL(30)	04-02-2003	27315	6847	20468
3	CY	CY-DWN-2001/2	D20	RIL(70) & BPEAL(30)	04-02-2003	14325	0	14325
4		CY-PR-DWN-2001/3	D21	RIL(70) & BPEAL(30)	04-02-2003	8600	0	8600
5	FR	PR-DWN-2001/1*	D23	RIL(70) & BPEAL(30)	04-02-2003	8255	2100	6155
6	KG	KG-DWN-2001/1*	D24	RIL(60) , BPEAL(30) & HEPI(10)	04-02-2003	11605	2910	8695
SHALLOW WATER								
7	KG	KG-OSN-2001/3	N38	GSPC(80) , GGR(10) & JOGPL(10)	04-02-2003	1850	1320	530
ONLAND								
8	AA	AA-ONN-2001/1	N39	ONGC(100)	04-02-2003	3010	1514	1496
9		AA-ONN-2001/2	N40	ONGC(80) & IOC(20)	04-02-2003	5340	1335	4005
10		AA-ONN-2001/3	N41	ONGC(85) & OIL(15%)	04-02-2003	110	0	110
11		AA-ONN-2001/4	N42	ONGC(100)	04-02-2003	645	0	645
12	CB	CB-ONN-2001/1	N45	ONGC(70) , CIL(15) & CED(15)	04-02-2003	215	189	26
RELINQUISHED BLOCKS (11 BLOCKS)								
13	KK	KK-DWN-2001/3	D18	ONGC(100)	04-02-2003	21775	21775	0
14		KK-OSN-2001/2	N34	ONGC(100)	04-02-2003	14120	14120	0
15		KK-OSN-2001/3	N35	ONGC(100)	04-02-2003	8595	8595	0
16	CY	CY-DWN-2001/1	D19	ONGC(80) & OIL(20)	04-02-2003	12425	12425	0
17		CY-PR-DWN-2001/4	D22	RIL(70) & BPEAL(30)	04-02-2003	10590	10590	0
18	KG	KG-OSN-2001/1	N36	RIL(100)	04-02-2003	1100	1100	0
19		KG-OSN-2001/2	N37	RIL(100)	04-02-2003	210	210	0
20	GS	GS-OSN-2001/1	N33	ONGC(100)	04-02-2003	9468	9468	0
21	RJ	RJ-ONN-2001/1	N44	ONGC(30), OIL(40)&SUNTERA(30)	04-02-2003	3425	3425	0
22	PG	PG-ONN-2001/1	N46	ONGC(100)	04-02-2003	6920	6920	0
23	HF	HF-ONN-2001/1	N43	ONGC(100)	04-02-2003	3175	3175	0
TOTAL AREA :						204588	116018	88570

NOTE : * PROPOSED FOR RELINQUISHMENT

EXPLORATION BLOCKS AWARDED UNDER FOURTH ROUND OF NELP (NELP-IV)

(As on 01.04.2013)

SL. NO.	BASIN	BLOCK NAME	REF. NO ON MAP	CONSORTIUM (PARTICIPATING INTEREST)	DATE OF SIGNING CONTRACT	AWARDED AREA	RELINQ. AREA (in sq.km)	PRESENT AREA
CURRENT ACTIVE BLOCKS (13 BLOCKS)								
DEEP WATER								
1	KK	KK-DWN-2002/2	D26	ONGC(80) & HPCL(20)	06-02-2004	22810	5703	17107
2	KG	KG-DWN-2002/1	D28	ONGC(70) , OIL(20) & BPCL(10)	06-02-2004	10600	2650	7950
3	MN	NEC-DWN-2002/1*	D31	RIL(60) ,BPEAL (30)& HARDY(10)	06-02-2004	25565	6391	19174
4		NEC-DWN-2002/2	D32	ONGC(100)	06-02-2004	15465	3879	11586
5	AN	AN-DWN-2002/1*	D33	ONGC(100)	06-02-2004	10990	2751.20	8238.80
ONLAND								
6	AA	AA-ONN-2002/1	N47	JOGPL(20) & GAIL(80)	06-02-2004	1680	420	1260
7		AA-ONN-2002/3	N48	OIL(30) & ONGC(70)	06-02-2004	1460	365	1095
8		AA-ONN-2002/4	N49	ONGC(90) & OIL(10)	06-02-2004	1060	0	1060
9	CB	CB-ONN-2002/1	N52	ONGC(70) & CEBGI(30)	06-02-2004	135	99	36
10		CB-ONN-2002/2*	N53	JOGPL(30) , GSPC(60) & GGR(10)	06-02-2004	125	31.60	93.40
11		CB-ONN-2002/3	N54	GSPC(55) , JEPL(20), PPCL(15) & GGR (10)	06-02-2004	285	245.2	39.8
12	CY	CY-ONN-2002/1*	N55	JOGPL(30) GAIL(50) & GSPC(20)	06-02-2004	680	175	505
13		CY-ONN-2002/2	N56	ONGC(60) & BPRL(40)	06-02-2004	280	140	140
RELINQUISHED BLOCKS (7 BLOCKS)								
14	GV	GV-ONN-2002/1	N50	CIL(50) & CESL(50)	06-02-2004	15550	15550	0
15	GS	GS-DWN-2002/1	D25	ONGC(100)	06-02-2004	21450	21450	0
16	RJ	RJ-ONN-2002/1	N51	OIL(60) & ONGC(40)	06-02-2004	9900	9900	0
17	KK	KK-DWN-2002/3	D27	ONGC(80) & HPCL(20)	06-02-2004	20910	20910	0
18	MN	MN-DWN-2002/1	D29	ONGC(36), ENI(34), OIL(20) & BPCL-10	06-02-2004	9980	9980	0
19		MN-DWN-2002/2	D30	ONGC(75) & BGEPIL(25)	06-02-2004	11390	11390	0
20	AN	AN-DWN-2002/2	D34	ONGC(100)	06-02-2004	12495	12495	0
TOTAL AREA :						192810	124525	68285

NOTE : * PROPOSED FOR RELINQUISHMENT

EXPLORATION BLOCKS AWARDED UNDER FIFTH ROUND OF NELP (NELP-V)

(As on 01.04.2013)

SL. NO.	BASIN	BLOCK NAME	REF. NO ON MAP	CONSORTIUM (PARTICIPATING INTEREST)	DATE OF SIGNING CONTRACT	AWARDED AREA	RELINQ. AREA (in sq.km)	PRESENT AREA
CURRENT ACTIVE BLOCKS (11 BLOCKS)								
DEEP WATER								
1	KG	KG-DWN-2003/1	D37	RIL(60) , BPEAL(30) & HEPI(10)	23-09-2005	3288	0	3288
2	MN	MN-DWN-2003/1*	D38	RIL(55) NIKO(15) & BPEAL(30)	23-09-2005	17050	0	17050
3	AN	AN-DWN-2003/1*	D39	ONGC(100)	23-09-2005	9970	0	9970
4		AN-DWN-2003/2	D40	ENI (40) , ONGC(45) & GAIL(15)	23-09-2005	13110	0	13110
SHALLOW WATER								
5	CB	CB-OSN-2003/1	N57	ONGC(100)	23-09-2005	2394	598.5	1795.5
ONLAND								
6	AA	AA-ONN-2003/1	N59	JOGPL(10) , JSPL(35), GSPC(20) & GAIL(35)	23-09-2005	81	0	81
7	VN	VN-ONN-2003/1	N63	ONGC(100)	23-09-2005	3585	912	2673
8	RJ	RJ-ONN-2003/2	N65	FEL(10) , BIL(40) & XOIL(50)	23-09-2005	13195	11031	2164
9	CB	CB-ONN-2003/1	N66	RIL (70) & BG (30)	23-09-2005	635	0	635
10		CB-ONN-2003/2	N67	GSPC(50) , GAIL(20), JSPL(20) & GGR(10)	23-09-2005	448	276	172
11	KG	KG-ONN-2003/1	N69	CIL(49) & ONGC(51)	23-09-2005	1697	1382	315
RELINQUISHED BLOCKS (9 BLOCKS)								
12	CY	CY-ONN-2003/1	N70	NR(V)L(100)	23-09-2005	957	957	0
13	KK	KK-DWN-2003/1	D35	RIL(100)	23-09-2005	18245	18245	0
14		KK-DWN-2003/2	D36	RIL(100)	23-09-2005	12285	12285	0
15	GS	GS-OSN-2003/1	N58	ONGC(51) & CE7L(49)	23-09-2005	5970	5970	0
16	AA	AA-ONN-2003/2 (Arunachal Pradesh)	N60	GPI(30), NTPC(40), CRL(15) & Brownstone (15)	23-09-2005	295	295	0
17		AA-ONN-2003/3	N61	OIL(85) & HPCL(15)	23-09-2005	275	275	0
18	GV	GV-ONN-2003/1	N62	CIL(24), CE1L(25) & ONGC(51)	23-09-2005	7210	7210	0
19	RJ	RJ-ONN-2003/1	N64	ENI(34),ONGC(36) & CE2L(30)	23-09-2005	1335	1335	0
20	DS	DS-ONN-2003/1	N68	GGR(100)	23-09-2005	3155	3155	0
TOTAL AREA :						115180	63926.50	51253.50

NOTE : * PROPOSED FOR RELINQUISHMENT

EXPLORATION BLOCKS AWARDED UNDER SIXTH ROUND OF NELP (NELP-VI)

(As on 01.04.2013)

SL. NO.	BASIN	BLOCK NAME	REF. NO ON MAP	CONSORTIUM (PARTICIPATING INTEREST)	DATE OF SIGNING CONTRACT	AWARDED AREA	RELINQ. AREA (in sq.km)	PRESENT AREA
DEEP WATER								
1	CY	CY-DWN-2004/1	D4	ONGC(70), GSPC(10), HPCL(10) & GAIL(10)	02-03-2007	10302	0	10302
2		CY-DWN-2004/2	D5	ONGC(70), GSPC(10), HPCL(10) & GAIL(10)	02-03-2007	12059	0	12059
3		CY-DWN-2004/3	D6	ONGC(70), GSPC(10), HPCL(10) & GAIL(10)	02-03-2007	12017	0	12017
4		CY-DWN-2004/4	D7	ONGC(70), GSPC(10), HPCL(10) & GAIL(10)	02-03-2007	12025	0	12025
5		CY-PR-DWN-2004/1	D8	ONGC(70), GSPC(10), HPCL(10) & GAIL(10)	02-03-2007	13451	0	13451
6		CY-PR-DWN-2004/2	D9	ONGC(70), GSPC(10), HPCL(10) & GAIL(10)	02-03-2007	9994	0	9994
7	KG	KG-DWN-2004/1	D10	ONGC(70), GSPC(10), HPCL(10) & GAIL(10)	02-03-2007	11951	0	11951
8		KG-DWN-2004/2	D11	ONGC(60), GSPC(10), HPCL(10), GAIL(10) & BPCL(10)	02-03-2007	11851	0	11851
9		KG-DWN-2004/3	D12	ONGC(70), GSPC(10), HPCL(10) & GAIL(10)	02-03-2007	6205	0	6205
10		KG-DWN-2004/5	D14	ONGC(50), GSPC(10), HPCL(10), GAIL(10), OIL(10) & BPCL(10)	02-03-2007	11922	0	11922
11		KG-DWN-2004/6	D15	ONGC(34), GSPC(10), HPCL(10), GAIL(10) Impex Corporation Japan (26) & OIL (10)	02-03-2007	10907	0	10907
12	MN	MN-DWN-2004/1*	D17	RIL (70) & BPEAL (30)	02-03-2007	9885	0	9885
13		MN-DWN-2004/2*	D18	RIL (70) & BPEAL (30)	02-03-2007	11813	0	11813
14		MN-DWN-2004/3*	D19	RIL (70) & BPEAL (30)	02-03-2007	11316	0	11316
15		MN-DWN-2004/4*	D20	RIL (70) & BPEAL (30)	02-03-2007	8822	0	8822
16		NEC-DWN-2004/1	D22	SANTOS (100)	02-03-2007	7790	0	7790
17		NEC-DWN-2004/2	D23	SANTOS (100)	02-03-2007	8706	0	8706
SHALLOW WATER								
18	GS	GS-OSN-2004/1	1	ONGC (100)	02-03-2007	6589	0	6589
19	CB	CB-OSN-2004/1	2	FOCUS(10) & NEWBURY (90%)	02-03-2007	2616	0	2616
20	MB	MB-OSN-2004/1	3	GSPC(20), IOC(20), GAIL(20), HPCL(20) & PETROGAS (20)	02-03-2007	1520	0	1520
21		MB-OSN-2004/2*	4	PETROGAS(20), GAIL(20), IOC(20), GSPC(20) & HPCL(20)	02-03-2007	741	0	741
22	PR	PR-OSN-2004/1	5	CIL(35), ONGC(35) & TATA(30)	02-03-2007	9417	0	9417
23	KG	KG-OSN-2004/1	6	ONGC (55) & BGEPI (45)	02-03-2007	1151	20	1131
ONLAND								
24	MZ	MZ-ONN-2004/1	7	OIL(85) & SHIV-VANI(15)	02-03-2007	3213	0	3213
25	AA	AA-ONN-2004/2	10	OIL (100)	02-03-2007	218	0	218
26		AA-ONN-2004/3	11	ESSAR ENERGY(90) & ESSAR OIL (10)	02-03-2007	1252	0	1252
27		AA-ONN-2004/5	13	ESSAR ENERGY(90) & ESSAR OIL (10)	02-03-2007	46	0	46
28	PA	PA-ONN-2004/1	14	ONGC (100)	02-03-2007	2537	0	2537
29	GV	GV-ONN-2004/1	15	ONGC (100)	02-03-2007	8354	0	8354
30	SR	SR-ONN-2004/1	16	PRIZE PETROLEUM (10) & JAIPRAKASH ASSOCIATES LTD. (90)	02-03-2007	13277	1456	11821
31	VN	VN-ONN-2004/1	17	ONGC (100)	02-03-2007	5801	1470	4331
32		VN-ONN-2004/2	18	ONGC (100)	02-03-2007	4466	1120	3346
33	RJ	RJ-ONN-2004/1	19	GSPC(22.22), GAIL(22.22), HPCL(22.22), HALLWORTHY(PANAMA)(11.11), NITINFIRE (11.11), & BPCL (11.11)	02-03-2007	4613	0	4613
34		RJ-ONN-2004/2	20	OIL (75) & GEOGLOBAL (25)	02-03-2007	2196	0	2196
35	CB	CB-ONN-2004/1	22	ONGC(50), GSPC(40) & HERAMEC (10)	02-03-2007	32	0	32
36		CB-ONN-2004/2	23	ONGC(55) & GSPC(45)	02-03-2007	423	0	423
37		CB-ONN-2004/3	24	ONGC(40), GSPC(35) & ENSEARCH (25)	02-03-2007	113	0	113
38		CB-ONN-2004/4	25	ONGC(50), GSPC(40) & HERAMEC(10)	02-03-2007	70	0	70
39	DS	DS-ONN-2004/1	27	GEOGLOBAL RESOURCES (BARBADOS) (100)	02-03-2007	2649	0	2649
40	KG	KG-ONN-2004/1	28	OIL(90) & GEOGLOBAL(10)	02-03-2007	549	38	511
41		KG-ONN-2004/2	29	GSPC (40), GAIL (40) & PETROGAS (20)	02-03-2007	1140	0	1140
42	CY	CY-ONN-2004/1	30	ONGC (80) & BPCL(20)	02-03-2007	214	0	214
43		CY-ONN-2004/2	31	ONGC (80) & BPCL(20)	02-03-2007	375	0	375
RELINQUISHED BLOCKS (9 BLOCKS)								
44	KK	KK-DWN-2004/1	D1	ONGC(45), CIL(40) & TATA(15)	02-03-2007	12324	12324	0
45	KG	KG-DWN-2004/4	D13	RIL(70) & BPEAL (30)	02-03-2007	11904	11904	0
46		KG-DWN-2004/7	D16	RIL (70) & BPEAL (30)	02-03-2007	11856	11856	0
47	MN	MN-DWN-2004/5	D21	RIL (70) & BPEAL (30)	02-03-2007	10454	10454	0
48	RJ	RJ-ONN-2004/3	21	OIL(60), GEOGLOBAL(25) & HPCL (15)	02-03-2007	1330	1330	0
49		MZ-ONN-2004/2**	8	NAFTOGAZ(10), RNRL(10), GEOPETROL(10) & REL(70)	02-03-2007	3619	3619	0
50	AA	AA-ONN-2004/1**	9	OIL(85) & SHIV-VANI (15)	02-03-2007	144	144	0
51		AA-ONN-2004/4**	12	ADANI ENTERPRISES(35), AISPL(20), NAFTOGAZ(10) & WPPL(35)	02-03-2007	95	95	0
52		CB-ONN-2004/5**	26	ADANI ENTERPRISES(35), ADANI PORT(20), NAFTOGAZ (10) & WELSPUN (35)	02-03-2007	75	75	0
TOTAL AREA :						306389	55905	250484

NOTE : * PROPOSED FOR RELINQUISHMENT

** PSC TERMINATED BY MOP&NG

EXPLORATION BLOCKS AWARDED UNDER SEVENTH ROUND OF NELP (NELP-VII)

(As on 01.04.2013)

SL. NO.	BASIN	BLOCK NAME	REF. NO ON MAP	CONSORTIUM (PARTICIPATING INTEREST)	DATE OF SIGNING CONTRACT	AWARDED AREA	RELINQ. AREA	PRESENT AREA
						(in sq.km)		
DEEP WATER								
1.	MB	MB-DWN-2005/2	D-6	BHP BILLITON (26) & GVK (74)	22-12-2008	3,660	0	3,660
2.		MB-DWN-2005/3	D-7	BHP BILLITON (26) & GVK (74)	22-12-2008	3,097	0	3,097
3.		MB-DWN-2005/4	D-8	BHP BILLITON (26) & GVK (74)	22-12-2008	3,408	0	3,408
4.		MB-DWN-2005/5	D-9	BHP BILLITON (26) & GVK (74)	22-12-2008	3,169	0	3,169
5.		MB-DWN-2005/7	D-11	BHP BILLITON (26) & GVK (74)	22-12-2008	3,324	0	3,324
6.		MB-DWN-2005/9	D-13	BHP BILLITON (26) & GVK (74)	22-12-2008	3,138	0	3,138
7.	KK	KK-DWN-2005/2	D-15	ONGC (90) & GSPC (10)	22-12-2008	19,234	0	19,234
8.	KG	KG-DWN-2005/1	D-16	ONGC (70), IOCL (20) & GSPC (10)	22-12-2008	1,727	0	1,727
9.		KG-DWN-2005/2	D-17	BP EXPLORATION (50) & RIL (50)	22-12-2008	1,949	0	1,949
10.	AN	AN-DWN-2005/1	D-19	ONGC (90) & OIL (10)	22-12-2008	11,837	0	11,837
SHALLOW WATER								
11.	MB	MB-OSN-2005/1	S-1	ONGC (80) & GSPC (20)	22-12-2008	2811	0	2,811
12.		MB-OSN-2005/2	S-2	ADAANI WELSPUN (100)	22-12-2008	1191	0	1,191
13.		MB-OSN-2005/3	S-3	EEPL (50) & NEIL (50)	22-12-2008	2810	0	2,810
14.		MB-OSN-2005/5	S-5	ONGC (70) & GSPC (30)	22-12-2008	2402	0	2,402
15.		MB-OSN-2005/6	S-6	ONGC (80) & GSPC (20)	22-12-2008	2820	0	2,820
16.		KG	KG-OSN-2005/1	S-7	ONGC (60), GSPC (20) & HMEL (20)	22-12-2008	2810	0
17.	KG-OSN-2005/2		S-8	ONGC (80) & HMEL (20)	22-12-2008	1881	0	1,881
ONLAND								
18.	AA	AA-ONN-2005/1	1	ONGC (60), OIL (30) & ACL (10)	22-12-2008	363	0	363
19.	PA	PA-ONN-2005/1	2	ONGC (100)	22-12-2008	1096	0	1,096
20.		PA-ONN-2005/2	3	ONGC (100)	22-12-2008	2552	0	2,552
21.		WB	WB-ONN-2005/2	5	ONGC (100)	22-12-2008	3792	0
22.	WB-ONN-2005/3		6	ONGC (100)	22-12-2008	4001	0	4,001
23.	WB-ONN-2005/4		7	ONGC (75) & OIL (25)	22-12-2008	3940	0	3,940
24.	GV	GV-ONN-2005/3	10	ONGC (80) & TATA PETRO (20)	22-12-2008	2227	0	2,227
25.	SR	SR-ONN-2005/1	11	DEEP ENERGY(10),DEEP INDUS(70)	22-12-2008	789	0	789
				KANVEL FINANCE (10) & SAVLA ELECTRONICS (10)				
26.	RJ	RJ-ONN-2005/1	14	HOEC (33.34), BPRL (33.33) & IMC (33.33)	22-12-2008	1424	0	1,424
27.		RJ-ONN-2005/2	15	OIL (60), HOEC (20)	22-12-2008	1517	0	1,517
				HPCL & MITTAL ENERGY (20)				
28.		RJ-ONN-2005/3	16	GSPC (60) & ONGC (40)	22-12-2008	1217	0	1,217
29.	CB	CB-ONN-2005/2	18A&B	IOCL (100)	22-12-2008	81	0	81
30.		CB-ONN-2005/3	19	MERCATOR PETROLEUM (100)	22-12-2008	48	0	48
31.		CB-ONN-2005/4	20	ONGC (51) & GSPC (49)	22-12-2008	31	0	31
32.		CB-ONN-2005/5	21	OMKAR NATUAL RESOUR. (100)	22-12-2008	83	0	83
33.		CB-ONN-2005/6	22	OMKAR NATUAL RESOUR. (100)	22-12-2008	102	0	102
34.		CB-ONN-2005/7	23	IOCL (100)	22-12-2008	199	0	199
35.		CB-ONN-2005/9	25	MERCATOR PETROLEUM (100)	22-12-2008	170	0	170
36.		CB-ONN-2005/10	26	ONGC (51) & GSPC (49)	22-12-2008	270	0	270
37.		CB-ONN-2005/11	27	QUEST (20), QQVS (40),	22-12-2008	223.87	0	223.87
				SREI (20), VIPL2 (10) & PRIM (10)				
38.		PR	PR-ONN-2005/1	28	ONGC (80) & TATA PETRO. (20)	22-12-2008	1807	0
39.	CY	CY-ONN-2005/1	29	GAIL (40), GSPC (30) &	22-12-2008	946	0	946
				BENGAL ENERGY (30)				
RELINQUISHED BLOCKS (2 BLOCKS)								
40.	KK	KK-DWN-2005/1	D-14	BHP BILLITON (26) & GVK (74)	22-12-2008	14,675	14,675	0
41.	CB	CB-ONN-2005/8**	24	VASUNDHARA RESOUR (100)	22-12-2008	133	133	0
TOTAL AREA :						112,954.87	14,808	98,146.87

NOTE : ** PSC TERMINATED BY MOP&NG

EXPLORATION BLOCKS AWARDED UNDER EIGHTH ROUND OF NELP (NELP-VIII)

(As on 01.04.2013)

SL NO.	BASIN	BLOCK NAME	REF. NO ON MAP	CONSORTIUM (PARTICIPATING INTEREST)	DATE OF SIGNING CONTRACT	AWARDED AREA (SQ. KM.)
DEEP WATER						
1.	MUMBAI	MB-DWN-2009/1	D-1	CIL(100)	30-06-2010	2,961
2.	KRISHNA-GODAVARI	KG-DWN-2009/1	D-6 (A&B)	BGEPIL(30), OIL(15), ONGC(45) & APGIC (10)	30-06-2010	1,800
3.	ANDAMAN-NICOBAR	AN-DWN-2009/1	D-7	ONGC (70) & OIL (30)	30-06-2010	4,981
4.		AN-DWN-2009/2	D-8	ONGC (60) & OIL (40)	30-06-2010	3,995
5.		AN-DWN-2009/3	D-9	ONGC (60) & OIL (40)	30-06-2010	3,992
6.		AN-DWN-2009/5	D-11	ONGC (90) & GSPC (10)	30-06-2010	4,002
7.		AN-DWN-2009/13	D-19	ONGC (70), NTPC (10), GAIL (10) & GSPC (10)	30-06-2010	4,007
8.		AN-DWN-2009/18	D-24	ONGC (60), OIL (30) & GAIL (10)	30-06-2010	4,040
TOTAL AREA : 29,778						
SHALLOW WATER						
9.	GUJARAT-KUTCH	GK-OSN-2009/1	S-1	ONGC (40), GSPC (20), AWEL (20) & IOC (20)	30-06-2010	1,264
10.		GK-OSN-2009/2	S-2	ONGC (40), AWEL (30) & IOC (30)	30-06-2010	1,242
11.	MUMBAI	MB-OSN-2009/3	S-5	BHP (100)	30-06-2010	1,492
12.		MB-OSN-2009/6	S-8	BHP (100)	30-06-2010	1,876
13.		MB-OSN-2009/7	S-9	BHP (100)	30-06-2010	1,865
14.	CAUVERY	CY-OSN-2009/1	S-19	Bengal Energy International Inc(100)	30-06-2010	1,362
15.		CY-OSN-2009/2	S-20	OIL (50) & ONGC (50)	30-06-2010	1,621
16.	KRISHNA-GODAVARI	KG-OSN-2009/1	S-22	ONGC (80), APGIC (10) & NTPC (10)	30-06-2010	1,472
17.		KG-OSN-2009/2	S-23	ONGC (90) & APGIC (10)	30-06-2010	1,471
18.		KG-OSN-2009/3	S-24	CIL (100)	30-06-2010	1,988
19.		KG-OSN-2009/4	S-25	ONGC (50), OIL (30), NTPC (10) & APGIC (10)	30-06-2010	835
TOTAL AREA : 16,488						
ONLAND						
20.	ASSAM-ARAKAN	AA-ONN-2009/1	1	JOGPL(47), JEKPL(17) & JODPL(36)	30-06-2010	2,217
21.		AA-ONN-2009/2	2	JOGPL(47), JEKPL(17) & JODPL(36)	19-07-2010	1,740
22.		AA-ONN-2009/3	3	ONGC (50) & OIL (50)	30-06-2010	84
23.		AA-ONN-2009/4	4	OIL (50) & ONGC (50)	30-06-2010	84
24.	VINDHYAN	VN-ONN-2009/3	9	ONGC (100)	30-06-2010	1,250
25.	CAMBAY	CB-ONN-2009/1	11	ESGPL (100)*	30-06-2010	113
26.		CB-ONN-2009/2	12	ESGPL (100)*	30-06-2010	68
27.		CB-ONN-2009/3	13	HCIL (100)	30-06-2010	71
28.		CB-ONN-2009/4	14	ONGC (50) & GSPC (50)	30-06-2010	58
29.		CB-ONN-2009/5	15	NTPC (100)	30-06-2010	165
30.		CB-ONN-2009/6	16	HCIL (100)	30-06-2010	177
31.		CB-ONN-2009/7	17	ESGPL (100)*	30-06-2010	144
32.		CB-ONN-2009/8	18	JPIL (87) & JPPL (13)	30-06-2010	136
TOTAL AREA : 6,307						
GRAND TOTAL : 52,573 SQ.KM.						

NOTE : * CHANGE PROPOSED TO SINTEX OIL & GAS LIMITED

EXPLORATION BLOCKS AWARDED UNDER NINTH ROUND OF NELP (NELP-IX)

(As on 01.04.2013)

SL NO.	BASIN	BLOCK NAME	REF. NO ON MAP	CONSORTIUM (PARTICIPATING INTEREST)	DATE OF SIGNING CONTRACT	AWARDED AREA (SQ. KM.)
DEEP WATER						
1.	MUMBAI	MB-DWN-2010/1	D-2	BGEPIL (50) & BHP (50)	10-09-2012	7,963
						TOTAL AREA : 7,963
SHALLOW WATER						
2.	GUJARAT-KUTCH	GK-OSN-2010/1	S-1	ONGC (60), OIL (30) & GAIL (10)	28-03-2012	1,361
3.		GK-OSN-2010/2	S-2	ONGC (90) & GAIL (10)	28-03-2012	1,625
4.	MUMBAI	MB-OSN-2010/2	S-4	OIL (50), HPCL (30) & BPRL (20)	30-08-2012	3,411
						TOTAL AREA : 6,397
ONLAND						
5.	ASSAM-ARAKAN	AA-ONN-2010/1	1	PPCL(20) & ABGEL (80)	30-08-2012	401
6.		AA-ONN-2010/2	2	OIL(40), ONGC(30), GAIL(20) & East West Petroleum (10)	28-03-2012	396
7.		AA-ONN-2010/3	3	OIL(40), ONGC(40) & BPRL(20)	28-03-2012	171
8.	VINDHYAN	VN-ONN-2010/1	4	Deep Energy LLC(10) & KGN Industries(90)	28-03-2012	3776
9.		VN-ONN-2010/2	5	Deep Energy LLC (10), Deep Natural Resources Limited (15) & Safak WSB Energy Pvt. Ltd. (75)	28-03-2012	4909
10.	RAJASTHAN	RJ-ONN-2010/2	8	FEL (10) & Birkbeck Investments Ltd. (90)	28-03-2012	535
11.	CAMBAY	CB-ONN-2010/1	9	ONGC (100)	28-03-2012	782
12.		CB-ONN-2010/3	11	Deep Energy LLC (10) & KGN Oil & Gas Pvt. Ltd. (90)	28-03-2012	534
13.		CB-ONN-2010/4	12	Pratibha Oil & Natural Gas Pvt. Ltd.(100)	28-03-2012	61
14.		CB-ONN-2010/5	13	Pan India Consultants (20) & Frost International Ltd. (80)	28-03-2012	49
15.		CB-ONN-2010/6	14	ONGC (80) & IOC (20)	28-03-2012	39
16.		CB-ONN-2010/8	16A&B	BPRL(25), GAIL(25), EIL(20), BFIL(20) & MIEL(10)	30-08-2012	42
17.		CB-ONN-2010/9	17	ONGC (100)	30-08-2012	120
18.		CB-ONN-2010/10	18	Sankalp Oil & Natural Resources Ltd. (100)	27-06-2012	122
19.		CB-ONN-2010/11	19	BPRL (25), GAIL (25), EIL (20) & BFIL (15) & MIEL (15)	28-03-2012	131
						TOTAL AREA : 12,068
						GRAND TOTAL : 26,428 SQ.KM.

ONGC - Oil & Natural Gas Corpn. Ltd.
 IOC - Indian Oil Corpn. Ltd.
 OIL - Oil India Ltd.
 GSPC - Gujarat State Petroleum Corporation Ltd.
 RIL - Reliance Industries Ltd.
 EOL - Essar Oil Ltd.
 Okland - Okland Offshore Holdings Ltd.
 FEL - Focus Energy Ltd.
 VPL - Videocon Petroleum Ltd.
 HEPI - Hardy Exploration & Production (India) Inc.
 JTI - Joshi Technologies Inc.
 EEIPL - Energy Equity India Petroleum Pty. Ltd.
 BPRL - Bharat Petroleum Resources Ltd.
 CIL - Cairn India Ltd.
 MIL - Mosbacher India LLC
 BGEPIL - British Gas Explo. & Prod. India Ltd.
 Naftogaz - Naftogaz India
 Santos - Santos
 BHP - BHP Billiton Pvt. Ltd.
 Adani - Aadani Welspun
 BPEAL - BP Exploration (Alpha) Ltd.
 Deep Energy - Deep Energy LLC.

MP - Mercator Petroleum Ltd.
 ONR - Omkar Natural Resources Pvt. Ltd.
 Quest - Quest Petroleum Ltd.
 Pan - Pan India Consultants
 Sanklap - Sankalp Oil & Natural Resources Ltd.
 NR(V)L - Niko Resources (NELP-V) Ltd.
 ENI - ENI India Ltd.
 JOGP - Jubilant Oil & Gas Pvt. Ltd.
 JSPL - Jubilant Securities Pvt. Ltd.
 NTPC - National Thermal Power Corporation Ltd.
 PONEI - Premier Oil North East India
 POGC - Polish Oil & Gas Company
 HOEC - Hindusthan Oil Exploration Company Ltd.
 GAIL - Gas Authority of India Ltd.
 NIKO - Niko Resources Ltd.
 GEO - Geo Global Resources (India) Inc.
 PPCL - Prize Petroleum Company Ltd.
 GGR - GeoGlobal Resources (Barbados) Inc.
 CRL - Canoro Resources Ltd.
 ACL - Assam Company Ltd.
 Gaz - Gazprom
 GPI - GeoPetrol International Inc.
 XOIL - X Oil, Maruritius

BASIN-WISE DISTRIBUTION OF PEL AREAS UNDER OPERATION (PRE-NELP & NELP BLOCKS)

(As on 01.04.2013)

SL.	BASIN		AREA (Sq. Km)									
NO.	(No. of Blocks)	PRE-NELP	NELP-I	NELP-II	NELP-III	NELP-IV	NELP-V	NELP-VI	NELP-VII	NELP-VIII	NELP-IX	TOTAL
DEEP WATER (57)												
1	MUMBAI (8)	—	—	—	—	—	—	—	19,796	2,961	7,963	30,720
2	KERALA-KONKAN (4)	—	—	—	43,983	17,107	—	—	19,234	—	—	80,324
3	CAUVERY (5)	—	—	—	14,325	—	—	46,403	—	—	—	60,728
4	CAUVERY-PALAR (3)	—	—	—	8,600	—	—	23,445	—	—	—	32,045
5	PALAR (1)	—	—	—	6,155	—	—	—	—	—	—	6,155
6	KRISHNA-GODAVARI (15)	—	26,130	—	8,695	7,950	3,288	52,836	3,676	1,800	—	104,375
7	MAHANADI-NEC (11)	—	12,183	—	—	30,760	17,050	58,332	—	—	—	118,325
8	ANDAMAN-NICOBAR (10)	—	—	—	—	8,238.80	23,080	—	11,837	25,017	—	68,172.80
TOTAL AREA :		—	38,313	—	81,758	64,055.80	43,418	181,016	54,543	29,778	7,963	500,844.80
SHALLOW WATER (35)												
9	GUJARAT-KUTCH (5)	5,725	—	—	—	—	—	—	—	2,506	2,986	11,217
10	GUJARAT-SAURASHTRA (2)	—	—	5,890	—	—	—	6,589	—	—	—	12,479
11	CAMBAY (4)	1,051	—	—	—	—	1,795.50	2,616	—	—	—	5,462.50
12	MUMBAI (11)	—	—	—	—	—	—	2,261	12,034	5,233	3,411	22,939
13	CAUVERY (2)	—	—	—	—	—	—	—	—	2,983	—	2,983
14	KRISHNA-GODAVARI (8)	—	—	—	530	—	—	1,131	4,691	5,766	—	12,118
15	MAHANADI-NEC (2)	—	9,461	4,061	—	—	—	—	—	—	—	13,522
16	PALAR (1)	—	—	—	—	—	—	9,417	—	—	—	9,417
TOTAL AREA :		6,776	9,461	9,951	530	—	1,795.50	22,014	16,725	16,488	6,397	90,137.50
ONLAND (102)												
17	VINDHYAN (6)	—	—	—	—	—	2,673	7,677	—	1,250	8,685	20,285
18	GUJARAT-KUTCH (1)	775	—	—	—	—	—	—	—	—	—	775
19	RAJASTHAN (9)	7,137.43	—	—	—	—	2,164	6,809	4,158	—	535	20,803.43
20	CAMBAY (42)	2,869.69	—	449.25	26	169.20	807	638	1,207.87	932	1,880	8,979.01
21	PRANHITA-GODAVARI (1)	21,850	—	—	—	—	—	—	—	—	—	21,850
22	PALAR (1)	—	—	—	—	—	—	—	1,807	—	—	1,807
23	CAUVERY (5)	—	—	—	—	645	—	589	946.00	—	—	2,180
24	GANGA VALLEY (2)	—	—	—	—	—	—	8,354	2,227	—	—	10,581
25	ASSAM-ARAKAN (22)	1,901	—	—	6,256	3,415	81	1,516	363	4,125	968	18,625
26	DECCAN SYNECLISE (1)	—	—	—	—	—	—	2,649	—	—	—	2,649
27	KRISHNA-GODAVARI (3)	—	—	—	—	—	315	1,651	—	—	—	1,966
28	MIZORAM (1)	—	—	—	—	—	—	3,213	—	—	—	3,213
29	PURNEA (3)	—	—	—	—	—	—	2,537	3,648	—	—	6,185
30	BENGAL (3)	—	—	—	—	—	—	—	11,733	—	—	11,733
31	SOUTH REWA (2)	—	—	—	—	—	—	11,821	789	—	—	12,610
TOTAL AREA :		34,533.12	—	449.25	6,282	4,229.20	6,040	47,454	26,878.87	6,307	12,068	144,241.44
GRAND TOTAL :		41,309.12	47,774	10,400.25	88,570	68,285	51,253.50	250,484	98,146.87	52,573	26,428	735,223.74

COMPANY-WISE DISTRIBUTION OF PEL AREAS UNDER OPERATION (PRE-NELP & NELP ROUNDS)

(As on 01.04.2013)

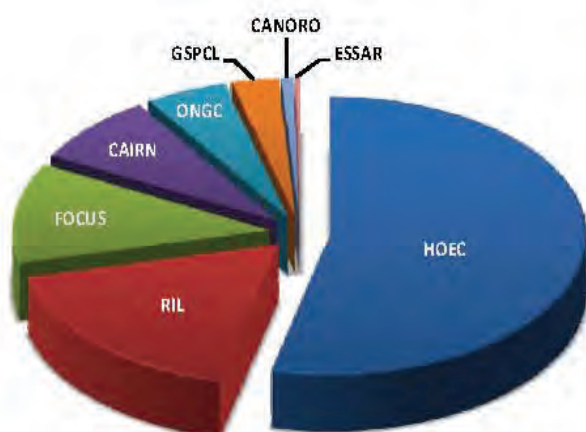
SL. NO.	COMPANY/ OPERATOR	NO.OF BLOCKS	PRE-NELP	NELP-I	NELP-II	NELP-III	NELP-IV	NELP-V	NELP-VI	NELP-VII	NELP-VIII	NELP-IX	TOTAL
1	ONGC	81	2123	16773	4061	6282	46117.80	14438.50	150199	65601	32693	3927	342,215.30
2	RIL	21	7258	31001	5890	81758	19174	20973	41836	—	—	—	207,890
3	OIL	11	—	—	—	—	1095	—	6138	1517	1705	3978	14,433
4	CIL	6	3316.27	—	—	—	—	315	9417	—	4949	—	17,997.27
5	GSPC	9	1210	—	425	530	39.80	172	7273	1217	—	—	10,866.80
6	HOEC	4	22162.64	—	—	—	—	—	—	1424	—	—	23,586.64
7	CANORO	1	319	—	—	—	—	—	—	—	—	—	319
8	ESSAR	4	119.05	—	—	—	—	—	1298	2810	—	—	4,227.05
9	JOGP	6	—	—	—	—	1858.40	81	—	—	3957	—	5,896.40
10	FOCUS	5	4801.16	—	—	—	—	2164	2616	—	—	535	10,116.16
11	GGR	1	—	—	—	—	—	—	2649	—	—	—	2,649
12	NIKO	1	—	—	24.25	—	—	—	—	—	—	—	24.25
13	ENI	1	—	—	—	—	—	13110	—	—	—	—	13,110
14	SANTOS	2	—	—	—	—	—	—	16496	—	—	—	16,496
15	PETROGAS	1	—	—	—	—	—	—	741	—	—	—	741
16	PRIZE PETROLEUM	1	—	—	—	—	—	—	11821	—	—	—	11,821
17	GAIL	1	—	—	—	—	—	—	—	946	—	—	946
18	IOCL	2	—	—	—	—	—	—	—	280	—	—	280
19	BHP BILLITON	9	—	—	—	—	—	—	—	19796	5233	—	25,029
20	BP EXPLORATION	1	—	—	—	—	—	—	—	1949	—	—	1,949
21	ADAANI WELSPUN	1	—	—	—	—	—	—	—	1191	—	—	1,191
22	DEEP ENERGY	3	—	—	—	—	—	—	—	789	—	4310	5,099
23	MERCATOR PET.	2	—	—	—	—	—	—	—	218	—	—	218
24	OMKAR NATURAL	2	—	—	—	—	—	—	—	185	—	—	185
25	QUEST	1	—	—	—	—	—	—	—	223.87	—	—	223.87
26	BGEPIL	2	—	—	—	—	—	—	—	—	1800	7963	9,763
27	BENGAL ENERGY	1	—	—	—	—	—	—	—	—	1362	—	1,362
28	ESGPL	3	—	—	—	—	—	—	—	—	325	—	325
29	HCIL	2	—	—	—	—	—	—	—	—	248	—	248
30	JPIL	1	—	—	—	—	—	—	—	—	136	—	136
31	NTPC	1	—	—	—	—	—	—	—	—	165	—	165
32	PRATIBHA OIL	1	—	—	—	—	—	—	—	—	—	61	61
33	PAN INDIA/ FROSTINT.	1	—	—	—	—	—	—	—	—	—	49	49
34	SANKALP	1	—	—	—	—	—	—	—	—	—	122	122
35	BPRL/ GAIL	2	—	—	—	—	—	—	—	—	—	173	173
36	PP* / ABGEL	1	—	—	—	—	—	—	—	—	—	401	401
37	DEEP ENERGY/DNRL**	1	—	—	—	—	—	—	—	—	—	4909	4909
TOTAL			194	41,309.12	47,774	10,400.25	88,570	68,285	51,253.50	250,484	98,146.87	52,573	26,428 735,223.74

* PP : Prize Petroleum, ** DNRL : Deep Natural Resources Limited

COMPANY - WISE DISTRIBUTION OF PEL AREAS UNDER OPERATION (PRE-NELP & NELP ROUNDS)

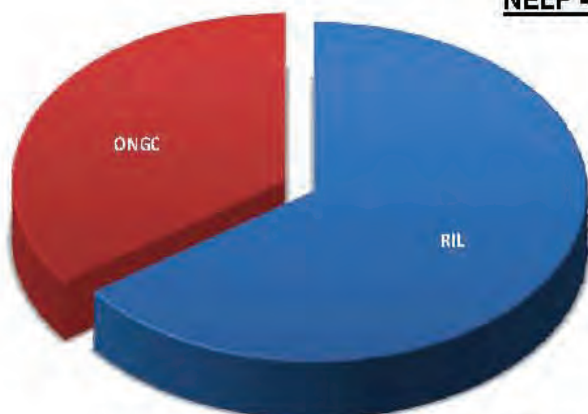
(As on 1.04.2013)

PRE - NELP



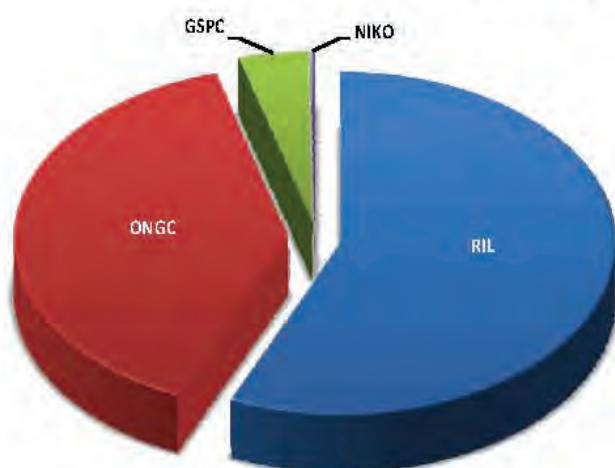
COMPANY / OPERATOR	Present Area (Sq. Km.)	(%)
HOEC	22,162.64	53.65
RIL	7,258.00	17.57
FOCUS	4,801.16	11.62
CAIRN	3,316.27	8.03
ONGC	2,123.00	5.14
GSPCL	1,210.00	2.93
CANORO	319.00	0.77
ESSAR	119.05	0.29
TOTAL	41,309.12	100

NELP - I



COMPANY / OPERATOR	Present Area (Sq. Km.)	(%)
RIL	31,001.00	64.89
ONGC	16,773.00	35.11
TOTAL	47,774.00	100

NELP - II

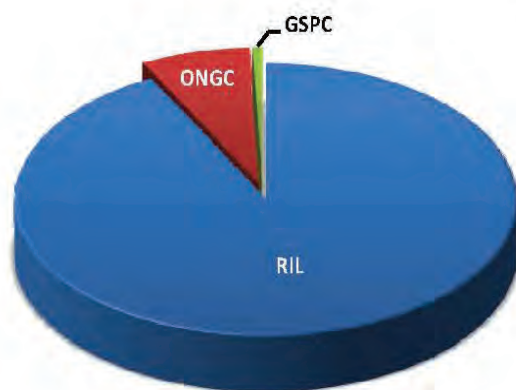


COMPANY / OPERATOR	Present Area (Sq. Km.)	(%)
RIL	5,890.00	56.63
ONGC	4,061.00	39.05
GSPC	425.00	4.09
NIKO	24.25	0.23
TOTAL	10,400.25	100

COMPANY - WISE DISTRIBUTION OF PEL AREAS UNDER OPERATION (PRE-NELP & NELP ROUNDS)

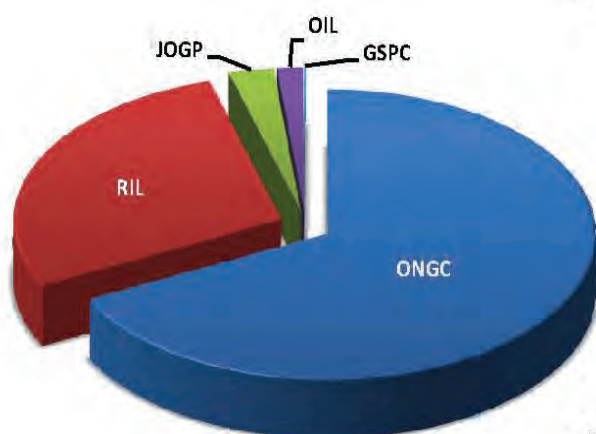
(As on 1.04.2013)

NELP - III



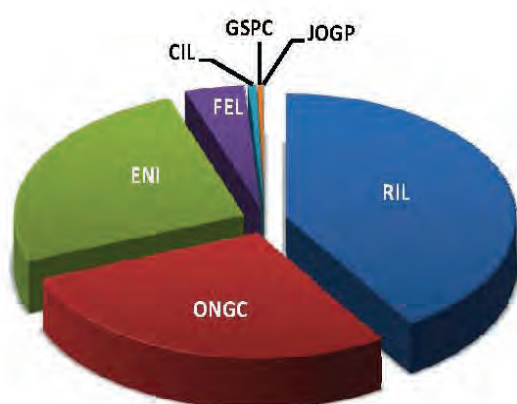
COMPANY / OPERATOR	Present Area (Sq. Km.)	(%)
RIL	81,758.00	92.31
ONGC	6,282.00	7.09
GSPC	530.00	0.60
TOTAL	88,570.00	100.00

NELP - IV



COMPANY / OPERATOR	Present Area (Sq. Km.)	(%)
ONGC	46,117.80	67.54
RIL	19,174.00	28.08
JOGP	1,858.40	2.72
OIL	1,095.00	1.60
GSPC	39.80	0.06
TOTAL	68,285.00	100.00

NELP - V

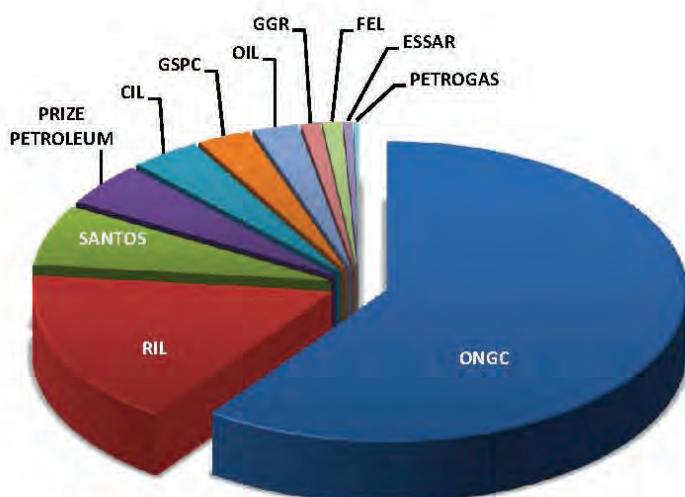


COMPANY / OPERATOR	Present Area (Sq. Km.)	(%)
RIL	20,973.00	40.92
ONGC	14,438.50	28.17
ENI	13,110.00	25.58
FEL	2,164.00	4.22
CIL	315.00	0.61
GSPC	172.00	0.34
JOGP	81.00	0.16
TOTAL	51,253.50	100.00

COMPANY - WISE DISTRIBUTION OF PEL AREAS UNDER OPERATION (PRE-NELP & NELP ROUNDS)

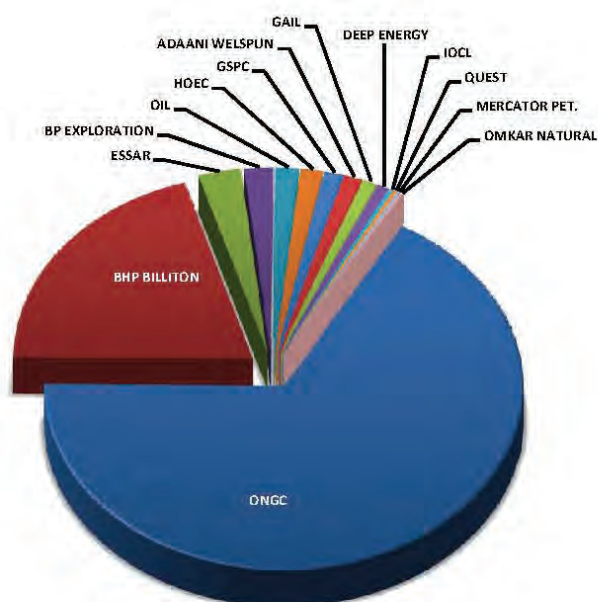
(As on 1.04.2013)

NELP - VI



COMPANY / OPERATOR	Present Area (Sq. Km.)	(%)
ONGC	150,199.00	59.96
RIL	41,836.00	16.70
SANTOS	16,496.00	6.59
PRIZE PETROLEUM	11,821.00	4.72
CIL	9,417.00	3.76
GSPC	7,273.00	2.90
OIL	6,138.00	2.45
GGR	2,649.00	1.06
FEL	2,616.00	1.04
ESSAR	1,298.00	0.52
PETROGAS	741.00	0.30
TOTAL	250,484.00	100.00

NELP - VII

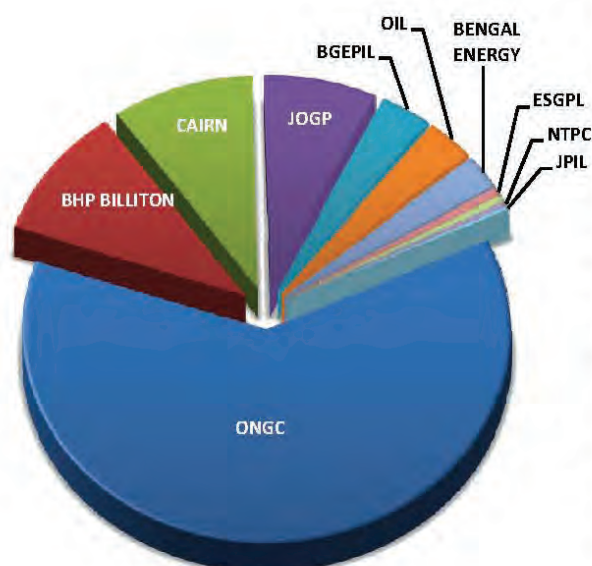


COMPANY / OPERATOR	Present Area (Sq. Km.)	(%)
ONGC	65,601.00	66.84
BHP BILLITON	19,796.00	20.17
ESSAR	2,810.00	2.86
BP EXPLORATION	1,949.00	1.99
OIL	1,517.00	1.55
HOEC	1,424.00	1.45
GSPC	1,217.00	1.24
ADAANI WELSPUN	1,191.00	1.21
GAIL	946.00	0.96
DEEP ENERGY	789.00	0.80
IOCL	280.00	0.29
QUEST	223.87	0.23
MERCATOR PET.	218.00	0.22
OMKAR NATURAL	185.00	0.19
TOTAL	98,146.87	100.00

COMPANY - WISE DISTRIBUTION OF PEL AREAS UNDER OPERATION (PRE-NELP & NELP ROUNDS)

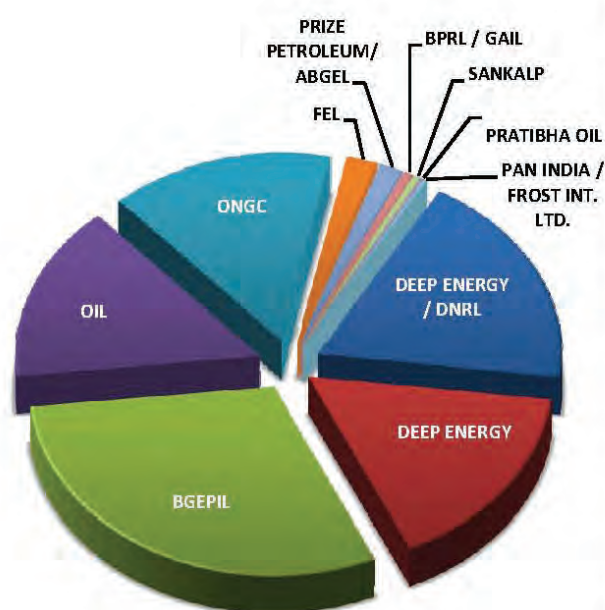
(As on 1.04.2013)

NELP - VIII



COMPANY / OPERATOR	Present Area (Sq. Km.)	(%)
ONGC	32,693.00	62.19
BHP BILLITON	5,233.00	9.95
CAIRN	4,949.00	9.41
JOGP	3,957.00	7.53
BGEPL	1,800.00	3.42
OIL	1,705.00	3.24
BENGAL ENERGY	1,362.00	2.59
ESGPL	325.00	0.62
HCIL	248.00	0.47
NTPC	165.00	0.31
JPIL	136.00	0.26
TOTAL	52,573.00	100.00

NELP - IX



COMPANY / OPERATOR	Present Area (Sq. Km.)	(%)
DEEP ENERGY / DNRL	4,909.00	18.57
DEEP ENERGY	4,310.00	16.31
BGEPL	7,963.00	30.13
OIL	3,978.00	15.05
ONGC	3,927.00	14.86
FEL	535.00	2.02
PRIZE PETROLEUM/ABGEL	401.00	1.52
BPRL / GAIL	173.00	0.65
SANKALP	122.00	0.46
PRATIBHA OIL	61.00	0.23
PAN INDIA / FROST INT. LTD.	49.00	0.19
TOTAL	26,428.00	100.00

SMALL AND MEDIUM SIZED FIELDS AWARDED TO PVT/JV COMPANIES

SL. NO.	ROUND / BASIN	FIELD	CONSORTIUM (PARTICIPATING INTEREST)	DATE OF SIGNING CONTRACT	PRESENT AREA (Sq. Km.)
A. FIELDS AWARDED					
MEDIUM- SIZED FIELDS					
1.	I ASSAM-ARAKAN	KHARSANG	GEO-ENPRO (10), JUBLIANT ENERGY (KHARSANG) (25), GEOPETROL (25) & OIL (40)	16.06.95	10.00
2.	I K-G OFFSHORE	RAVVA	CEIL (22.5), Videocon Industries Ltd.(25), RAVVA OIL PTE. LTD. (12.5) & ONGC (40)	28.10.94	331.26
3.	I MUMBAI OFFSHORE	MID & SOUTH TAPTI	BRITISH GAS EXPLO. & PROD. INDIA LTD. (BGEPIL) (30), ONGC (40) & RELIANCE IND. LTD. (RIL) (30)	22.12.94	1,471.00
4.		PANNA MUKTA	BGEPIL (30), RIL(30) & ONGC (40) BGEPIL (30), RIL(30) & ONGC (40)	22.12.94 22.12.94	430.00 777.00
TOTAL AREA :					3,010.26
SMALL- SIZED FIELDS					
5.	I CAMBAY	ASJOL	HOEC (50) & GSPCL (50)	03.02.95	15.00
6.		LOHAR	SELAN EXPL. TECH. LTD. (100)	13.03.95	5.00
7.		INDRORA	SELAN EXPL. TECH. LTD. (100)	13.03.95	130.00
8.		BAKROL	SELAN EXPL. TECH. LTD. (100)	13.03.95	36.00
9.		KARJISAN	SELAN EXPL. TECH. LTD. (100)	16.02.04	5.00
10.		WAVEL	JOSHI TECH. INC. (JTI) (100)	20.02.95	9.00
11.		DHOLKA	JOSHI TECH. INC. (JTI) (100)	20.02.95	48.00
12.		BAOLA	INTERLINK PETROLEUM LTD (100)	05.04.95	3.09
13.		MODHERA	INTERLINK PETROLEUM LTD. (100)	23.02.01	12.70
14.		SABARMATI	OILEX LTD. HOLDINGS(I) LTD. (40) & GSPCL (60)	23.09.94	5.80
15.		CAMBAY	OILEX LTD. (30), GSPC (55), & OILEX LTD. HOLDINGS (I) LTD. (15)	23.09.94	161.00
16.		BHANDUT	OILEX LTD. HOLDINGS(I) LTD.(40) & GSPCL(60)	23.09.94	6.00
17.		HAZIRA	NIKO (33.33) & GSPCL (66.67)	23.09.94	50.00
18.	I CAUVERY OFFSHORE	PY-1	HOEC (100)	06.10.95	75.00
19.	II ASSAM-ARAKAN	AMGURI	CRL / GOI (60) & ASSAM CO. LTD. (40)	23.02.01	52.75
20.	II CAMBAY	N. BALOL	HOEC (25), GSPCL (45) & HERAMEC LTD. (30)	23.02.01	27.30
21.		KANAWARA	HERAMEC LTD. (30) & GSPCL (70)	23.02.01	6.30
22.		ALLORA	HERAMEC LTD. (30) & GSPCL (70)	23.02.01	6.85
23.		UNAWA	GSPCL (70) & HERAMEC LTD. (30)	23.02.01	5.65
24.		N. KATHANA	HERAMEC LTD. (30) & GSPCL (70)	23.02.01	12.20
25.		DHOLASAN	HERAMEC LTD. (30) & GSPCL (70)	23.02.01	8.80
26.		SANGANPUR	HYDROCARBON DEV. CO. (P) LTD. (HDCPL) (50) & PRIZE PETROLEUM CORP. LTD. (50)	23.02.01	4.40
27.		OGNAJ	SELAN EXPL. TECH. LTD. (100)	16.02.04	13.65
28.		MATAR	NIKO (65) & GSPC (35)	RELINQUISHED	
TOTAL AREA :					700.40
GRAND TOTAL : 3710.66 Sq.Km.					
B. AWARD OF FIELD AWAITING FINALIZATION OF CONTRACT					
1.	II MUMBAI OFF.	RATNA-R-SERIES	POL(10), ESSAR OIL LTD.(50) & ONGC(40)		57.60
PRODUCING FIELDS DISCOVERED/DEVELOPED IN EXPLORATION BLOCKS BY PVT/JV COMPANIES					
1.	CAUVERY OFF.	PY-3(CY-OS-90/1)	HARDY (18), ONGC (40), TPL (21) & HOEC (21)		81.00
2.	GULF OF CAMBAY	LAKSHMI (CB-OS/2)	CAIRN(40), ONGC(50) & TPL(10)		121.06
3.		GAURI (CB-OS/2)	CAIRN(40), ONGC(50) & TPL(10)		50.70
4.		CB-X	CAIRN(40), ONGC(50) & TPL(10)		33.30
5.	CAMBAY	NS-A (CB-ONN-2000/2)	NIKO(100)		20.22
6.		BHEEMA (CB-ONN-2000/2)	NIKO(100)		4.03
7.		PALEJ-PROMODA (CB-ON/7)	HOEC(35), GSPC(35) & ONGC(30)		7.64
8.		INGOLI & SE-1 (CB-ONN-2000/1)	GSPC (50), GAIL (50)		14.03 + 1.69
9.		ESU (CB-ON/3)	EOL (70) & ONGC (30)		0.54
10.		TARAPUR-1 & G (CB-ON/2)	GSPC(56), GGR(14) & ONGC (30)		2.14 + 0.54
11.	RAJASTHAN	DA1, DA2 & DA3 (RJ-ON-90/1)	CIL (35), CEHL (35) & ONGC (30)		3111.17
12.		RJ-ON/6 (SGL)	FOCUS(7), ISIL(45.5), NOCL (17.5) & ONGC(30)		176.00
13.	KG OFFSHORE	D-1, D-3 & MA (KG-DWN-98/3)	RIL (60), BPEAL (30) & NIKO(10)		389.12
14.		DDW (KG-OSN-2001/3)	GSPC(80), JOGPL(10) & GGR(10)		37.5
14.	CAMBAY	ANK#21 (CB-ONN-2003/2)	GSPC(50), GAIL(20), JSPL(20) & GGR(10)		1.60
15.		Miroli-1 & 6 (CB-ONN-2002/3)	GSPC(55), JOGPL(20), HPCL(15) & GGR(10)		3.29

GEOSCIENTIFIC STUDIES BY DGH

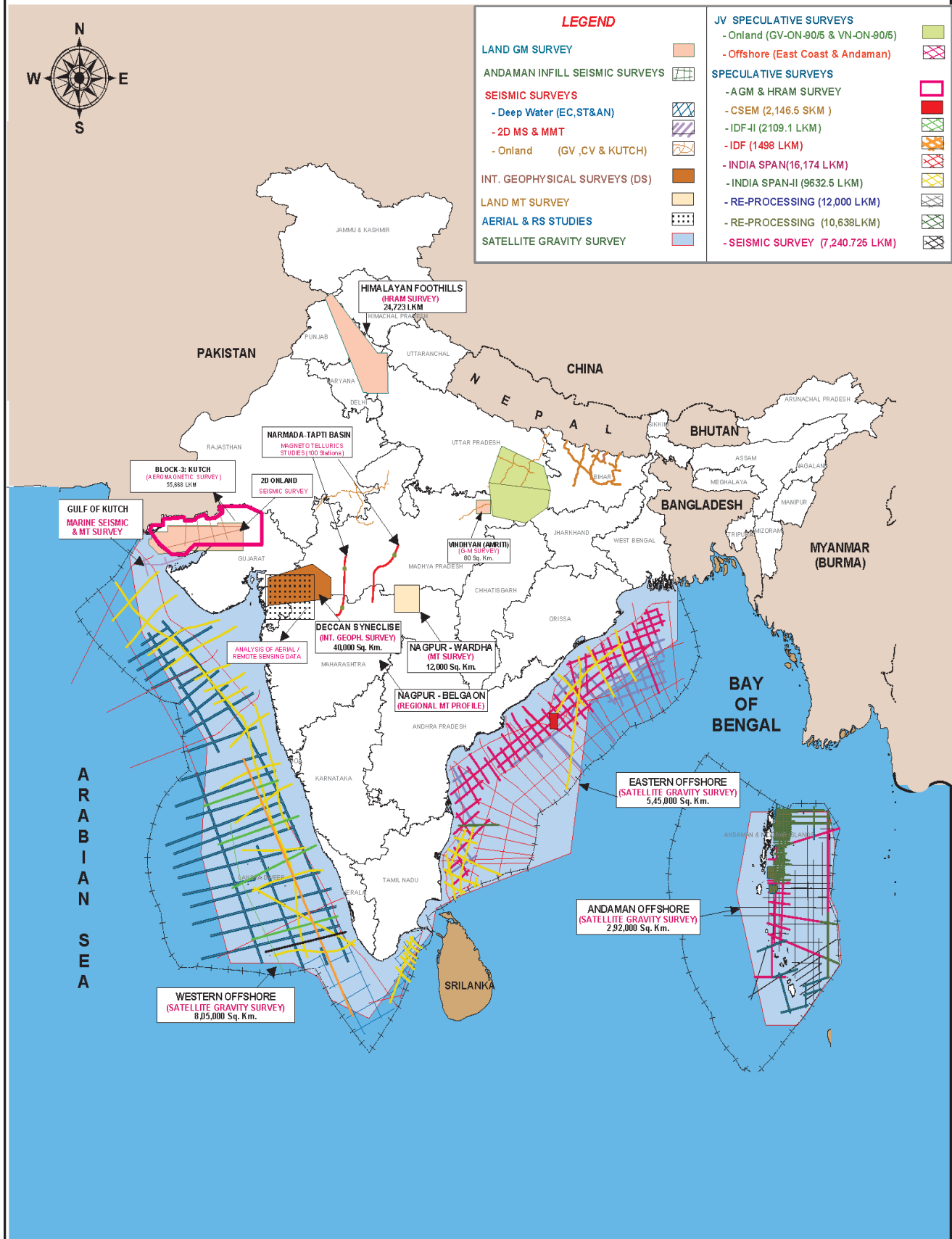
- The DGH has carried out, either alone or in collaboration with reputed companies, several projects to upgrade information in hitherto unexplored/poorly-explored areas. This totals to 2 million sq kms and covers both offshore (82%) and onland (18%).
- Of this total, satellite gravity surveys over the eastern and western offshore areas and Andaman account for 1.642 million sq. Kms. Joint venture offshore speculative geophysical surveys within the same area in eastern offshore and Andaman cover about 0.246 million sq. Kms. These surveys have given valuable indications to structure, tectonics, and sedimentary thickness and play recognition in the deep waters and have provided inputs for modeling studies and for the preparation of hydrocarbon prospect map of the area.
- A 2D seismic coverage of 0.053 million sq. km. was achieved in 1997-98 in the onland areas of U.P., Bihar and M.P. 2D seismic survey was repeated in Bihar in 2002-03 over 0.05 million sq. km. These surveys were carried out to assess the hydrocarbon potential of Vindhyan and Ganga basins. A new lower Vindhyan paleo-embayment comprising of a number of highs and lows basement features has been mapped for the first time. These studies have led to the demarcation of certain prospective areas and with new data, 3 blocks were offered and awarded in Ganga basin under second, fourth and fifth rounds of NELP. In 2003-04, 805.0 GLK 2D seismic data have been acquired from Chambal Valley area to assess the prospectively of the western part of the Vindhyan basin. Three Blocks have been awarded in NELP-V and VI in Vindhyan basin.
- During 1999-2003, 25,000 LKM of 2D seismic surveys were carried out in the deep waters of Andaman, east and west coasts including the southern tip.
- 16174 LKM 2D seismic data have been acquired, processed and interpreted through GX-Technology, USA in eastern & western offshore during 2005-07 under speculative survey programme. Based on this data a good number of blocks were offered and awarded in NELP-VI.
- 690.6 GLK of 2D seismic data has been acquired through NGRI in unexplored Kutch onland basin.
- Integrated geophysical surveys, carried out jointly by DGH and NGRI in the northwestern part of the Deccan Syncline, revealed sub-trappean Mesozoic-Gondwana sediments with a maximum thickness of 3 Kms.
- Aeromagnetic surveys amounting to 24,723 LKM were carried out in Himalayan Foreland area during the year 2003-04, 2004-05 and 2005-06.
- DGH has completed reprocessing of 12000 LKM of 2D seismic data of west coast of India through M/s GGS-Spectrum during the 2007-08.
- DGH has completed Acquisition & processing of Speculative Controlled Source Electromagnetic (CSEM) survey in KG-DWN-2005/3 by EMGS, Norway in 2008 covering an area of 2146.5 sq.km.
- DGH has acquired 55,668.3 LKM of High Resolution Aeromagnetic (HRAM) and 13994.64 LKM Airborne Gravity Magnetic (AGM) data over Kutch, Gujarat through McPhar.

- Speculative 2D seismic API project acquiring 7240.725 LKM data in offshore Andaman was completed through M/s. PGS.
- Speculative 2D seismic API project (India, Span-II) acquiring 9632.5 LKM data in East & West coast of India was completed through Ms GX Technology.
- Speculative reprocessing of 2D seismic data of 10638 LKM of Andaman islands was carried out through Ms Spectrum Geo Ltd., UK.
- Under Speculative 2D seismic API project 1498.35 LKM data has been acquired, processed and interpreted through M/s. Fugro Data Services, Switzerland.
- Speculative 2D seismic API project acquiring 2109.113 LKM data was completed through M/s. Fugro Multiclient services Pty Ltd, Australia.
- DGH has acquired 103 stations {Sihore-Akola (63 stns) & Indore-Jalgaon (40 stns)} of Land MT in Central India through NGRI, Hyderabad.
- DGH has completed analysis of Aerial images / Remote sensing data for 302,500 sq.km area in Narmada - Cambay basin by NGRI.
- The Processing and Interpretation of 690.6 GLK onland 2D seismic data has been completed through GEOPIC, ONGC.
- Archival from lower density media to higher density media of Raw and Processed 2D / 3D seismic data has been completed for 11246 (Raw data 10372 + Processed data 874) Cartridges with ~ 100 TB data.
- Geochemical surveys in Spiti-Zaskar and Karewa basins completed in 2012-13. 805 soil sample from Spiti-Zaskar and 209 soil sample from Ladakh were collected and analysed for light hydrocarbon gases.
- Petroleum system modeling studies : DGH has taken up the petroleum system modeling of two basins namely (i) Bengal onland basin and (ii) Kerala-Konkan offshore basin. The study is being carried out by Beicp-Franlab, France. Contract was signed between DGH & Beicp-Franlab in January 2008, currently the modeling study of Kerala-Konkan basin is completed.
- Tender for 2nd Phase of study for techno-economic feasibility, environment impact and legislation etc. was closed.
- About 2540 SKM of area has been selected for identification of favorable locations for Gas hydrate exploration in KG basin, currently studies are being carried out.

GEOSCIENTIFIC STUDIES BY DGH

Sl. No.	Area/Block	Survey Type	Area	Achievement (API)	Year	Agreement/ MOU signed with
I. RECONNAISSANCE SURVEY						
1	Western & Eastern Offshore	Satellite Gravity	Offshore	1.642 Million Sq. Km.	1995-98	Petroscan
2	Kutch Offshore & Onland	Aero-Magnetic	Onland	23,730 LKM	1995-96	NRSA
3	Nagpur-Wardha-Belgaum	MT	Onland	352 Stations	1996-98	NGRI
4	Himalayan Foreland	Aero-Magnetic	Onland	11,958 LKM	2003-05	NRSA
5	Punjab and Foot Hills of Himalayas	Aero-Magnetic	Onland	12,765 LKM	2005-06	NRSA
II. JOINT VENTURE SPECULATIVE SURVEYS OFFSHORE						
6	OFFSHORE East Coast	2D seismic & GM	Offshore	7428.685 LKM & RI of 4625 LKM of old data	1996-97	Western Geophysical
7	Andaman-Nicobar	2D seismic & GM	Offshore	3606.375 LKM & RI of 695 LKM of old data	1996-97	Western Geophysical
8	ONLAND Ganga Valley (GV-ON-90/5)	2D seismic	Onland	634 GLK	1997-98	Alpha Geo
9	Vindhyan (VN-ON-90/5)	2D seismic	Onland	566 GLK	1997-98	Alpha Geo
III. SPECULATIVE SURVEYS						
10	Western & Eastern Offshore	2D seismic	Offshore	16,174 LKM	2005-07	GXT
11	Western Offshore	2D seismic (Re-processing)	Offshore	Reprocessing (12,000 LKM)	2007-08	GGs Spectrum
12	Andaman Offshore	2D seismic	Offshore	7240.725 LKM	2007-09	PGS
13	Eastern Offshore	CSEM	Offshore	2146.5 sq. km.	2007-08	EMGS
14	Western Offshore	2D seismic	Offshore	1498.35 LKM	2009-10	Fugro Data Services, Switzerland
15	Western Offshore	2D seismic	Offshore	2109.113 LKM	2009-10	Fugro Multiclient Services Pty Ltd Australia
16	West and east coast	2D seismic	Offshore	9632.5 LKM	2008-10	GXT
17	Andaman Islands of India	2D seismic (Re-processing)	Offshore	Reprocessing (10,638 LKM)	2009-10	Spectrum Geo Ltd
18	Kutch	Airborne HRAM	Onland	55,668.3 LKM	2007-09	Mcphar
		Airborne GM	Onland	13,994.64 LKM	2009-10	Mcphar
IV. SEISMIC SURVEYS						
19	OFFSHORE Andaman Infill	2D Seismic	Offshore	1484.75 LKM	1999	Western Geco
20	Southern Tip (ST)	2D Seismic	Offshore	2835.925 LKM	2001-02	Large
21	East Coast (EC)	2D Seismic	Offshore	4319.45 LKM	2001-02	Large
22	Andaman-Nicobar (AN)	2D Seismic	Offshore	4307.275 LKM	2001-02	Large
23	West Coast (WC)	2D Seismic	Offshore	12,000.65 LKM	2002-03	Large
24	ONLAND Ganga Valley (GV)	2D Seismic	Onland	1135.05 LKM	2002-03	Alpha Geo
25	Chambal Valley (CV)	2D Seismic	Onland	805.00 GLK	2003-04	Alpha Geo
26	Kutch	2D Seismic (Acq.)	Onland	690.6 GLK	2006-09	NGRI
27	Kutch	2D Seismic (P&I)	Onland	690.6 GLK	2010-12	GEOPIC, ONGC
V. INTEGRATED GEOPHYSICAL SURVEYS						
28	Deccan Syncline (DS) Narmada-Tapti Area	Gravity, MT, DRS, 2D seismic	Onland	6000 Stations, 600 & 50 stations, 700 LKM	2003-04	NGRI
VI. GRAVITY -MAGNETIC SURVEYS & OTHER GEOPHYSICAL SURVEYS						
29	Vindhyan (Amriti)	GM	Onland	303 Stations (80 sq.km)	2003-04	NGRI
30	Gulf of Kutch	MS & MMT	Offshore	133.984 LKM & 13Stn.	2006-08	NGRI
31	Central India	Land MT	Onland	103 Stations	2006-09	NGRI
32	Narmada-Cambay/ Deccan Syncline	Analysis of Aerial Images/ Remote sensing data	Onland	302,500 sq. km	2006-08	NGRI

GEOPHYSICAL SURVEYS CARRIED OUT BY DGH



ACTIVITIES DURING THE YEAR 2012-13

- E&P Highlights
- NELP-IX Blocks Awarded
- Oil & Gas Production
- Hydrocarbon Discoveries



EXPLORATION & PRODUCTION HIGHLIGHTS 2012-13

S. No.	Subject	Parameter	ONGC (Nomination)	OIL (Nomination)	Pvt/JVs	Total
1	Initial In-place reserves (as on 01.04.2013)	Gas (BCM)	2254.94	342.23	1291.70	3888.87
		Oil (MMT)	5118.71	796.49	829.92	6745.12
		O+OEG (MMT)	7373.65	1138.72	2121.62	10633.99
2	Ultimate Reserves (as on 01.04.2013)	Gas (BCM)	1240.46	187.90	680.06	2108.42
		Oil (MMT)	1451.18	240.69	197.21	1889.08
		O+OEG (MMT)	2691.64	428.59	877.27	3997.50
3	Accretion of In-place reserves	Gas (BCM)	60.69	9.44	36.39	106.52
		Oil (MMT)	116.63	6.72	12.32	135.67
		O+OEG (MMT)	177.32	16.16	48.71	242.19
4	Accretion of Ultimate Reserves	Gas (BCM)	39.75	7.18	3.24	50.17
		Oil (MMT)	20.75	3.44	1.72	25.91
		O+OEG (MMT)	60.50	10.62	4.96	76.08
5	2D seismic data acquired	Onland (GLKM)	140.97	223.77	739	1103.74
		Offshore (GLKM)	0	0.0	3313	3313
		TOTAL	140.97	223.77	4052	4416.74
6	3D seismic data acquired	Onland (SKM)	844.25	304.52	3926	5074.77
		Offshore (SKM)	0	0.00	13984	13984
		TOTAL	844.25	304.52	17910	19058.77
7	Exploratory wells drilled	Onland	53	18	46	117
		Offshore	21	0	22	43
		TOTAL	74	18	68	160
8	Development wells drilled	Onland	251	19	28	298
		Offshore	72	0	11	83
		TOTAL	323	19	39	381
9	Exploratory meterage drilled	Onland ('000 M)	162.966	65.14	101.64	329.74
		Offshore ('000 M)	62.946	0	84.43	147.38
		TOTAL	225.912	65.14	186.07	477.12
10	Development meterage drilled	Onland ('000 M)	480.192	62.48	44.02	586.69
		Offshore ('000 M)	200.530	0	39.61	240.14
		TOTAL	680.722	62.48	83.63	826.83
11	Oil & Gas production (2012-13)	Gas (BCM)	23.550	2.64	14.38	40.57
		Oil (MMT)	22.562	3.66	11.64	37.86
		O+OEG (MMT)	46.112	6.30	26.02	78.43
		CBM (BCM)	-	-	-	0.107

* Note : Conversion factor 1 MMT = 1 BCM

- ♦ Issuance of Essentiality Certificates for import of goods used in petroleum operations.
- ✓ Clearances issued during April 2012 to March 2013. 12,954 cases valued at Rs. 3912.63 Crores.

EXPLORATION BLOCKS AWARDED UNDER NINTH ROUND OF NELP (NELP-IX)

(As on 01.04.2013)

SL NO.	BASIN	BLOCK NAME	REF. NO ON MAP	CONSORTIUM (PARTICIPATING INTEREST)	DATE OF SIGNING CONTRACT	AWARDED AREA (SQ. KM.)
DEEP WATER						
1.	MUMBAI	MB-DWN-2010/1	D-2	BGEPI (50) & BHP (50)	10-09-2012	7,963
						TOTAL AREA : 7,963
SHALLOW WATER						
2.	GUJARAT-KUTCH	GK-OSN-2010/1	S-1	ONGC (60), OIL (30) & GAIL (10)	28-03-2012	1,361
3.		GK-OSN-2010/2	S-2	ONGC (90) & GAIL (10)	28-03-2012	1,625
4.	MUMBAI	MB-OSN-2010/2	S-4	OIL (50), HPCL (30) & BPRL (20)	30-08-2012	3,411
						TOTAL AREA : 6,397
ONLAND						
5.	ASSAM-ARAKAN	AA-ONN-2010/1	1	PPCL(20) & ABGEL (80)	30-08-2012	401
6.		AA-ONN-2010/2	2	OIL(40), ONGC(30), GAIL(20) & East West Petroleum (10)	28-03-2012	396
7.		AA-ONN-2010/3	3	OIL(40), ONGC(40) & BPRL(20)	28-03-2012	171
8.	VINDHYAN	VN-ONN-2010/1	4	Deep Energy LLC(10) & KGN Industries(90)	28-03-2012	3776
9.		VN-ONN-2010/2	5	Deep Energy LLC (10), Deep Natural Resources Limited (15) & Safak WSB Energy Pvt. Ltd. (75)	28-03-2012	4909
10.	RAJASTHAN	RJ-ONN-2010/2	8	Focus Energy Ltd. (10) & Birkbeck Investments Ltd. (90)	28-03-2012	535
11.	CAMBAY	CB-ONN-2010/1	9	ONGC (100)	28-03-2012	782
12.		CB-ONN-2010/3	11	Deep Energy LLC (10) & KGN Oil & Gas Pvt. Ltd. (90)	28-03-2012	534
13.		CB-ONN-2010/4	12	Pratibha Oil & Natural Gas Pvt. Ltd.(100)	28-03-2012	61
14.		CB-ONN-2010/5	13	Pan India Consultants (20) & Frost International Ltd. (80)	28-03-2012	49
15.		CB-ONN-2010/6	14	ONGC (80) & IOC (20)	28-03-2012	39
16.		CB-ONN-2010/8	16A&B	BPRL(25), GAIL(25), EIL(20), BFIL(20) & MIEL(10)	30-08-2012	42
17.		CB-ONN-2010/9	17	ONGC (100)	30-08-2012	120
18.		CB-ONN-2010/10	18	Sankalp Oil & Natural Resources Ltd. (100)	27-06-2012	122
19.		CB-ONN-2010/11	19	BPRL (25), GAIL (25), EIL (20) & BFIL (15) & MIEL (15)	28-03-2012	131
						TOTAL AREA : 12,068
						GRAND TOTAL : 26,428 SQ.KM.

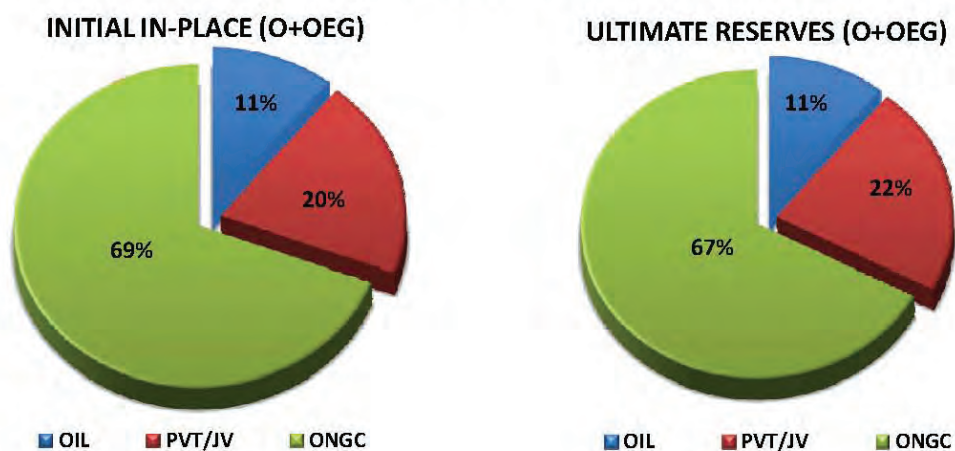
ONGC - Oil & Natural Gas Corpn. Ltd.
 IOC - Indian Oil Corpn. Ltd.
 OIL - Oil India Ltd.
 GSPC - Gujarat State Petroleum Corporation Ltd.
 FEL - Focus Energy Ltd.
 BPRL - Bharat Petroleum Resources Ltd.
 Deep Energy - Deep Energy LLC., USA
 Pan - Pan India Consultants
 Sanklap - Sankalp Oil & Natural Resources Ltd.
 BIL - Birkbeck Investment Ltd., Mauritius
 GAIL - Gas Authority of India Ltd.

East West - East West Petroleum
 DNRL - Deep Natural Resources Limited
 SWSBEPL - Safak WSB Energy Pvt. Ltd.
 KGN - KGN Oil & Gas Pvt. Ltd.
 FIL - Frost International Ltd.
 EIL - Engineers India Ltd.
 BFIL - BF Infrastructure Ltd.
 MIEL - Monnet & Esspat Energy Ltd.
 BGEPI - British Gas Exploration & Production India Ltd.
 PPCL - Prize Petroleum Co. Ltd.
 ABGEL - ABG Energy Limited

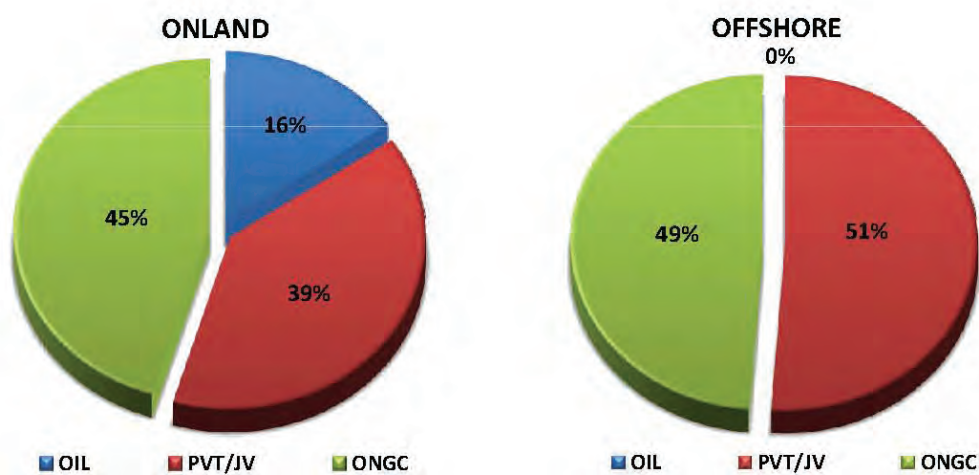
COMPANY / BASIN WISE OIL & GAS PRODUCTION (01.04.2012 TO 31.03.2013)

Sl. No.	COMPANY / OPERATOR	BASIN	PRODUCTION		
			OIL (MMT)*	GAS (MMSCM)	O+OEG (MMT)
NATIONAL OIL COMPANIES (NOC)					
1	ONGC	Rajasthan	—	14.430	0.014
2		Cambay	5.187	1845.883	7.033
3		Cauvery Onland	0.339	1304.182	1.643
4		KG (Onland & Offshore)	0.238	1206.037	1.444
5		Assam-Arakan	1.224	1131.876	2.356
6		Mumbai Offshore	15.573	18046.411	33.619
		TOTAL ONGC	22.561	23548.819	46.110
7	OIL	Rajasthan	—	2443.87	2.444
8		Assam-Arakan	3.661	195.34	3.856
		TOTAL OIL	3.661	2639.21	6.30
		TOTAL NOCs	26.222	26188.029	52.410
PVT / JV COMPANIES					
9	CAIRN	KG Offshore	1.072	514.575	1.586
10		Gulf of Cambay	0.211	142.242	0.353
11		Rajasthan	8.592	403.546	8.996
12	RIL	KG Offshore	0.394	9516.526	9.911
13	BG-RIL-ONGC	Mumbai Offshore	1.122	3408.278	4.530
14	GEO-ENPRO	Assam-Arakan	0.98	21.840	0.120
15	GOI - ACL	Assam-Arakan	0	0	0.000
16	HOEC	Cambay	0.009	10.758	0.02
17		Cauvery Offshore	0.005	118.306	0.123
18	JTI	Cambay	0.04	12.143	0.052
19	NIKO	Cambay	0	12.841	0.013
20	SELAN	Cambay	0.023	9.428	0.032
21	HERAMAC	Cambay	0.003	2.160	0.005
22	HRDCL - PPCL	Cambay	0.0002	0.085	0.000
23	GSPCL	Cambay	0.067	138.792	0.206
24	HARDY	Cauvery Offshore	0	0.000	0.000
25	OILEX	Cambay	0.001	0.01	0.001
26	ESSAR	Cambay	0.001	0.000	0.001
27	FOCUS	Rajasthan	0.001	72.112	0.073
		TOTAL PVT./JV	11.639	14383.642	26.023
		TOTAL	37.861	40571.671	78.433
COAL BED METHANE (CBM)					
1	GEECL	Raniganj South	0.0	88.021	0.088
2	ESSAR	Raniganj East	0.0	12.827	0.013
3	ONGC	Jharia	0.0	2.949	0.003
4	RIL	Sohagpur East	0.0	2.240	0.002
5		Sohagpur West	0.0	1.20	0.001
		TOTAL	0.0	107.237	0.107
		INDIA GRAND TOTAL	37.86	40678.908	78.540
* NOTE : FIGURES INCLUSIVE OF CONDENSATE (MMT)					

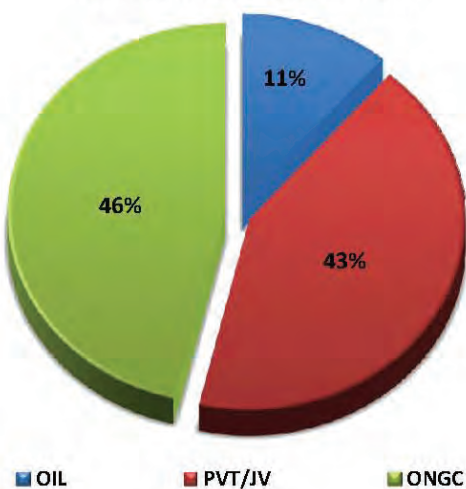
INITIAL IN-PLACE AND ULTIMATE RESERVES OF HYDROCARBONS (AS ON 01-04-2013)



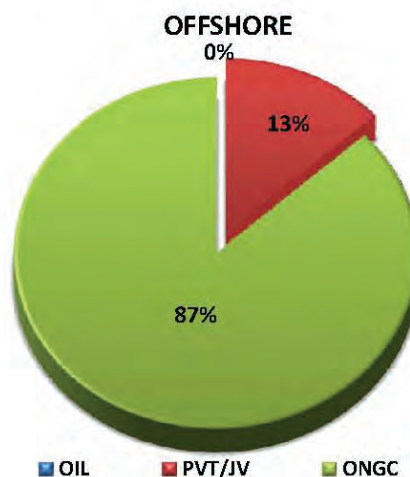
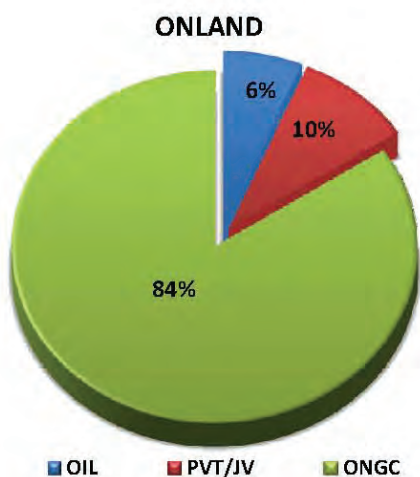
EXPLORATORY WELLS DRILLED (2012-13)



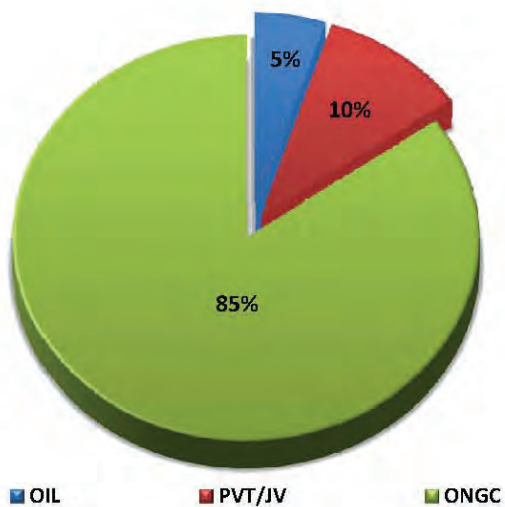
TOTAL EXPLORATORY WELLS



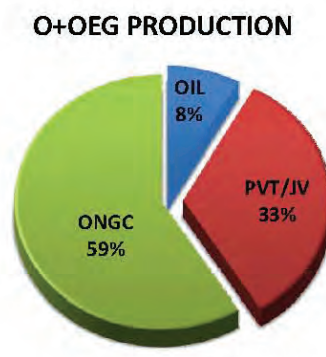
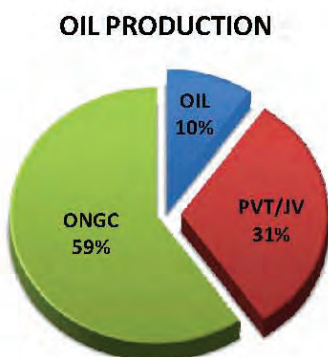
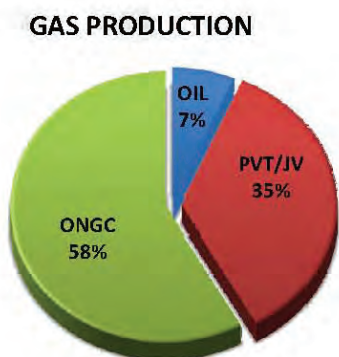
DEVELOPMENT WELLS DRILLED (2012-13)



TOTAL DEVELOPMENT WELLS



OIL & GAS PRODUCTION (2012-13)



HYDROCARBON DISCOVERIES

A total of 28 hydrocarbon discoveries have been made by ONGC (21) & OIL (7) in Nomination, NELP and Pre-NELP blocks and fields during 2012-13.

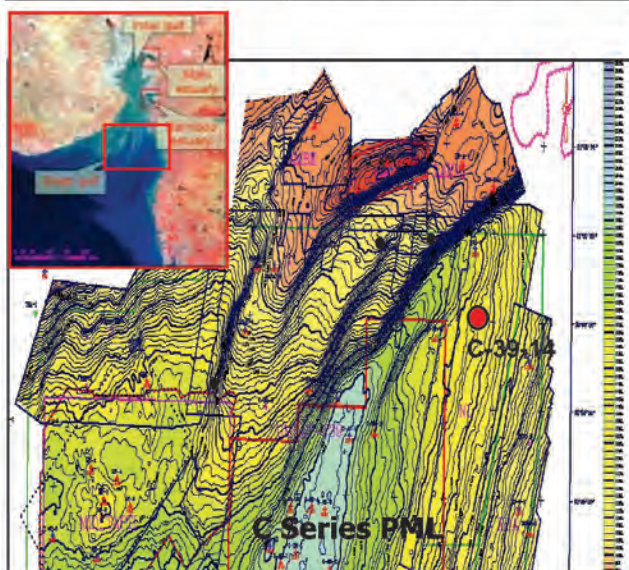
Sl. No.	Basin/State	Prospect Name	Discovery Well	Name of PEL / ML / NELP	Type of Discovery
NOMINATION REGIME					
ONGC					
1	Western Off.	C-39-14	C-39-V (New Pool)	BOFF-1/2/3 PEL	Oil & Gas
2		BH-G	BH-68 (New Pool)	BOFF-1/2/3 PEL	Oil & Gas
3		D1-D#1	D1-D#1 (New Pool)	D-1 ML	Oil & Gas
4	KG Onland	Koravaka-1	KRV-AA	Adavipalem-Ponnamanda ML	Oil & Gas
5		Mukkamala-1	MUK-AA	1B PEL	Gas
6		Mandapeta West-12	MWAO (New Pool)	1B PEL	Gas
7		Vanadurru South-1	VNS-AA	West Godavari ML	Oil & Gas
8		Bantumilli South-1	BTS-AA	1B PEL	Gas
9	A&AA / Assam	Phulani-1	ELAB	Merapani PEL	Oil
10		Agartala Dome-37	ADAO(AD#37) (New Pool)	Agartala Dome Ext.II ML	Gas
11	Cambay	Anklav-9	AVDB (New Pool)	Anklav Ext.-I ML	Oil
12		Motera-36	MODU(MO-36) (New pool)	Motera Ext.-II ML	Oil
13		Mansa-36	MSBQ (MS-36) (New Pool)	Charda-Mansa Ext.-I PEL	Oil
OIL					
14	A&AA / Assam	Balimara Structure	Balimara-2 (Loc.BF)	Borhat PEL	Oil
15		East Zaloni Structure	NHK-600	Hugrijan ML	Gas
16		Dimowkinar Structure	Moran-116 (Loc. MFC)	Moran ML	Oil
17		E. Khagorijan	East Khagorijan-1 (TAI)	Tinsukia ML	Oil
18		West Barekuri	Barekuri-12 (Loc.DGJ)	Dumduma ML	Oil
19		South Chandmari	South Chandmari-4	Dumduma ML	Oil & Gas
PSC REGIME					
Sl. No.	Operator	Block / Field	Name of Discovery	Discovery Well	Type of Discovery
20	OIL	RJ-ONN-2004/2	Punam Structure	Punam-1	Oil
21	ONGC	CB-OSN-2003/1	Aliabet-4	ABAG	Gas + Cond.
22		CB-ONN-2004/2	Vadtal-5	VDAC	Oil & Gas
23		CY-ONN-2002/2	Madanam-3	CYON022NMAB	Oil & Gas
24		CY-ONN-2004/2	Pandanallur-8	NPAC	Oil & Gas
25		KG-DWN-98/2	KG-DWN-98/2-A-2	KG-DWN-98/2-A (AB)	Oil
26		KG-DWN-2005/1	KGD051NAA-1	KG-DWN-2005/1-A	Gas
27		KG-OSN-2004/1	Saveri-1	KGOSN041NASA-1	Gas
28		MB-OSN-2005/1	MBS051NBA-1	MBS051NBA-A	Gas

NEW DISCOVERIES / NEW POOLS

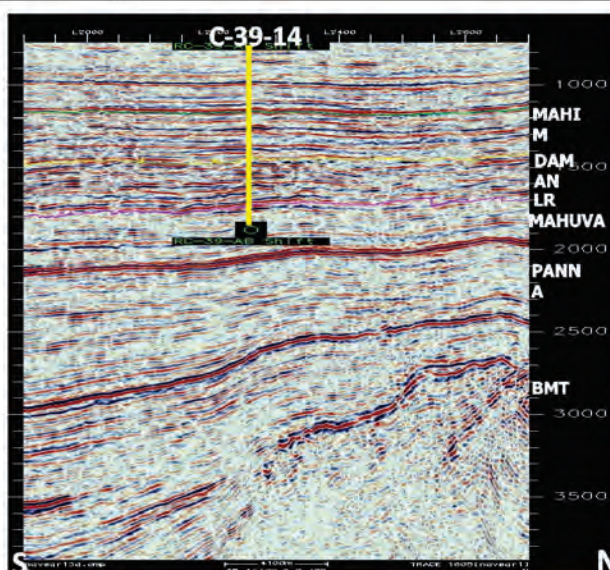
C-39-14/C-39-V (BOFF-1/2/3 – PEL) (NEW POOL)

OPERATOR : ONGC

Structure / Well No. & Location	Testing Result	Leads / Expl. Efficacy
C-39 / C-39-V / C-39-14	Obj-I: 1917-15, 1914-13 & 1912-10m, produced gas @ 94900 m ³ /d and light oil @ 294 bbls/d (API gr: 52°) through ½" bean.	Discovery of oil and gas towards east of C-39 Field beyond C Series PML has opened up a large area for further exploration.



Depth Relief Map at Daman Top

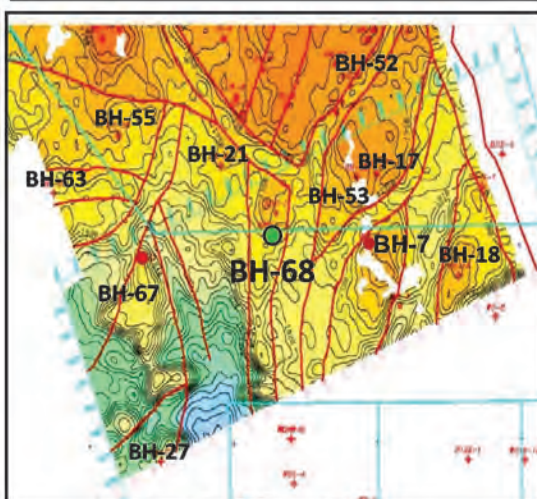


Trace 1605 showing the drilled well C-39-14

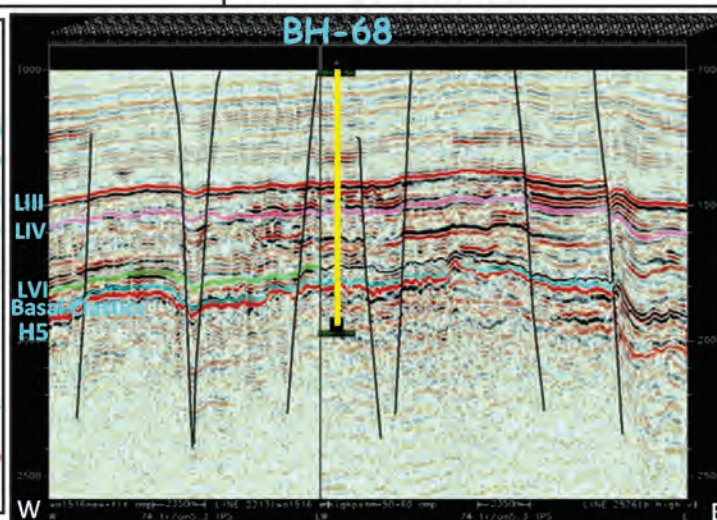
BH-68 / BH-G (BOFF-1/2/3 PEL) (NEW POOL)

OPERATOR : ONGC

Structure / Well No. & Location	Testing Result	Leads / Expl. Efficacy
BH-68 / BH-G	Obj-II: 2002-2000 m produced oil @ 120 bpd and gas @ 1,61,584 m ³ /d through 12 mm bean.	This new pool discovery in BOFF PEL to the south of Mumbai High will provide great impetus to hydrocarbon exploration in Basement/Basal Clastics in the area and will help in PEL to ML conversion.



Time Map – Basal Clastics



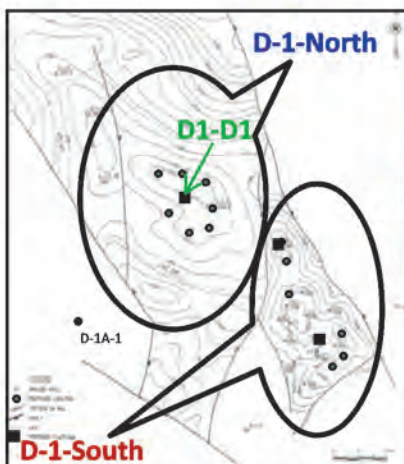
Inline 2576 showing the drilled well BH-68 / BH-G

NEW DISCOVERIES / NEW POOLS

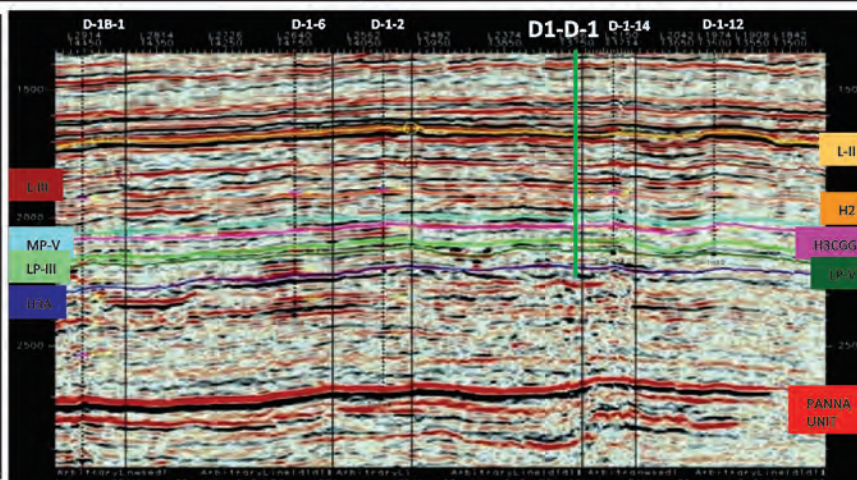
D1/D-1 (D-1 PML) (NEW POOL)

OPERATOR : ONGC

Structure / Well No. & Location	Testing Result	Leads / Expl. Efficacy
D1-D-1/ D1-D-1	Obj-I: 2759-53, 2751-45, 2740-34, 2732-26, 2723-17, 2713-07 & 2704-2698 m produced oil @ 908 bpd & gas @ 3549 m ³ /d through 40/64" bean.	This new pool discovery in LP-V, LP-VI and LP-VII within Panvel Formation in D1-North Field will lead to substantial accretion; as ~113 m of additional hydrocarbon bearing column has been encountered in the well. The fast track development planned for this discovery is likely to contribute to increased production of oil from the Field.



Structure Map on top of Middle Pay-I Showing Location of well D1-D1

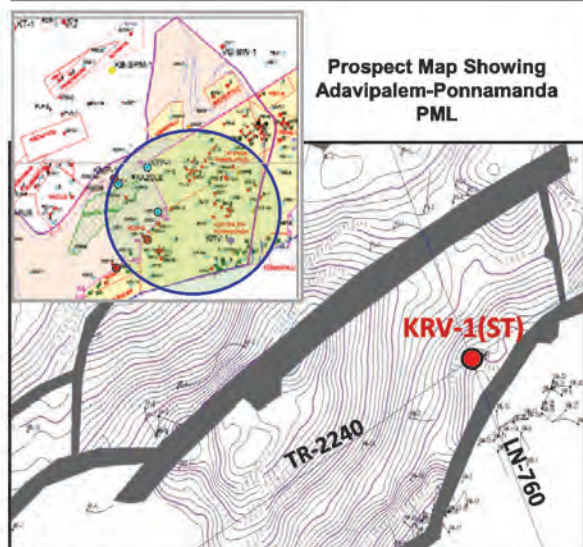


Arbitrary seismic line thru wells D-1-6, 2, 5, D-1-D#1, 14 & 12

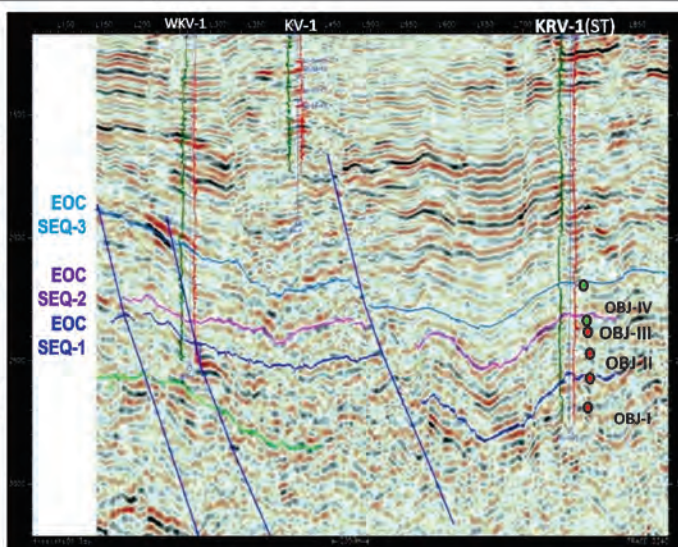
KRV-AA / Koravaka-1 (Adavipalem-Ponnamanda PML)

OPERATOR : ONGC

Structure / Well No. & Location	Testing Result	Leads / Expl. Efficacy
Koravaka/ KRV-AA/ Koravaka-1 (ST)	Obj-I: 3724.5-3720.5 m, produced oil @ 15 m ³ /d and gas @ 39408 m ³ /d through 6 mm bean.	This hydrocarbon discovery from sands within older Eocene sequences of Vadaparru Formation has established deeper prospectivity within the producing Adavipalem-Ponnamanda Field.



Time Structure Map Close To Top of EOC.SEQ-1



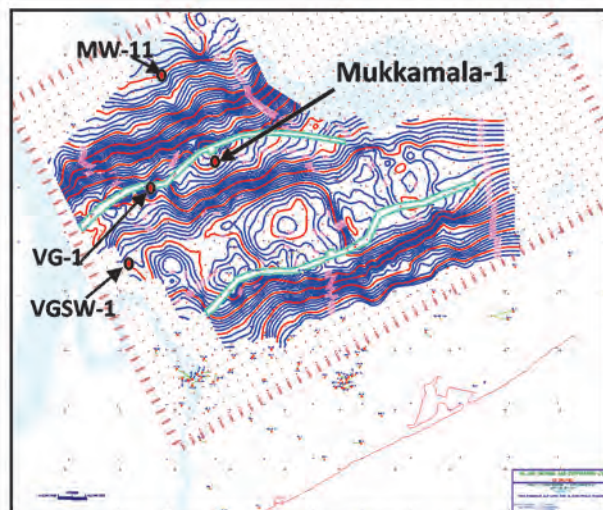
Inline TR-2240 passing through well KRV-1 (ST)

NEW DISCOVERIES / NEW POOLS

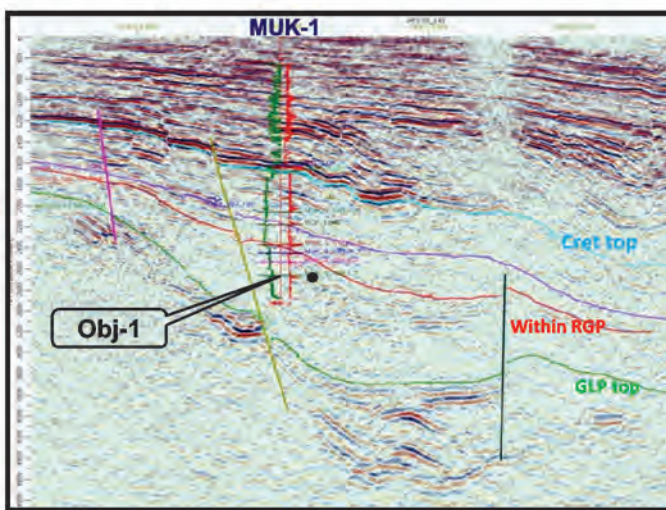
MUK-AA / Mukkamala-1 (1B PEL - KG Onland)

OPERATOR : ONGC

Structure / Well No. & Location	Testing Result	Leads / Expl. Efficacy
Mukkamala/ MUK-AA/ Mukkamala-1	<p>Obj-I: 3639.5-37.5, 3628.5-27.5, 3626-24.5 & 3612-09 m produced gas @ 38,545 m³/d through 6 mm bean.</p> <p>Object-IV: 3095.5-98.5, 3091-92.5 & 3086-87 m flowed gas @ 43,080 m³/day, oil @ 7.05 m³/day & water @ 2.007 m³/d through 6 mm bean.</p>	The concerted effort for probing deeper plays in the area has succeeded in continuous discoveries in Vygreswaram, Vygreswaram Southwest and Mukkamala proving hydrocarbon potential of the entire area for deeper plays.



Time Map within RGP Formation

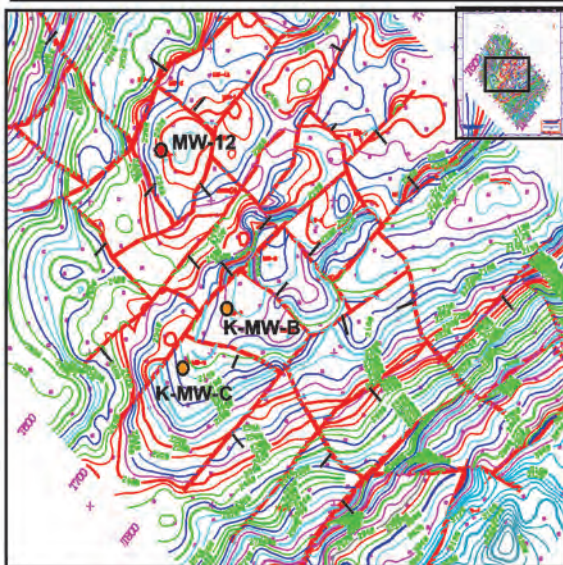


Inline 1540 through well, MUK-1

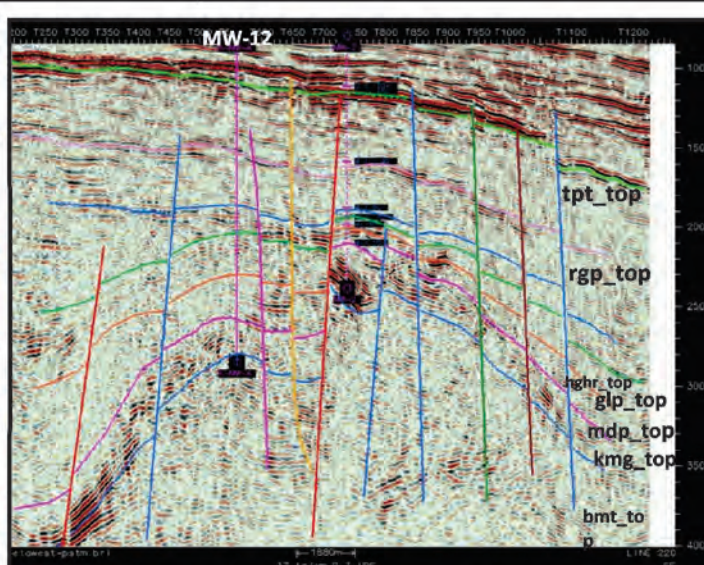
MWAO / Mandapeta West-12 (1B-PEL -KG Onland) (NEW POOL)

OPERATOR : ONGC

Structure / Well No. & Location	Testing Result	Leads / Expl. Efficacy
Mandapeta West / MWAO / MW-12	<p>Obj-III: 3725-15, 3709-03, 3695-90 & 3683-76 m (after hydro-fracturing) flowed gas @ 52,000 m³/d through 8 mm bean.</p>	This discovery has extended the Mandapeta West Field further west ward and will also enable to extend the current PML area.



Time Structure Map Close To Top Of Mandapeta Formation



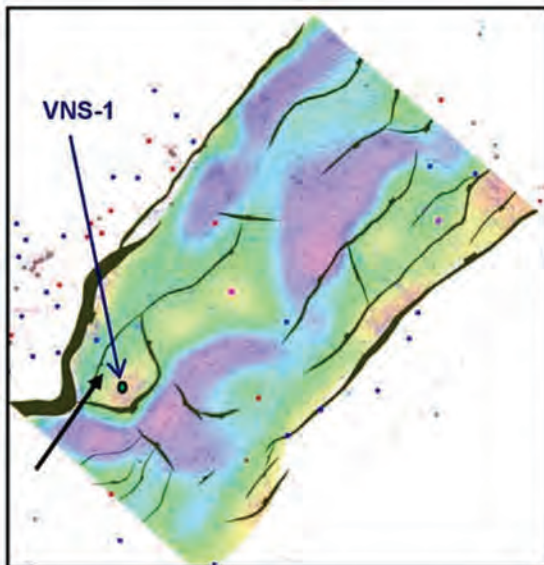
IL 220 showing the Prospect K-MW-A (Interpreted)

NEW DISCOVERIES

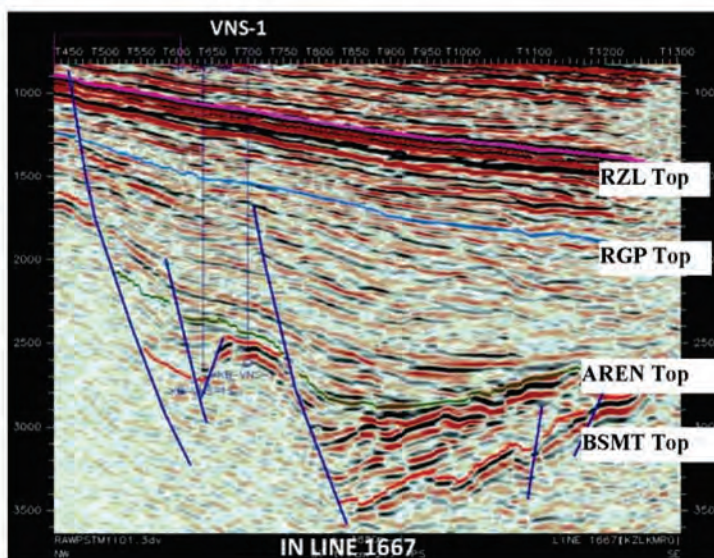
VNS-AA / Vanadurru South-1 (West Godavari – PML)

OPERATOR : ONGC

Structure / Well No. & Location	Testing Result	Leads / Expl. Efficacy
Vanadurru South/ VNS-AA/ Vanadurru South-1	Obj-I: 3634-3628 m flowed oil @ 24.72 m ³ /d and gas @ 51,772 m ³ /d through 6 mm bean.	This discovery has further strengthened the prospectivity of Syn-rift sequence and opened up the entire western rising flank of Bantumilli Graben for hydrocarbon exploration.



Time Map Near NDG Aren Unit

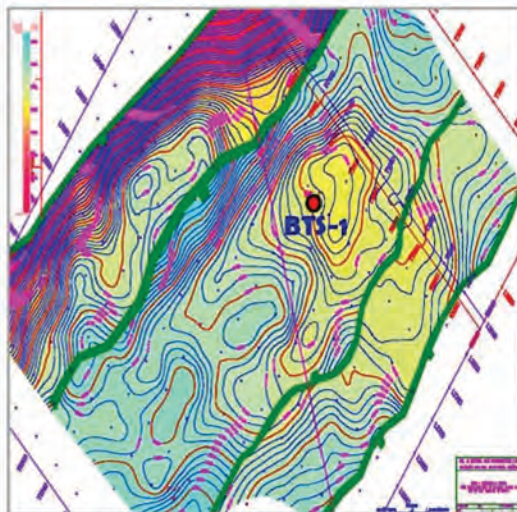


Inline 1667 showing the drilled well VNS-1

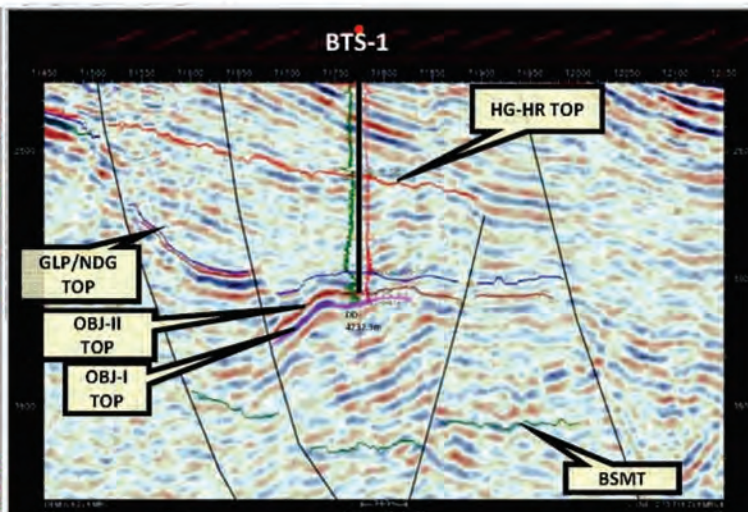
Bantumilli South-1 (1B PEL - KG Onland)

OPERATOR : ONGC

Structure / Well No. & Location	Testing Result	Leads / Expl. Efficacy
Bantumilli South/ BTA-AA/ Bantumilli South-1	Obj-I: 4232.3–4221.3 m, flowed gas @ 98010 m ³ /d through 4 mm bean. (testing of other objects in progress)	The gas strike from Nandigama Arenaceous unit in this area is significant as it is the first discovery to the south of Bantumilli High that has opened up a large area for further exploration of synrift prospectivity.



Time Structure Map Close To Top Of Obj-II



Inline 2753 Passing Through BTS-1 (Zoom-interpreted)

OPERATOR : ONGC

Interpreted depth section XL1435 passing through well, PL-1

OPERATOR : ONGC

Interpreted seismic line passing through well, AD-37

NEW DISCOVERIES / NEW POOLS

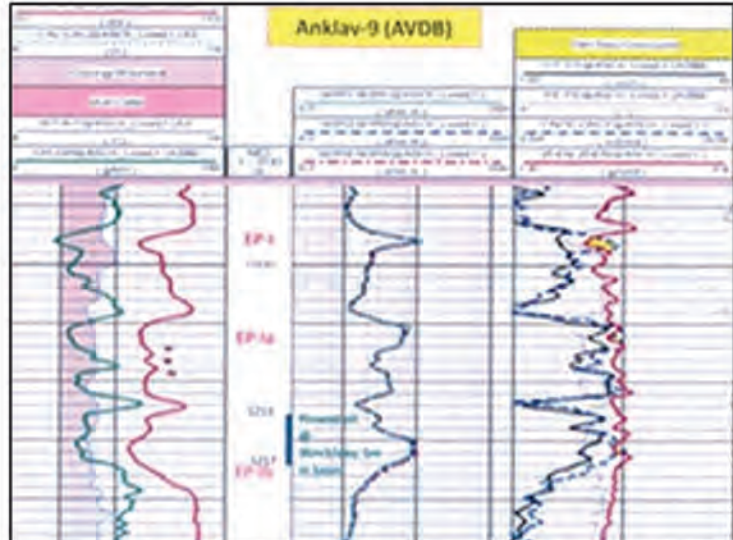
Anklav-9 / AVDB (Anklav Extn.-I – PML) (NEW POOL)

OPERATOR : ONGC

Structure / Well No. & Location	Testing Result	Leads / Expl. Efficacy
Anklav/ AVDB/ Anklav-9	Obj-I: 1217-1213 m flowed oil @ 36 m ³ /d through 5 mm bean.	This new oil pool discovery of a new sand in Anklav Field will result in reserve accretion and further development.



Structure Contour Map On Top of EP-Ib Pay Sand



Electro-log Motifs Of HC Bearing Layers In Anklav-9

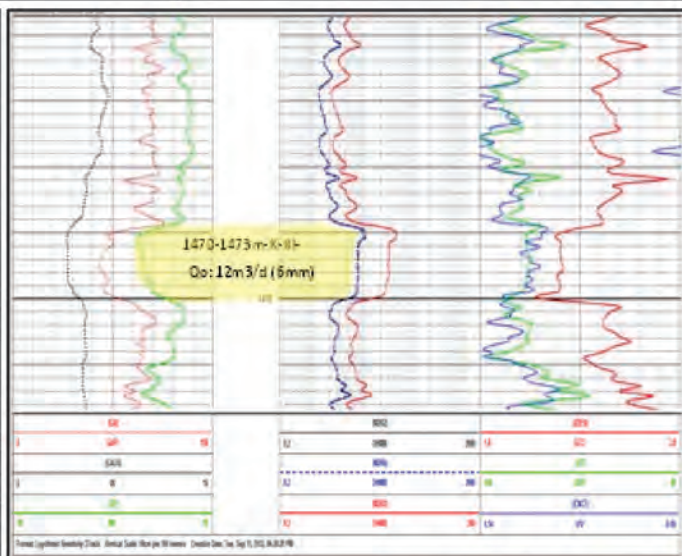
MO-36 / MODU (Motera Ext.-II – PML) (NEW POOL)

OPERATOR : ONGC

Structure / Well No. & Location	Testing Result	Leads / Expl. Efficacy
Motera/ MODU/ MO-36 ^A	Obj-I: 1473-1470 m flowed oil @ 12 m ³ /d through 6 mm bean.	This new oil pool discovery in K-III in Motera Field will result in reserve accretion and further exploration & development in the area.



Time Map On Top Of Pay K-VI+VII Showing Dev. Well Motera-36



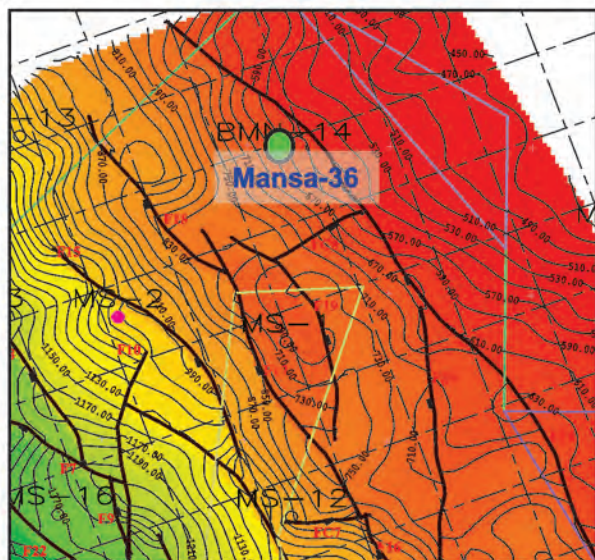
Electro-log Motifs Of HC Bearing Layer In Motera-36

NEW DISCOVERIES / NEW POOL

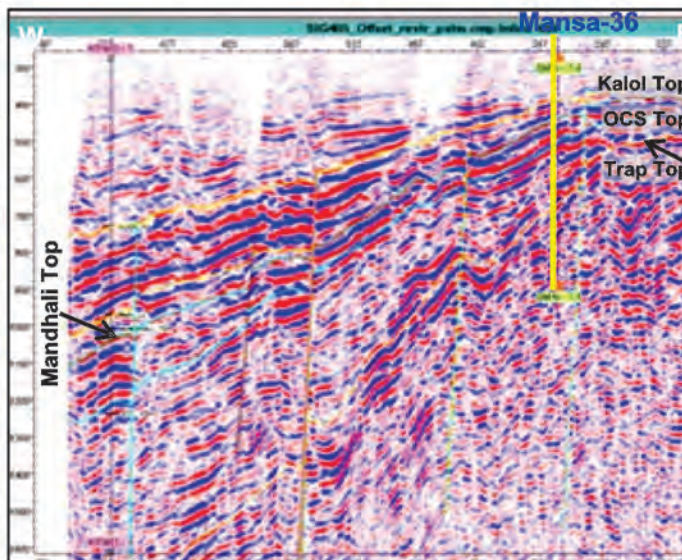
MSBQ / MS-36 (Charada-Mansa Extn.-I – PEL) (NEW POOL)

OPERATOR : ONGC

Structure / Well No. & Location	Testing Result	Leads / Expl. Efficacy
Mansa/ MSBQ/ Mansa-36	Obj-II: 695.5-91.5, 689.5-677 m flowed oil @ 53 m ³ /d through 8 mm bean.	This new oil pool discovery in Olpad Formation in this part of the block (Mansa Extn.-I PEL) will result in substantial reserve accretion and further development.



Time Map Close To Trap Top Showing Loc. Mansa-36

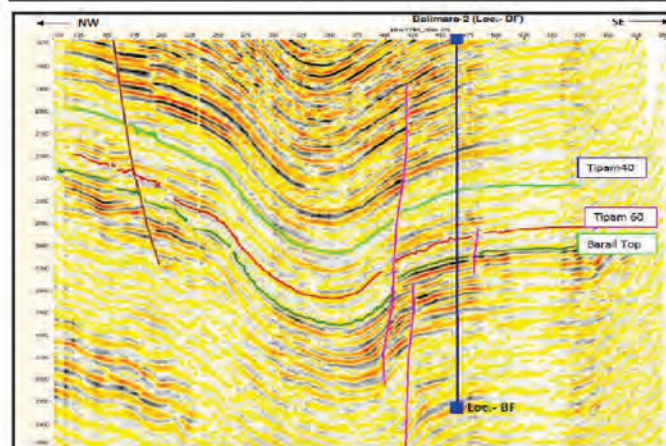


II 460 Passing Through Well Mansa-36

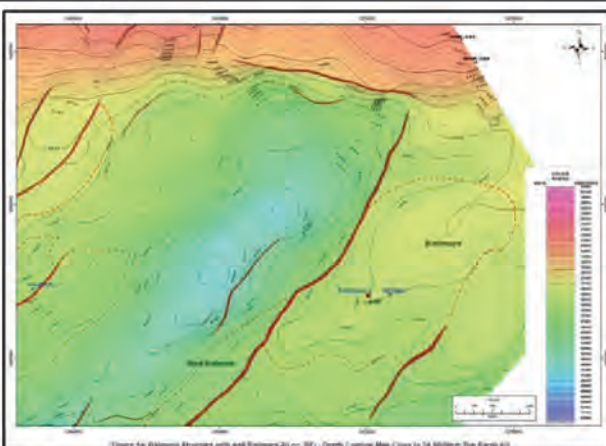
Balimara-2 (Borhat –PEL)

OPERATOR : OIL

Structure / Well No. & Location	Testing Result	Leads / Expl. Efficacy
Balimara structure / Balimara-2 (Loc. BF)	Object: 4314-m Barail sand /Upper Eocene to Lower Oligocene Perforation Ranges : 4314.0-4320.0 m, 4317.0-4320.0 m Oil: 72 klpd through 6.5 mm bean (API: 34.6°, PP: 30°C). FTHP: 134 kg/cm ²	The discovery of oil within Barail sand in this well has opened up a new prospect for future exploration and exploitation in Balimara area within Borhat PEL. Accretion to in-place volume of O+OEG in 2P category is around 3.00 MMSKL.



Seismic Section- IL-979 across Balimara Structure well Balimara-2 (Loc. BF)



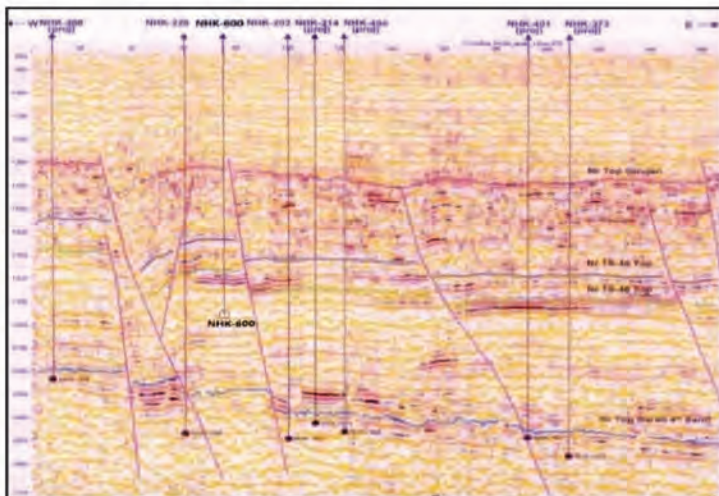
Depth Contour map Near Top of Barail 4/5 sand

NEW DISCOVERIES

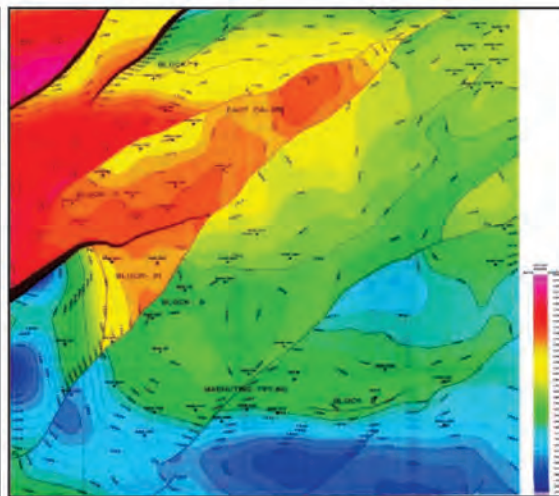
NHK-600 (Hugrijan PML)

OPERATOR : OIL

Structure / Well No. & Location	Testing Result	Leads / Expl. Efficacy
East Zaloni Structure / NHK-600 (Loc. HUI)	Object: 2253-m Upper Tipam sand / Miocene Perforation Range: 2262.0-2268.0 m, Gas: 50,000 SCMD through 4 mm bean FTHP: 165 kg/cm ²	The discovery of gas within Tipam formation in this well has opened up new play for exploration and exploitation of gas in Zaloni structure of Greater Nahorkatiya field within Hugrijan ML. Accretion to in-place volume of OEG in 2P category is around 0.23 MMSKL.



Seismic Cross-line 270 passing through well NHK-600 (East Zaloni)

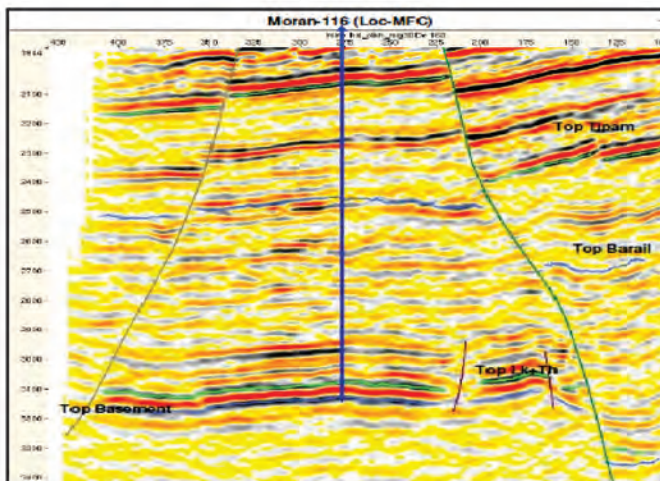


TWT Contour map on top of TS-40 sand / Upper Tipam sand

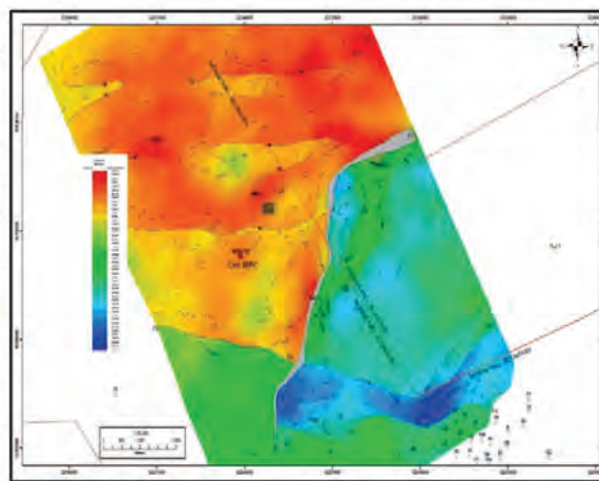
Moran-116 (Moran PML)

OPERATOR : OIL

Structure / Well No. & Location	Testing Result	Leads / Expl. Efficacy
Dimowkinar structure / Moran-116 (Loc. MFC)	Object: 4140-m Lakadong + Therria sand / Paleocene – Lower Eocene Perforation Range : 4143.0-4149.0 m, Oil: 84 klpd through 5 mm bean FTHP: 120 kg/cm ²	The discovery of oil within Lakadong + Therria formation in this well has opened up a new play for further exploration and exploitation in Dimowkinar structure within Moran ML area. Accretion to in-place volume of O+OEG in 2P category is around 0.47 MMSKL



Seismic Section IL-160 across Dimowkinar Structure (MRN-116)



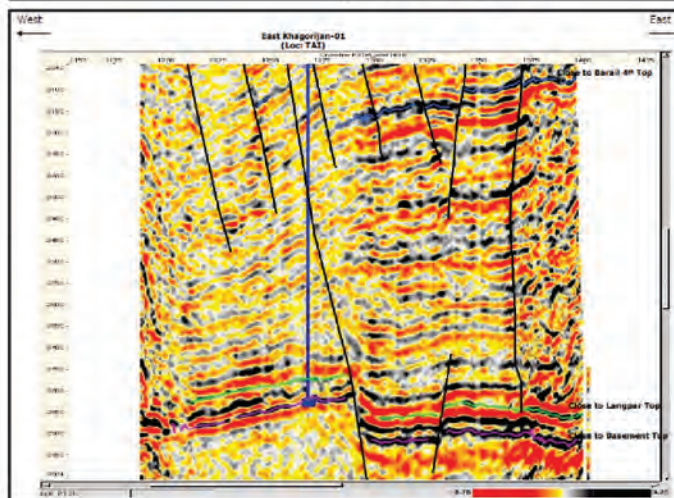
Depth Contour Map on Lk+Th formation (MRN-116)

NEW DISCOVERIES

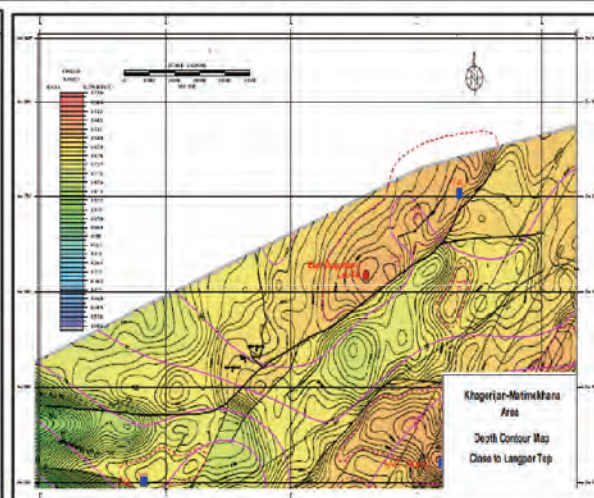
East Khagorijan-1 (Tinsukia PML)

OPERATOR : OIL

Structure / Well No. & Location	Testing Result	Leads / Expl. Efficacy
E. Khagorijan structure / E. Khagorijan-1 (Loc. TAI)	Object: 3597-m Lakadong + Therria sand / Paleocene – Lower Eocene Perforation Range :3597.5-3600.5 m Oil: 66 klpd through 5 mm bean (API: 23.6°, PP: 24°C). FTHP: 49 kg/cm ² .	The discovery of oil within Lakadong + Therria sand in this well has opened up a new play for future exploration and exploitation in E. Khagorijan structure within Tinsukia ML. Accretion to in-place volume of O+OEG in 2P category is around 0.39 MMSKL.



Seismic section XL-1618 across Balijan Structure well East Khagorijan-01(Loc.TAI)

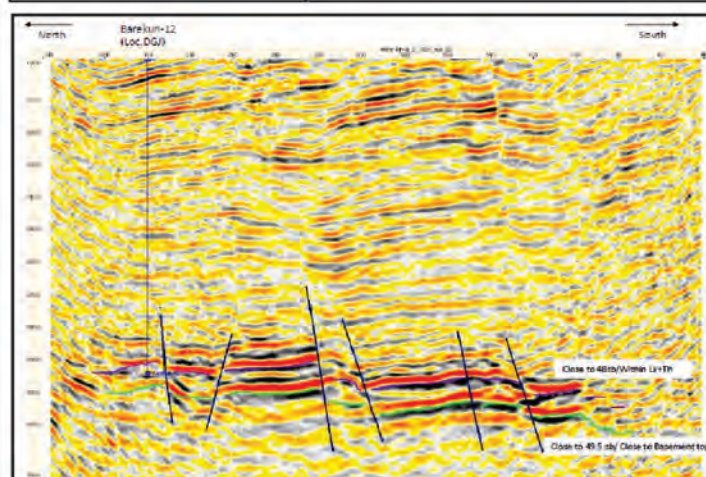


Depth Contour Map close to Langpar Top

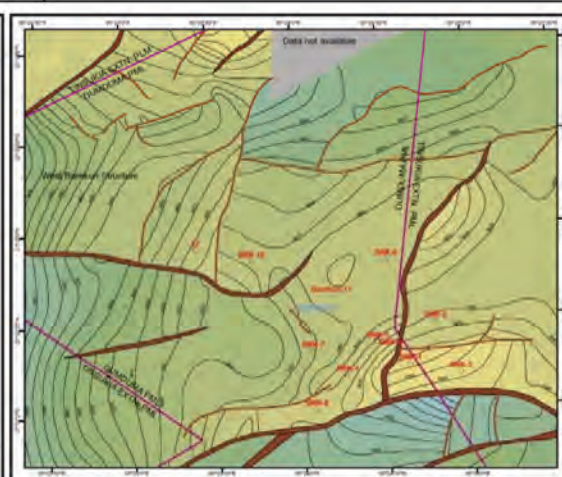
Barekuri-12 (Dumduma PML)

OPERATOR : OIL

Structure / Well No. & Location	Testing Result	Leads / Expl. Efficacy
West Barekuri structure / Barekuri-12 (Loc. DGJ)	Object: 3947-m Lakadong + Therria sand / Paleocene – Lower Eocene Perforation Range : 3947.0-3953.0 m Oil: 100 klpd through 5.0 mm bean (API: 27.9°, PP : 33°C). FTHP: 116 kg/cm ² .	The discovery of oil within Lakadong + Therria formation in this well has opened up a new play for exploration and exploitation in north-west part of Barekuri area within Dumduma ML. Accretion to in-place volume of O+OEG in 2P category is around 0.55 MMSKL.



Seismic Inline-22 across West Barekuri structure well Barekuri-12 (Loc.DGJ)



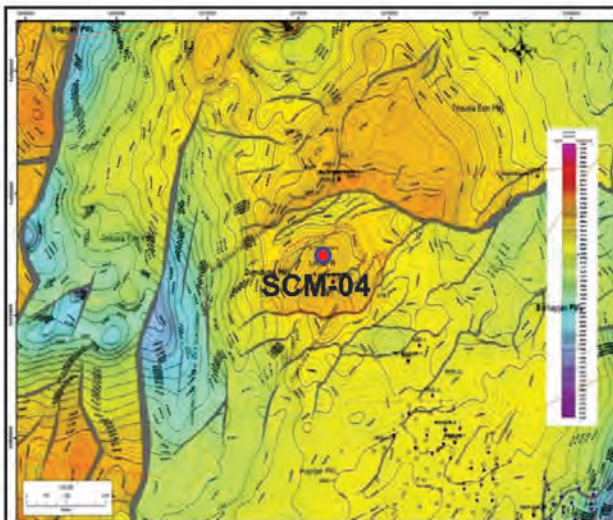
Depth Contour Map on a Reflector Close to Langpar Top Showing West Barekuri Structure

NEW DISCOVERIES

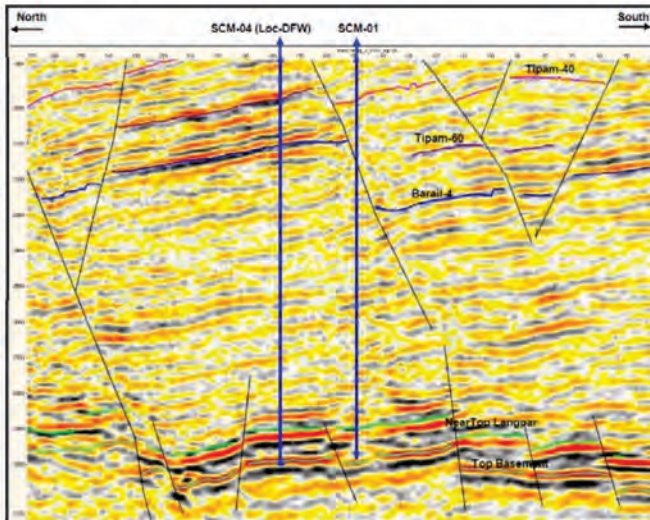
South Chandmari-4 (Dumduma PML)

OPERATOR : OIL

Structure / Well No. & Location	Testing Result	Leads / Expl. Efficacy
South Chandmari / SCM-04 (Loc. DFW) / Dumduma PML	Object: 3915 – 3920 m / Lakadong + Therria Fm. / Oil @ 12 Klpd and Gas @ 38000 SCUMD	This oil discovery opened up the new unappraised sands within Lakadong, Therria Formation.



South Chandmari Structure with well SCM-04(Loc. DFW) - Depth Contour Map 48ma SB/Near Top Langpar

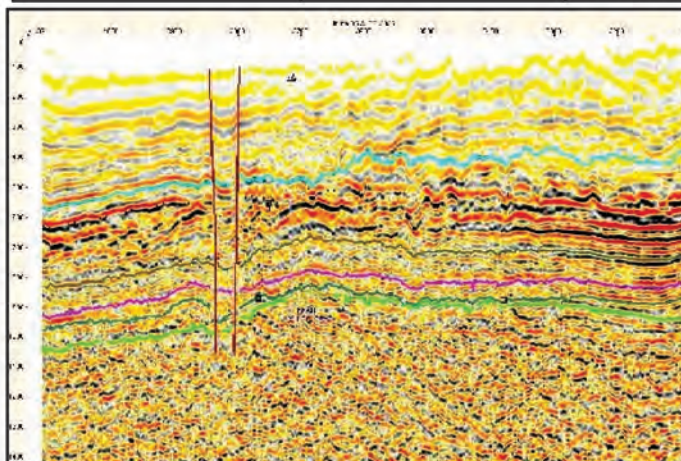


Seismic Section- IL-50 across South Chandmari Structure well SCM-04(Loc.-DFW)

Punam-1 (RJ-ONN-2004/2)

OPERATOR : OIL

Structure / Well No. & Location	Testing Result	Leads / Expl. Efficacy
Punam Structure in NELP Block VI : RJ-ONN-2004/2 & Baghewala PML / Punam-1 (Loc. RBAO) / Infra-Cambrian	Object: 1229 – 1235 m (Jodhpur Sandstone Formation / Infra-Cambrian).	The well Punam-1 encountered 12m net pay. The discovery of heavy oil (API Gravity: 14.77°, Pour Point: 24°C at 60°F & Viscosity: 13650 cps at 50°F) opened up a new play for exploration / exploitation in NELP Block: RJ-ONN-2004/2 and in Baghewala PML areas. In-place volume of heavy oil in 2P category is 0.8545 MMKLS (NELP area) & 20.1367 MMKLS (PML+NELP areas). Based on the testing results, well Punam-1 was assessed to have the production potential of 1.4 KLPD.



Seismic Inline - 3035 Through Well Punam-1



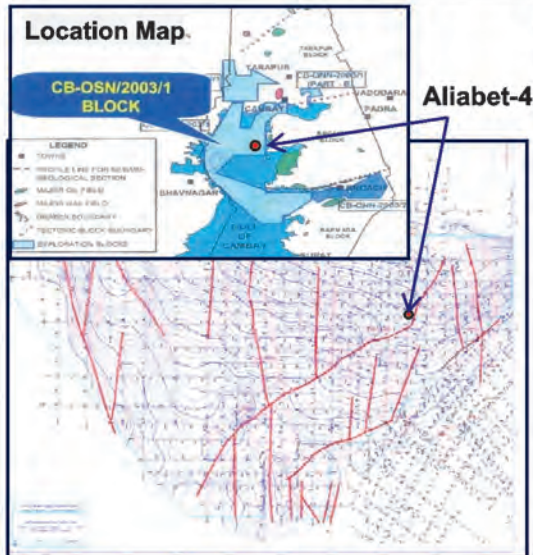
Punam structure with well Punam-1 Depth Contour Map on top of Jodhpur S.St.

NEW DISCOVERIES

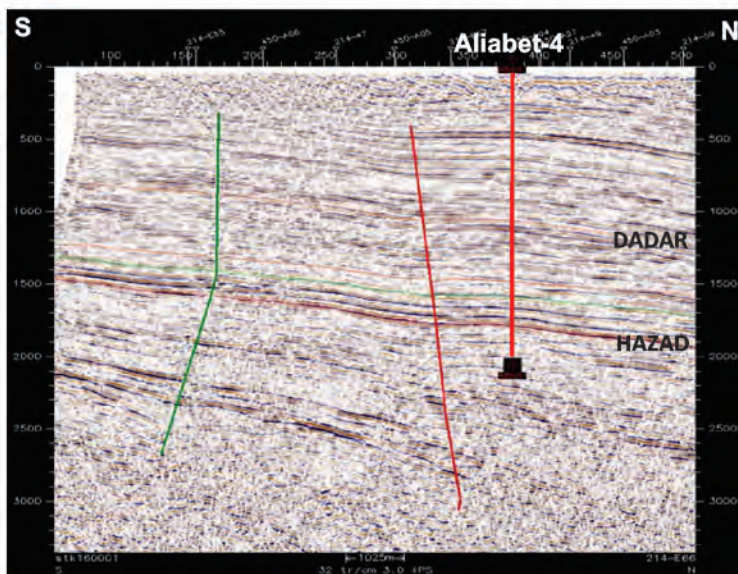
Aliabet-4 (CB-OSN-2003/1)

OPERATOR : ONGC

Structure / Well No. & Location	Testing Result	Leads / Expl. Efficacy
Aliabet-4/ ABAG/ Aliabet-4	Obj-I: 2120-2114 m produced gas @ 58,152 m ³ /d and condensate @ 14.3 m ³ /d through 6 mm bean.	This is a new gas discovery in the NELP block, CB-OSN-2003/1 which will open up significant area for exploration and exploitation.



TIME MAP CLOSE TO HAZAD TOP

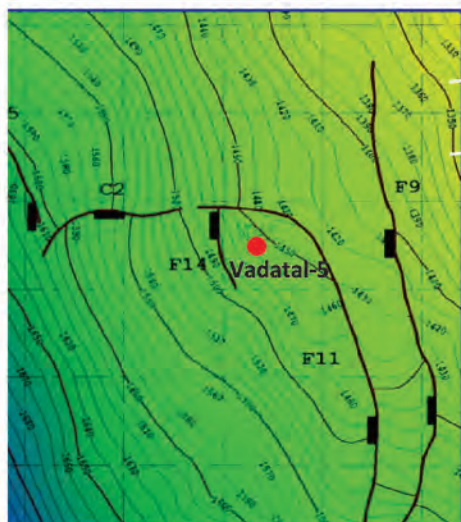


LINE 214-66 PASSING THROUGH WELL ALIABET-4

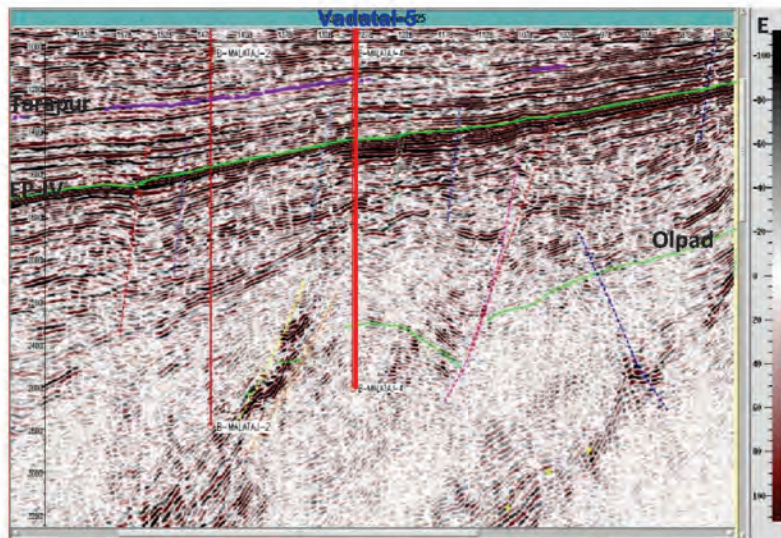
Vadatal-5 (CB-ONN-2004/2)

OPERATOR : ONGC

Structure / Well No. & Location	Testing Result	Leads / Expl. Efficacy
Vadatal/ VDAC/ Vadatal-5	Obj-II: 1654-1663, 1668-1673 m, produced oil @ 22.5 m ³ /d and gas @ 6700 m ³ /d through 6 mm bean. ^ Obj-III: 1598-1604 m, gave influx of oil (60.42 m ³ /d)	This is a new oil discovery in the NELP block, CB-ONN-2004/2 which will open up significant area for further exploration and exploitation.



Time Map Close To EP-IV Showing Location Vadatal-5



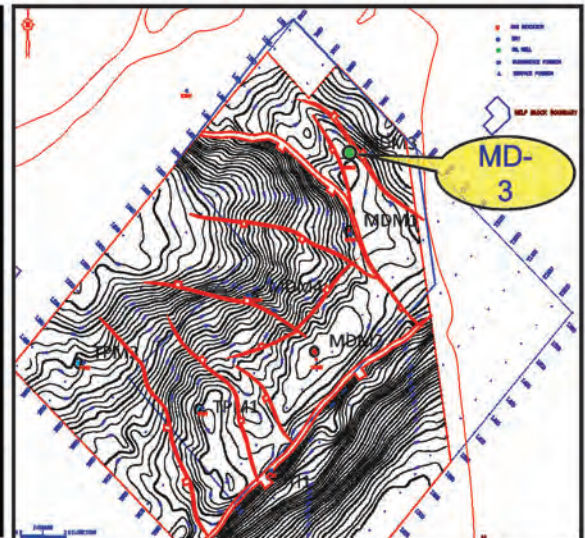
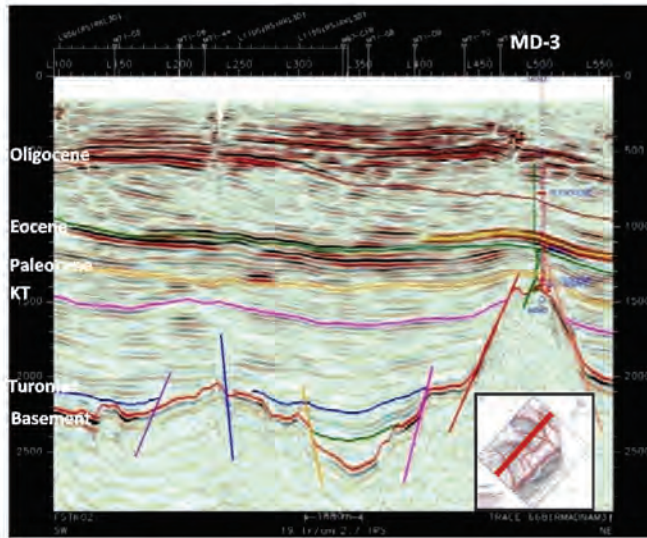
Part Of Inline 425 Passing Through Well Vadatal-5

NEW DISCOVERIES

Madanam-3 (CY-ONN-2002/2)

OPERATOR : ONGC

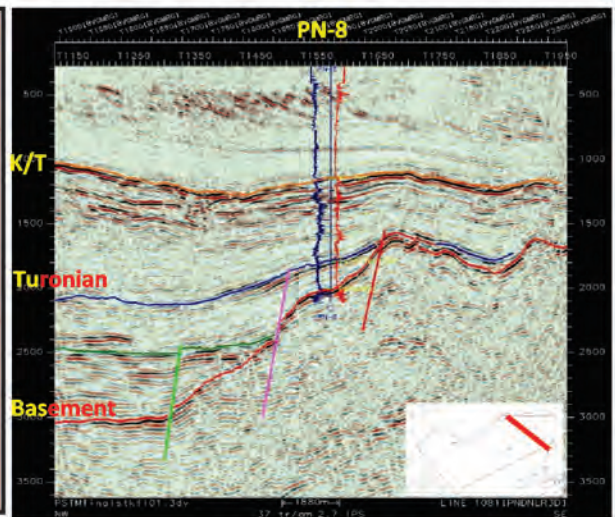
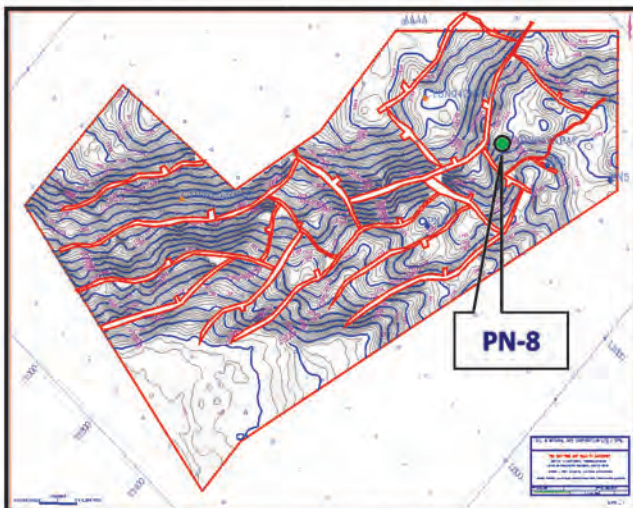
Structure / Well No. & Location	Testing Result	Leads / Expl. Efficacy
Madanam/ CYON022NMAB/ Madanam-3	Obj-I: 1505-1430 m (barefoot) flowed oil @ 115 m ³ /d and gas @ 11,500 m ³ /d through 6 mm bean.	This oil & gas flow from Basement has given an impetus for further exploration in this area. It is also the first hydrocarbon strike in NELP block, CY-ONN-2002/2 in Cauvery Basin, operated by ONGC.



Pandanallur-8 (CY-ONN-2004/2)

OPERATOR : ONGC

Structure / Well No. & Location	Testing Result	Leads / Expl. Efficacy
Pandanallur / NPAC / Pandanallur-8	Obj-I: 2982-2692 m (Barefoot) flowed oil @ 30 m ³ /d and gas @ 18,000 m ³ /d through 6 mm bean.	This discovery in NELP block, CY-ONN-2004/2 has established the basement as a major play for further exploration in the suitable locales in the entire Cauvery Basin.

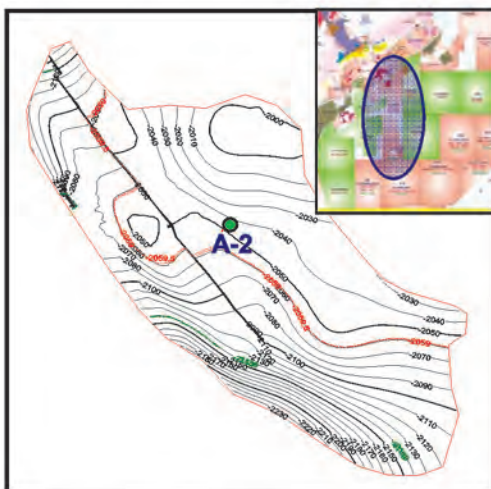


NEW DISCOVERIES

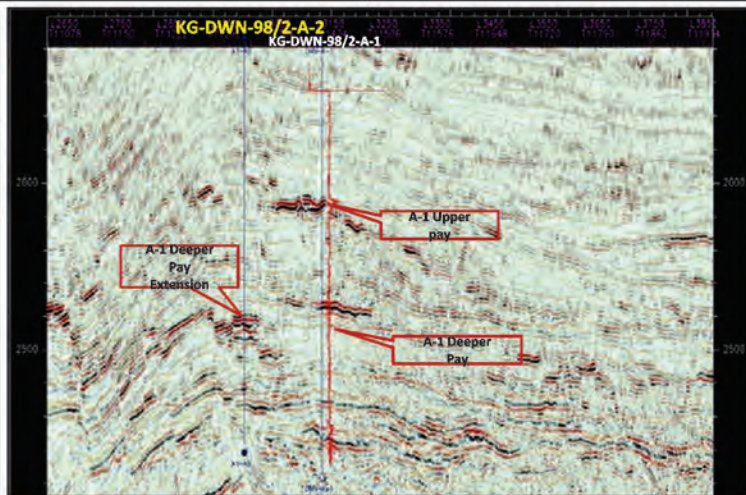
KG-DWN-98/2-A-2 (KG-DWN-98/2)

OPERATOR : ONGC

Structure / Well No. & Location	Testing Result	Leads / Expl. Efficacy
KG-DWN-98/2-A(AB)/ KG-DWN-98/2-A-2	Formation testing with mini DST revealed oil bearing sands in the interval 2171.5-2090.0 m (gross pay thickness: 81.5 m, net pay: 53.82 m) and gas sand in the interval 2090-2075 m (gross pay thickness: 15 m, net pay: 4.31 m). Well is under further evaluation.	Discovery of oil in this block has further enhanced the commerciality of the block, KG-DWN-98/2 in Deep water.



Structure Map on Top of A-2 Pay

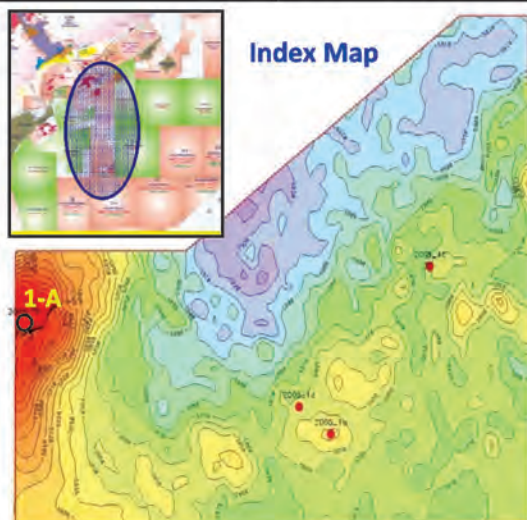


RC section through A-1 well and KG-DWN-98/2-A-AB location showing Deep pay extension

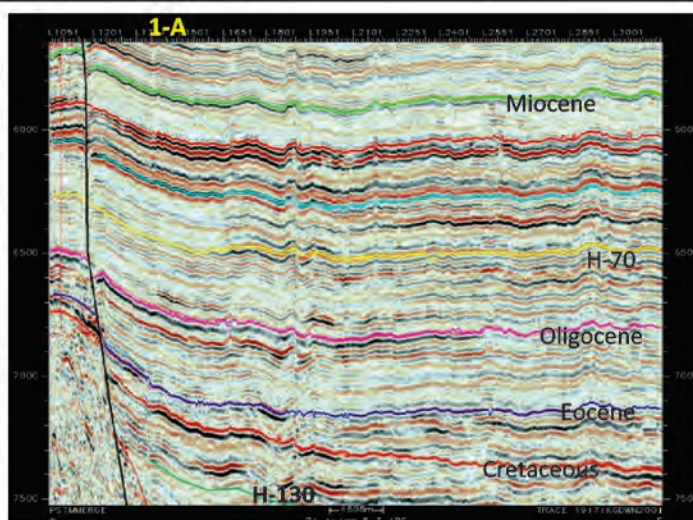
KG051NAA-1 (KG-DWN-2005/1)

OPERATOR : ONGC

Structure / Well No. & Location	Testing Result	Leads / Expl. Efficacy
KG-DWN-2005/1-A / KG051NAA-1	Mini DST conducted in 12 1/4" open hole (pilot hole) using Straddle Packer at 4645.5-4646.5 m (packer centre: 4646 m) gave fluid type as gas with AOF: 0.9 MM m3/d (for 1 m thickness).	This discovery has further strengthened the cause of deep water exploration in south of KG-DWN-98/2 block.



Time Structure Map Miocene Top



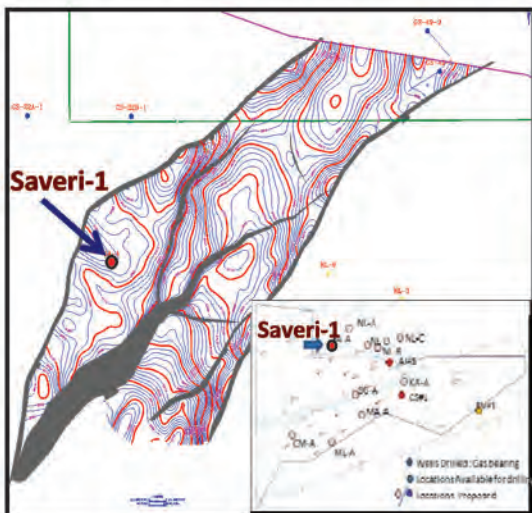
XL-1917

NEW DISCOVERIES

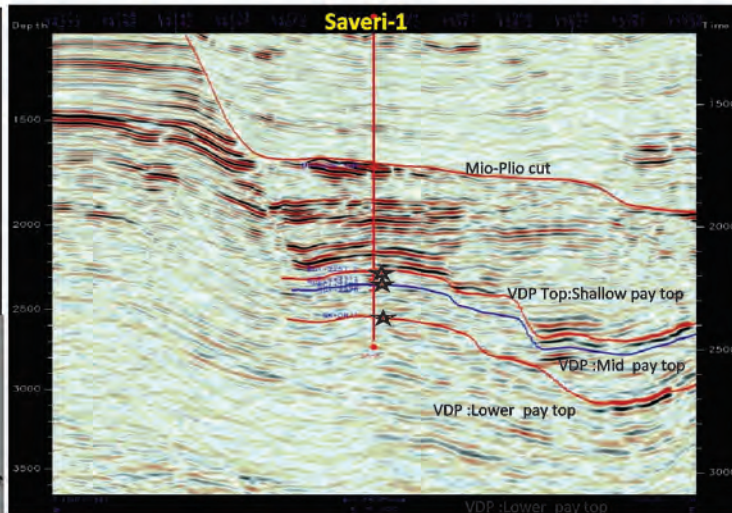
Saveri-1 (KG-OSN-2004/1)

OPERATOR : ONGC

Structure / Well No. & Location	Testing Result	Leads / Expl. Efficacy
KG-OSN-2004/1 / KGOSN041NASA-1/ Saveri#1	Obj-II: 2543-2537 m flowed gas @ 4,09,453 m ³ /d through 3/8" choke.	This is the third successive discovery made in the block, KG-OSN-2004/1 establishing further prospectivity and additional reserves.



Time Map: Lower Pay Top

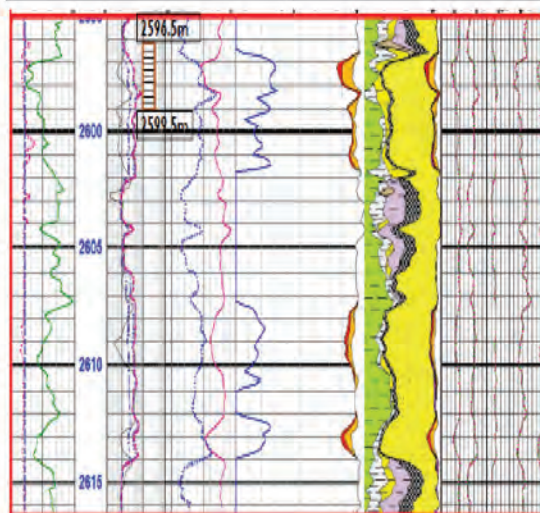


Well section - NASA#1

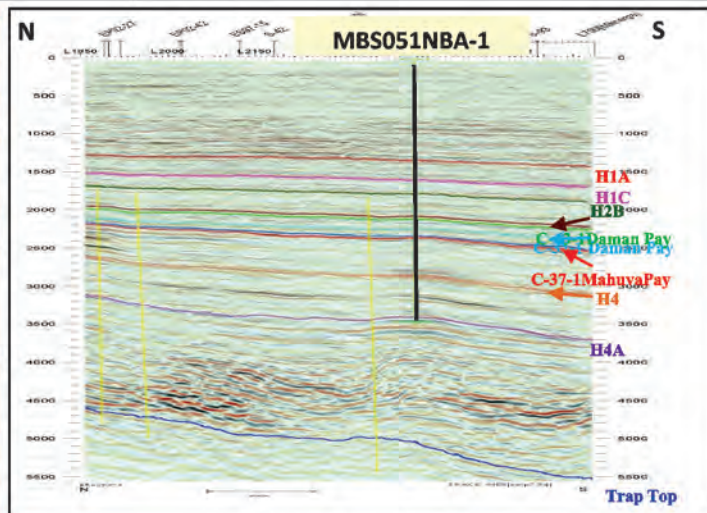
MBS051NBA-1 (MB-OSN-2005/1)

OPERATOR : ONGC

Structure / Well No. & Location	Testing Result	Leads / Expl. Efficacy
MBS051NBA-A /MBS051NBA-1	Obj-III: 2599.5-2596.5 m flowed gas @ 1,71,630 m ³ /d & condensate @ 93 bbl/d through 1/2" bean.	This gas discovery in NELP block, MB-OSN-2005/1 is first discovery in this area and will provide great impetus to hydrocarbon exploration in Daman & Panna Formations and has opened a large area for further exploration.



Log Map



Cross Line 4468

UNCONVENTIONAL HYDROCARBONS & OTHER ACTIVITIES

- Gas Hydrates
- Shale Oil & Gas
- Underground Coal Gasification
- Oil Shale
- Coal Bed Methane
- Recovery Enhancement Techniques implemented by NOC's
- New Technology used / adopted
- Environmental Issues & CSR



UNCONVENTIONAL HYDROCARBONS

GAS HYDRATES

Steered by the Ministry of Petroleum and Natural Gas and technically coordinated by Directorate General of Hydrocarbons (DGH), National Gas Hydrate Program (NGHP) is a consortium of National E & P companies, namely ONGC, GAIL, OIL, IOC and national research institutions NIO, NIOT and NGRI. During the period 1998 to 2003, data of Krishna Godavari Basin (offshore), Cauvery Basin (offshore), Gulf of Mannar and Western offshore were studied by ONGC for assessing Gas Hydrate prospectivity. These studies provided technical support in formulating NGHP Expedition-01 program, wherein 21 sites were drilled/ cored in Indian offshore in 2006 using the ship Joides Resolution.

The following are highlights of the findings of NGHP Expedition-01 :

- Established presence of gas hydrate in KG, Mahanadi and Andaman deep waters in numerous complex geologic settings.
- Collected an unprecedented number of gas hydrate cores
- Most of the recovered gas hydrate was characterized as either pore-filling grains or particles disseminated in coarser grain sediments or as a fracture-filling material in clay dominated sediments.
- Gas hydrate was found occurring in “combination reservoirs” consisting of horizontal or sub-horizontal coarse grained permeable sediments (sands for the most part) and apparent vertical to sub-vertical fractures that provide the conduits for gas migration.
- Delineated and sampled one of the richest marine gas hydrate accumulations yet discovered (Site NGHP-01-10 in the KG Basin).
- Discovered one of the thickest and deepest (612m below sea floor) gas hydrate occurrences yet known (offshore of the Andaman Islands, Site NGHP-01-17).
- Scientific Contribution globally acknowledged.

NGHP Expedition-02

Based on the findings of NGHP Expedition-01, the Krishna Godavari deepwater basin and the Mahanadi deep waters have been considered potential areas where large tracts of turbidity sand channel systems can be expected in the delta sequence accumulations.

The aims and objectives of the NGHP Expedition-02 are to identify gas hydrate bearing sands, identify the free gas below the gas hydrate stability zone and identify suitable location for carrying out pilot production testing in NGHP Expedition-03. 3D seismic data interpretation is in progress to identify potential sand channel systems. The results of the studies will yield potential sites for NGHP Expedition-02. The NGHP Expedition-02 is likely to consist of an exclusive logging while drilling programme followed by selective coring.

Identification of Locations:

Based on the geophysical studies carried out so far, in over 5000 km² in Krishna Godavari and Mahanadi offshore deepwater areas more than 50 sites have been identified for NGHP Expedition-02. These locations are being prioritized in consultation with NGHP and US scientists. Geoscientific studies are continuing to identify more locations in the area.

Resource Estimation:

Earlier studies have prognosticated gas hydrate resources of 1894 TCM for India and USDOE in Feb 2012 published that around 933 TCF is the concentration of gas hydrate in sands within the gas hydrate stability zone. This estimate is encouraging, although the estimated presence of sand is approximated based on gross geological depositional models. Under NGHP, NGRI completed a research project on quantitative estimation of gas hydrates computing seismic attenuation and other attributes on the characteristic high velocity anomaly observed in gas hydrate bearing sediments. The studies indicate 51.56 BCM gas in $2.47 \times 10^9 \text{ m}^3$ of gas hydrate sediments for the localized area of study. Under NGHP, NIO completed a study around the site NGHP-01-10 where ~128 m thick gas hydrate has been recovered. The study aimed at understanding the spatial extent of gas hydrate in the vicinity of the site NGHP-01-10 using the estimates of longitudinal seismic wave attenuation and velocity and modeled the heterogeneous, scattered hydrate deposits to understand the characteristic in the real seismic data. The studies indicate a resource estimate of ~ 16.5 million cubic meters from a gas hydrate bearing sediment over an area of 0.98 km².

Efforts on deriving benefits from MoU

NGHP has MoU with USGS, USMMS, JOGMEC, GFZ-Potsdam and IFM-Geomar for collaborative research in gas hydrates. USGS scientists are in close consultation for prioritizing locations and R & D activities of NGHP.



GAS HYDRATE CORE SAMPLES FROM KG BASIN – EXPEDITION-01

Exploitation of methane from Gas Hydrates

Exploitation of methane from gas hydrates is still at a research stage globally. Various factors, such as characteristic nature of gas hydrates, dissociation and stability of gas hydrates and environmental factors have to be well understood before contemplating pilot production testing for the extraction of methane. NGHP has taken several initiatives in this direction based on the global R & D trends.

A collaborative project with ONGC-IIT-Kharagpur taken up to firm up the theoretical background has been completed. The project has brought out that the heat transfer rates are very slow and hence the ultimate production rate by thermal stimulation will be very low.

Also, studies at IEOT, ONGC has brought out that apart from the problem of low production rates, sea floor stability is a more serious problem in carrying out gas production from gas hydrates in shallow marine environments. A conceptual mining method is being considered and various technical aspects are being looked into.

NGRI has demonstrated core competency development by successfully carrying out experimental studies on synthesizing gas hydrates in the laboratory and studying basic properties using Raman Microprobe. NGRI has proposed phase stability studies on synthesized gas hydrate, which is under active consideration as these studies will provide valuable insight in the nature of natural gas hydrates.

NIO has completed characterization of gas hydrate bearing sediments to evaluate the subsurface geological environments based on selected cores.

Global Analogues

Global efforts for the extraction of methane from gas hydrates began as early as 2002. However, these were restricted to onshore permafrost areas. It was only in March 2013 that the first ever marine offshore production trials for the extraction of methane from gas hydrates was conducted by Japan. A brief review of these tests is given below :-

(i) First Production Testing - Mallik :

In 2002, the “hot water circulation method” – a type of heating method – was selected for producing methane gas from methane hydrate. In this method, hot water heated up to 80° C was fed into test wells to heat methane hydrate layers existing approximately 1,100 m below ground so that methane hydrate can be dissociated. The temperature of hot water was estimated to be around 50° C when it came near the methane hydrate layers.

This test succeeded in producing approximately 470 m³ of methane gas over the five-day production period. This was the first time in the world that anyone had ever produced methane gas from methane hydrate layers.

(ii) Second Production Testing - Mallik :

MH21, Research Consortium for Methane Hydrate Resources in Japan, carried out the Second Onshore Gas Production Test at the Mallik site in the Mackenzie Delta in the Northeast Territories of Canada, where they tested the hot water circulation method in 2002.

This testing was conducted twice, once in 2007 and again in 2008. The tests conducted in 2007 and 2008 are called the First Winter Test and the Second Winter Test, respectively. In the First Winter Test in 2007, methane gas was collected from methane hydrate being dissociated with the depressurization method. However, since methane hydrate layers are unconsolidated sediments, sand was also collected (sand production) along with methane gas and water and the sand stalled the pump. As a result, the test had to stop 12.5 hours after it began.

Although the test was terminated within a very short time, it was the first time in the world that methane gas had ever been successfully collected from methane hydrate layers using the depressurization method.

After developing measures to prevent sand production (sanding), MH21 reattempted the depressurization method-based production test again in the Second Winter Test in 2008. In this test, MH21 achieved continuous production over approximately 5.5 days. The amount of methane gas produced during the test period was approximately 13,000 m³, much larger than the approximately 470 m³ in the First Onshore Gas Hydrate Production Test. It demonstrated that the depressurization method is effective for producing methane hydrate.

On behalf of NGHP, DGH participated in this field test.

(iii) Ignik Sikumi Gas Hydrate Field Trial :

In 2012, ConocoPhillips, Japan Oil, Gas, and Metals National Corporation (JOGMEC) and the US Department of Energy (USDOE) completed the first field program designed to investigate the potential for CO₂-CH₄ exchange in naturally occurring methane hydrate reservoir. The well Ignik Sikumi#1 produced for approximately 30 days and the production rates achieved was as high as 1,75,000 scf/d.

The results of this latest field experiment were discussed in detail and DGH participated in the discussions. The database created on the results of this production trial has been shared with various participating global organizations including DGH.

(iv) First Marine offshore test for gas hydrate in Nankai Trough, Japan

In March 2013, Japan carried out the first ever marine offshore test in the Nankai trough. After a prolonged study of the various aspects of gas hydrates, five wells were drilled of which four were observation wells at a distance of 20m from the main pilot test well.

The well flowed for six days and testing was closed due to anticipated problems. The well flowed 1,20,000 m³ of gas at an average rate of 20,000 m³/day.

The test is considered successful as it has shown better flow conditions when compared with earlier tests in other areas which were onshore.

Future plans for NGHP

The NGHP technical committee is planning to locate an ideal gas hydrate bearing sand in the channel-levee system by drilling several of the identified locations in the areas KG & Mahanadi deepwater areas during NGHP Expedition-02.

SHALE OIL & GAS

Shale gas has gained predominance particularly in USA and contributes approx. 25-30% of total gas production. The experience accumulated so far in USA with the exploration and exploitation of these plays has encouraged other countries to venture into such plays. Though Shale gas was recognized much earlier, two things in particular, horizontal multilateral drilling with water fracturing and improved prices of gas in the US markets, have changed the scenario rapidly after 2001.

There are large basinal segments, which appear prospective from Shale Oil & Gas point of view in India. A systematic approach has been initiated by DGH under MOPNG since 2010 to identify, characterize and prioritize the Indian sedimentary basins for focused shale oil /gas exploitation and also to assess and establish the potential of fields.

Memorandum of understanding (MOU) has been signed between Department of State, USA and MOPNG, GOI on November 06, 2010 to cooperate in areas of

- a. Assessment of Shale Gas Resources in India.
- b. Technical Studies
- c. Consultations in regulatory frameworks
- d. Investment Promotion

In this respect technical workshops were held during Jan 2011, May 2011, Jan 2012 and Aug 2012 at Delhi attended by USGS Team, MOPNG, DGH, ONGC, OIL, GAIL and several others.

DGH under MoP & NG has initiated steps to

- a. Identify prospective areas and carry out resources assessment studies for Shale Oil & Gas exploration and exploitation.
- b. Formulation of Policy for Shale Oil & Gas exploration. The draft policy was put on MOPNG / DGH website in July 2012

Based on the data available from conventional oil/gas exploration in the country for the last so many years, it appears that following sedimentary basins may be prospective from Shale oil & gas point of view under Phase-I.

- a. Cambay Basin
- b. Gondwana Basin
- c. KG Basin
- d. Cauvery Basin
- e. Indo-Gangetic Basin
- f. Assam Arakan Basin

However, detailed analysis of geo-scientific data gathered during conventional exploration of Oil/Gas is being carried out to identify areas/basins prospective for shale oil & gas.

- GoI has granted permission to ONGC for an R&D project in Gondwana Basin in the existing two CBM Blocks for exploration of Shale Gas. ONGC has drilled 4 Pilot wells to gather data relevant to Shale Gas. Presence of gas has been established by ONGC.
- A Multi Organizational Team (MOT) of DGH, ONGC, OIL, GAIL has been formed by MOPNG to analyze the existing data set and suggest methodology for Shale Oil & Gas development in India.
- Technical studies have been awarded to ONGC & CMPDI to identify prospective areas in several Basins / sub basins.
- MoP&NG / DGH are in discussion with other agencies to address Environmental issues and issues related for social impact etc.
- Different agencies have reported upon the shale gas resources in India. EIA, USA (June'13) has reported a GIP concentration of 1278 TCF, risked gas-in-place of the order of 584 TCF with 96 TCF as recoverable in 4 Indian basins with shale oil / condensate in place of 178.5 billion bbl, risked value of 87 billion bbl and technically recoverable as 3.8 billion bbl. USGS (Jan'12) has estimated 6.1 TCF as technical recoverable in 3 Indian basins and mention potential for Shale oil. Media reports mention shale gas resources ranging from 300 to 2100 TCF in India.

Future Action Plan

- Identification of prospective areas in different sedimentary basins and interaction with various E&P operators
- Finalization of Shale Gas Policy

ONGC

Shale Gas R&D Pilot Project-Damodar Basin

ONGC has drilled four wells viz., RNSG#1, NKSG#2, RNSG#2, NKSG#1, for assessment of shale gas potential under a R&D Pilot programme in Damodar Valley. The well RNSG#1 has flowed water and gas in surges after hydro-fracturing on 25th January, 2011. It was recorded as first ever event in India from the Barren Measures Shales. The Studies carried out in the Pilot Project has brought out the Gas-in-Place (GIP) resources of Raniganj Sub basin covering an area 800 Sq.Km to be in the order of 48 Tcf, based on integrated core and log evaluation. GIP of the North Karanpura has been estimated as 1.5 Tcf.

Way forward after R&D Pilot Project

Apart from the pilot project in Damodar basin, ONGC has continued its shale gas studies in a number of onland sedimentary basins of India to assess their shale gas potential and prioritize them through available G&G data of drilled wells. Based on the preliminary studies, it is inferred that following shale formations appear highly prospective from shale gas point of view. These are:

- Cambay Shale and Olpad Formation in Cambay Basin
- Kommugudem and Raghavpuram Shales in KG Basin
- Andimadam Shales and Sattapadi Shales in Cauvery Basin

Government of India is likely to come out with a shale gas exploration policy to facilitate the process of shale gas exploration in the country. ONGC, on its part, has established a dedicated Centre of Delivery (COD) for Shale Gas to bring together the necessary expertise in order to achieve the objectives in the areas of shale gas exploration/exploitation on fast track.

In 2012, ONGC has entered into a MOU with Conoco Phillips, USA for cooperation in exploration and development of shale gas resources in India. M/s Conoco Phillips have carried study of G&G data of four basins namely, Cambay, KG, Cauvery and Damodar to assess their shale gas potential. Based on the results of joint studies carried out with M/s Conoco Phillips (COP) prospective shale gas areas in Cambay basin have been identified and finalization of locations for drilling in Cambay Basin is planned to be completed soon.

M/s ConocoPhillips (COP) has agreed to provide technical assistance to ONGC in its shale gas pilot programme which is planned to be taken up in Cambay basin. Drilling of pilot wells in identified ONGC operated blocks in Cambay basin is likely to begin in 2013-14. It is hoped that shale gas pilot programme envisaged in Cambay basin would provide good leads and help in establishing shale gas/ oil potential in the country.

Studies are also in progress for identification of prospective areas/locations in KG and Cauvery basins .

G&G data of four basins viz., Cambay, Cauvery, Krishna-Godavari and Vindhyan basins was collected and shared with M/s Esso Exploration International Limited for evaluation of Shale Gas potential under a confidentiality agreement signed between ONGC and M/s Esso.

OIL

As far as Oil India Ltd. (OIL) is concerned, M/s Schlumberger was engaged to carry out the shale gas assessment study in its operational areas in North East India and Rajasthan during 2011-12. However, the maturity of source rocks in the operational areas of OIL in Assam-Arakan and Rajasthan basins has not reached the gas generation window. Hence the shale gas potential from these source rocks is limited.

UNDERGROUND COAL GASIFICATION (UCG) as submitted by ONGC

ONGC signed an Agreement of Collaboration (AOC) with M/s Skochinsky Institute of Mining (SIM), Russia on 25th November, 2004 for implementation of Underground Coal Gasification (UCG) program in India. As follow-up, MOUs were signed with various coal companies for accessing the coal/lignite blocks for evaluating their suitability to UCG. After evaluating a number of coal/lignite blocks, Vastan Mine block belonging to GIPCL in Surat district, Gujarat was found suitable for UCG. This site has been taken up by ONGC as an R&D project to establish UCG technology.

Work at Vastan Mine Block:

All the ground work and inputs for pilot construction have been finalized for implementation of UCG pilot at Vastan. In order to implement UCG the following steps have been undertaken:

- The “**Environmental Clearance**” from MoEF, GoI has been obtained in the month of Feb’ 2010.
- Basic and detailed engineering design has been prepared with the help of SIM, Russia and Ukrainian Design Institute, OJSC Dongiproshakht in November, 2009.
- The spade work for execution of pilot module in terms of land acquisition, electric supply, water connection, soil survey etc. have been initiated.
- Draft contract for construction of UCG pilot has been finalised after cost optimisation and inclusion of Indian vendors.

Further Progress made for allocation of mining lease for UCG:

- Allocation of Vastan mine block is being followed up with Ministry of Coal consistently through top management of ONGC, MD-GIPCL and Director General, ONGC Energy Centre.
- *Allocation of Vastan mine block for UCG by MoC is awaited.*

Status of other UCG Sites:

In parallel action, other sites have been taken up for studying their suitability for UCG. ONGC and Neyveli Lignite Corporation Limited (NLC) jointly identified Tarkeshwar in Gujarat and Hodu-Sindhari & East Kurla in Rajasthan. One more site was also jointly identified by ONGC & Gujarat Mineral Development Corporation Ltd (GMDC) viz. Surkha in Bhavnagar Distt., Gujarat. The data of all the fields have already been analysed for evaluating the suitability of these sites for UCG and all the sites have been found suitable for UCG. These projects will be taken up on the basis of learning curve from Vastan project.

OIL SHALE

Following work has been carried out in respect of exploration of oil shale in the country :

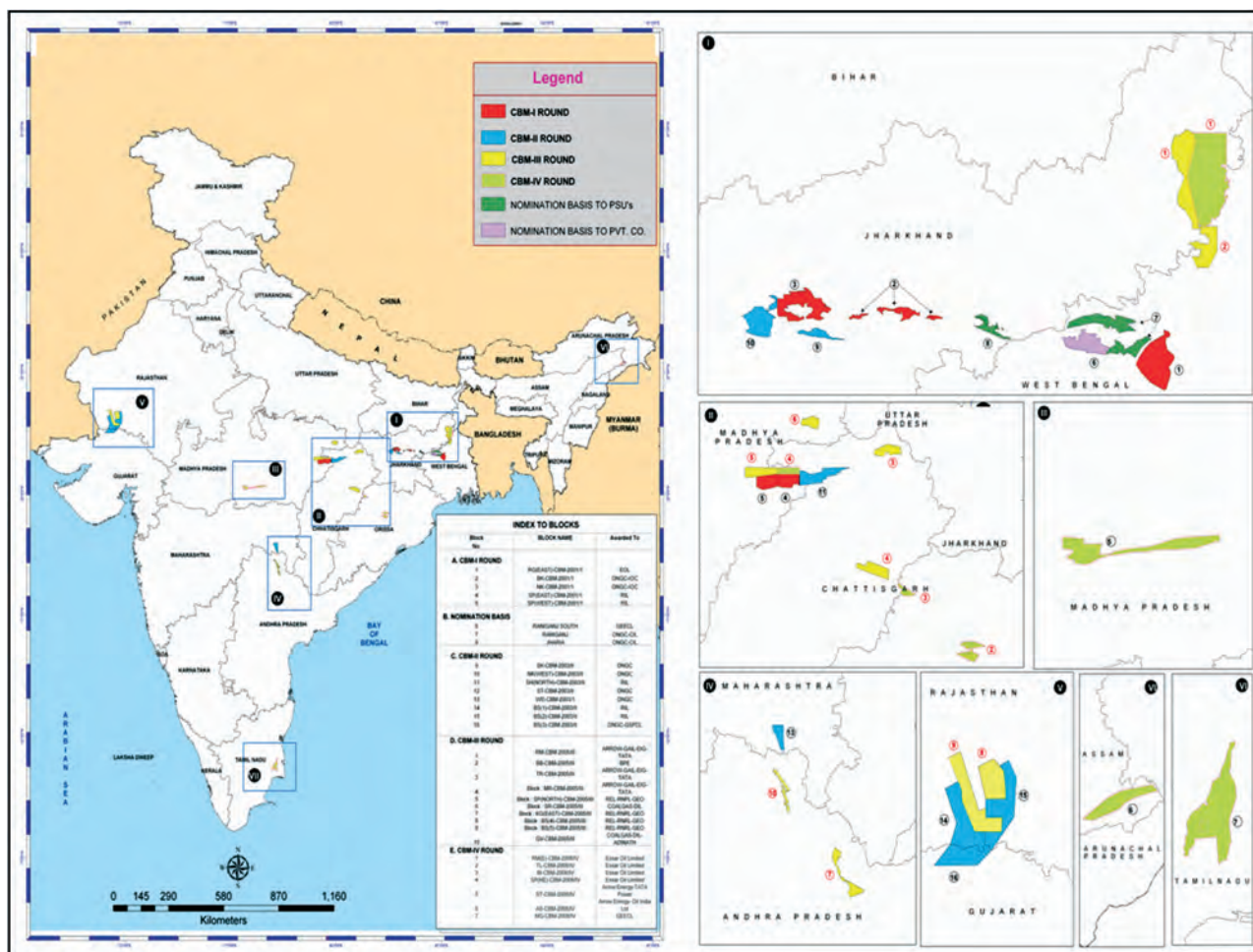
- Oil Shale prospectivity mapped in selected Assam-Arakan Basin areas
- Oil Shale resources has been estimated to be around 400 MMT of oil upto a depth of 500m in selected areas in Assam-Arakan Basin
- Vision document on Oil Shale prepared
- An MoU has been signed between IOC & DGH to analyse the oil shale samples to establish its productivity and producibility

COAL BED METHANE (CBM)

India, having the fourth largest proven coal reserves in the world, holds significant prospects for exploration and exploitation of CBM. The prognosticated CBM resources in the country are about 92 TCF (2608 BCM). In order to harness CBM potential in the country, the Government of India formulated CBM policy in 1997 wherein CBM being Natural Gas is explored and exploited under the provisions of OIL Fields (Regulation & Development) Act 1948 (ORD Act 1948) and Petroleum & Natural Gas Rules 1959 (P&NG Rules 1959) administered by Ministry of Petroleum & Natural Gas (MOP&NG).

CBM blocks were carved out by DGH in close interaction with MOC & CMPDI. Till date, four rounds of CBM bidding rounds have been implemented by MOP&NG under the CBM policy resulting in award of 33 CBM blocks which covers 17,200 Sq.km out of the total available coal bearing areas for CBM exploration of 26,000 sq.km. Exploration under CBM policy has been undertaken by national and international companies. Total prognosticated CBM resource for awarded 33 CBM blocks, is about 63.85 TCF (1810 BCM), of which, so far, 9.9 TCF (280.20 BCM) has been established as Gas in Place (GIP).

Commercial CBM production has started since July 2007 which contributes about 0.25 MMSCMD of CBM production. Seven more CBM blocks are expected to start commercial production in near future. The total CBM production is expected to be around 4MMSCMD by end of 12th plan as per XII plan document.



CBM BLOCKS AWARDED SO FAR

CBM BLOCKS AWARDED

SL NO.	COAL FIELD / STATE	BLOCK NAME	CONSORTIUM (PARTICIPATING INTEREST)	DATE OF SIGNING CONTRACT	AWARDED AREA (SQ. KM.)
CBM-I ROUND					
1.	RANIGANJ EAST / WEST BENGAL	RG(E)-CBM-2001/1	EOL (100)	26.07.2002	500
2.	BOKARO / JHARKHAND	BK-CBM-2001/1	ONGC (80) & IOC (20)	26.07.2002	95
3.	N. KARANPURA / JHARKHAND	NK-CBM-2001/1	ONGC (80) & IOC (20)	26.07.2002	340
4.	SOHAGPUR EAST / M.P	SP(E)-CBM-2001/1	RIL (100)	26.07.2002	495
5.	SOHAGPUR WEST / M.P	SP(W)-CBM-2001/1	RIL (100)	26.07.2002	500
TOTAL AREA :					1930
ON NOMINATION BASIS					
6.	RANIGANJ NORTH / WEST BENGAL	RANIGANJ NORTH	ONGC (74) & CIL (26)	06.02.2003	350
7.	JHARIA / JHARKHAND	JHARIA	ONGC (90) & CIL (10)	06.02.2003	85
8.	RANIGANJ SOUTH / WEST BENGAL	RANIGANJ SOUTH	GEECL (100)	31.05.2001	210
TOTAL AREA :					645
CBM-II ROUND					
9.	SOUTH KARANPURA / JHARKHAND	SK-CBM-2003/II*	ONGC (100)	06.02.2004	70
10.	NORTH KARANPURA / JHARKHAND	NK(WEST)-CBM-2003/II*	ONGC (100)	06.02.2004	267
11.	SONHAT / CHATTISGARH & M.P.	SH(NORTH)-CBM-2003/II*	RIL (100)	06.02.2004	825
12.	BARMER / RAJASTHAN	BS(1)-CBM-2003/II*	RIL (100)	06.02.2004	1045
13.	BARMER / RAJASTHAN	BS(2)-CBM-2003/II*	RIL (100)	06.02.2004	1020
TOTAL AREA :					3227
CBM-III ROUND					
14.	RAJMAHAL / JHARKHAND	RM-CBM-2005/III*	ARROW(35)-GAIL(35)-EIG(15)-TATA(15) 07.11.06		469
15.	BIRBHUM / WEST BENGAL	BB-CBM-2005/III*	BPE (100)	16.11.06	248
16.	TATAPANI RAMKOLA / CHATTISGARH	TR-CBM-2005/III*	ARROW(35)-GAIL(35)-EIG(15)-TATA(15) 07.11.06		458
17.	MAND RAIGARH / CHATTISGARH	MR-CBM-2005/III*	ARROW (40)-GAIL(45)-EIG(15)	07.11.06	634
18.	SOHAGPUR / M.P.	SP(N)-CBM-2005/III	GEO(10)-REL(45)-RNPL(45)	07.11.06	609
19.	SINGRAULI / M.P.	SR(N)-CBM-2005/III	COALGAS (10)-DIL(90)	07.11.06	330
20.	KOTHAGUDEM / ANDHRA PRADESH	KG(E)-CBM-2005/III*	GEO(10)-REL(45)-RNPL(45)	07.11.06	750
21.	BARMER / RAJASTHAN	BS(4)-CBM-2005/III	GEO(10)-REL(45)-RNPL(45)	07.11.06	1168
22.	BARMER / RAJASTHAN	BS(5)-CBM-2005/III	GEO(10)-REL(45)-RNPL(45)	07.11.06	739
23.	GODAVARI / ANDHRA PRADESH	GV(N)-CBM-2005/III	COALGAS (10)-DIL(40)-ADINATH(50)	07.11.06	386
TOTAL AREA :					5791
CBM-IV ROUND					
24.	RAJ MAHAL / JHARKHAND	RM(E)-CBM-2008/IV	ESSAR OIL LIMITED (100)	29.07.10	1128
25.	TALCHIR / ORISSA	TL-CBM-2008/IV	ESSAR OIL LIMITED (100)	29.07.10	557
26.	IB VALLEY / ORISSA	IB-CBM-2008/IV	ESSAR OIL LIMITED (100)	29.07.10	209
27.	SOHAGPUR / MP & CHHATTISGARH	SP(NE)-CBM-2008/IV	ESSAR OIL LIMITED (100)	29.07.10	339
28.	SATPURA / MADHYA PRADESH	ST-CBM-2008/IV	DART ENERGY (80)-TATA POWER(20)	29.07.10	714
29.	NORTH EAST / ASSAM	AS-CBM-2008/IV	DART ENERGY (60)-OIL INDIA(40)	29.07.10	113
30.	MANNARGUDI / TAMIL NADU	MG-CBM-2008/IV	GEECL (100)	29.07.10	667
TOTAL AREA :					3727
RELINQUISHED CBM-II BLOCKS					
1.	SATPURA / M.P.	ST-CBM-2003/II	ONGC (100)	06.02.2004	714
2.	WARDHA / MAHARASHTRA	WD-CBM-2003/II	ONGC (100)	06.02.2004	503
3.	BARMER-SANCHOR / GUJARAT	BS(3)-CBM-2003/II	ONGC (70)&GSPCL(30)	06.02.2004	790
* : Relinquishment proposed by Operator Note : Name of Arrow Energy has been changed to Dart Energy					

RECOVERY ENHANCEMENT TECHNIQUES IMPLEMENTED BY NOC's

ONGC

- 1 The program for augmenting crude oil recovery in 15 major fields contributing nearly 75-80% of the production was conceptualized in 1998-1999. 19 projects (15 IOR & 4 EOR projects) were identified and preparation of feasibility report (FR) was initiated in 2000-2001. These FR were approved by ONGC EC / Board in stages between August, 2000 and January, 2005. So far 18 projects have been approved.
- 2 The total approved cost of the 18 (15 IOR and 3 EOR) projects is Rs. 15803 Crore. The envisaged incremental oil is 108.28 MMT by 2029-30 for an increase in recovery factor by an average of 4%. The base year for the profiles is 2000-2001.
- 3 Six redevelopment projects in western offshore (Heera& South Heera Redevelopment, MHS Redevelopment Ph-II, MHN Redevelopment Ph-II, IOR of B-173A Field, Development of Western Periphery of MH South and Heera& South Heera Redevelopment Ph-II) have been approved subsequently with an approved cost of Rs. 25513 Crore. The envisaged incremental oil is 61.30 MMT by the year 2029-30.
- 4 Hence, the total number of IOR-EOR projects taken up is 24 with approved cost of Rs. 41316 Crore with envisaged incremental oil production of 170 MMT by the year 2029-30. Sixteen projects have been commissioned as below :

S. N.	Projects	Completion date
1	In-situ Combustion Balol (EOR)	Nov 2001, Plant commissioned
2	In-situ Combustion Santhal (EOR)	Dec 2001, Plant commissioned
3	Sanand Polymer (EOR)	Sept 2002
4	IOR Santhal	Nov.'2003
5	Addl. Development Heera Part - I	Dec.'2003
6	IOR Jotana	Oct.' 2004
7	IOR Gandhar	Jun.' 2005
8	IOR Neelam	July'2005
9	IOR North KadiPh-II	Nov.'2006
10	MHN Redevelopment	Dec.'2006
11	IOR North KadiPh-I	Apr.'2007
12	MHS Redevelopment	May'2007
13	IOR Sobhasan	May'2008
14	Addl. Development Heera Part - II	Jan.'2009
15	IOR Kalol	July'2010
16	Heera& South Heera Redevelopment	Nov.'2011

- 5 Six projects have made significant progress and are under various stages of implementation.
- 6 Two projects namely (IOR of B-173A Field & Development of Western Periphery of MH South) were approved recently for which work has been awarded and facilities are in progress.
- 7 The total expenditure on the 24 projects up to end Mar.'2013 is Rs. 31081 Crore (provisional) against the total plan of Rs. 41316 Crore.

- 8 867 development wells have been completed by end Mar.'2013 against the plan of 923 wells.
- 9 After implementation of the IOR-EOR schemes, the production performance of the major fields as a group has arrested the natural decline and overall production has improved.
- 10 The cumulative incremental oil gain up to Mar.'13 is in the order of 79.939 MMT (Provisional) against the plan of 103.867 MMT till end Mar.'2013.

OIL

- 1 Currently, the only pressure maintenance scheme being employed in OIL's fields is water injection. It is being undertaken in 12 reservoirs, with the total injection rate being around 9300 cubic metres per day.
- 2 ASP flooding is currently being adopted; to this effect, three reservoirs have been shortlisted.
- 3 MEOR has been undertaken in some wells with encouraging results.
- 4 Feasibility of exploitation of high pour point oil reserves is being studied.
- 5 Other IOR methods, such as horizontal drilling, microbial paraffin remediation jobs, optimization of artificial lift (namely gas lift and SRP), infill drilling, gravel packing, extension of perforations under live conditions, stimulation jobs etc are also undertaken for enhancement of recovery and production.

NEW TECHNOLOGY USED / ADOPTED

ONGC

The new technology adopted and its usefulness is given below :

Sm-Nd Dating facility: New state-of-the-art dating facility Sm-Nd (Samarium-Neodymium) has successfully been setup at ONGC (KDMIPE). It will be used to date hard rocks (Igneous and metamorphic) and to ascertain the provenance age in sedimentary rocks and correlation of reservoir lithologies.

Sea Bed Node (SBN) Technology: Sea bed node technology is now gaining acceptance in the industry over conventional towed streamer or OBC (Ocean Bottom Cable) technology as it can be used effectively in areas having many obstructions such as platforms, pipelines & other structures. The nodes can also be effectively used for multi-component recording in deep waters, full azimuth or wide azimuth surveys. These can also be used for Passive Seismic Studies.

ONGC has deployed for the first time Node Technology for 2D long offset reflection and refraction surveys in KK-DWN-2002/2 block in Kerala-Kokan basin for sub-basalt Mesozoic exploration. The survey has two parts: first 2200 KM 2D long offset of 12 KM spread and second 800 KM of Sea Bed Node (SBN) 40 KM offset on either side based Wide Angle Refraction cum Reflection Profiling seismic survey (WARRP) using 4 component SBN receivers.

Technology developed in house and absorbed during the year:

- ◆ Mitigation H₂S generation problem in wells of Mumbai High fields
- ◆ Development of microbial consortium (NJS4-96) for high temperature reservoirs (above 900 C) in carbonate environment
- ◆ Use of slow release fertilizer in bioremediation of Oil

In Offshore Production

- ◆ **FPSO Technology:** Implemented at D-1 Field, under implementation at Cluster- 7 fields. Floating Production Storage and Offloading Vessel FPSOs are effective in remote or deepwater locations. Advantages include: No expensive long export pipelines, makes smaller fields economically viable and can be used on numerous locations as fields deplete.
- ◆ **Float over Technology:** B-193 Process Platform (AP) & Living Quarter (AQ) was installed using new Technology of Float Over method, which is a reliable and cost-effective alternative to topside weights that are increasingly exceeding floating crane lifting capacities.
- ◆ **Twin Screw Horizontal Surface Multiphase Pump:** Implemented at D-1 Platform. Benefits include handling high gas volume fractions (GVF) and fluctuating inlet conditions (slugs). The pump remains functional even at GVF's of 95 %.
- ◆ **Venturi type surface choke:** Advantages are that any pressure fluctuations in downstream will not affect the gas throughput and eliminate instability in the upstream pressure and can be used in oil wells also for stable flow.
- ◆ **Visco-elastic foam acid system:** Implemented in Heera field. It increases the effective volume and reactive surface area of acid by 2-3 times, which increases the overall acid exposure in the formation.
- ◆ **Field trial for H₂S scavenger in gas lift lines of MH Asset:** Under implementation. Pipeline chemical injection system has been found as the best option because of lesser deck space and ease of operations.

- ◆ **Modified acid fracturing system:** Implemented in 3 wells of Heera field.
- ◆ **CPT/PCPT** based methods for pile capacity.
- ◆ The state of the art **Gas Hydrate Cell System for Gas Hydrate** prediction and characterization has been acquired and put in use for the purpose.

In Onshore Production

- ◆ As a part of innovative well completion strategy, Gravel Pack done in 12 1/4" hole for the first time in 3 new wells of Bechraji field.
- ◆ Comprehensive redevelopment of Gamij Field prepared under 'Stage Gate' process.
- ◆ Plunger lift commissioned successfully in 5 wells for improving productivity of intermittent gas lift wells.
- ◆ Initiation for implementation of WAG pilot scheme in sand GS-4(Central) has been taken-up. Three wells have been converted as WAG injectors.
- ◆ On recommendations of IOGPT, venturi type surface choke installed in three wells and production enhancement of about 15% was observed.
- ◆ Rajahmundry Asset carried out successful HF jobs in the HPHT environment with the help of M/s Halliburton in wells Nandigama#3 and Mandapeta#12. This resulted in gas gain of 29,000 m³/d and 37,000 m³/d in the 2 wells respectively. 2 more wells have been undertaken for HPHT HF. Results are being evaluated.

Drilling Services

1. Introduction of PBL tool: This large bore bypass tool is used for placing large size LCM pills through directional string without pulling out the string. This helps in safer, quicker and economical drilling of wells. The tool has been successfully used in wells of Western Offshore.
2. Introduction of casing drive system: This new technology is used for safe and smooth lowering of casings. Initially it is proposed to use in Mumbai offshore wells.
3. Introduction of Conductor Slot Recovery (CSR) : CSR is a low risk technique to reutilize slots of offshore platforms for drilling new wells to increase production by replacing old conductor with new.
4. Proprietary mud systems like KCI-PHPA-Glycol Mud system, Non-damaging Drilling Fluids, hollow glass sphere mud system & environment friendly SOBM (synthetic oil base mud systems).
5. Drilling of more & more hi-tech wells utilizing horizontal drilling, multi-lateral drilling, ERD, LDST, SDST on a larger scale in offshore as well as onshore fields.
6. Deep Water Drilling
 - During 2012-13, ONGC's has set a world record for drilling well in deepest water depth by an offshore drilling rig. The rig DDKG1 has spudded well NA-7#1 in exploratory block KG-DWN-2004/1 in east coast at a water depth of 3165m (10,385 feet) on Jan 23, 2013. Thereafter it successfully lowered and latched subsea BOP and riser on wellhead on Feb 09, 2013 to drill further to TD 5625m.

Well Services

1. **Coil Tubing Well Tractor Technology:** CT well Tractor deployed successfully for the first time in ONGC by WS, Mumbai to access the horizontal barefoot section of the drain-hole in well N_9#1H of MH Asset.
2. **New Frac Fluid based Frac Pack Technology:** Successfully completed of Frac pack job with K-formate based frac fluid & recovery of Cs-Formate Brine in well C_39P1#1 in offshore which is producing @ 0.15 MMSCMD gas.

3. **HF Technology in HPHT Wells:** Successfully implemented Hydro-fracturing technology in High Pressure and High Temp Wells NDG#3 & MWAO of KG Basin.

OIL

Technology used**i. Multifinger Imaging Tool (MIT):**

To assess corrosion damage, scale formation, wax, and solids accumulation; mechanical damage etc. within tubing and casing of old producing wells.

ii. Mechanical Plug- Back Tool (MPBT):

MPBT is an anchored elastomeric plug which is run through tubing and set in casing to plug off fluid flow in the casing below the plug

Benefits: Can be used without rig through tubing re-completions, using a mast or a crane.

The plug is drillable and can be set in open hole and at gravel pack screens. Saves rig time, when the tubing or the production string cannot be pulled out.

iii. High Resolution Laterolog:

Determination of R_t , Thin-bed analysis, Fracture identification and characterization, Deviated and horizontal well evaluation, Evaluation of heterogeneous reservoirs, Borehole profiling, Invasion characterization for permeability indication, Identification of fluid contacts.

iv. Compact Combo Logging Tool:

Reservoir delineation, hydrocarbon saturation determination and imaging, movable-hydrocarbon determination, location of porous and permeable zones, gas detection, porosity analysis, lithology determination, well-to-well correlation, thin-bed analysis

v. Quick Formation Pressure Tester (QFPT):

Pressure measurements and fluid mobilities in a fraction of the time required by multifunction formation testers, increase survey efficiency with minimized setting and retracting times, save time and cost with the elimination of additional wireline runs solely for acquiring pressure measurement data, reduced risk of sticking, reduced overall expenditure for pressure testing.

vi. Flow Scan Imager/ MAPS:

Unambiguous flow profiling in non vertical wells regardless of phase mixing or recirculation, More accurate flow measurements than possible with conventional logging tools in highly deviated and horizontal wells, three-phase flow rates computed in real time using dedicated algorithm.

vii. Multi-Frequency Dielectric Scanner (DS):

This tool gives direct measurement of water volume independent of water resistivity (R_w), dielectric dispersion analysis for In situ measurement of rock texture using multiple frequencies in both invaded and non invaded zones, continuous Archie M-N exponent log from rock texture measurements for determining saturations beyond the invaded zone and continuous C.E.C log for shaly sand analysis using multi frequency dielectric dispersion analysis.

viii. Motorized Tractor Services:

Conveyance of logging tools in highly deviated and horizontal wells, conveyance of logging tools in perforated casing, slotted liners, and gravel-pack screens and conveyance of logging tools in in-gauge barefoot completions.

ix. Elemental Capture Spectroscopy Logging (ECS/ GEM):

Integrated petrophysical analysis, clay fraction independent of gamma ray, spontaneous potential, and density neutron; matrix density and matrix neutron values for more accurate porosity calculation, mineralogy-based permeability estimates, coalbed methane bed delineation, producibility, and in situ reserves estimation.

x. Advance Remote Sensing as Direct Hydrocarbon Indicator (DHI) in MZ-ONN-2004/1 (Mizoram)

Advance Remote Sensing as Direct Hydrocarbon Indicator (DHI) study was carried out in two independent blocks (300 sq. km. in each block) viz; NELP-VI block (MZ-ONN-2004/1) in Mizoram and Sonari – Sapekhati – Borhat ML area in Assam. The technology of Earth remote sensing is based on Satellite Thermal Imaging Data in order to study deep subsurface structure and hydrocarbon potential of different geological provinces. There are cases of successful application of the said technology to detect or to confirm hydrocarbon deposits presence in several geological provinces of the globe. Along with achieved results on detection (or confirmation of known before) hydrocarbon deposits, thermal imaging technology possesses a number of technological advantages such as:

- ✓ Independence of surveying on surrounding conditions.
- ✓ Localization of objects surveyed in the vertical plane regarding electromagnetic waves receiver and independent of inclination angle of studied geological bodies or surfaces.
- ✓ Relatively low cost of the surveyed area unit if compared to other geophysical methods (e.g. seismic prospecting).

The advantages enumerated above are especially important in mountainous regions difficult to access and MZ-ONN-2004/1 Block being one of examples of such conditions. The present investigations attempted to complete the lack of continuous information revealing subsurface geometry based on thermal imaging data using methods of Thermodynamic Analysis (TDA) and Structural-Metrical Analysis (SMA).

xi. Seisloop Technique: for MZ-ONN-2004/1 (Mizoram) Block

Due to highly elevated terrain and poor logistics, in NELP-VI Block: MZ-ONN-2004/1 in Mizoram, conventional 2D and 3D seismic survey work could not be achievable in view of irregularities in fold geometry, higher statics, complex velocity and azimuth distributions etc to obtain realistic subsurface image.

To complete MWP 3D seismic survey work, a new technology (Seisloop Technique) has been adopted to apply in the Block MZ-ONN-2004/1, Mizoram area to delineate, map, analyze supra & sub-thrust structural & stratigraphic prospects, prioritize and rank the prospects and provide the drilling locations. Seisloop seismic data acquisition, processing and interpretation are specialized works to be carried out in the Mizoram area. The work is already under progress in the Mizoram Block.

PVT. / JV

- I. **Enhanced Oil Recovery in Rajasthan:** Cairn-ONGC JV is studying application of aqueous-based chemical flooding EOR techniques for the Mangala, Bhagyam and Aishwariya fields. Early application of chemical flooding in these fields has been designed to extend their oil production plateau periods, increase recovery factor, reduce water production, mitigate future decline rates and potentially accelerate crude oil production. Alkali and surfactant chemicals injection is planned to enhance the displacement efficiency. The first phase of laboratory studies for Mangala Field was successfully concluded in January 2007. The core-flood data was successfully matched in a reservoir simulator allowing full field simulation of polymer and Alkaline-Surfactant-Polymer (ASP) flooding and justify a pilot study in the field. Pilot phase for polymer flooding has been completed & pilot for ASP is to commence.

- II. **Intelligent Sucker Rod Pump (SRP)** was installed at one of the well in Kharsang field. It's first of its kind in India brought from Dyna Pump Company of United States. The concept of intelligent SRP is longer stroke length for increased pump efficiency and strokes are flexible (variable). It runs on hydraulic power. It has a touch screen system which display and store data with log of activities and the data can be downloaded easily. It can be remotely operated. Implementation of Intelligent SRP has resulted into increased production by 50% and reduction in well Interventions.
- III. **Extended Reach Drilling (ERD)** by BGEPIL in PSC area Tapti. The drilled wells MTA-L-B (MTA-7), MTA-U-B (MTA-8) and MTA-U-C (MTA-9) are all Extended Reach Drilling (ERD) with approximately 4-4.5 km step out which are the longest in India.

ENVIRONMENTAL ISSUES & CSR

ROLE of DGH towards Safety & Environment

Regulatory oversight alone is not sufficient to ensure adequate safety and environmental protection. The Oil & Gas Industry needs to take its own, unilateral steps to increase dramatically safety throughout the industry including self policing mechanisms that supplement governmental enforcement. This goes a long way in building trust of the stakeholders. DGH under the aegis of MOP&NG ensures through the stipulations of the Production Sharing Contract under its Article 14, use of modern oil field and petroleum industry practices and standards including advance techniques, practices and methods of operation and compliance of applicable laws for protection of environment and conservation of natural resources.

Studies by DGH on environmental issues

DGH with its proactive approach initiated a major study to address some of the key environmental issues like Probable Land Subsidence Study in a shallow gas reservoir at Surat in Gujarat.

Study on monitoring probable Land subsidence at CB-ONN-2000/2 block by Central Institute of Mining & Fuel Research (CIMFR), Dhanbad (Formerly known as CMRI, Dhanbad).

DGH assigned the job to carry out for the first time in India, the land subsidence study in Surat Block CB-ONN-2000/2 to CIMFR, Dhanbad an institution of Government of India under CSIR. This study has been carried out every year to monitor probability of land subsidence over a considerable period till end of production phase, for a better evaluation of land subsidence and for a data bank for future reference as well.

In the final report of CIMFR received by DGH on 04.10.2012, the cumulative Subsidence investigations conducted since August, 2004 till December 2011 concluded that all the villages lying above the gas reservoir are safe as the magnitude of ground movements are well within the safe limits.

Offshore Safety and Environment Protection

With increasing shipping movement due to crude oil imports & upcoming deep water E&P activities in Indian waters and the aftermath of Macondo oil well blowout in Gulf of Mexico, following a review meeting of MoP&NG on 23rd June 2010 having representatives of MOEF, OISD, DGH, Coast Guard and all offshore operators were in attendance, where it was reiterated that all E&P companies must be prepared for any contingencies even at the cost of redundancy in safety systems reckoning the Gulf of Mexico disaster as a wakeup call. The aim for 100% safe operations through up gradation of SOP's and lessons learnt must be maintained. In this regard the Indian Coast Guard has taken up the matter with concerned ministries in setting up two oil response centres as proposed by DGH -one in the East Coast and the other in the West coast of India similar to OSRL, U.K to handle larger oil spill, for adequate oil spill response capability. Further, based on the sensitivity and activities, eight locations in East Coast and West Coast of India were identified and MOU were set for pooling resources as mutual aid among operators and ports to enhance oil spill response capability.

Tier I level Oil spill response facilities has been made mandatory during exploration/production phase to combat oil spill at incipient stage and it is being complied by all the offshore operators. Presently Coast Guard is equipped with Level II and Level III oil spill response facilities. All E&P operators are members of OSRL, U.K. for level II & III oil spill response facilities. Coast Guard and other organisations are imparting training to build up trained power to handle the response. There has been a close coordination among DGH, OISD, ICG and Ports on the issue of oil spill response capacity build up for E&P sector.

Contribution to ecological restoration and environmental remediation by NOC's**ONGC**

ONGC has commitment to protect environment and arrest climate change agents in the written documented form of HSE policy as well as Climate Change and Sustainability Policy. ONGC has always given great importance to tree plantation with emphasis on survival of planted saplings. Two such massive projects undertaken by ONGC are: (1) Mangrove Restoration and Conservation Education Unit" started in March 2007. (2) Ringal Bamboo Plantation started in 2010.

- a. **Mangrove Plantation:** ONGC has undertaken massive mangrove plantation drive in operational areas. In the Phase 1 of the project, 12 lakh saplings and about 5 lakh seeds and propagules were planted in the soil erosion-prone area along the coast of the Dhada river at Ankleshwar with the total cost of 1.99 Crores. Following the success of the Phase 1 of 'Mangrove Restoration and Conservation Education Project' at Ankleshwar, in FY 2012-2013, ONGC has gone for the continuation of the mangrove plantation at Ankleshwar and Hazira. Ongoing Mangrove Plantation under Phase II envisages plantation of 1 lakh mangroves in Hazira and 5 lakh mangroves in Gandhar with the cost of 30 Lakhs and 1.14 Crores respectively
- b. **Ringal Plantation:** We are working on a long-term project to plant Ringal Bamboo in the fragile Upper Himalayan Region which is also focus area outlined in National Action Plan for Climate Change by Prime Minister. This project extends over a period of 5 years and covers an area of 730 hectares. Under Phase I & II, 7.0 Lakh Plants in Upper Himalayas were planted in the area of 280 Hectares with the cost of Rs. 1.90 Crore, ONGC signed a Project Agreement with Hemwati Nandan Bahuguna Garhwal University, Srinagar, on 01.03.12 for third party verification of Ringal Plantation under phase II. Phase III of ringal plantation was launched in FY 2012-2013 for planting 3.75 Lakh Plants in 150 Hectare with cost of Rs. 82.4 Lakhs.

Environmental Remediation

Bioremediation of oily wastes is a process of treating the organic wastes. The technology involves the utilization of naturally occurring microbial consortium for treatment of the waste. The said microbial consortium is applied in the Oil contaminated soil/ Oily sludge along-with requisite nutrients which result into the conversion of harmful waste to non –harmful chemicals. An environmentally sound technique of bioremediation is being employed effectively in ONGC since 2007. After the formation of joint venture ONGC-TERI Biotech Limited (OTBL), all the oily sludge is being treated through bioremediation by OTBL. In the FY 2012-2013 approximately 25000 MT of oily sludge was treated through OTBL.

In continuation with the practice a renewed Rate Contract was signed between ONGC and ONGC-TERI Biotech Limited (OTBL) for Bioremediation of Oily Waste in presence of Director (Exploration)-I/c HSE Shri N K Verma on 8th May 2013 at New Delhi. The annual quantity of oily waste to be offered to OTBL for bioremediation is 25,000 MT per year and total contract quantity is 75,000 MT for 3 years.

OIL**Water harvesting at Mz-8 in MZ-ONN-2004/1 (Mizoram):**

In the location Mz-8, which was constructed by cutting and leveling a hill, an artificial pond was created by partially blocking the natural stream which was flowing by the side of the plinth. A culvert was also placed in the retaining wall along with construction of a drain to allow the surplus water to flow as usual. This has resulted in storing some water which otherwise would have gone waste by flowing down stream, without physically stopping flow of the stream. A water body has thus been created from which water could be used for day to day use and drilling the well. This is a good example of water harvesting which is very much required in state like Mizoram where there is acute shortage of water during winter.

Rajasthan Project:

- ✓ Drilling waste water including drill cuttings collected in disposal pit lined with HDPE linings.
- ✓ The membership of common TSDF has been obtained for the disposal of drill cuttings and hazardous waste in accordance to handling and disposal of Hazardous Wastes (Management and Handling) Rules, 1989/ 2003.
- ✓ A garland drain is constructed around the well plinth to prevent overflow / runoff of any oil contained water in to the nearby water bodies.
- ✓ BOP drills are carried out at regular intervals.
- ✓ Periodic medical examination of every employee once in five years is continued to monitor occupational health.
- ✓ Six monthly reports on the status of compliance of the EC conditions is being submitted to MOEF.
- ✓ MSDS of all the chemical used are displayed at sites.
- ✓ Acoustic DG sets are deployed at all sites to keep the noise level within the limit.

The company has made a contingency plan for emergency including all necessary aspects from evacuation to resumption of normal operations. The workers are provided with personal protective gears in all sites.

Corporate Social Responsibility (CSR) by E&P Companies

We are living at a time when the social context of business is being redefined. From the past decade, the social demand made on companies to be environmentally and socially responsible in their business has been increasing at unprecedented rates. The Companies now recognise the importance of Corporate Social Responsibility and the need to strike a balance between the overall objectives of achieving corporate excellence vis-à-vis the corporate responsibility towards the community.

Operators are making significant social investments in the communities where they operate and also contribute positively to local sustainability through their operations. The Corporate Social Responsibility (CSR) programmes by E&P companies in India fall under the various thematic areas of Education, Livelihood, Medical & Health, Environment, Disaster relief, Women empowerment, Cultural, Community improvement, Welfare, Economic Infrastructure & human development.

All CSR projects are mainly carried out by following ways:

- a) Directly by Operator/JV
- b) In association with State Government Departments
- c) In partnership with reputed NGOs
- d) By donation

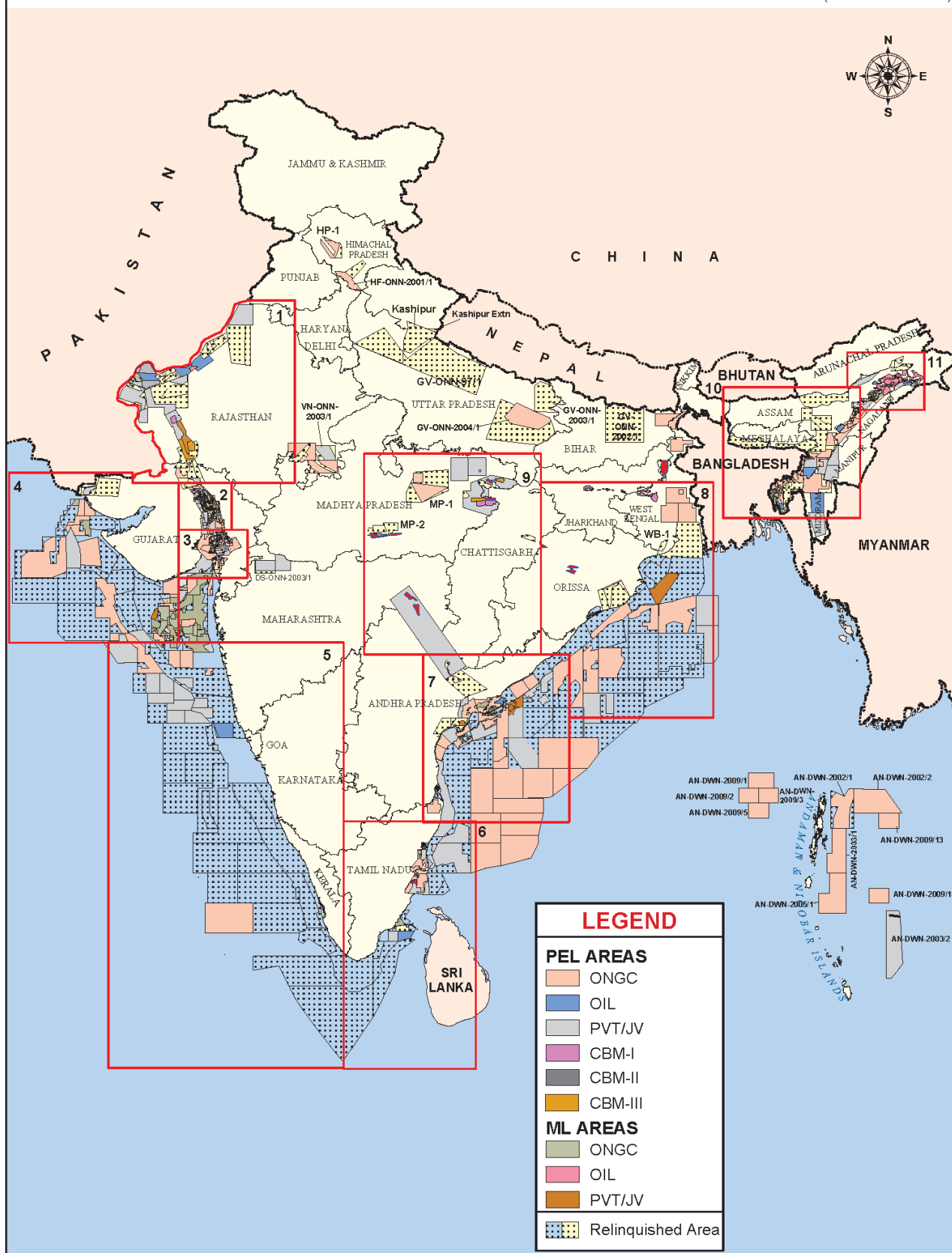


SUPPLEMENTARY INFORMATION

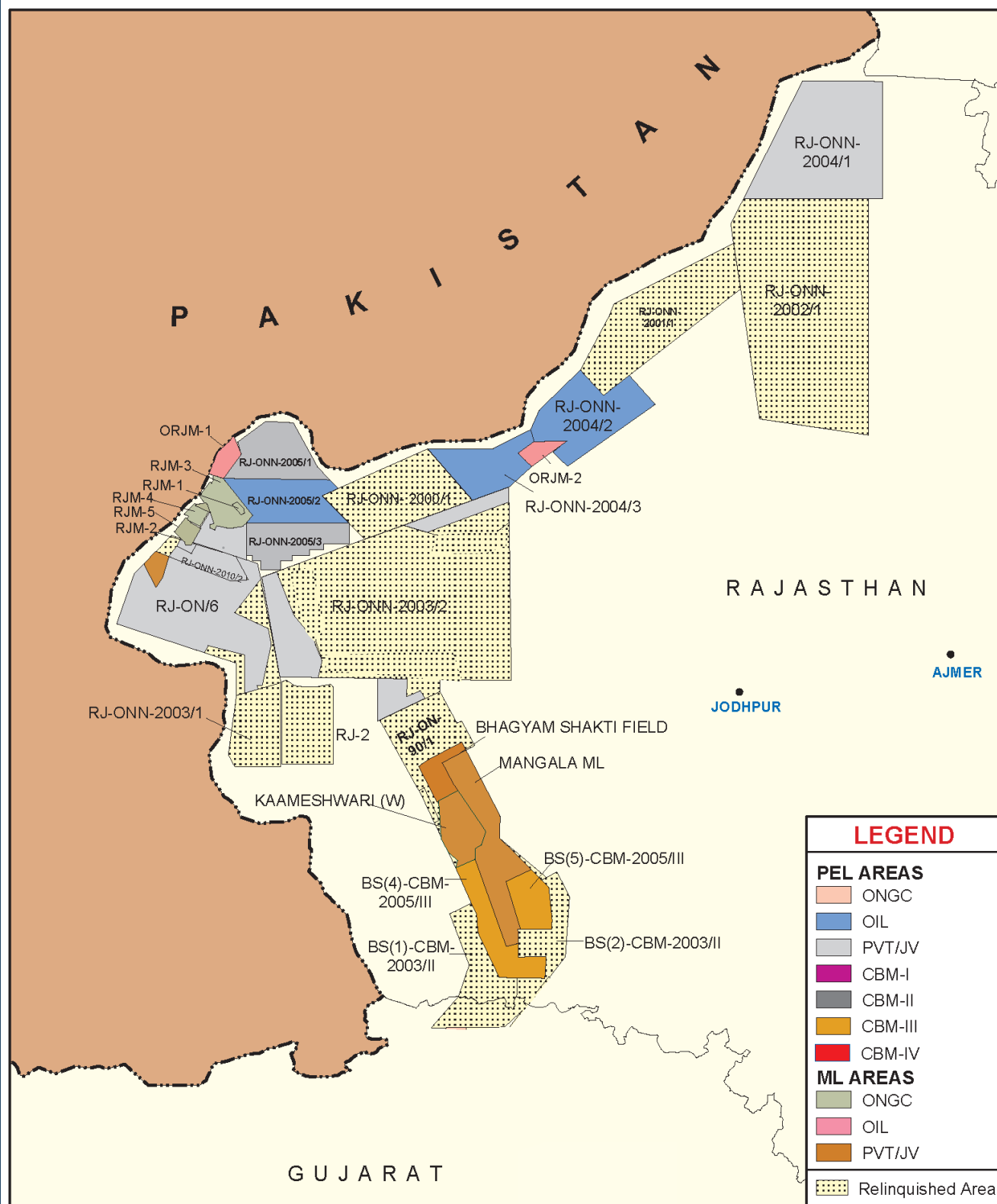
- PEL & ML Details
- Inplace reserves accretion, Oil/Gas Discoveries & Production trends
- Details of Oil & Gas Discoveries in Pre-NELP and NELP
- Initiatives by Government of India
- RTI Annual Return Information
- Extracts from XIITH Five Year Plan
- Extracts from BP Statistics Review
- Glossary of common Oil field Terms
- List of some companies in Indian E&P sector

PEL AND ML AREAS UNDER OPERATION BY ONGC, OIL AND PVT/JV COMPANIES

(AS ON 01.04.2013)



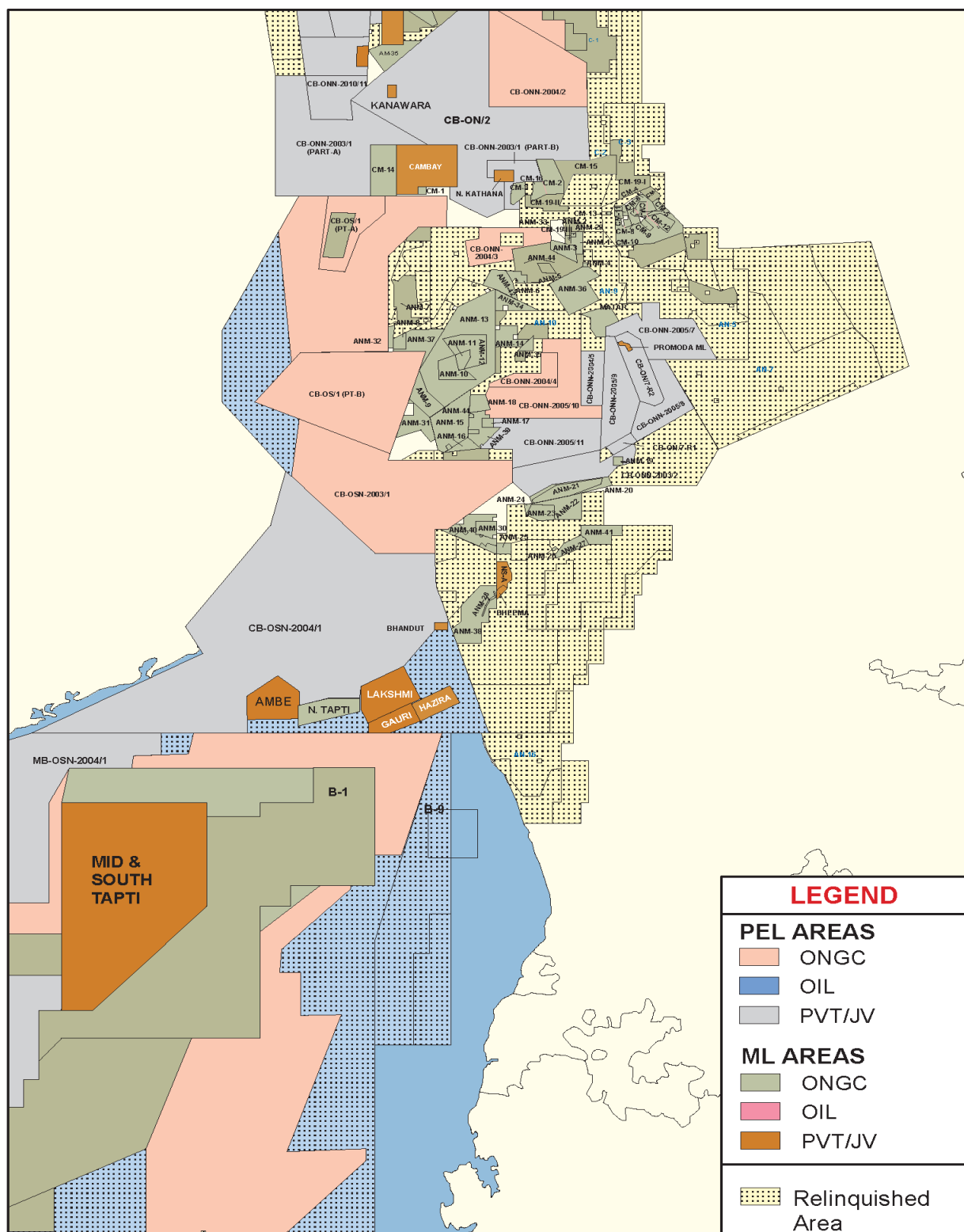
1. RAJASTHAN BASIN



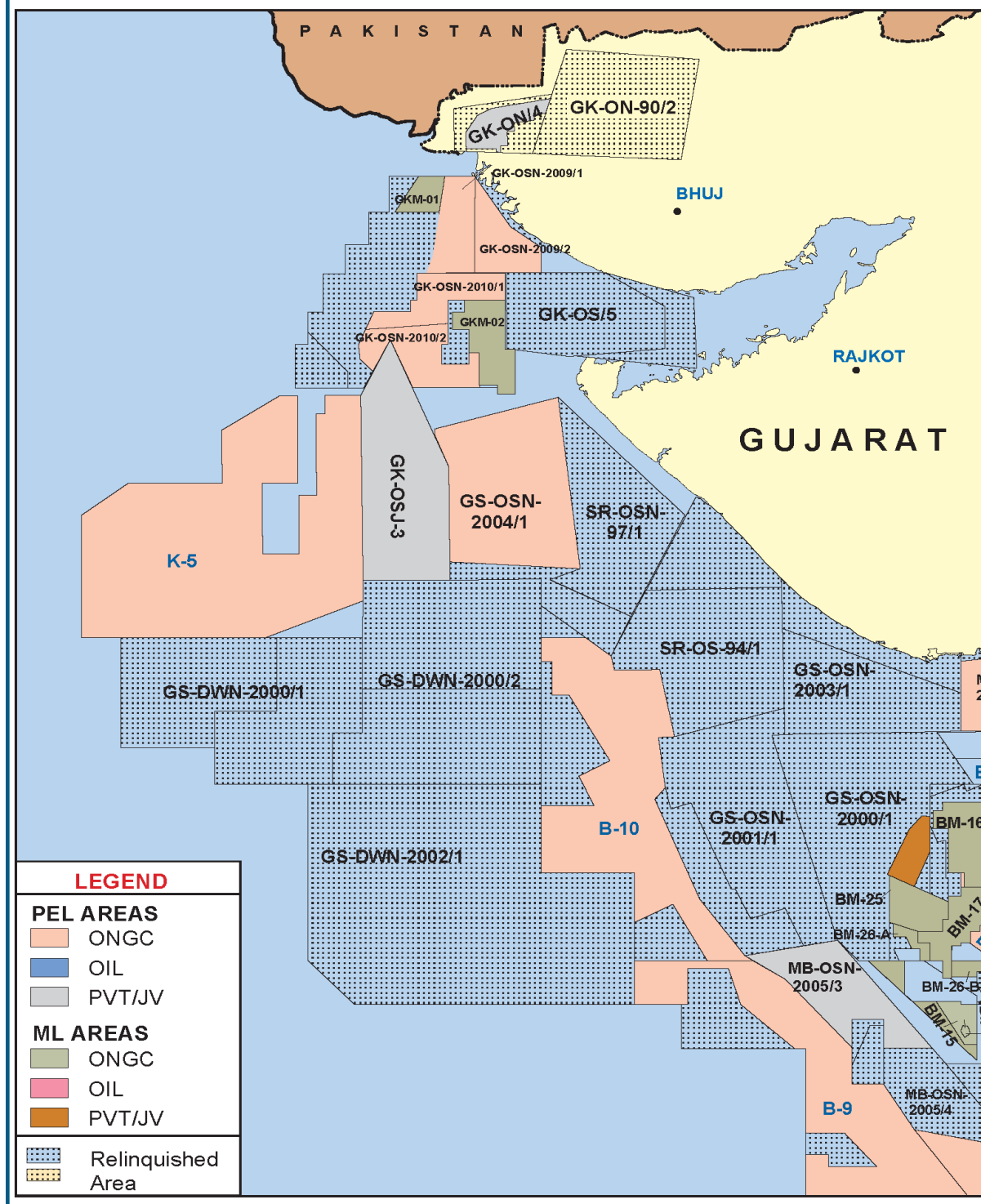
2. NORTH CAMBAY BASIN

The map displays the North Cambay Basin, a significant oil and gas region. It is divided into various fields and areas, categorized by ownership and type. The legend indicates that PEL AREAS (Production License Areas) include ONGC (orange), OIL (blue), and PVT/JV (grey). ML AREAS (Mineral Lease Areas) include ONGC (green), OIL (pink), and PVT/JV (brown). The map also shows a Relinquished Area (dotted pattern). The boundary between RAJASTHAN and GUJARAT is clearly marked. The map includes numerous field names and codes, such as CB-ONN-2010/1, CB-ONN-2010/3, CB-ONN-2010/4, CB-ONN-2010/5, CB-ONN-2010/6, CB-ONN-2010/7, CB-ONN-2010/8, CB-ONN-2010/9, CB-ONN-2010/10, CB-ONN-2010/11, CB-ONN-2010/12, CB-ONN-2010/13, CB-ONN-2010/14, CB-ONN-2010/15, CB-ONN-2010/16, CB-ONN-2010/17, CB-ONN-2010/18, CB-ONN-2010/19, CB-ONN-2010/20, CB-ONN-2010/21, CB-ONN-2010/22, CB-ONN-2010/23, CB-ONN-2010/24, CB-ONN-2010/25, CB-ONN-2010/26, CB-ONN-2010/27, CB-ONN-2010/28, CB-ONN-2010/29, CB-ONN-2010/30, CB-ONN-2010/31, CB-ONN-2010/32, CB-ONN-2010/33, CB-ONN-2010/34, CB-ONN-2010/35, CB-ONN-2010/36, CB-ONN-2010/37, CB-ONN-2010/38, CB-ONN-2010/39, CB-ONN-2010/40, CB-ONN-2010/41, CB-ONN-2010/42, CB-ONN-2010/43, CB-ONN-2010/44, CB-ONN-2010/45, CB-ONN-2010/46, CB-ONN-2010/47, CB-ONN-2010/48, CB-ONN-2010/49, CB-ONN-2010/50, CB-ONN-2010/51, CB-ONN-2010/52, CB-ONN-2010/53, CB-ONN-2010/54, CB-ONN-2010/55, CB-ONN-2010/56, CB-ONN-2010/57, CB-ONN-2010/58, CB-ONN-2010/59, CB-ONN-2010/60, CB-ONN-2010/61, CB-ONN-2010/62, CB-ONN-2010/63, CB-ONN-2010/64, CB-ONN-2010/65, CB-ONN-2010/66, CB-ONN-2010/67, CB-ONN-2010/68, CB-ONN-2010/69, CB-ONN-2010/70, CB-ONN-2010/71, CB-ONN-2010/72, CB-ONN-2010/73, CB-ONN-2010/74, CB-ONN-2010/75, CB-ONN-2010/76, CB-ONN-2010/77, CB-ONN-2010/78, CB-ONN-2010/79, CB-ONN-2010/80, CB-ONN-2010/81, CB-ONN-2010/82, CB-ONN-2010/83, CB-ONN-2010/84, CB-ONN-2010/85, CB-ONN-2010/86, CB-ONN-2010/87, CB-ONN-2010/88, CB-ONN-2010/89, CB-ONN-2010/90, CB-ONN-2010/91, CB-ONN-2010/92, CB-ONN-2010/93, CB-ONN-2010/94, CB-ONN-2010/95, CB-ONN-2010/96, CB-ONN-2010/97, CB-ONN-2010/98, CB-ONN-2010/99, CB-ONN-2010/100, CB-ONN-2010/101, CB-ONN-2010/102, CB-ONN-2010/103, CB-ONN-2010/104, CB-ONN-2010/105, CB-ONN-2010/106, CB-ONN-2010/107, CB-ONN-2010/108, CB-ONN-2010/109, CB-ONN-2010/110, CB-ONN-2010/111, CB-ONN-2010/112, CB-ONN-2010/113, CB-ONN-2010/114, CB-ONN-2010/115, CB-ONN-2010/116, CB-ONN-2010/117, CB-ONN-2010/118, CB-ONN-2010/119, CB-ONN-2010/120, CB-ONN-2010/121, CB-ONN-2010/122, CB-ONN-2010/123, CB-ONN-2010/124, CB-ONN-2010/125, CB-ONN-2010/126, CB-ONN-2010/127, CB-ONN-2010/128, CB-ONN-2010/129, CB-ONN-2010/130, CB-ONN-2010/131, CB-ONN-2010/132, CB-ONN-2010/133, CB-ONN-2010/134, CB-ONN-2010/135, CB-ONN-2010/136, CB-ONN-2010/137, CB-ONN-2010/138, CB-ONN-2010/139, CB-ONN-2010/140, CB-ONN-2010/141, CB-ONN-2010/142, CB-ONN-2010/143, CB-ONN-2010/144, CB-ONN-2010/145, CB-ONN-2010/146, CB-ONN-2010/147, CB-ONN-2010/148, CB-ONN-2010/149, CB-ONN-2010/150, CB-ONN-2010/151, CB-ONN-2010/152, CB-ONN-2010/153, CB-ONN-2010/154, CB-ONN-2010/155, CB-ONN-2010/156, CB-ONN-2010/157, CB-ONN-2010/158, CB-ONN-2010/159, CB-ONN-2010/160, CB-ONN-2010/161, CB-ONN-2010/162, CB-ONN-2010/163, CB-ONN-2010/164, CB-ONN-2010/165, CB-ONN-2010/166, CB-ONN-2010/167, CB-ONN-2010/168, CB-ONN-2010/169, CB-ONN-2010/170, CB-ONN-2010/171, CB-ONN-2010/172, CB-ONN-2010/173, CB-ONN-2010/174, CB-ONN-2010/175, CB-ONN-2010/176, CB-ONN-2010/177, CB-ONN-2010/178, CB-ONN-2010/179, CB-ONN-2010/180, CB-ONN-2010/181, CB-ONN-2010/182, CB-ONN-2010/183, CB-ONN-2010/184, CB-ONN-2010/185, CB-ONN-2010/186, CB-ONN-2010/187, CB-ONN-2010/188, CB-ONN-2010/189, CB-ONN-2010/190, CB-ONN-2010/191, CB-ONN-2010/192, CB-ONN-2010/193, CB-ONN-2010/194, CB-ONN-2010/195, CB-ONN-2010/196, CB-ONN-2010/197, CB-ONN-2010/198, CB-ONN-2010/199, CB-ONN-2010/200, CB-ONN-2010/201, CB-ONN-2010/202, CB-ONN-2010/203, CB-ONN-2010/204, CB-ONN-2010/205, CB-ONN-2010/206, CB-ONN-2010/207, CB-ONN-2010/208, CB-ONN-2010/209, CB-ONN-2010/210, CB-ONN-2010/211, CB-ONN-2010/212, CB-ONN-2010/213, CB-ONN-2010/214, CB-ONN-2010/215, CB-ONN-2010/216, CB-ONN-2010/217, CB-ONN-2010/218, CB-ONN-2010/219, CB-ONN-2010/220, CB-ONN-2010/221, CB-ONN-2010/222, CB-ONN-2010/223, CB-ONN-2010/224, CB-ONN-2010/225, CB-ONN-2010/226, CB-ONN-2010/227, CB-ONN-2010/228, CB-ONN-2010/229, CB-ONN-2010/230, CB-ONN-2010/231, CB-ONN-2010/232, CB-ONN-2010/233, CB-ONN-2010/234, CB-ONN-2010/235, CB-ONN-2010/236, CB-ONN-2010/237, CB-ONN-2010/238, CB-ONN-2010/239, CB-ONN-2010/240, CB-ONN-2010/241, CB-ONN-2010/242, CB-ONN-2010/243, CB-ONN-2010/244, CB-ONN-2010/245, CB-ONN-2010/246, CB-ONN-2010/247, CB-ONN-2010/248, CB-ONN-2010/249, CB-ONN-2010/250, CB-ONN-2010/251, CB-ONN-2010/252, CB-ONN-2010/253, CB-ONN-2010/254, CB-ONN-2010/255, CB-ONN-2010/256, CB-ONN-2010/257, CB-ONN-2010/258, CB-ONN-2010/259, CB-ONN-2010/260, CB-ONN-2010/261, CB-ONN-2010/262, CB-ONN-2010/263, CB-ONN-2010/264, CB-ONN-2010/265, CB-ONN-2010/266, CB-ONN-2010/267, CB-ONN-2010/268, CB-ONN-2010/269, CB-ONN-2010/270, CB-ONN-2010/271, CB-ONN-2010/272, CB-ONN-2010/273, CB-ONN-2010/274, CB-ONN-2010/275, CB-ONN-2010/276, CB-ONN-2010/277, CB-ONN-2010/278, CB-ONN-2010/279, CB-ONN-2010/280, CB-ONN-2010/281, CB-ONN-2010/282, CB-ONN-2010/283, CB-ONN-2010/

3. SOUTH CAMBAY BASIN



4. KUTCH-SAURASHTRA BASIN



5. MUMBAI OFFSHORE & KERALA - KONKAN BASIN

The map displays the Mumbai Offshore & Kerala - Konkan Basin, showing various oil and gas fields. The legend indicates the following areas:

- PEL AREAS**
 - ONGC (Orange)
 - OIL (Blue)
 - PVT/JV (Grey)
- ML AREAS**
 - ONGC (Green)
 - OIL (Pink)
 - PVT/JV (Brown)
- Relinquished Area** (Dotted pattern)

The map also shows the Arabian Sea to the west, and the states of Gujarat, Maharashtra, Goa, Karnataka, Kerala, and Tamil Nadu to the east. Key locations marked include Mumbai, Panaji, Calicut, and Cochin. The map is titled "5. MUMBAI OFFSHORE & KERALA - KONKAN BASIN".

6. CAUVERY BASIN

The map displays the Cauvery Basin, a significant oil and gas field located in the Bay of Bengal. The basin is divided into various areas, including PEL (Petroleum) and ML (Mineral Lease) areas. The map shows the coastline of India, with Tamil Nadu and Karnataka visible. The Bay of Bengal is to the east, and Sri Lanka is to the south. The map includes labels for major cities like Bangalore, Chennai, and Pondicherry. The legend in the bottom right corner defines the colors and patterns used for the different areas:

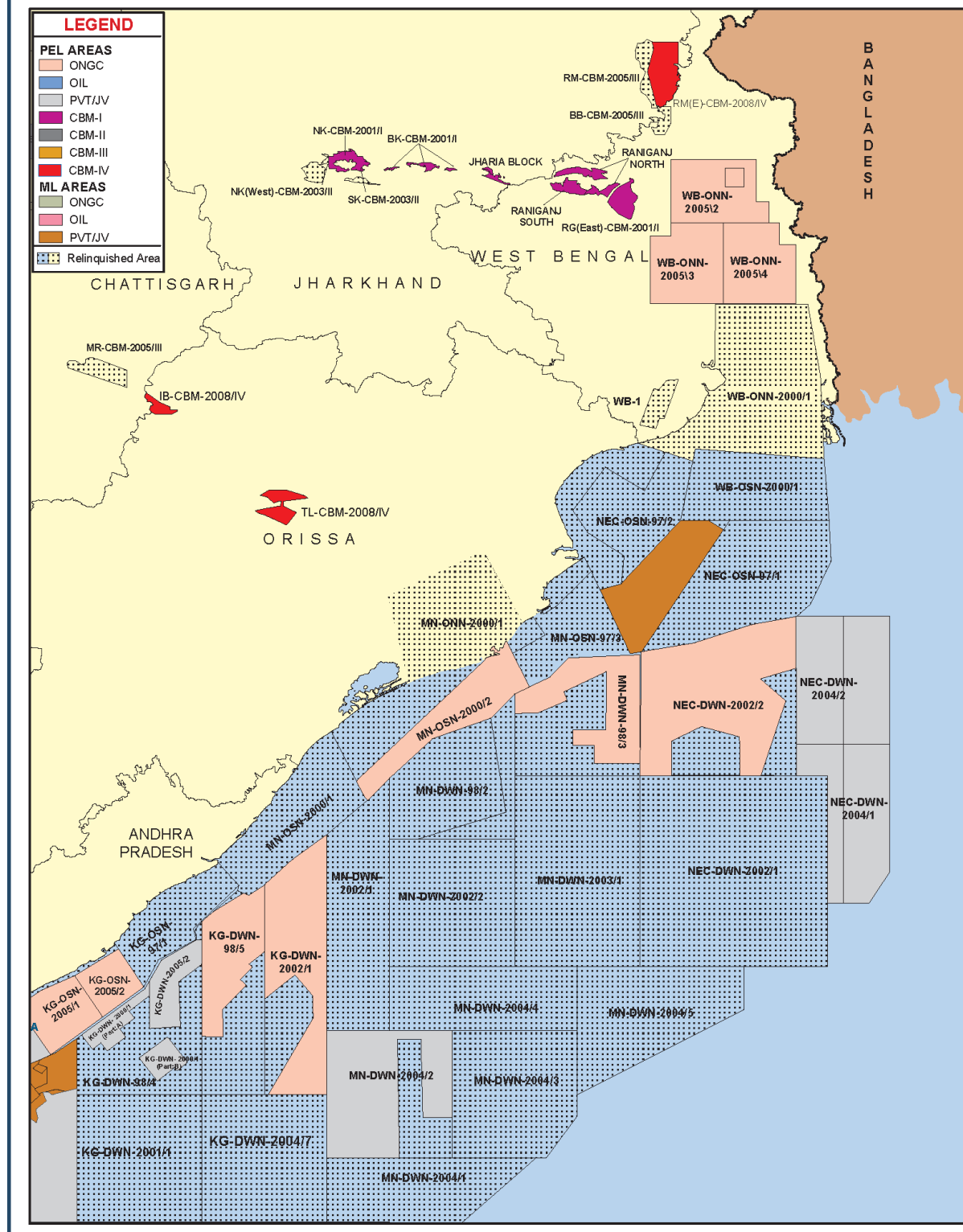
- PEL AREAS**
 - ONGC (Orange)
 - OIL (Blue)
 - PVT/JV (Grey)
- ML AREAS**
 - ONGC (Green)
 - OIL (Pink)
 - PVT/JV (Brown)
- Relinquished Area** (Patterned)

Key areas labeled on the map include:

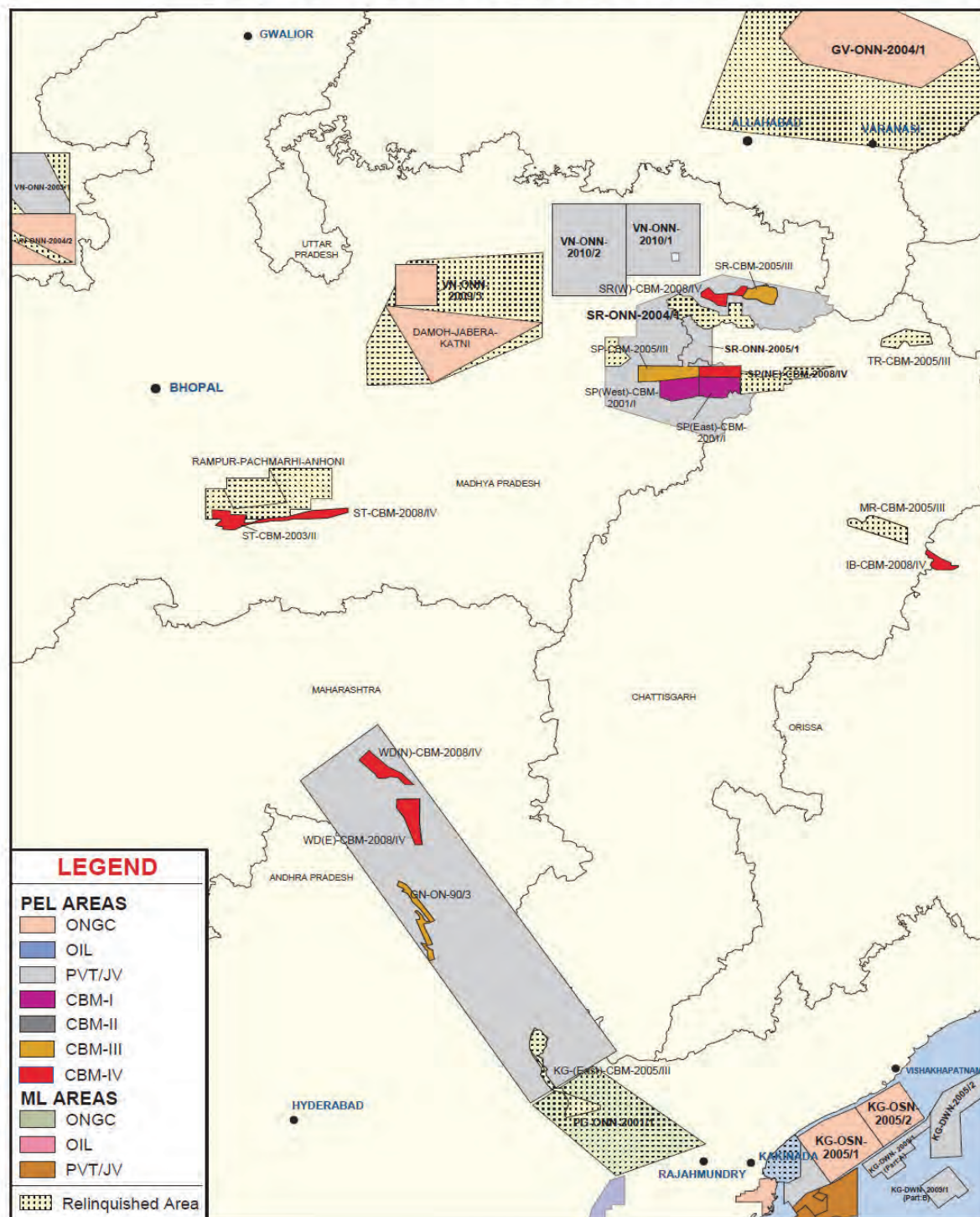
- CY-ONN-2002/1
- CY-ONN-2002/2
- CY-ONN-2004/2
- CY-ONN-2003/1
- CY-OSN-2009/1
- CY-OSN-2009/2
- CY-OSN-2001/1
- CY-OSN-2001/2
- CY-OSN-2001/3
- CY-OSN-2001/4
- CY-OSN-2001/5
- CY-OSN-2001/6
- CY-OSN-2001/7
- CY-OSN-2001/8
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- CY-OSN-2001/95
- CY-OSN-2001/96
- CY-OSN-2001/97
- CY-OSN-2001/98
- CY-OSN-2001/99
- CY-OSN-2001/100

The map displays the coastal region of India, focusing on the Bay of Bengal. It shows various Petroleum Exploration and Production (PEL) areas, categorized by color and pattern. The legend indicates that PEL areas include ONGC (light orange), Oil (blue), and PVT/JV (grey). ML areas include ONGC (light green), Oil (pink), and PVT/JV (brown). Relinquished areas are shown with a blue dotted pattern. The map also labels several states and cities, including Chhattisgarh, Orissa, Andhra Pradesh, Tamil Nadu, and Chennai. Key locations like Vishakhapatnam, Rajahmundry, and Kakinada are marked. Numerous PEL areas are identified by codes such as KG-ONN-2004/1, KG-DWN-2002/1, and KG-OSN-2005/1. The map also shows the coastline of India and the Bay of Bengal.

8. MAHANADI - NEC - BENGAL - DAMODAR BASINS



9. SATPURA-PRANHITA GODAVARI BASINS



LEGEND

PEL AREAS

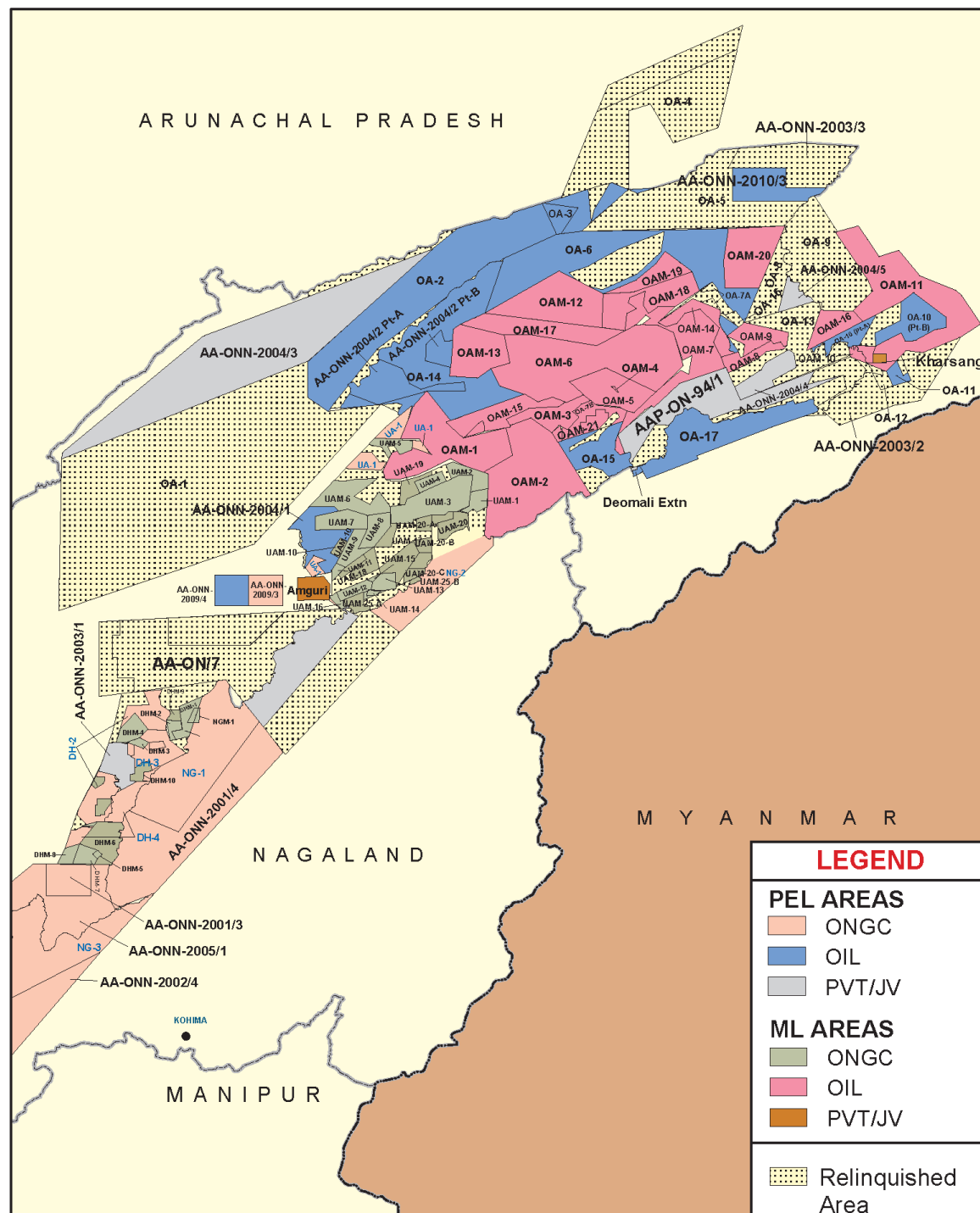
- ONGC
- OIL
- PVT/JV

ML AREAS

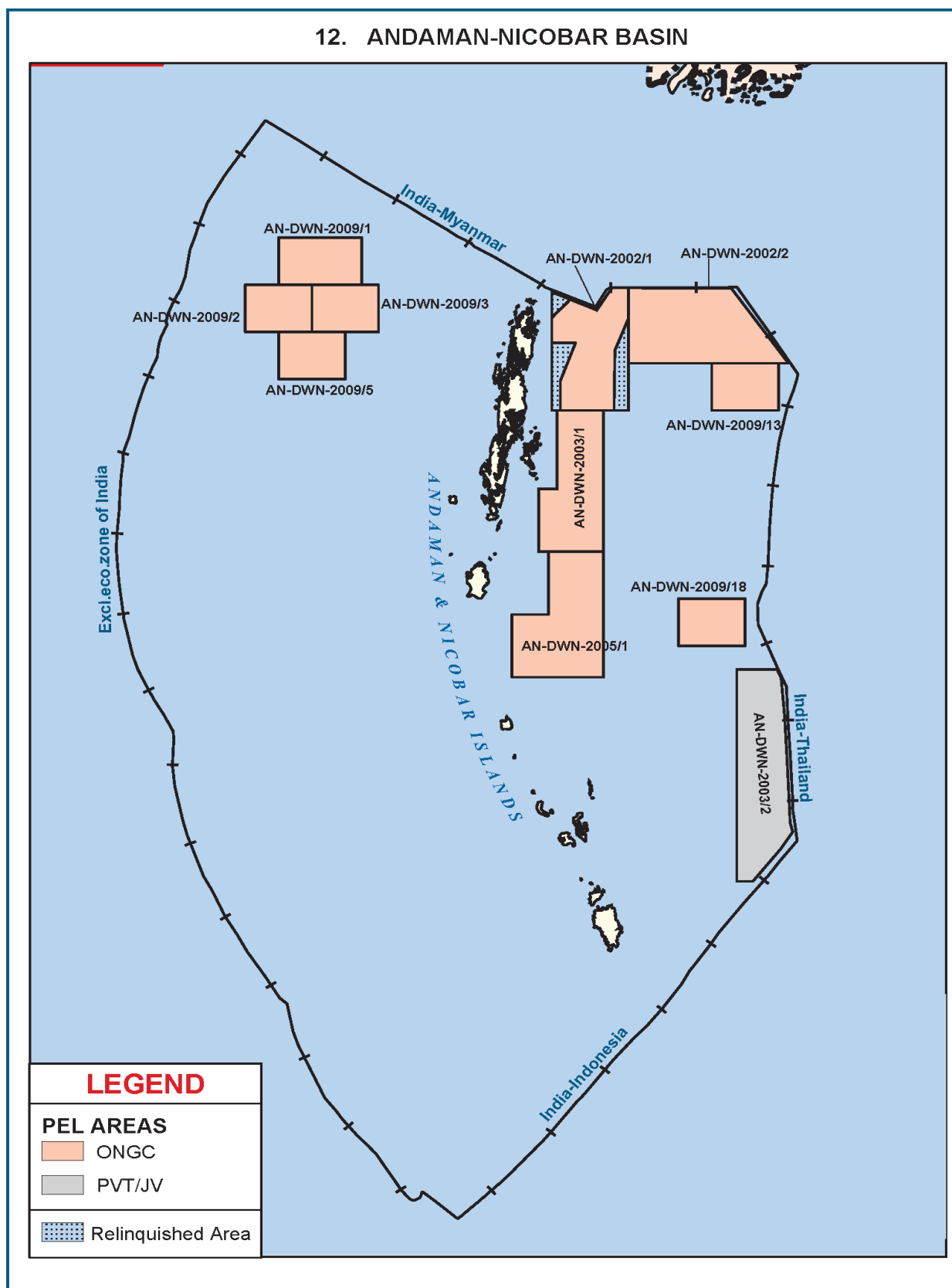
- ONGC
- OIL
- PVT/JV

Relinquished Area

11. ASSAM-ARAKAN BASIN



12. ANDAMAN-NICOBAR BASIN



PELs OPERATED BY OIL

As on 01.04.2013

Sl. No.	BASIN	BLOCK NAME	REF. NO. ON MAP	EFFECTIVE DATE OF PEL	AREA (Sq. Km.)	TOTAL AREA (Sq. Km.)
NOMINATION BLOCKS						
1	Assam-Arakan	Murkongselek (NF)	OA-2	01.04.02	449.00	
2		Tinsukia	OA-6	01.04.02	480.00	
3		Namchik	OA-10	01.05.05	195.00	
4		Deomali	OA-17	18.02.05	113.50	
5		Dibrugarh	OA-14	01.04.02	427.00	
6		Borhat	OA-15	04.04.02	111.00	
7		Jairampur Extn.	OA-11	01.04.06	23.25	
8		Murkongselek (F)	OA-3	01.04.08	95.00	
TOTAL					1893.75	
PRE-NELP / NELP BLOCKS						
1	Rajasthan	RJ-ONN-2004/2	20	21.01.08	2196.00	3713.00
2		RJ-ONN-2005/2	15	22.12.08	1517.00	
3	Assam-Arakan	AA-ONN-2002/3	N-48	05.02.05	1095.00	
4		AA-ONN-2004/2	10	28.06.07	218.00	
5		AA-ONN-2009/4	4	30.06.10	84.00	
6		AA-ONN-2010/2	2	28.03.12	396.00	
7		AA-ONN-2010/3	3	28.03.12	171.00	
8	Mizoram	MZ-ONN-2004/1	7	22.05.07	3213.00	3213.00
9	Krishna - Godavari	KG-ONN-2004/1	28	16.02.08	511	511.00
10	Cauvery	CY-OSN-2009/2	S-20	30.06.10	1621	1621.00
11	Mumbai	MB-OSN-2010/2	S-4	30.08.12	3411	3411.00
TOTAL					14,433.00	
GRAND TOTAL					16,326.75	

PELs OPERATED BY ONGC

As on 01.04.2013

Sl. No.	BASIN	BLOCK NAME	REF. NO. ON MAP	EFFECTIVE DATE OF PEL	AREA (Sq. Km.)	TOTAL AREA (Sq. Km.)
NOMINATION BLOCKS						
1	Cambay	Patan-Tharad	M-1	04.09.05	11.10	41.37
2		Valod	A-10	10.12.05	30.27	
3	Assam - Arakan	Sibsagar District	UA-1	01.04.02	456.50	3013.50
4		Merapani	DH-3	01.10.01	60.00	
5		Golaghat District	DH-4	20.01.01	83.00	
6		Sector-V C (Assam)	CH-4	01.04.04	824.00	
7		Bhagty Bhandari	NG-1	28.04.06	620.00	
8		Singphan	NG-2	28.04.06	320.00	
9		Dimapur	NG-3	28.04.06	650.00	
10	Himalayan Foreland	Kangra-Mandi	HP-1	10.11.03	1828.00	1828.00
11	Vindhyan	Damoh-Jabera-Katni	MP-1	10.11.03	4208.00	4208.00
TOTAL ONLAND						9090.87
12	Gujarat-Kutch Offshore	GK-DW-1	K-5	01.10.04	16557.00	16557.00
13	Mumbai Offshore	BB-OS-DW-I	B-9	28.12.04	7537.00	16487.00
14		BB-OS-DW-II	B-10	28.12.04	8950.00	
15	K-G Offshore	Block - IA	KGO-5	22.10.04	74.00	1264.00
16		KG-OS-DW-III	KGO-7	15.05.03	1190.00	
TOTAL OFFSHORE						34,308.00
TOTAL NOMINATION						43,398.87
PRE-NELP / NELP BLOCKS						
1	Cambay	CB-OS/1	6	19.11.06	846.00	4641.50
2		CB-ONN-2001/1	N45	19.08.03	26.00	
3		CB-ONN-2002/1	N52	18.10.04	36.00	
4		CB-OSN-2003/1	N57	05.12.05	1795.50	
5		CB-ONN-2004/1	22	20.10.07	32.00	
6		CB-ONN-2004/2	23	28.05.07	423.00	
7		CB-ONN-2004/3	24	17.05.07	113.00	
8		CB-ONN-2004/4	25	28.05.07	70.00	
9		CB-ONN-2005/4	20	22.12.08	31.00	
10		CB-ONN-2005/10	26	22.12.08	270.00	
11		CB-ONN-2009/4	14	30.06.10	58.00	
12		CB-ONN-2010/1	9	28.03.12	782.00	
13		CB-ONN-2010/6	14	28.03.12	39.00	
14		CB-ONN-2010/9	17	30.08.12	120.00	
15	Cauvery Onland	CY-ONN-2002/2	N56	31.08.04	140.00	729.00
16		CY-ONN-2004/1	30	02.05.08	214.00	
17		CY-ONN-2004/2	31	30.05.08	375.00	
18	PALAR	PR-ONN-2005/1	28	22.12.08	1807.00	1807.00
19	Assam-Arakan	AA-ONJ/2	11	-	1277.00	9040.00
20		AA-ONN-2001/1	N39	01.05.03	1496.00	
21		AA-ONN-2001/2	N40	29.07.03	4005.00	
22		AA-ONN-2001/3	N41	19.12.03	110.00	
23		AA-ONN-2001/4	N42	28.04.06	645.00	
24		AA-ONN-2002/4	N49	28.04.06	1060.00	
25		AA-ONN-2005/1	1	22.12.08	363.00	
26		AA-ONN-2009/3	3	30.06.10	84.00	

PELs OPERATED BY ONGC

Sl. No.	BASIN	BLOCK NAME	REF. NO. ON MAP	EFFECTIVE DATE OF PEL	AREA (Sq. Km.)	TOTAL AREA (Sq. Km.)
27	Purnea	PA-ONN-2004/1	14	12.09.07	2537.00	6185.00
28		PA-ONN-2005/1	2	22.12.08	1096.00	
29		PA-ONN-2005/2	3	22.12.08	2552.00	
30	Ganga Valley	GV-ONN-2004/1	15	11.12.07	8354.00	10581.00
31		GV-ONN-2005/3	10	22.12.08	2227.00	
32	Vindhyan	VN-ONN-2003/1	N63	23.09.05	2673.00	11600.00
33		VN-ONN-2004/1	17	17.01.08	4331.00	
34		VN-ONN-2004/2	18	17.01.08	3346.00	
35		VN-ONN-2009/3	9	30.06.10	1250.00	
36	Gujarat - Kutch - Saurashtra Offshore	GS-OSN-2004/1	1	25.04.07	6589.00	12081.00
37		GK-OSN-2009/1	S-1	30.06.10	1264.00	
38		GK-OSN-2009/2	S-2	30.06.10	1242.00	
39		GK-OSN-2010/1	S-1	28.03.12	1361.00	
40		GK-OSN-2010/2	S-2	28.03.12	1625.00	
41	Mumbai Offshore	MB-OSN-2005/1	S-1	22.12.08	2811.00	8033.00
42		MB-OSN-2005/5	S-5	22.12.08	2402.00	
43		MB-OSN-2005/6	S-6	22.12.08	2820.00	
44	Kerala-Konkan Offshore	KK-DWN-2002/2	D26	17.03.04	17107.00	36341.00
45		KK-DWN-2005/2	D-15	22.12.08	19234.00	
46	Cauvery Offshore	CY-DWN-2004/1	D4	28.05.07	10302.00	46403.00
47		CY-DWN-2004/2	D5	23.05.07	12059.00	
48		CY-DWN-2004/3	D6	21.05.07	12017.00	
49		CY-DWN-2004/4	D7	21.05.07	12025.00	
50	Cauvery-Palar Offshore	CY-PR-DWN-2004/1	D8	15.05.07	13451.00	23445.00
51		CY-PR-DWN-2004/2	D9	23.05.07	9994.00	
52	K-G Offshore	KG-DWN-98/2	D2	12.04.00	7295.00	83898.00
53		KG-DWN-98/5	D5	12.04.00	4490.00	
54		KG-DWN-2002/1	D28	06.02.04	7950.00	
55		KG-OSN-2004/1	6	25.05.07	1131.00	
56		KG-DWN-2004/1	D10	15.05.07	11951.00	
57		KG-DWN-2004/2	D11	07.05.07	11851.00	
58		KG-DWN-2004/3	D12	08.05.07	6205.00	
59		KG-DWN-2004/5	D14	23.05.07	11922.00	
60		KG-DWN-2004/6	D15	23.05.07	10907.00	
61		KG-DWN-2005/1	D16	22.12.08	1727.00	
62		KG-OSN-2005/1	S-7	22.12.08	2810.00	
63		KG-OSN-2005/2	S-8	22.12.08	1881.00	
64		KG-OSN-2009/1	S-22	30.06.10	1472.00	
65		KG-OSN-2009/2	S-23	30.06.10	1471.00	
66		KG-OSN-2009/4	S-25	30.06.10	835.00	
67	Mahanadi-NEC Offshore	MN-DWN-98/3	D7	19.05.00	4988.00	20635.00
68		MN-OSN-2000/2	N24	16.08.01	4061.00	
69		NEC-DWN-2002/2	D32	17.03.04	11586.00	
70	Bengal	WB-ONN-2005/2	5	22.12.08	3792.00	11733.00
71		WB-ONN-2005/3	6	22.12.08	4001.00	
72		WB-ONN-2005/4	7	22.12.08	3940.00	

PELs OPERATED BY ONGC

Sl. No.	BASIN	BLOCK NAME	REF. NO. ON MAP	EFFECTIVE DATE OF PEL	AREA (Sq. Km.)	TOTAL AREA (Sq. Km.)
73	Andaman-Nicobar Off.	AN-DWN-2002/1	D33	17.03.04	8238.80	55062.80
74		AN-DWN-2002/2	D34	17.03.04	12495.00	
75		AN-DWN-2005/1	D19	22.12.08	11837.00	
76		AN-DWN-2009/1	D-7	30.06.10	4981.00	
77		AN-DWN-2009/2	D-8	30.06.10	3995.00	
78		AN-DWN-2009/3	D-9	30.06.10	3992.00	
79		AN-DWN-2009/5	D-11	30.06.10	4002.00	
80		AN-DWN-2009/13	D-19	30.06.10	4007.00	
81		AN-DWN-2009/18	D-24	30.06.10	4040.00	
TOTAL						342,215.30
GRAND TOTAL						385,614.17

PELs UNDER PRE-NELP & NELP BLOCKS WITH PVT. / JV COMPANIES

As on 01.04.2013

Sl. No.	COMPANY / OPERATOR	BASIN	BLOCK NAME	REF.NO. ON MAP	EFFECTIVE DATE OF PEL	AREA (Sq. Km.)	TOTAL AREA (Sq. Km.)
1	RELIANCE INDUSTRIES LIMITED	K-G Offshore	KG-DWN-98/1	D1	07.06.00	6700.00	
2			KG-DWN-98/3	D3	07.06.00	7645.00	
3			KG-DWN-2001/1	D24	03.04.03	8695.00	
4			KG-DWN-2003/1	D37	05.12.05	3288.00	
5		Cauvery Offshore	CY-DWN-2001/2	D20	03.04.03	14325.00	14325.00
6		Cauvery-Palar Offs.	CY-PR-DWN-2001/3	D21	03.04.03	8600.00	8600.00
7		Palar Offshore	PR-DWN-2001/1	D23	03.04.03	6155.00	6155.00
8		Mahanadi-NEC Offs.	MN-DWN-98/2	D6	07.06.00	7195.00	
9			NEC-OSN-97/2	N15	07.06.00	9461.00	
10			NEC-DWN-2002/1	D31	18.03.04	19174.00	
11			MN-DWN-2003/1	D38	05.12.05	17050.00	
12			MN-DWN-2004/1	D17	15.05.07	9885.00	
13			MN-DWN-2004/2	D18	15.05.07	11813.00	
14			MN-DWN-2004/3	D19	15.05.07	11316.00	
15			MN-DWN-2004/4	D20	21.05.07	8822.00	
16		Kerala-Konkan Offshore	KK-DWN-2001/1	D16	03.04.03	20468.00	43983.00
17			KK-DWN-2001/2	D17	03.04.03	23515.00	
18		Gujarat-Kutch-Saurashtra Offs.	GK-OSJ/3	2	05.10.01	5725.00	11615.00
19			GS-OSN-2000/1	N18	16.08.01	5890.00	
20		Cambay	CB-ON/1	18	05.09.03	1533.00	2168.00
21			CB-ONN-2003/1 (A&B)	N66	05.06.06	635.00	
TOTAL							207890.00
22	CAIRN	Rajasthan	RJ-ON-90/1	17	15.05.95	3111.27	
23		Cambay	CB-OS/2	7	-	205.00	
24		Krishna Godavari	KG-ONN-2003/1	N69	08.02.07	315.00	
25			KG-OSN-2009/3	S-24	30.06.10	1988.00	
26		Palar offshore	PR-OSN-2004/1	5	24.04.07	9417.00	
27		Mumbai offshore	MB-DWN-2009/1	D-1	30.06.10	2961.00	
28	ESSAR	Cambay	CB-ON/3	19	11.02.03	119.05	4227.05
29		Assam-Arakan	AA-ONN-2004/3	11	02.05.08	1252.00	
30			AA-ONN-2004/5	13	02.05.08	46.00	
31		Mumbai offshore	MB-OSN-2005/3	S-3	22.12.08	2810.00	
32	HOEC	Pranhita-Godavari	GN-ON-90/3	24	29.03.93	21850.00	23586.64
33		Assam - Arakan	AAP-ON-94/1	14	28.11.00	305.00	
34		Rajasthan	RJ-ONN-2005/1	14	22.12.08	1424.00	
35		Cambay	CB-ON/7	22	-	7.64	
36	FOCUS	Rajasthan	RJ-ON/6	16	21.08.99	4026.16	10116.16
37			RJ-ONN-2003/2	N65	28.01.06	2164.00	
38			RJ-ONN-2010/2	8	28.03.12	535.00	
39		G-K Onland Cambay	GK-ON/4	21	19.04.03	775.00	
40			CB-OSN-2004/1	2	28.05.07	2616.00	
41	CANORO (Subjudice)	Assam-Arakan	AA-ON/7	13	27.03.01	319.00	319.00
42	GSPC	Cambay	CB-ON/2	23	23.11.00	1210.00	
43			CB-ONN-2000/1	N29	17.07.01	425.00	
44			CB-ONN-2002/3	N54	29.07.04	39.80	
45			CB-ONN-2003/2	N67	01.04.06	172.00	

PELs UNDER PRE-NELP & NELP BLOCKS WITH PVT. / JV COMPANIES

SI. No.	COMPANY / OPERATOR	BASIN	BLOCK NAME	REF. NO. ON MAP	EFFECTIVE DATE OF PEL	AREA (Sq. Km.)	TOTAL AREA (Sq. Km.)
46	GSPC	Krishna Godavari	KG-OSN-2001/3	N38	12.03.03	530.00	10866.80
47			KG-ONN-2004/2	29	10.01.08	1140.00	
48		Mumbai Offshore Rajasthan	MB-OSN-2004/1	3	12.06.07	1520.00	
49			RJ-ONN-2004/1	19	06.11.07	4613.00	
50			RJ-ONN-2005/3	16	22.12.08	1217.00	
51	PETROGAS	Mumbai Offshore	MB-OSN-2004/2	4	21.05.07	741.00	741.00
52	JOGPL	Assam-Arakan	AA-ONN-2002/1	N47	07.04.04	1260.00	5896.40
53			AA-ONN-2003/1	N59	-	81.00	
54			AA-ONN-2009/1	1	30.06.10	2217.00	
55			AA-ONN-2009/2	2	30.06.10	1740.00	
56		Cauvery Onland	CY-ONN-2002/1	N55	22.11.04	505.00	
57		Cambay	CB-ONN-2002/2(Part-A&B)	N53	21.05.04	93.40	5896.40
58	GEO-GLOBAL	Deccan Syncline	DS-ONN-2004/1	27	07.06.07	2649.00	2649.00
59	ENI	Andaman-Nicobar	AN-DWN-2003/2	D40	05.12.05	13110.00	13110.00
60	SANTOS	Mahanadi - NEC offshore	NEC-DWN-2004/1	D22	08.05.07	7790.00	16496.00
61			NEC-DWN-2004/2	D23	09.05.07	8706.00	
62	PRIZE PETROLEUM	South-Rewa	SR-ONN-2004/1	16	12.07.07	11821.00	11821.00
63	GAIL	Cauvery	CY-ONN-2005/1	29	22.12.08	946.00	946.00
64	IOCL	Cambay	CB-ONN-2005/2	18 A&B	22.12.08	81.00	280.00
65			CB-ONN-2005/7	23	22.12.08	199.00	
66	BHP Billiton	Mumbai offshore	MB-DWN-2005/2	D-6	22.12.08	3660.00	25029.00
67			MB-DWN-2005/3	D-7	22.12.08	3097.00	
68			MB-DWN-2005/4	D-8	22.12.08	3408.00	
69			MB-DWN-2005/5	D-9	22.12.08	3169.00	
70			MB-DWN-2005/7	D-11	22.12.08	3324.00	
71			MB-DWN-2005/9	D-13	22.12.08	3138.00	
72			MB-OSN-2009/3	S-5	30.06.10	1492.00	
73			MB-OSN-2009/6	S-8	30.06.10	1876.00	
74			MB-OSN-2009/7	S-9	30.06.10	1865.00	25029.00
75	BP Explo.	Krishna-Godavari	KG-DWN-2005/2	D-17	22.12.08	1949.00	1949.00
76	Adani Welspun	Mumbai offshore	MB-OSN-2005/2	S-2	22.12.08	1191.00	1191.00
77	Deep Energy	Satpura-Rewa	SR-ONN-2005/1	11	22.12.08	789.00	5099.00
78		Vindhyan	VN-ONN-2010/1	4	28.03.12	3776.00	
79		Cambay	CB-ONN-2010/3	11	28.03.12	534.00	
80	Mercator Petr.	Cambay	CB-ONN-2005/3	19	22.12.08	48.00	218.00
81			CB-ONN-2005/9	25	22.12.08	170.00	
82	Omkar Natural	Cambay	CB-ONN-2005/5	21	22.12.08	83.00	185.00
83			CB-ONN-2005/6	22	22.12.08	102.00	
84	Quest	Cambay	CB-ONN-2005/11	27	22.12.08	223.87	223.87
85	BGEPIIL	Krishna-Godavari	KG-DWN-2009/1	D-6(A&B)	30.06.10	1800.00	9763.00
86		Mumbai	MB-DWN-2010/1	D-2	10.09.12	7963.00	
87	Bengal Energy	Cauvery	CY-OSN-2009/1	S-19	30.06.10	1362.00	1362.00

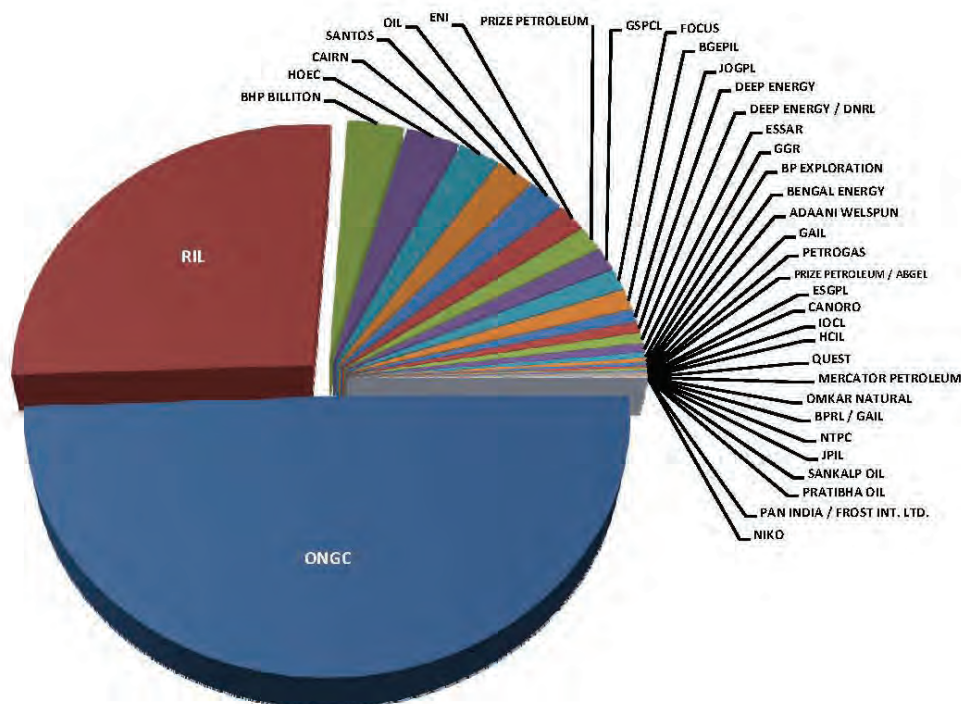
PELs UNDER PRE-NELP & NELP BLOCKS WITH PVT. / JV COMPANIES

Sl. No.	COMPANY / OPERATOR	BASIN	BLOCK NAME	REF. NO. ON MAP	EFFECTIVE DATE OF PEL	AREA (Sq. Km.)	TOTAL AREA (Sq. Km.)
88	ESGPL	Cambay	CB-ONN-2009/1	11	30.06.10	113.00	325.00
89			CB-ONN-2009/2	12	30.06.10	68.00	
90			CB-ONN-2009/7	17	30.06.10	144.00	
91	HCIL	Cambay	CB-ONN-2009/3	13	30.06.10	71.00	248.00
92			CB-ONN-2009/6	16	30.06.10	177.00	
93	NTPC	Cambay	CB-ONN-2009/5	15	30.06.10	165.00	165.00
94	JPIL	Cambay	CB-ONN-2009/8	18	30.06.10	136.00	136.00
95	NIKO	Cambay	CB-ONN-2000/2	N30	-	24.25	24.25
96	PAN India / Frost Int. Ltd.	Cambay	CB-ONN-2010/5	13	-	49.00	49.00
97	Pratibha Oil	Cambay	CB-ONN-2010/4	12	-	61.00	61.00
98	BPRL/ GAIL	Cambay	CB-ONN-2010/8	16 A&B	-	42.00	173.00
99			CB-ONN-2010/11	19	28.03.12	131.00	
100	SANKALP	Cambay	CB-ONN-2010/10	18	27.06.2012	122.00	122.00
101	DEEP ENERGY/ DNRL	Vindhyan	VN-ONN-2010/2	5	28.03.12	4909.00	4909.00
102	PP / ABGEL	Assam-Arakan	AA-ONN-2010/1	1	30.08.12	401.00	401.00
TOTAL							170,685.44
GRAND TOTAL							378,575.44

Grand Total of PELs awarded in the country : 780,516.36 Sq.km
(NOC's & Pvt. / JV Companies)

PEL AREAS UNDER OPERATION BY NOC'S AND PVT/JV COMPANIES

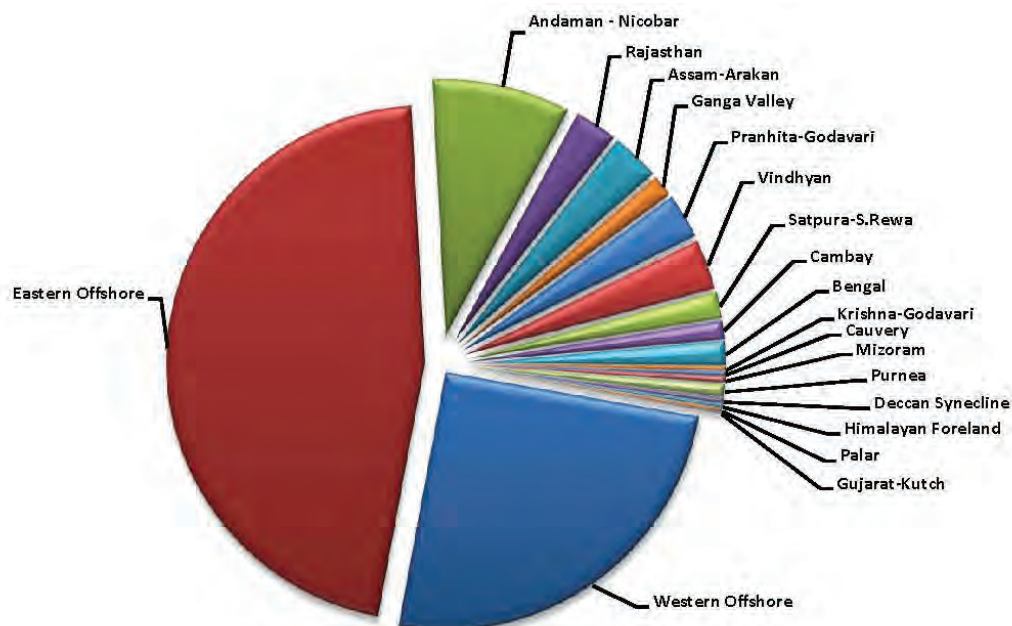
As on 01.04.13



COMPANY / OPERATOR	PEL AREA		COMPANY / OPERATOR	PEL AREA	
	(Sq. Km.)	(%)		(Sq. Km.)	(%)
ONGC	385614.17	49.41	ADANI WELSPUN	1191.00	0.15
RIL	207890.00	26.63	GAIL	946.00	0.12
BHP BILLITON	25029.00	3.21	PETROGAS	741.00	0.09
HOEC	23586.64	3.02	PRIZE PETROLEUM / ABGEL	401.00	0.05
CAIRN	17997.27	2.31	ESGPL	325.00	0.04
SANTOS	16496.00	2.11	CANORO	319.00	0.04
OIL	16326.75	2.09	IOCL	280.00	0.04
ENI	13110.00	1.68	HCIL	248.00	0.03
PRIZE PETROLEUM	11821.00	1.51	QUEST	223.87	0.03
GSPCL	10866.80	1.39	MERCATOR PETROLEUM	218.00	0.03
FOCUS	10116.16	1.30	OMKAR NATURAL	185.00	0.02
BGEPIL	9763.00	1.25	BPRL / GAIL	173.00	0.02
JOGPL	5896.40	0.76	NTPC	165.00	0.02
DEEP ENERGY	5099.00	0.65	JPIL	136.00	0.02
DEEP ENERGY LLC / DNRL	4909.00	0.63	SANKALP OIL	122.00	0.02
ESSAR	4227.05	0.54	PRATIBHA OIL	61.00	0.01
GGR	2649.00	0.34	PAN INDIA / FROST INT. LTD.	49.00	0.01
BP EXPLORATION	1949.00	0.25	NIKO	24.25	0.00
BENGAL ENERGY	1362.00	0.17			
GRAND TOTAL : 780,516.36 (100%)					

BASIN WISE DISTRIBUTION OF PEL AREAS

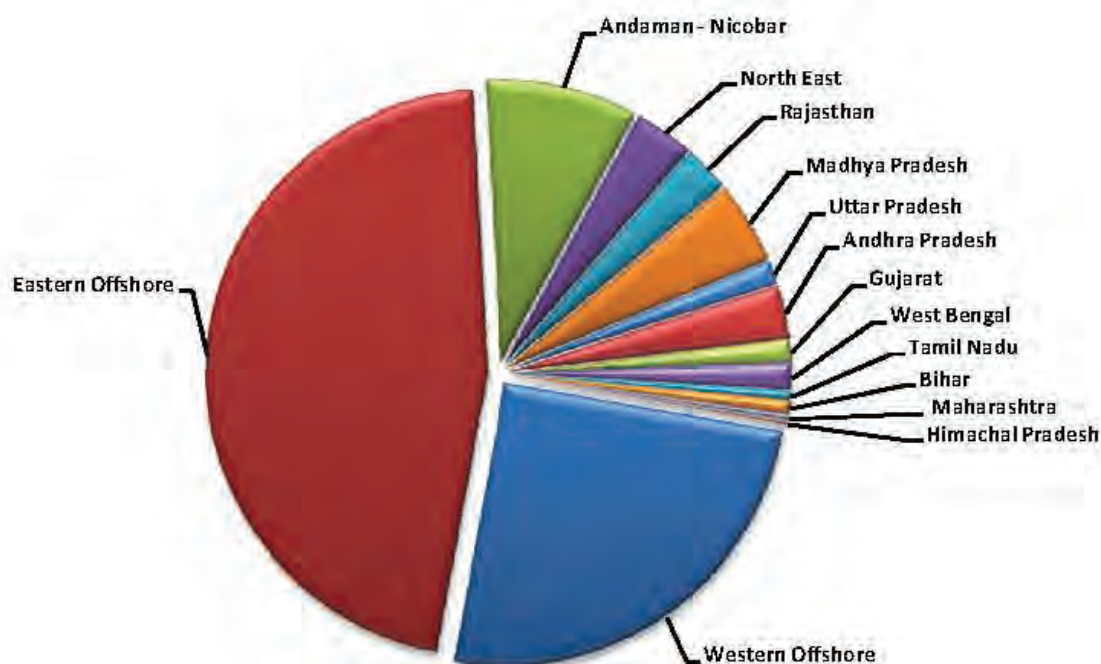
As on 01.04.13



OFFSHORE/BASIN	PEL AREA	
	(Sq. Km.)	(%)
OFFSHORE		
WESTERN	196,185.50	25.14
EASTERN	360,932.00	46.24
ANDAMAN - NICOBAR	68,172.80	8.73
TOTAL OFFSHORE	625,290.30	80.11
ONLAND		
RAJASTHAN	20,803.43	2.67
ASSAM - ARAKAN	23,532.25	3.01
GANGA VALLEY	10,581.00	1.36
PRANHITA - GODAVARI	21,850.00	2.80
VINDHYAN	24,493.00	3.14
SATPURA - S. REWA	12,610.00	1.62
CAMBAY	9,020.38	1.16
BENGAL	11,733.00	1.50
KRISHNA - GODAVARI	1,966.00	0.25
CAUVERY	2,180.00	0.28
MIZORAM	3,213.00	0.41
PURNEA	6,185.00	0.79
DECCAN SYNECLISE	2,649.00	0.34
HIMALAYAN FORELAND	1,828.00	0.23
PALAR	1,807.00	0.23
GUJARAT - KUTCH	775.00	0.10
TOTAL ONLAND	155,226.06	19.89
GRAND TOTAL	780,516.36	100.00

STATE WISE DISTRIBUTION OF PEL AREAS

As on 01.04.13



OFFSHORE/STATE	PEL AREA	
	(Sq. Km.)	(%)
OFFSHORE		
WESTERN	196,185.50	25.14
EASTERN	360,932.00	46.24
ANDAMAN - NICOBAR	68,172.80	8.73
TOTAL OFFSHORE	625,290.30	80.11
STATE		
NORTH-EASTERN STATES	26,745.25	3.43
RAJASTHAN	20,803.43	2.67
MADHYA PRADESH	37,103.00	4.75
UTTAR PRADESH	10,581.00	1.36
ANDHRA PRADESH	23,816.00	3.05
GUJARAT	9,795.38	1.25
WEST BENGAL	11,733.00	1.50
TAMIL NADU	3,987.00	0.51
BIHAR	6,185.00	0.79
MAHARASTRA	2,649.00	0.34
HIMACHAL PRADESH	1,828.00	0.23
TOTAL ONLAND	155,226.06	19.89
GRAND TOTAL	780,516.36	100.00

ML AREAS UNDER OPERATION BY NOC's AND PVT/JV COMPANIES

As on 01.04.2013

Sl. No.	COMPANY / OPERATOR	BASIN	BLOCK NAME	REF. NO. ON MAP	EFFECTIVE DATE OF ML	AREA (Sq. Km.)	TOTAL AREA (Sq. Km.)
1	ONGC	Rajasthan	Manherra Tibba	RJM-1	01.05.94	24.00	884.85
2			Bakriwala	RJM-2	10.01.01	1.00	
3			Ghotaru Ext. - I	RJM-3	10.01.01	564.60	
4			Chinnewala Tibba	RJM-4	15.10.03	114.86	
5			South Kharatar (Part A & B)	RJM-5	25.03.11	180.39	
6		Cambay	Lanwa	MM-1	09.12.02	30.00	
7			Balol	MM-2	25.05.10	24.00	
8			Jotana Ext.-I	MM-3	28.11.06	57.70	
9			West Sobhasan	MM-4	23.04.03	9.60	
10			Mehsana City	MM-5	08.08.96	8.85	
11			Mehsana City Ext.-II	MM-6	18.07.95	7.58	
12			Sobhasan	MM-7	20.08.93	35.89	
13			Geratpur	MM-8	20.08.00	18.31	
14			Linch Ext.-II	MM-9	24.03.07	13.35	
15			North Sobhasan Ext.-I	MM-10	12.03.01	56.85	
16			Jotana	MM-11	26.07.00	39.50	
17			Santhal	MM-12	09.06.94	19.46	
18			Bechraji	MM-13	31.08.11	37.11	
19			Bechraji Ext.-I	MM-14	29.03.04	3.06	
20			Charada Mansa	MM-15	23.10.12	187.50	
21			N. Kadi Ext.-I	MM-16	03.05.93	61.43	
22			Kadi	MM-17	22.06.09	64.49	
23			Linch Ext. - I	MM-18	18.03.07	34.25	
24			Linch	MM-19	16.10.93	43.73	
25			Nandasan Ext.-I	MM-20	18.07.95	26.39	
26			Mansa	MM-21	26.07.95	58.72	
27			Nandasan - Langnaj	MM-22	27.04.06	61.90	
28			Chanasma	MM-23	28.09.96	2.81	
29			Dedana (ML)	MM-24	04.11.96	5.44	
30			Lanwa Ext.-I	MM-25	16.12.96	2.15	
31			Jotana Ext.-II	MM-26	16.06.97	0.87	
32			Jakasna(ML)	MM-27	02.06.01	9.80	
33			South Patan	MM-28	16.06.97	6.99	
34			N. Sobhasan Pt. A+B	MM-29	25.01.99	12.05	
35			East Sobhasan	MM-30	28.06.02	22.42	
36			North Sobhasan Ext.-II	MM-31	17.11.01	23.00	
37			West Mewad(ML)	MM-32	11.10.00	13.20	
38			Langhnaj-Wadasma	MM-33	05.02.01	13.84	
39			Sanganpur ML	MM-34	05.06.02	6.97	
40			Langhnaj ML	MM-35	23.07.02	17.92	
41			Chandrora	MM-36	16.02.04	1.39	
42			Kadi Asjol	MM-37	28.08.03	0.72	
43			Jotana-Warosan	MM-38	24.06.05	38.05	
44			Charada Mansa Extn.-I	MM-39	20.09.08	12.50	
45			Jotana South	MM-40	10.03.08	23.00	
46			Kamboi	MM-41	25.12.07	2.35	
47			Rajpur	AM-1	26.06.95	6.76	
48			Wadu	AM-2	26.05.90	15.41	
49			Kalol North-East	AM-3	15.03.90	9.44	
50			Paliyad-Kalol-Limbodra	AM-4	26.06.95	161.48	
51			Limbodra	AM-5	21.12.05	15.75	
52			Limbodra Ext.-I	AM-6	25.03.98	14.96	
53			Halisa	AM-7	30.01.98	143.44	
54			Kalol (Main)	AM-8	13.05.04	35.84	
55			Kalol Ext.-I	AM-9	04.08.86	159.92	
56			Kalol Ext.-II	AM-10	11.04.09	15.50	

ML AREAS UNDER OPERATION BY NOC's AND PVT/JV COMPANIES

Sl. No.	COMPANY / OPERATOR	BASIN	BLOCK NAME	REF. NO. ON MAP	EFFECTIVE DATE OF ML	AREA (Sq. Km.)	TOTAL AREA (Sq. Km.)
57	ONGC	Cambay	Motera Ext.-II	AM-11	25.03.98	26.02	
58			Motera	AM-12	14.08.96	15.69	
59			Motera Ext.-I	AM-13	25.03.97	23.65	
60			Wamaj	AM-14	30.09.95	19.44	
61			Viraj	AM-15	26.07.00	17.49	
62			Lohar	AM-16	16.11.04	8.29	
63			Sanand	AM-17	10.05.09	81.36	
64			Sanand Ext.-I	AM-18	30.04.93	18.51	
65			Sanand Ext.-II	AM-19	23.03.99	10.37	
66			Sanand Ext.-III	AM-20	30.04.89	19.30	
67			Gamij	AM-21	13.10.94	39.16	
68			Gamij Ext.-I	AM-22	25.03.97	81.22	
69			Hirapur	AM-23	24.10.97	87.92	
70			Ahmedabad-Bakrol	AM-24	05.08.09	30.16	
71			Ahmedabad Ext.-I	AM-25	22.02.01	17.29	
72			Ahmedabad Ext.-II	AM-26	29.07.08	5.98	
73			Ahmedabad Ext.-III	AM-27	11.11.91	34.75	
74			Nandej East	AM-28	26.06.95	20.92	
75			Nandej	AM-29	25.03.97	90.18	
76			Nawagam Main	AM-30	28.03.07	72.23	
77			Nawagam Ext.-I	AM-31	21.03.03	2.77	
78			Wadu Ext.-I	AM-32	19.05.97	55.17	
79			Ahmedabad Ext.-IV	AM-33	08.10.98	10.21	
80			Rajpur Ext.-I	AM-34	02.02.99	8.70	
81			Asmali ML	AM-35	15.06.98	43.26	
82			Kadi Ext.-III	AM-36	02.02.99	16.07	
83			Nawagam Ext.-II	AM-37	26.11.99	14.66	
84			Ahmedabad Ext.-V	AM-38	08.05.00	17.75	
85			Gamij Ext.-III ML	AM-39	08.02.02	15.41	
86			Nandej Ext.-I	AM-40	08.02.02	56.18	
87			Gamij Ext. - II	AM-41	04.04.01	116.22	
88			South Wamaj ML	AM-42	28.06.02	18.29	
89			Nawagam Ext. - III	AM-43	31.08.00	56.00	
90			Kalol West Extn.-I	AM-44	03.02.06	54.25	
91			Kalol West ML	AM-45	21.11.03	14.53	
92			Nawagam South Ext.-I	AM-46	21.11.03	30.88	
93			Nawagam South Ext.-II	AM-47	21.11.03	43.94	
94			Rupal	AM-48	29.10.04	14.06	
95			Kadi Extn.-IV	AM-49	13.11.03	5.28	
96			Nawagam South Ext.-III	AM-50	13.12.05	53.71	
97			Valod	AM-51	07.11.07	8.58	
98			Kalol West Ext.-II	AM-52	20.09.07	20.00	
99			Balasar	AM-53	08.06.09	12.00	
100			Varsoda Halisa Extn.-I	AM-54	21.11.10	169.00	
101			Kadi Extn.-V	AM-55	22.11.10	13.00	
102			Valod Extn.-I	AM-56	22.11.10	110.00	
103			Cambay	CM-1	14.12.04	2.60	
104			Siswa	CM-2	12.02.00	37.78	
105			Kathana	CM-3	20.11.08	16.95	
106			Padra Ext.-II	CM-4	03.09.93	14.50	
107			Padra Ext.-I	CM-5	12.04.91	8.42	
108			Padra Main	CM-6	18.09.06	1.25	
109			Padra Ext.-III	CM-7	12.05.94	0.38	
110			Padra Ext.-IV	CM-8	14.03.96	6.37	
111			Padra Ext.-V	CM-9	03.02.97	3.58	
112			Padra Ext.-VI	CM-10	28.01.99	83.95	

ML AREAS UNDER OPERATION BY NOC's AND PVT/JV COMPANIES

Sl. No.	COMPANY / OPERATOR	BASIN	BLOCK NAME	REF. NO. ON MAP	EFFECTIVE DATE OF ML	AREA (Sq. Km.)	TOTAL AREA (Sq. Km.)
113	ONGC	Cambay	Padra Ext.-VII	CM-11	26.04.00	7.11	
114			Padra Ext.-VIII	CM-12	08.11.00	15.68	
115			Padra Ext.-IX	CM-13	10.03.04	21.00	
116			Akholjuni	CM-14	27.07.00	81.25	
117			Anklav Ext.-I	CM-15	15.02.02	61.00	
118			Kathana Ext.-I	CM-16	15.03.04	16.99	
119			Padra Ext.-X	CM-17	15.01.08	10.00	
120			Chaklasi-Rasnol	CM-18	06.12.07	42.00	
121			Vasad Kathol Extn.-III	CM-19	08.07.11	103.18	
122			Dabka Ext.-I	ANM-1	23.08.88	12.85	
123			Dabka Ext.-II	ANM-2	30.06.09	0.56	
124			Dabka	ANM-3	01.05.93	21.67	
125			Umera	ANM-5	10.08.87	8.44	
126			Umera Ext.-I	ANM-6	19.10.94	9.93	
127			Malpur (ML)	ANM-7	03.06.87	1.00	
128			Nada	ANM-8	19.02.09	9.85	
129			Gandhar Ext.-IV	ANM-9	30.08.94	36.75	
130			Gandhar Ext.-I	ANM-10	08.10.06	32.75	
131			Gandhar	ANM-11	07.01.05	11.78	
132			Gandhar Ext.-II (Denwa)	ANM-12	08.07.06	54.30	
133			Gandhar Ext.-III	ANM-13	24.02.87	235.38	
134			Gandhar Ext.-V	ANM-14	22.03.96	29.43	
135			Dahej Ext.-I	ANM-15	17.04.94	90.90	
136			Dahej	ANM-16	06.02.05	18.52	
137			Pakhajan(ML)	ANM-17	21.08.07	6.25	
138			Pakhajan Ext.-I	ANM-18	10.01.95	18.00	
139			Kasiyabet	ANM-19	12.09.09	5.06	
140			Ankleshwar Ext.-I	ANM-20	26.05.05	17.43	
141			Ankleshwar (Main)	ANM-21	15.08.01	38.98	
142			Motwan	ANM-22	04.07.99	42.20	
143			Sanaokhurd	ANM-23	30.12.96	23.29	
144			Kudara	ANM-24	28.06.02	2.60	
145			Elav	ANM-25	30.03.90	10.37	
146			Kharach	ANM-26	23.03.95	0.72	
147			Kosamba	ANM-27	03.01.08	19.17	
148			Olpad (A)	ANM-28	24.11.02	2.75	
149			Dabka Ext.-IV (D#6)	ANM-29	20.02.97	1.00	
150			Kim(ML)	ANM-30	10.03.97	18.33	
151			Gandhar Ext.-VI (G#388)	ANM-31	22.01.97	44.47	
152			Nada Ext.-I	ANM-32	03.09.98	6.12	
153			Dabka Ext.-V (D#38)	ANM-33	29.06.99	2.00	
154			Gandhar Ext.-VII(G#155)	ANM-34	24.04.99	25.82	
155			Gandhar Ext.-VIII	ANM-35	16.08.00	7.23	
156			Kural (ML)	ANM-36	03.04.01	83.49	
157			Gandhar Ext. - IX	ANM-37	20.08.02	40.91	
158			Olpad - Dandi Ext. - I	ANM-38	01.01.04	94.40	
159			Pakhajan Extn. - II	ANM-39	16.09.02	38.50	
160			Kim Ext. - I	ANM-40	04.01.02	56.11	
161			Kosamba Extn.-I	ANM-41	01.03.03	39.00	
162			Umra Extn.-II	ANM-42	13.03.03	34.43	
163			South Dahej	ANM-43	12.11.08	27.00	
164			Jambusar-Dabka	ANM-44	25.03.08	101.50	
165			Charada	ANM-45	06.10.09	10.60	
166			Matar	ANM-46	01.10.09	66.50	
167			balol Extn.-I	ANM-47	26.12.08	5.83	
168			Gandhar Extn.-X	ANM-48	19.06.09	9.00	

ML AREAS UNDER OPERATION BY NOC's AND PVT/JV COMPANIES

Sl. No.	COMPANY / OPERATOR	BASIN	BLOCK NAME	REF. NO. ON MAP	EFFECTIVE DATE OF ML	AREA (Sq. Km.)	TOTAL AREA (Sq. Km.)
169	ONGC	Cambay	Gandhar Extn.-XI	ANM-49	19.06.09	7.20	5436.85
170			Gandhar Extn.-XII	ANM-50	19.06.09	29.00	
171		Cauvery Onland	Greater Bhuvanagiri	CYM-1	15.12.07	14.00	
172			Mattur	CYM-2	04.05.94	3.00	
173			Nannilam-I	CYM-3	26.04.93	4.70	
174			Kamalapuram-II	CYM-4	04.05.94	3.50	
175			Kamalapuram-I	CYM-5	27.05.99	23.50	
176			Adiyakka Mangalam	CYM-6	27.05.99	17.80	
177			Greater Kovilkalappal	CYM-7	15.05.07	33.61	
178			Nannilam-II	CYM-8	27.05.99	1.00	
179			Perungulam-Periyapattinam	CYM-9	15.07.97	75.00	
180			Tulsapatnam	CYM-10	27.05.99	3.70	
181			Pundi	CYM-11	27.05.99	1.00	
182			Kizhavalur	CYM-12	27.05.99	3.60	
183			Kuthalam	CYM-13	01.06.01	91.00	
184			Kuthalam-13	CYM-14	12.02.04	12.00	
185			Kali	CYM-15	01.06.01	19.00	
186			Vijayapuram #13	CYM-16	03.11.02	2.00	
187			Greater Kamalapuram	CYM-17	26.02.04	22.00	
188			Kuthanallur	CYM-18	26.02.04	6.25	
189			Kali-6	CYM-19	01.01.04	1.60	
190			Kanjirangudi	CYM-20	13.10.03	68.00	
191			Greater Narimanam	CYM-21	27.01.06	54.00	
192			PBS-1-1	CYM-22	01.10.03	9.00	
193			Adichapuram	CYM-23	13.04.07	2.30	
194			Neyveli	CYM-24	15.03.08	3.84	
195			Karaikal	CYM-25	10.09.08	2.00	
196			Vadatheru	CYM-26	31.12.07	15.18	
197			Tiruvarur-19	CYM-27	12.02.04	2.00	
198			Greater Kali	CYM-28	21.07.10	36.00	
199			Ramanathapuram	CYM-29	21.11.12	493.21	
200			L-I	CYM-30	31.12.12	948.16	
201			L-II	CYM-31	31.12.12	1542.02	3513.97
202	ONGC	K-G Onland	Endamuru-I	KGM-1	03.04.92	3.00	
203			Endamuru-4	KGM-2	30.04.03	6.00	
204			Pasarlapudi-9	KGM-3	23.07.12	6.60	
205			Pasarlapudi-8	KGM-4	27.06.12	5.50	
206			Tatipaka-Pasarlapudi	KGM-5	14.02.94	62.00	
207			Kesanapalli-I	KGM-6	18.07.12	3.70	
208			Mori-5	KGM-7	02.06.94	1.56	
209			Mori-1	KGM-8	07.04.11	6.50	
210			Razole-1 & 2	KGM-9	23.01.08	18.85	
211			Elamanchali	KGM-10	21.02.11	6.00	
212			Medapadu-1	KGM-11	08.07.12	16.60	
213			Penumadam-1	KGM-12	03.04.12	9.60	
214			Lingala	KGM-13	21.12.09	7.60	
215			Kaikalur-3	KGM-14	10.09.06	9.00	
216			Vadali	KGM-15	20.04.10	4.00	
217			Mandapeta	KGM-16	22.08.95	40.00	
218			Mandapeta-19	KGM-17	01.05.98	6.00	
219			Mandepeta West	KGM-18	01.06.04	20.00	
220			Addvipalem-Ponnamanda	KGM-19	30.07.96	95.00	
221			Nandigama	KGM-20	31.01.00	55.00	
222			Enugupalli	KGM-21	06.07.00	7.00	
223			Kesavadasupalem	KGM-22	30.07.02	26.50	
224			Suryaraopeta	KGM-23	30.07.02	56.00	

ML AREAS UNDER OPERATION BY NOC's AND PVT/JV COMPANIES

Sl. No.	COMPANY / OPERATOR	BASIN	BLOCK NAME	REF. NO. ON MAP	EFFECTIVE DATE OF ML	AREA (Sq. Km.)	TOTAL AREA (Sq. Km.)
225	ONGC	KG Onland	Lingala Ext. & Kaikalur-12	KGM-24	30.07.02	30.00	
226			Lakshmaneswaram	KGM-25	30.07.02	23.50	
227			Endamuru-7&9	KGM-26	19.05.03	7.30	
228			Penumadam-2	KGM-27	01.07.04	3.20	
229			Srikatpalli	KGM-28	30.07.02	163.00	
230			Turputallu	KGM-29	28.11.08	39.58	
231			Achanta	KGM-30	28.11.08	14.10	
232			Kavitam	KGM-31	12.10.07	156.35	
233			Bantumilli Extn.	KGM-32	05.01.09	154.67	
234			Manapalli Extn.	KGM-33	12.11.09	10.00	
235			West Godavari	KGM-34	01.01.13	1278.32	
236			Godavari Onland	KGM-35	01.01.13	2176.00	
237			Chintalapalli Extn.	KGM-36	12.11.09	18.56	4546.59
238		Assam-Arakan	Sonari	UAM-1	01.08.89	30.00	
239			Banamali	UAM-2	17.12.02	50.00	
240			Lakwa	UAM-3	29.09.08	172.49	
241			Laippling-Gaon	UAM-4	13.10.03	26.00	
242			Panidihing	UAM-5	19.05.04	34.00	
243			North Rudrasagar	UAM-6	30.01.06	149.00	
244			Rudrasagar	UAM-7	30.05.09	70.50	
245			Charali	UAM-8	20.03.99	51.64	
246			Charali Ext.-I	UAM-9	20.05.98	45.00	
247			West Charali	UAM-10	23.03.12	12.00	
248			Changmaigaon	UAM-11	07.02.04	10.00	
249			Namti	UAM-12	09.11.07	35.55	
250			Geleki	UAM-13	16.08.90	27.94	
251			Geleki Ext.-I	UAM-14	23.11.09	5.01	
252			Geleki Ext.- II	UAM-15	14.12.01	2.65	
253			SE Geleki	UAM-16	30.01.06	20.50	
254			Mekeypore-Santak-Nazira	UAM-17	30.01.06	77.00	
255			Changmaigaon East	UAM-18	30.01.06	15.00	
256			Lip Gaon Extn.	UAM-19	26.09.11	30.45	
257			Charaideo-Nahorhabi	UAM-20	30.01.06	14.00	
258			Mekeypore-Santak-Nazira Bihupur Extn.	UAM-21	26.09.11	50.00	
259			East Changmaigaon Extn.	UAM-22	01.12.11	35.00	
260			SE Geleki Extn.	UAM-23	26.09.11	28.00	
261			Charaideo-Nahorhabi Extn.	UAM-24	26.09.11	41.00	
262			Changpang ML	NGM-1	14.03.07	12.00	
263			Borholla	DHM-1	17.06.98	32.12	
264			Mekrang	DHM-2	19.09.97	16.00	
265			East Lakhibari	DHM-3	23.07.03	8.50	
266			East Lakhibari Extn.	DHM-4	27.01.06	49.00	
267			Khoraghat	DHM-5	27.07.89	3.00	
268			Khoraghat Ext. - I	DHM-6	17.07.00	83.00	
269			Namber	DHM-7	05.09.99	26.00	
270			Namber Extn.	DHM-8	27.01.06	20.00	
271			Kalyanpur	DHM-9	13.04.07	40.00	
272			Badarpur	CHM-1	01.08.89	2.30	
273			Banaskandi	CHM-2	21.07.97	15.00	
274			Adamtila	CHM-3	24.11.09	4.00	
275			Bhubandar	CHM-4	22.12.02	6.00	
276			Adamtila Extn.	CHM-5	03.03.12	63.00	
277			North Patharia	CHM-6	30.03.12	60.00	
278			Cachar Distt.	CHM-7	04.01.13	732.00	
279			Baramura(BRM-1)	TM-1	18.07.04	4.71	
280			Baramura(BRM-10)	TM-2	15.03.87	2.22	

ML AREAS UNDER OPERATION BY NOC's AND PVT/JV COMPANIES

Sl. No.	COMPANY / OPERATOR	BASIN	BLOCK NAME	REF. NO. ON MAP	EFFECTIVE DATE OF ML	AREA (Sq. Km.)	TOTAL AREA (Sq. Km.)
281	ONGC	Assam-Arakan	Baramura(BRM-11)	TM-3	27.07.91	1.41	5145.53
282			Baramura(BRM-12)	TM-4	01.10.93	2.41	
283			Agartala Dome (AD-1)	TM-5	01.05.09	15.75	
284			Agartala Dome (AD-4)	TM-6	01.01.98	32.58	
285			Konaban (RO-4)	TM-7	01.01.98	11.11	
286			Manikya Nagar (RO-15)	TM-8	01.01.98	0.80	
287			Rokhia (RO-2)	TM-9	14.11.08	5.04	
288			Rokhia (RO-19)	TM-10	26.02.92	0.58	
289			Agartala Dome Extn.-II	TM-11	01.02.06	160.86	
290			Baramura Extn.-IV	TM-12	01.02.06	150.25	
291			Konaban Extn.-III	TM-13	01.02.06	16.89	
292			Manikyanagar-Sonamura Extn-I	TM-15	01.02.06	138.55	
293			Konaban Field (Rokihia)	TM-14	01.08.04	0.81	
294			Tichna block	TM-16	07.02.06	195.41	
295			Gojalia block	TM-17	07.02.06	271.17	
296			Kunjaban	TM-18	14.07.08	288.00	
297			Titabar	TM-19	24.12.08	10.00	
298			Kasomarigaon	TM-20	09.12.09	76.00	
299			Tulamura	TM-21	20.11.09	83.75	
300			Golaghat Extn. II-A	TM-22	09.12.09	85.00	
301			Agartala Dome Extn.-III	TM-23	30.03.11	60.00	
302			West Tripura	TM-24	04.01.13	1327.58	
303		Mumbai Off.	Single PML MH Field	BM-1	24.10.10	1953.83	30394.39
304			Extn. of NW-Mumbai High	BM-2	17.11.08	2480.00	
305			C-37 (BOFF I, II & III)	BM-3	12.09.07	469.17	
306			B-55	BM-4	30.06.99	135.85	
307			South Bassein	BM-5	01.10.87	743.00	
308			B-119 / B-121	BM-6	15.05.97	113.40	
309			B-173A	BM-7	01.06.98	51.95	
310			Neelam	BM-8	14.11.09	213.00	
311			Heera	BM-9	20.11.04	448.05	
312			D-1 Field	BM-10	31.07.05	25.60	
313			Bassein Field Extn. (SB-II)	BM-11	15.06.05	22.55	
314			D-18	BM-12	01.01.05	194.00	
315			North Tapti Field	BM-13	09.01.06	68.14	
316			C-Series Fields	BM-14	01.04.06	3620.00	
317			Around D-1 Field	BM-27	14.09.09	1167.00	
318			Mumbai High NW	BM-16	01.04.06	1567.67	
319			Mumbai High-SW	BM-17	01.04.06	1064.71	
320			Mumbai High-South	BM-18	09.01.06	801.54	
321			West of Bassein	BM-19	01.04.06	835.00	
322			Vasai East	BM-20	10.04.06	103.69	
323			S&E of Bassein	BM-21	01.04.06	1447.31	
324			North Heera	BM-22	04.12.07	121.00	
325			Ratna (R-12) field	BM-23	11.02.01	67.93	
326			D-33 (BOFF I, III, SWBH)	BM-24	05.09.06	603.00	
327			BOFF	BM-25	03.01.13	11595.00	
328			SW-BH Extn.	BM-26	03.01.13	482.00	
329		K-G Off.	GS-15 & 23	KGM-37	04.09.98	80.00	
330			G-1 Field	KGM-38	05.09.03	105.00	
331			Vainateyam	KGM-39	20.09.08	221.00	
332			GS-29	KGM-40	30.10.09	35.00	
333			GS-49	KGM-41	22.10.09	52.50	
334			Yanam	KGM-42	19.11.09	268.50	
335			Godavari	KGM-43	24.01.08	111.50	
336			Vasistha	KGM-44	15.02.08	119.00	

ML AREAS UNDER OPERATION BY NOC's AND PVT/JV COMPANIES

Sl. No.	COMPANY / OPERATOR	BASIN	BLOCK NAME	REF. NO. ON MAP	EFFECTIVE DATE OF ML	AREA (Sq. Km.)	TOTAL AREA (Sq. Km.)
337	ONGC	KG Off.	Vainateyam Extn.	KGM-45	11.01.11	78.00	1208.12
338			GS-29 Extn.	KGM-46	07.12.11	137.62	
339		Cauvery Off.	PBS-1-1 Extn.	CYM-32	10.04.09	96.83	96.83
340		Gujarat-Kutch	KD Field	GKM-1	01.04.11	430.00	1672.50
341			GK-28	GKM-2	10.10.11	1242.50	
ONGC TOTAL							52899.63
342	OIL	Rajasthan	Dandewala (Jaisalmer)	ORJM-1	01.01.86	250.00	460.00
343			Baghewala	ORJM-2	30.05.03	210.00	
344		Assam-Arakan	Moran	OAM-1	01.11.06	429.42	4456.01
345			Moran Extn.	OAM-2	10.01.91	560.00	
346			Dum-Duma BK-A	OAM-3	26.11.09	98.42	
347			Nahorkatiya	OAM-4	04.02.04	1.42	
348			Nahorkatiya Extn.	OAM-5	10.01.91	165.76	
349			Hugrijan	OAM-6	10.01.01	725.20	
350			Dum-Duma BK-B	OAM-7	26.11.09	311.96	
351			Digboi	OAM-8	14.10.01	49.33	
352			Dum-Duma BK-C	OAM-9	26.11.09	85.47	
353			Dum-Duma BK-D	OAM-10	26.11.09	10.36	
354			Ningru	OAM-11	27.11.03	540.67	
355			Tinsukia	OAM-12	02.08.01	250.00	
356			Dibrugarh	OAM-13	06.08.01	186.00	
357			Borhapan	OAM-14	07.08.01	87.00	
358			Dholiya	OAM-15	02.08.01	131.00	
359			Ningru Extension	OAM-16	04.06.03	75.00	
360			Chabua	OAM-17	12.06.02	189.00	
361			Tinsukia Extension	OAM-18	17.05.03	185.00	
362			Baghjan	OAM-19	14.05.03	75.00	
363			Mechaki	OAM-20	19.05.03	195.00	
364			Sapkaint	OAM-21	24.12.07	105.00	
OIL TOTAL							
365	CAIRN	K-G Off.	Ravva	—	28.10.94	331.26	3754.96
366			Lakshmi	—	07.07.98	121.06	
367			Gauri	—	—	50.70	
368			Ambe	—	—	107.47	
369		Rajasthan	CBX	—	—	33.30	
370			Mangala (RJ-ON-90/1)	—	21.06.05	1859.00	
371			Bhagyam-Shakti	—	15.11.06	430.17	
372			Kaameshwari West	-	27.10.09	822.00	
373	BG-RIL-ONGC	Mumbai Off.	Mid & South Tapti	—	22.12.94	1471.00	2678.00
374			Panna	—	22.12.94	430.00	
375			Mukta	—	22.12.94	777.00	
376	GEOENPRO	Assam-Arakan	Kharsang	—	21.10.97	10.00	10.00
377	CANORO	Assam-Arakan	Amguri	—	01.11.03	52.75	52.75
378	HOEC	Cambay	Asjol	—	09.04.96	15.00	124.94
379			N. Balol	—	21.03.02	27.30	
380			Promoda & Palej	—	21.09.05	7.64	
381		Cauvery Off.	PY-1	—	06.10.95	75.00	
382	INTERLINK	Cambay	Baola	—	12.12.96	4.00	16.70
383			Modhera	—	19.05.07	12.70	
384	JTI	Cambay	Wavel	—	20.02.95	9.00	57.00
385			Dholka	—	20.02.95	48.00	
386	NIKO	Cambay	Hazira	—	23.09.94	50.00	74.25
387			NS-A	—	01.05.04	20.22	
388			Bheema	—	29.09.04	4.03	

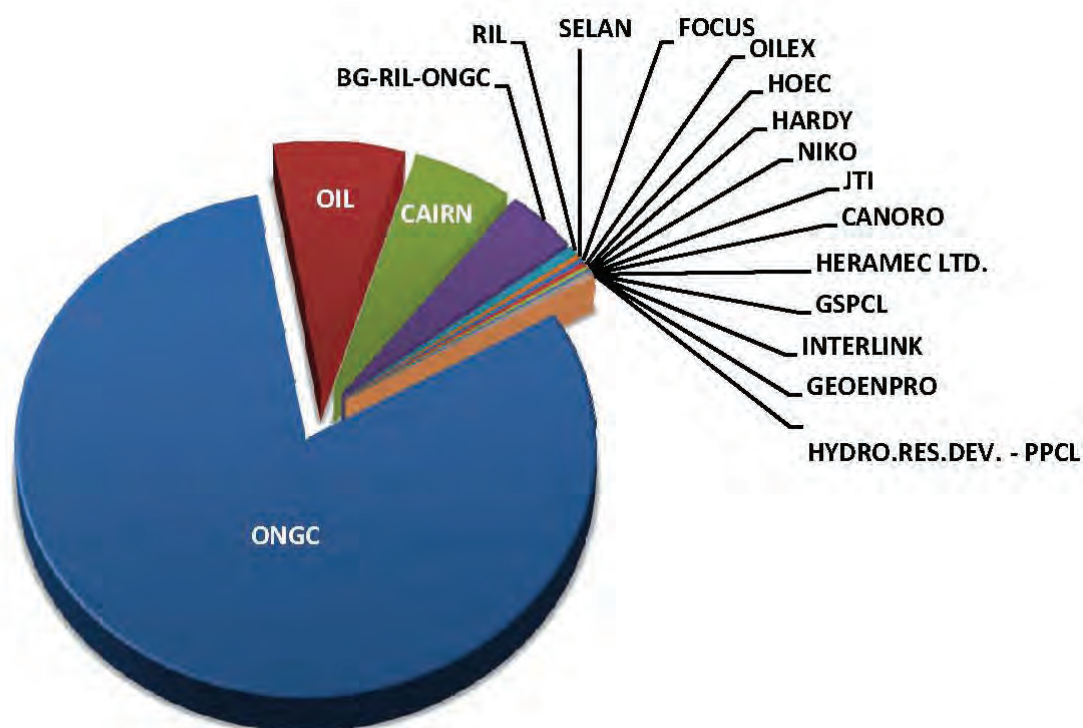
ML AREAS UNDER OPERATION BY NOC's AND PVT/JV COMPANIES

Sl. No.	COMPANY / OPERATOR	BASIN	BLOCK NAME	REF. NO. ON MAP	EFFECTIVE DATE OF ML	AREA (Sq. Km.)	TOTAL AREA (Sq. Km.)
389	SELAN	Cambay	Lohar	—	13.03.95	5.00	189.65
390			Indrora	—	13.03.95	130.00	
391			Bakrol	—	13.03.95	36.00	
392			Karjisan	—	23.11.05	5.00	
393			Ognaj	—	05.08.08	13.65	
394	Heramec	Cambay	Kanawara	—	04.02.03	6.30	34.15
395			Dholasan	—	27.02.03	8.80	
396			Allora	—	16.05.03	6.85	
397			N. Kathana	—	11.06.03	12.20	
398	HYDROCARBON RES. DEV.-PPC	Cambay	Sanganpur	—	27.02.02	4.40	4.40
399	OILEX	Cambay	Cambay	—	23.09.94	161.00	172.80
400			Sabarmati	—	23.09.94	5.80	
401			Bhandut	—	23.09.94	6.00	
402	GSPCL	Cambay	Unawa	—	19.05.03	5.65	19.68
403			Ingoli Field (CBONN-2001/1)	—	—	14.03	
404	FOCUS	Rajasthan	RJ-ON/6 (SGL)	—	—	176.00	176.00
405	HARDY	Cauvery Off.	CY-OS-90/1 (PY-3)	—	20.07.98	81.00	81.00
406	RIL	KG Off.	KG-DWN-98/3(D-1&3)	—	02.03.05	339.40	389.12
407			KG-DWN-98/3 (D-26)	—	17.04.08	49.72	
Pvt./JV TOTAL							7835.40
GRAND TOTAL							65651.04

**Grand Total of MLs awarded in the country : 65651.04 Sq.km
(NOC's & Pvt. / JV Companies)**

ML AREAS UNDER OPERATION BY NOC'S AND PVT/JV COMPANIES

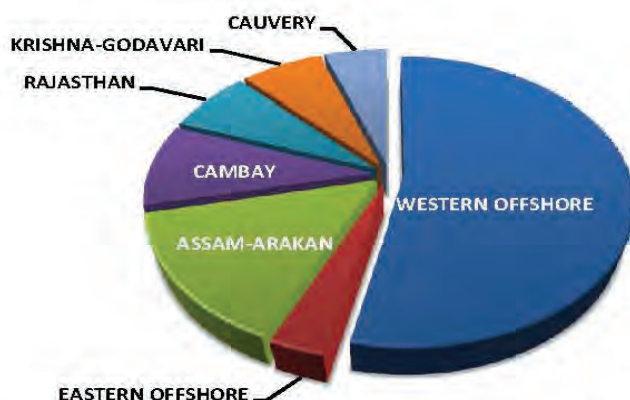
As on 01.04.13



COMPANY / OPERATOR	ML AREA	
	(Sq. Km.)	(%)
ONGC	52,899.63	80.58
OIL	4,916.01	7.49
CAIRN	3,754.96	5.72
BG-RIL-ONGC	2,678.00	4.08
RIL	389.12	0.59
SELAN	189.65	0.29
FOCUS	176.00	0.27
OILEX	172.80	0.26
HOEC	124.94	0.19
HARDY	81.00	0.12
NIKO	74.25	0.11
JTI	57.00	0.09
CANORO	52.75	0.08
HERAMEC LTD.	34.15	0.05
GSPCL	19.68	0.03
INTERLINK	16.70	0.03
GEOENPRO	10.00	0.02
HYDRO.RES.DEV. - PPCL	4.40	0.01

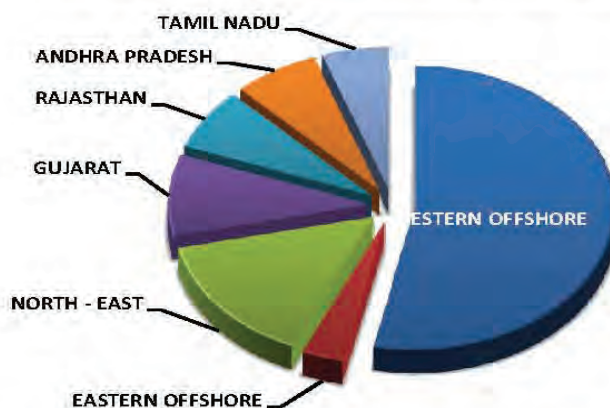
BASIN / STATE WISE DISTRIBUTION OF ML AREAS

As on 01.04.13



OFFSHORE/BASIN	ML AREA	
	(Sq.km)	(%)
OFFSHORE		
WESTERN	35,057.42	53.40
EASTERN	2,181.33	3.32
TOTAL OFFSHORE	37,238.75	56.72
ONLAND		
ASSAM - ARAKAN	9,664.29	14.72
CAMBAY	6,055.42	9.22
RAJASTHAN	4,632.02	7.06
KRISHNA-GODAVARI	4,546.59	6.93
CAUVERY	3,513.97	5.35
TOTAL ONLAND	28,412.29	43.28
GRAND TOTAL	65,651.04	100.00

STATE WISE DISTRIBUTION OF ML AREAS

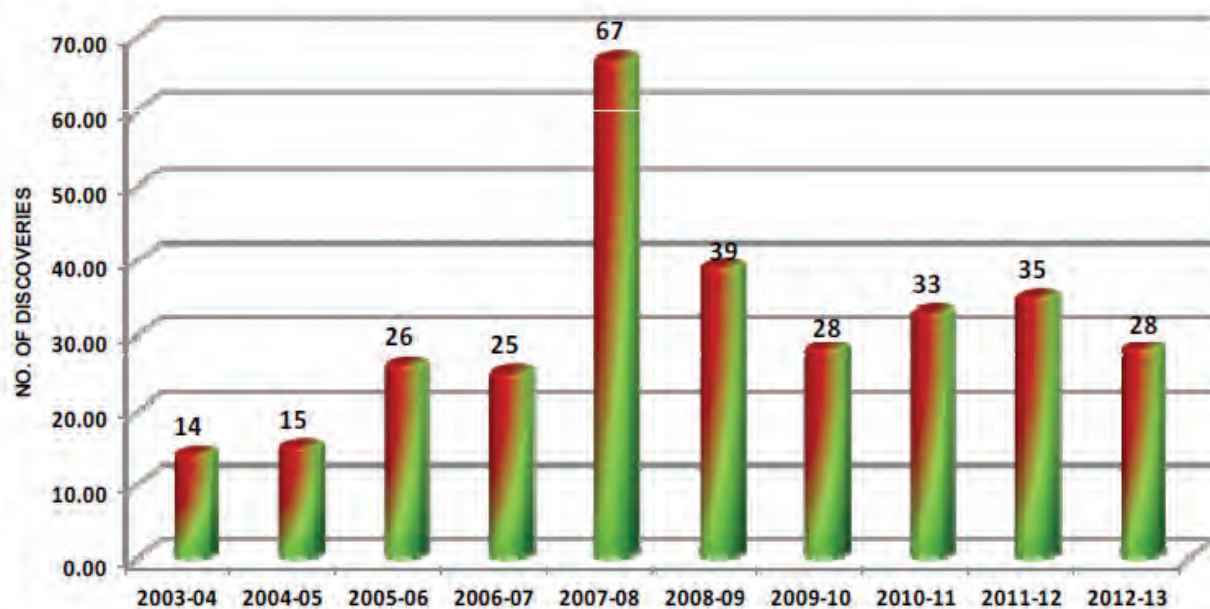


OFFSHORE/BASIN	ML AREA	
	(Sq.km)	(%)
OFFSHORE		
WESTERN	35,057.42	53.40
EASTERN	2,181.33	3.32
TOTAL OFFSHORE	37,238.75	56.72
ONLAND		
NORTH - EASTERN STATES	9,664.29	14.72
GUJARAT	6,055.42	9.22
RAJASTHAN	4,632.02	7.06
ANDHRA PRADESH	4,546.59	6.93
TAMIL NADU	3,513.97	5.35
TOTAL ONLAND	28,412.29	43.28
GRAND TOTAL	65,651.04	100.00

INPLACE RESERVE ACCRETION TREND



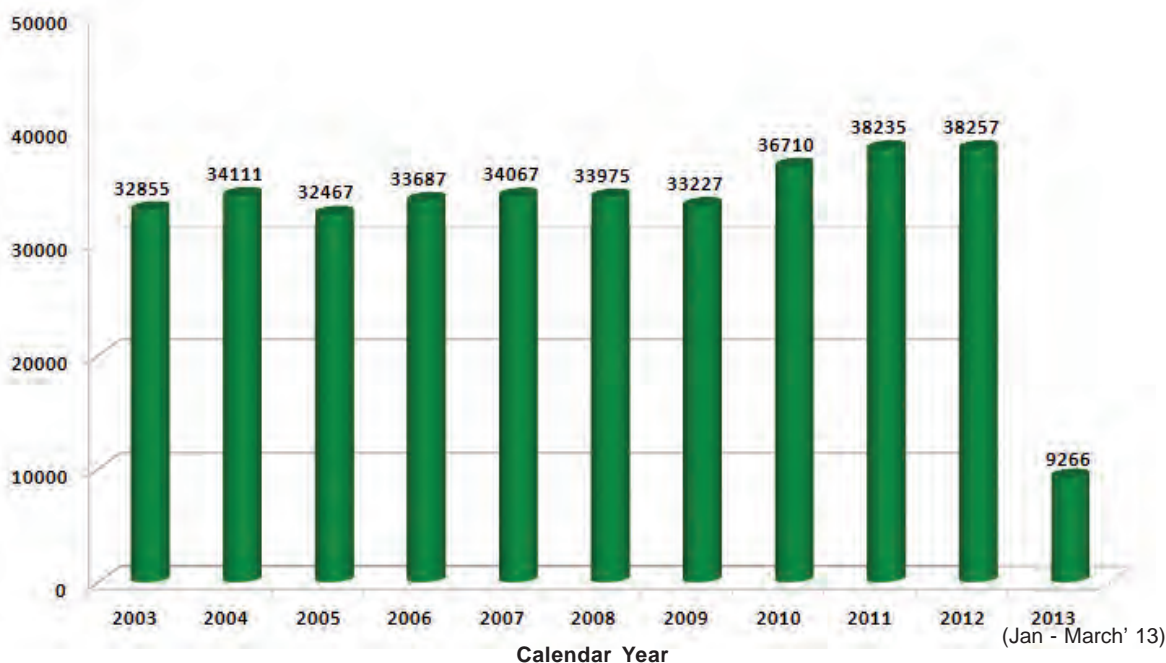
OIL & GAS DISCOVERY TREND



Note : Trends include Nomination and PSC regime

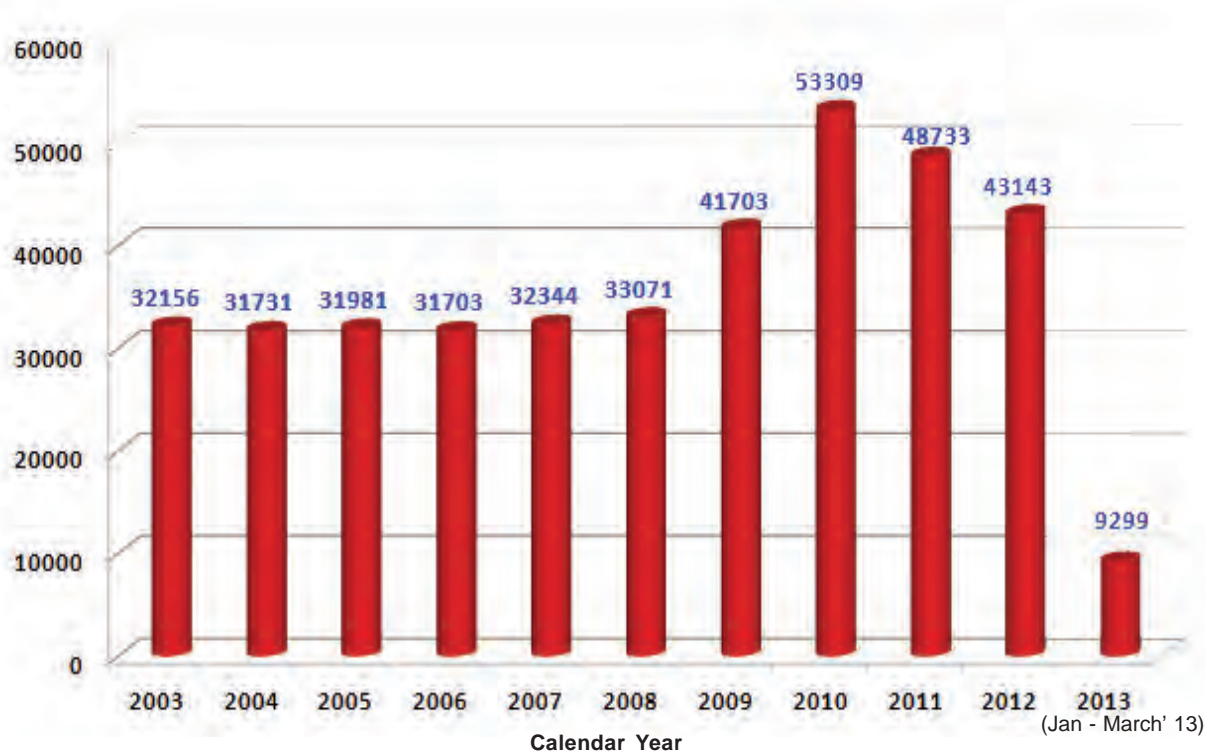
OIL & GAS PRODUCTION TREND

Oil Production Yearwise in '000 Tonnes



Source : <http://petroleum.nic.in/psbody.htm>

Gas Production Yearwise in MCM

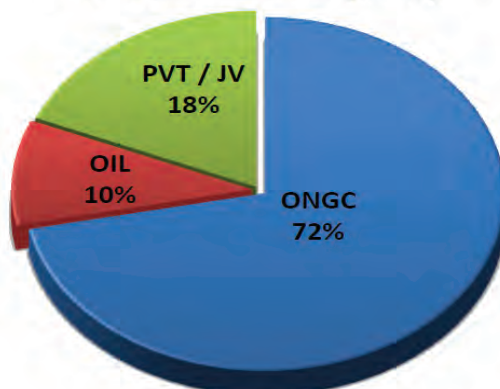


Source : <http://petroleum.nic.in/psbody.htm>

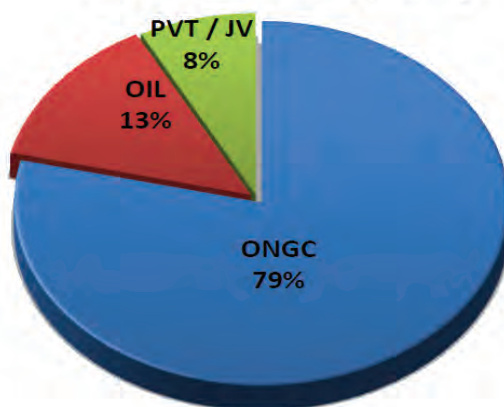
Note : Trends include Nomination and PSC regime

OIL & GAS PRODUCTION (SINCE INCEPTION TILL 31.03.2013)

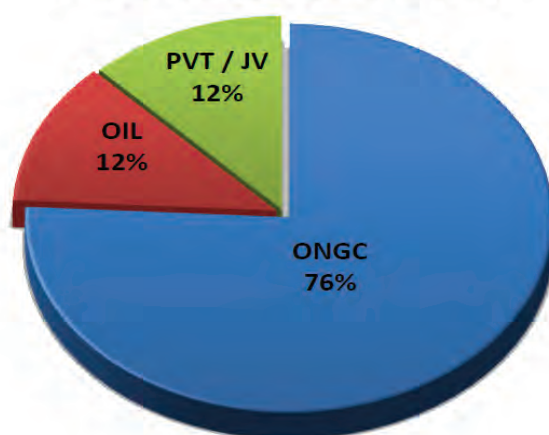
GAS PRODUCTION (BCM)



OIL PRODUCTION (MMT)

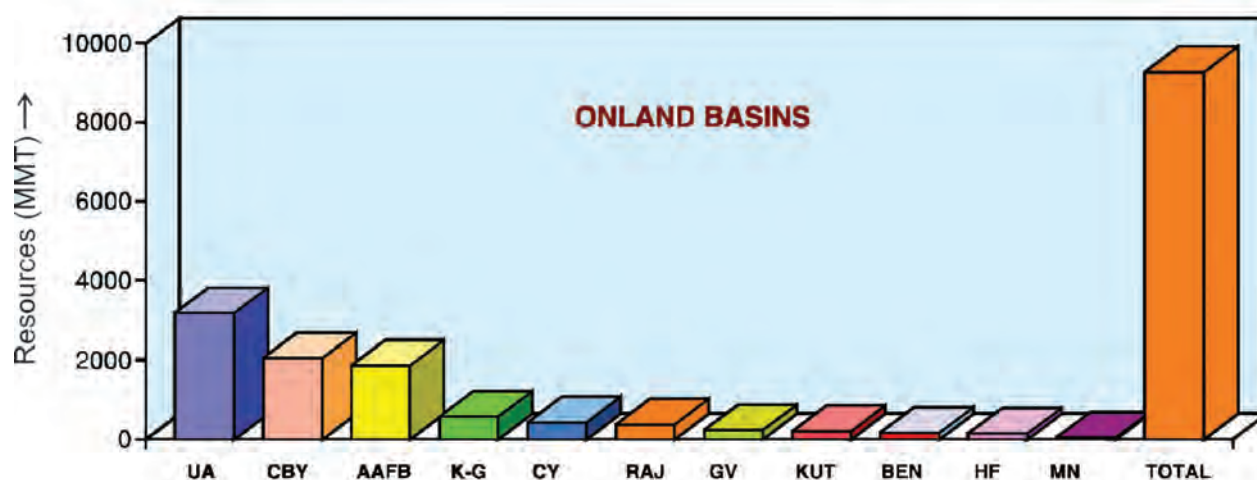
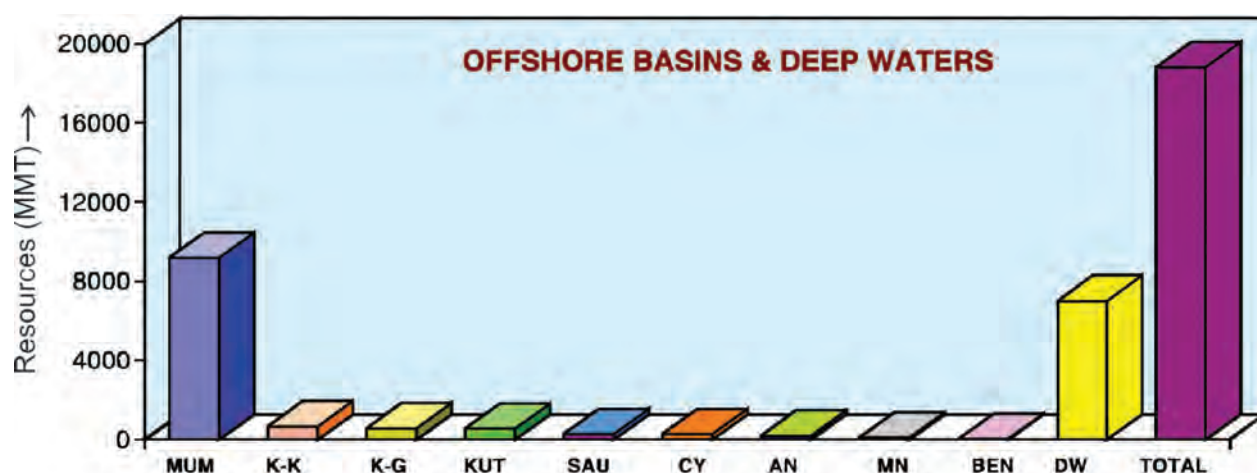


O+OEG PRODUCTION (MMT)



COMPANY	GAS(BCM)	OIL(MMT)	O+OEG(MMT)
ONGC (Nomination)	578.620	909.000	1487.620
OIL (Nomination)	77.740	156.660	234.400
PVT / JV (PSC)	150.066	88.995	239.061
GRAND TOTAL	806.426	1154.655	1961.081

TOTAL HYDROCARBON RESOURCES (A Historical Assessment)



BASIN-WISE HYDROCARBON RESOURCES (MMT)

BASIN	OFFSHORE	ONLAND	TOTAL
MUMBAI (MUM)	9,190	---	9,190
ASSAM-ARAKAN FOLD BELT (AAFB)	---	1,860	1,860
CAMBAY (CBY)	---	2,050	2,050
UPPER ASSAM (UA)	---	3,180	3,180
KRISHNA-GODAVARI (K-G)	555	575	1,130
CAUVERY (CY)	270	430	700
RAJASTHAN (RAJ)	---	380	380
KUTCH (KUT)	550	210	760
ANDAMAN-NICOBAR (AN)	180	---	180
KERALA-KONKAN (K-K)	660	---	660
SAURASHTRA OFFSHORE (SAU)	280	---	280
GANGA VALLEY (GV)	---	230	230
BENGAL (BEN)	30	160	190
HIMALAYAN FORELAND (HF)	---	150	150
MAHANADI (MN)	100	45	145
DEEP WATER (DW) *	7,000	---	7,000
GRAND TOTAL	18,815	9,270	28,085

* Resources are under revision.

Areas having greater than 200 m bathymetry

Details of oil & gas discoveries under NELP / Pre-NELP as on 31.03.2013

Sl. No.	Company Name	Block Name / Field	Round	OIL	GAS	TOTAL
1	RIL(48)	KG-DWN-98/3	NELP I	1	18	19
2		KG-OSN-2001/2	NELP III	2	-	2
3		KG-OSN-2001/1	NELP III	-	3	3
4		NEC-OSN-97/2	NELP I	-	8	8
5		GS-OSN-2000/1	NELP II	-	1	1
6		KG-DWN-98/1	NELP I	1	-	1
7		CY-DWN-2001/2	NELP III	1	-	1
8		KG-DWN-2003/1	NELP V	-	3	3
9		CB-ONN-2003/1	NELP V	8	-	8
10		CY-PR-DWN-2001/3	NELP-III	-	1	1
11		KG-DWN-2001/1	NELP-III	-	1	1
12	ONGC (36)	KG-DWN-98/2	NELP I	2	8	10
13		MN-DWN-98/3	NELP I	-	2	2
14		MN-OSN-2000/2	NELP II	-	2	2
15		CB-OSN-2003/1	NELP V	-	3	3
16		CB-ONN-2002/1	NELP IV	1	-	1
17		AA-ONN-2001/1	NELP III	-	1	1
18		CB-ONN-2001/1	NELP III	1	-	1
19		CB-ONN-2004/1	NELPVI	1	-	1
20		CB-ONN-2004/2	NELP VI	3	-	3
21		AN-DWN-2002/1	NELP IV	-	1	1
22		KG-OSN-2004/1	NELP VI	-	3	3
23		NEC-DWN-2002/1	NELP IV	-	1	1
24		AA-ONN-2001/2	NELP III	-	1	1
25		CB-ONN-2004/3	NELP VI	-	1	1
26		GS-OSN-2004/1	NELP VI	-	1	1
27		MB-OSN-2005/1	NELP VII	-	1	1
28		CY-ONN-2002/2	NELP IV	1	-	1
29		CY-ONN-2004/2	NELP VI	1	-	1
30		KG-DWN-2005/1	NELP VII	-	1	1
31	OIL (1)	RJ-ONN-2004/2	NELP VI	1	-	1
32	CEIL (2)	KG-ONN-2003/1	NELP V	2	-	2
33	NIKO (2)	CB-ONN-2000/2	NELP II	-	2	2
34	GSPC (24)	CB-ONN-2000/1	NELP II	4	-	4
35		KG-OSN-2001/3	NELP III	-	9	9
36		CB-ONN-2002/3	NELP IV	8	-	8
37		CB-ONN-2003/2	NELP-V	2	1	3
38	JUBILANT (4)	AA-ONN-2002/1	NELP IV	-	4	4
NELP Total				40	77	117
1	CAIRN (33)	RJ-ON-90/1	Pre-NELP	22	4	26
2		CB-OS/2	Pre-NELP	3	2	5
3		Ravva	Pre-NELP	1	1	2
4	ESSAR OIL (5)	CB-ON/3	Pre-NELP	5	-	5
5	FOCUS (3)	RJ-ON/6	Pre-NELP	-	3	3
6	GSPC (10)	CB-ON/2	Pre-NELP	9	1	10
7	HARDY (1)	CY-OS/2	Pre-NELP	-	1	1
8	HOEC (3)	CB-ON/7	Pre-NELP	2	-	2
9		AAP-ON-94/1	Pre-NELP	-	1	1
10	ONGC (1)	CB-OS/1	Pre-NELP	1	-	1
11	RIL (1)	SR-OS-94/1	Pre-NELP	-	1	1
12	BGEPIL (1)	Panna-Mukta	Pre-NELP	1	-	1
13	Interlink (1)	Baola	Pre-NELP	1	-	1
Pre-NELP/Field Total				45	14	59

Note: The above status is indicative only and may not be a comprehensive list of all discoveries, as notified by the operators.

INITIATIVES BY GOVERNMENT OF INDIA TO BOOST HYDROCARBON SECTOR

Some bold initiatives were taken by the Government of India in 2012-13 to foster the Exploration and Production sector and easing out the bottlenecks coming in the way of energy security of the country. A few laudable steps in this direction are:

1. Allowing exploration in the mining lease and monetization of earlier discoveries. This should significantly add up to the existing reserve base of the country.
2. A rethink on the extant PSC mechanism and examining the scope for improvement.
3. Revamping of DGH for better functioning as an advisory body to the MoPNG.

A. Exploration in the mining lease

Government of India (GoI) vide Office Memorandum No. O-19025/10/2005-ONG-DV dated 1.2.2013 has decided that exploration will be allowed in Mining Lease Area with cost recovery on establishment of commerciality. All approved exploration costs will be allowed for cost recovery on such Declaration of Commerciality. The permission to explore in ML areas will be according to the following mechanism:

The contractor may do further exploration activities at his risk in the Mining Lease area, after the expiry of exploration period, subject to the following conditions:

1. Cost of such exploration activities will be recoverable after a resultant discovery is proved commercially and techno-economically viable at FDP stage, in the manner stipulated below and the development plan is approved under the provision of the PSC, such Exploration costs incurred till then will be recovered as provided in the PSC. Cost of any further exploration done subsequently will be recoverable only after any of those subsequent exploration efforts results in a commercially viable discovery as seen from approved FDP for that discovery.
2. (i) The Contractor must prove commercial and techno-economical viability of new discoveries as a result of such exploration, both at DOC stage and FDP stage, with requisite computations of cash flows and distribution of Profit Petroleum, demonstrating that the cumulative Government's share of Profit Petroleum from the existing discoveries will not be adversely impacted, over the period of such FDP or tenure of PSC, as appropriate, at the projected production profile validated by DGH.
 (ii) The costs considered for such computation shall include the past costs of exploration incurred in ML area after the expiry of exploration period.
 (iii) The crude oil price used for such computation shall be the average 'Brent' price for last one year and gas price shall be the price obtained from the formula approved by Government for that block, if any, or in its absence, the lowest current price obtained from the formula approved by Government for various NELP blocks.
 (iv) The development and production costs considered for techno economic evaluation of FDP shall be realistic estimates. In any case, the Contractor shall agree and undertake to cap the development and production costs in respect of the new discovery, considered as Contract Costs for cost petroleum and Investment Multiple within the cost estimates used in FDP for development and production.
 (v) The Contractor will have the option to propose any revision in the FDP if required for operational reasons. However, all such revised FDPs must pass the same test of commerciality and techno-economic viability as prescribed above in order to be eligible to be Contract Cost. If such revised FDPs are not approved by the Management Committee [not commercial or techno-economically viable], then the costs considered as contract Costs under the revised FDP shall be limited to earlier approved FDP.
3. The provisions of existing PSC will continue to apply for development and production relating to such discoveries, except for the timelines relating to discovery and development as provided in the relevant articles of PSC.

4. Approval for further exploration, development and production shall not confer any right on the contractor for further extension in the tenure of the PSC, except as provided for in the PSC.
5. The contractor will also be permitted to develop and monetize the existing discoveries, if any, in the ML area which could not be developed or monetized earlier because some of the activities may have been in deviation from PSC provisions, provided that the commerciality and techno-economic feasibility of such discoveries is established at FDP stage in the same manner as provided above. However, this will be subject to the following conditions.
 - (i) Costs which cannot be recovered:
 - ◆ Costs incurred in the past upto the date of the policy on activities which were in deviation from PSC provisions.
 - (ii) Costs which can be recovered.
 - ◆ Costs incurred in the past on activities which were in accordance with the provisions of PSC and which are, therefore, already eligible for cost recovery.
 - ◆ Any future costs for appraisal, development and production of all such existing discoveries.
6. The contractor shall obtain the approval of MC for quarterly allocation of Cost Petroleum and Profit Petroleum as provided in the specific articles of PSC.
7. Operators may approach DGH for approval of any such proposals.

B. Improving PSC Mechanism

During 2012-13, a Committee was constituted by GOI to review the profit sharing mechanism and the Production Sharing Contracts (PSCs) in Hydrocarbon exploration, which was headed by Dr. C. Rangarajan- Chairman, Prime Minister's Economic Advisory Council.

The Committee has deliberated and published their report containing its recommendations on the following terms of reference / issues:

- (i) Modification necessary for the future PSCs after review of the existing PSCs, including in respect of the current profit-sharing mechanism with the Pre-Tax Investment Multiple (PTIM) as the base parameter.
- (ii) Exploring various contract models with a view to minimize the monitoring of expenditure of the contractor without compromising, firstly, on the hydrocarbon output across time and secondly on the Government's take.
- (iii) A suitable mechanism for managing the contract implementation of PSCs which is being handled at present by the representation of Regulator/Government nominee appointed to the Managing Committee.
- (iv) Suitable Government mechanisms to monitor and to audit GOI share of profit petroleum.
- (v) Structure and elements of the Guidelines for determining the basis or formula for the price of domestically produced gas and for monitoring actual price fixation.

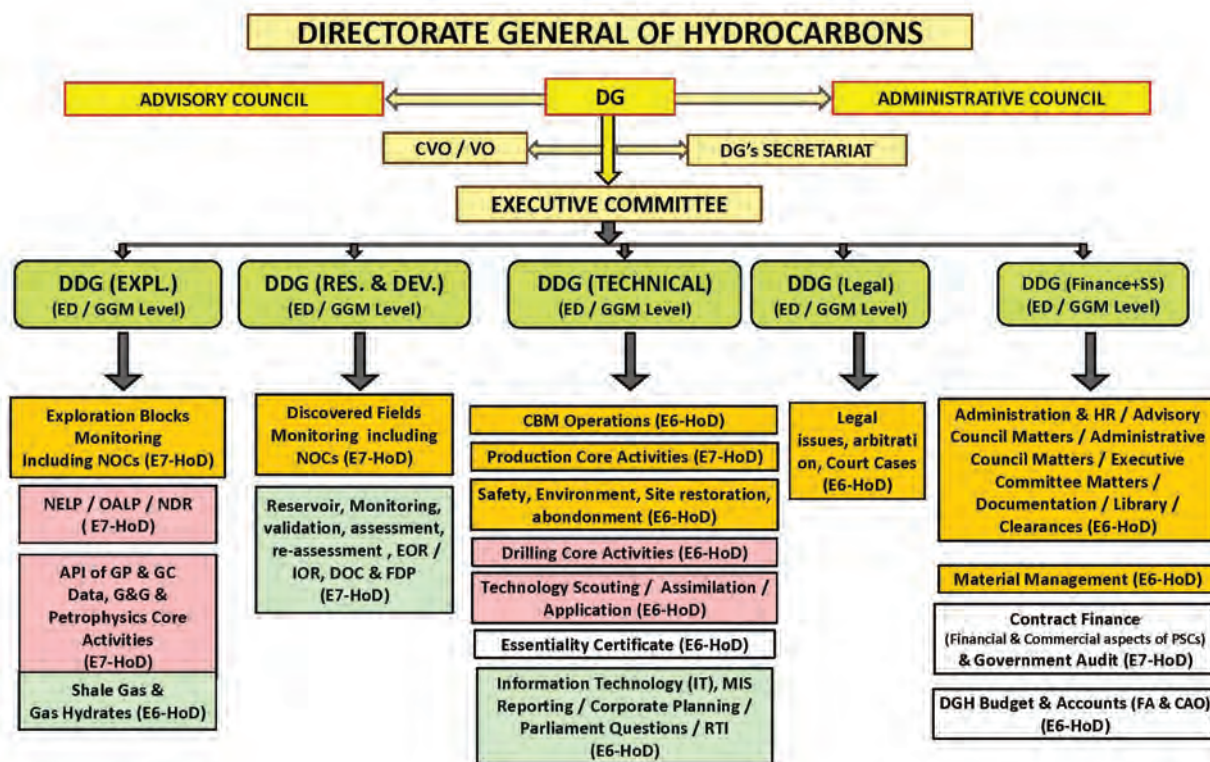
The Committee has aimed at arriving at a mechanism that would lead to greater synergy between the Government and oil companies, thereby enhancing domestic production, simplifying monitoring procedures and incentivising investments in the exploration and production of hydrocarbons, including from the private sector.

The full report of the Committee is published in the public domain.

The various recommendations of the Committee are under various stages of examination by GOI.

C. Revamping of DGH

Administrative Council of DGH in its 20th meeting held on 01.03.2013 approved the Revised Organizational Structure.



Organizational Structure: Organizational structure (Organogram) for DGH as given above was approved with the following stipulations:

- There would not be more than three functional/ administrative levels within each Department (for example, Nodal Officer, Coordinator and HOD in Exploration Block Monitoring Department).
- Job description and responsibilities of Nodal Officers and Coordinators would be clearly defined.

RTI ANNUAL RETURN INFORMATION

Year : 2012-2013

Sr.No	Ministry/Department/ Organisation	Quarter	Opening balance of Requests (as on start of Quarter)	No.of Requests Received during Quarter	Total no.of Requests (Column 3+4)	No.of Requests transferred to other PAs	Decisions where Applications for information rejected	Number of cases where disciplinary action taken against any officer in respect of administration of RTI Act	Total amount collected (fee+addl. Charges+pe nalty) (Rs.)	No. of times various Provisions were invoked while Rejecting Requests													
										Relevant Sections of RTI Act 2005													
										Section 8 (1)										Other Sections			
										(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(9)	(11)	(24)	(Others)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(27)
1	Ministry of Petroleum & Natural Gas																						
1.1	Directorate General of Hydrocarbons	1st Quarter (Apr 12-Jun12)	0	6	6	0	0 (0%)	0	1674	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		2nd Quarter (July 12-Sept12)	14	3	17	2	0 (0%)	0	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		3rd Quarter (Oct 12-Dec12)	25	11	36	1	0 (0%)	0	270	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		4th Quarter (Jan 13-Mar13)	45	15	60	4	0 (0%)	0	808	0	0	0	1	0	0	0	1	0	0	0	2	0	0

EXTRACTS FROM XIITH FIVE YEAR PLAN (2012-2017)

Extracts from “Twelfth Five Year Plan (2012-17) Economic Sectors- Vol-II” published by Planning Commission, Government of India

Introduction

India is the fourth largest consumer of energy in the world after USA, China and Russia but it is not endowed with abundant energy resources. It must, therefore, meet its development needs by using all available domestic resources of coal, uranium, oil, hydro and other renewable resources, and supplementing domestic production by imports. High reliance on imported energy is costly given the prevailing energy prices which are not likely to soften; it also impinges adversely on energy security. Meeting the energy needs of achieving 8 per cent– 9 per cent economic growth while also meeting energy requirements of the population at affordable prices therefore presents a major challenge. It calls for a sustained effort at increasing energy efficiency to contain the growth in demand for energy while increasing domestic production as much as possible to keep import dependence at a reasonable level.

Exploration and Production (E&P)

Both oil and gas production targets have slipped by large percentages during the Eleventh Plan period. Against the crude oil production target of 206.73 MMT in the Eleventh Plan, the actual achievement is only 177 MMT, that is, 14 per cent below the target. The actual natural gas production was 212.54 BCM as against the production target of 255.76 BCM, with a shortfall of about 17 per cent of the Eleventh Plan targets. The balance recoverable reserve position as on 1 April 2011 of O + OEG was about 2015 million tonnes, which has increased by 10.5 per cent from 1,847 million tonnes as on 1 April 2007.

E& P program in 12th Plan

Crude Oil and Gas Production :

Table A- Projection of Crude oil production in 12th Plan

(Figs. in MMT)

Company	2012-13	2013-14	2014-15	2015-16	2016-17	Total
ONGC	25.045	28.27	28.002	26.286	25.456	133.059
OIL	3.92	4.00	4.06	4.16	4.20	20.34
Pvt./JV	13.34	13.30	12.70	12.10	11.50	62.94
Total	42.305	45.57	44.762	42.546	41.156	216.339

Table B- Projection of Natural Gas production in 12th Plan

(Figs. in BCM)

Company	2012-13	2013-14	2014-15	2015-16	2016-17	Total
ONGC	24.9	25.5	26.7	28.2	38.7	143.9
OIL	3.1	3.8	4.0	4.1	4.2	19.2
Pvt./JV	15.0	14.5	16.5	18.5	21.0	85.5
Total	43.0	43.8	47.2	50.8	63.9	248.6
Total MMSCMD	118	120	129	139	175	—

The above projections of natural gas production in 12th plan are as revised vide MoPNG OM no Q-26012/3/2010-ED (Vol II) dated 4 May, 2012- "Revised Estimates of Domestic Natural Gas Production- 12th Plan"

TABLE - SUMMARY OF 12TH FIVE YEAR PLAN

ACTIVITY	UNIT	ONGC	OIL	Private/JV	Total
Seismic Surveys 2D	Kilometer	28170	6850	103954	138974
Seismic Surveys 3D	Sq. Km	24163	8364	49961	82488
Exploration Wells	Nos.	611	174	525	1310
Reserves Accretion IIH	MMTOE	1080	78.14	728	1886.14
Ultimate Hydrocarbon Reserves Accretion	MMTOE	360	26	341	727

BP STATISTICAL REVIEW 2013

OIL PROVED RESERVES

Thousand million barrels	1982	1992	2002	2012	2012 Share of Total
US	35.1	31.2	30.7	35.0	2.1%
Canada	40.3	39.6	180.4	173.9	10.4%
Mexico	57.0	51.2	17.2	11.4	0.7%
Total North America	132.4	122.1	228.3	220.2	13.2%
Argentina	1.9	2.0	2.8	2.5	0.1%
Brazil	1.7	5.0	9.8	15.3	0.9%
Colombia	0.6	3.2	1.6	2.2	0.1%
Ecuador	0.9	3.2	5.1	8.2	0.5%
Peru	0.8	0.8	1.0	1.2	0.1%
Trinidad & Tobago	0.6	0.5	1.1	0.8	f&
Venezuela	24.9	63.3	77.3	297.6	17.8%
Other S. & Cent. America	0.8	0.6	1.6	0.5	f&
Total S. & Cent. America	32.3	78.8	100.3	328.4	19.7%
Azerbaijan	n/a	n/a	7.0	7.0	0.4%
Denmark	0.3	0.7	1.3	0.7	f&
Italy	0.4	0.6	0.8	1.4	0.1%
Kazakhstan	n/a	n/a	5.4	30.0	1.8%
Norway	3.8	9.7	10.4	7.5	0.4%
Romania	1.0	1.2	0.5	0.6	f&
Russian Federation	n/a	n/a	76.1	87.2	5.2%
Turkmenistan	n/a	n/a	0.5	0.6	f&
United Kingdom	7.5	4.6	4.5	3.1	0.2%
Uzbekistan	n/a	n/a	0.6	0.6	f&
Other Europe & Eurasia	65.3	61.3	2.2	2.1	0.1%
Total Europe & Eurasia	78.3	78.3	109.3	140.8	8.4%
Iran	56.1	92.9	130.7	157.0	9.4%
Iraq	59.0	100.0	115.0	150.0	9.0%
Kuwait	67.2	96.5	96.5	101.5	6.1%
Oman	3.4	4.7	5.7	5.5	0.3%
Qatar	3.4	3.1	27.6	23.9	1.4%
Saudi Arabia	165.5	261.2	262.8	265.9	15.9%
Syria	1.8	3.0	2.3	2.5	0.1%
United Arab Emirates	32.4	98.1	97.8	97.8	5.9%
Yemen	-	2.0	2.9	3.0	0.2%
Other Middle East	0.2	0.1	0.1	0.6	f&
Total Middle East	388.9	661.6	741.3	807.7	48.4%
Algeria	9.4	9.2	11.3	12.2	0.7%
Angola	1.5	1.3	8.9	12.7	0.8%
Chad	-	-	0.9	1.5	0.1%
Rep. of Congo (Brazzaville)	0.8	0.7	1.5	1.6	0.1%
Egypt	3.7	3.4	3.5	4.3	0.3%
Equatorial Guinea	-	0.3	1.1	1.7	0.1%
Gabon	0.5	0.8	2.4	2.0	0.1%
Libya	22.2	22.8	36.0	48.0	2.9%
Nigeria	16.8	21.0	34.3	37.2	2.2%
South Sudan	-	-	-	3.5	0.2%
Sudan	0.4	0.3	0.6	1.5	0.1%
Tunisia	2.5	0.5	0.5	0.4	f&
Other Africa	0.7	0.8	0.6	3.7	0.2%
Total Africa	58.3	61.1	101.6	130.3	7.8%
Australia	2.9	3.2	4.6	3.9	0.2%
Brunei	1.4	1.1	1.1	1.1	0.1%
China	13.3	15.2	15.5	17.3	1.0%
India	3.5	5.9	5.6	5.7	0.3%
Indonesia	10.5	5.6	4.7	3.7	0.2%
Malaysia	2.6	5.1	4.5	3.7	0.2%
Thailand	^	0.2	0.7	0.4	f&
Vietnam	-	0.3	2.8	4.4	0.3%
Other Asia Pacific	1.1	0.9	1.1	1.1	0.1%
Total Asia Pacific	35.4	37.5	40.6	41.5	2.5%
Total World	725.6	1039.3	1321.5	1668.9	100.0%

NOTE: ♦ Less than 0.05% & ^ Less than 0.05

OIL PRODUCTION					
Million tonnes	1982	1992	2002	2012	2012 share of Total
US	480.7	413.0	342.0	394.9	9.6%
Canada	74.6	97.2	132.6	182.6	4.4%
Mexico	151.0	153.0	177.8	143.9	3.5%
Total North America	706.3	663.2	652.4	721.4	17.5%
Argentina	25.6	29.0	43.1	31.0	0.8%
Brazil	14.1	34.2	78.4	112.2	2.7%
Colombia	7.6	23.3	30.4	49.9	1.2%
Ecuador	11.4	17.5	21.1	27.1	0.7%
Peru	10.2	6.1	4.9	4.8	0.1%
Trinidad & Tobago	8.8	6.9	8.0	6.0	0.1%
Venezuela	102.6	131.6	152.8	139.7	3.4%
Other S. & Cent. America	4.6	3.6	7.7	7.3	0.2%
Total S. & Cent. America	184.8	252.1	346.4	378.0	9.2%
Azerbaijan	n/a	11.2	15.3	43.4	1.1%
Denmark	1.7	7.7	18.1	10.1	0.2%
Italy	1.8	4.5	5.5	5.4	0.1%
Kazakhstan	n/a	25.8	48.2	81.3	2.0%
Norway	25.2	106.9	157.9	87.5	2.1%
Romania	12.2	6.8	6.1	4.1	0.1%
Russian Federation	n/a	398.8	383.7	526.2	12.8%
Turkmenistan	n/a	5.2	9.0	11.0	0.3%
United Kingdom	103.2	94.3	115.7	45.0	1.1%
Uzbekistan	n/a	3.3	7.2	3.2	0.1%
Other Europe & Eurasia	636.6	31.3	23.6	19.2	0.5%
Total Europe & Eurasia	780.7	695.7	790.3	836.4	20.3%
Iran	120.1	175.7	177.5	174.9	4.2%
Iraq	48.5	26.1	103.9	152.4	3.7%
Kuwait	42.7	54.0	98.9	152.5	3.7%
Oman	16.7	37.0	44.6	45.8	1.1%
Qatar	16.9	23.6	37.4	83.3	2.0%
Saudi Arabia	340.2	442.4	425.2	547.0	13.3%
Syria	7.7	25.6	33.7	8.2	0.2%
United Arab Emirates	65.1	118.4	112.5	154.1	3.7%
Yemen	-	8.7	21.6	8.3	0.2%
Other Middle East	2.5	2.5	2.3	10.1	0.2%
Total Middle East	660.3	914.1	1057.5	1336.8	32.5%
Algeria	46.8	56.6	70.9	73.0	1.8%
Angola	6.4	27.2	44.6	86.9	2.1%
Chad	-	-	-	5.3	0.1%
Rep. of Congo (Brazzaville)	4.6	8.6	11.7	15.3	0.4%
Egypt	33.3	46.0	37.2	35.4	0.9%
Equatorial Guinea	-	0.1	11.1	13.2	0.3%
Gabon	7.8	14.5	12.8	12.3	0.3%
Libya	55.4	69.7	64.6	71.1	1.7%
Nigeria	63.5	99.1	101.7	116.2	2.8%
South Sudan	-	-	-	1.5	♦
Sudan	-	-	11.9	4.1	0.1%
Tunisia	5.1	5.2	3.5	3.1	0.1%
Other Africa	7.5	8.3	6.8	11.6	0.3%
Total Africa	230.5	335.3	376.8	449.0	10.9%
Australia	21.0	28.3	33.4	19.9	0.5%
Brunei	8.7	8.8	10.3	7.8	0.2%
China	102.1	142.0	166.9	207.5	5.0%
India	19.9	29.2	37.2	42.0	1.0%
Indonesia	66.6	76.7	63.3	44.6	1.1%
Malaysia	14.5	31.3	34.2	29.7	0.7%
Thailand	0.2	3.6	8.1	16.2	0.4%
Vietnam	-	5.5	17.3	17.0	0.4%
Other Asia Pacific	4.0	9.4	8.7	12.5	0.3%
Total Asia Pacific	237.0	334.8	379.3	397.3	9.6%
Total World	2799.7	3195.3	3602.7	4118.9	100.0%

NATURAL GAS : PROVED RESERVES

Trillion Cubic Metres	1982	1992	2002	2012	2012 share of Total
US	5.7	4.7	5.3	8.5	4.5%
Canada	2.6	2.7	1.7	2.0	1.1%
Mexico	2.1	2.0	0.4	0.4	0.2%
Total North America	10.4	9.3	7.4	10.8	5.8%
Argentina	0.7	0.5	0.7	0.3	0.2%
Bolivia	0.1	0.1	0.8	0.3	0.2%
Brazil	0.1	0.1	0.2	0.5	0.2%
Colombia	0.1	0.2	0.1	0.2	0.1%
Peru	^	0.3	0.2	0.4	0.2%
Trinidad & Tobago	0.3	0.2	0.6	0.4	0.2%
Venezuela	1.5	3.7	4.2	5.6	3.0%
Other S. & Cent. America	0.2	0.2	0.1	0.1	f&
Total S. & Cent. America	3.0	5.4	7.0	7.6	4.1%
Azerbaijan	n/a	n/a	0.9	0.9	0.5%
Denmark	0.1	0.1	0.1	^	f&
Germany	0.2	0.2	0.2	0.1	f&
Italy	0.2	0.3	0.2	0.1	f&
Kazakhstan	n/a	n/a	1.3	1.3	0.7%
Netherlands	1.8	1.7	1.4	1.0	0.6%
Norway	0.3	1.4	2.1	2.1	1.1%
Poland	0.1	0.2	0.1	0.1	0.1%
Romania	0.3	0.5	0.3	0.1	0.1%
Russian Federation	n/a	n/a	29.8	32.9	17.6%
Turkmenistan	n/a	n/a	2.3	17.5	9.3%
Ukraine	n/a	n/a	0.7	0.6	0.3%
United Kingdom	0.6	0.6	1.0	0.2	0.1%
Uzbekistan	n/a	n/a	1.2	1.1	0.6%
Other Europe & Eurasia	21.7	34.7	0.4	0.3	0.2%
Total Europe & Eurasia	25.3	39.6	42.1	58.4	31.2%
Bahrain	0.2	0.2	0.1	0.2	0.1%
Iran	14.1	20.7	26.7	33.6	18.0%
Iraq	0.8	3.1	3.2	3.6	1.9%
Kuwait	1.0	1.5	1.6	1.8	1.0%
Oman	0.1	0.2	0.9	0.9	0.5%
Qatar	3.1	6.7	25.8	25.1	13.4%
Saudi Arabia	3.4	5.2	6.6	8.2	4.4%
Syria	0.1	0.2	0.3	0.3	0.2%
United Arab Emirates	3.0	5.8	6.1	6.1	3.3%
Yemen	-	0.4	0.5	0.5	0.3%
Other Middle East	^	^	0.1	0.2	0.1%
Total Middle East	25.9	44.0	71.8	80.5	43.0%
Algeria	3.6	3.7	4.5	4.5	2.4%
Egypt	0.2	0.4	1.7	2.0	1.1%
Libya	0.7	1.3	1.5	1.5	0.8%
Nigeria	1.4	3.7	5.0	5.2	2.8%
Other Africa	0.4	0.8	1.1	1.3	0.7%
Total Africa	6.3	9.9	13.8	14.5	7.7%
Australia	0.6	1.0	2.5	3.8	2.0%
Bangladesh	0.3	0.3	0.3	0.2	0.1%
Brunei	0.2	0.4	0.3	0.3	0.2%
China	0.9	1.4	1.3	3.1	1.7%
India	0.4	0.7	0.8	1.3	0.7%
Indonesia	1.0	1.8	2.6	2.9	1.6%
Malaysia	1.4	1.7	2.5	1.3	0.7%
Myanmar	0.1	0.3	0.4	0.2	0.1%
Pakistan	0.5	0.6	0.8	0.6	0.3%
Papua New Guinea	-	0.4	0.4	0.4	0.2%
Thailand	0.3	0.2	0.4	0.3	0.2%
Vietnam	-	0.1	0.2	0.6	0.3%
Other Asia Pacific	0.2	0.3	0.4	0.3	0.2%
Total Asia Pacific	6.0	9.4	13.0	15.5	8.2%
Total World	77.0	117.6	154.9	187.3	100.0%

NOTE: ♦ Less than 0.05% & ^ Less than 0.05

NATURAL GAS PRODUCTION

Billion Cubic Feet Per Day	1982	1992	2002	2012	2012 share of Total
US	48.8	48.7	51.9	65.7	20.4%
Canada	7.3	12.2	18.2	15.1	4.6%
Mexico	2.9	2.6	3.8	5.6	1.7%
Total North America	59.0	63.5	73.9	86.5	26.8%
Argentina	0.9	1.9	3.5	3.6	1.1%
Bolivia	0.3	0.3	0.5	1.8	0.6%
Brazil	0.1	0.3	0.9	1.7	0.5%
Colombia	0.3	0.4	0.6	1.2	0.4%
Peru	0.1	^	^	1.2	0.4%
Trinidad & Tobago	0.3	0.5	1.9	4.1	1.3%
Venezuela	1.5	2.1	2.7	3.2	1.0%
Other S. & Cent. America	0.1	0.2	0.3	0.3	0.1%
Total S. & Cent. America	3.7	5.8	10.4	17.1	5.3%
Azerbaijan	n/a	0.7	0.5	1.5	0.5%
Denmark	-	0.4	0.8	0.6	0.2%
Germany	1.7	1.4	1.6	0.9	0.3%
Italy	1.3	1.6	1.3	0.8	0.2%
Kazakhstan	n/a	0.7	0.9	1.9	0.6%
Netherlands	5.9	6.7	5.8	6.2	1.9%
Norway	2.3	2.5	6.3	11.1	3.4%
Poland	0.4	0.3	0.4	0.4	0.1%
Romania	3.6	2.1	1.3	1.1	0.3%
Russian Federation	n/a	56.2	52.1	57.1	17.6%
Turkmenistan	n/a	5.2	4.7	6.2	1.9%
Ukraine	n/a	1.8	1.6	1.8	0.6%
United Kingdom	3.4	5.0	10.0	4.0	1.2%
Uzbekistan	n/a	3.7	5.0	5.5	1.7%
Other Europe & Eurasia	45.6	1.6	1.1	0.9	0.3%
Total Europe & Eurasia	64.1	90.0	93.5	99.9	30.7%
Bahrain	0.3	0.6	0.9	1.4	0.4%
Iran	0.7	2.4	7.3	15.5	4.8%
Iraq	0.1	0.2	0.2	0.1	♦
Kuwait	0.4	0.3	0.9	1.4	0.4%
Oman	0.1	0.3	1.5	2.8	0.9%
Qatar	0.5	1.2	2.9	15.2	4.7%
Saudi Arabia	1.2	3.7	5.5	9.9	3.0%
Syria	^	0.2	0.6	0.7	0.2%
United Arab Emirates	0.9	2.1	4.2	5.0	1.5%
Yemen	-	-	-	0.7	0.2%
Other Middle East	^	^	^	0.3	0.1%
Total Middle East	4.1	11.0	23.9	52.9	16.3%
Algeria	2.1	5.3	7.8	7.9	2.4%
Egypt	0.3	0.9	2.6	5.9	1.8%
Libya	0.3	0.7	0.6	1.2	0.4%
Nigeria	0.2	0.4	1.7	4.2	1.3%
Other Africa	0.1	0.2	0.6	1.8	0.5%
Total Africa	3.0	7.6	13.4	20.9	6.4%
Australia	1.1	2.3	3.2	4.7	1.5%
Bangladesh	0.2	0.6	1.1	2.1	0.6%
Brunei	0.8	0.9	1.1	1.2	0.4%
China	1.2	1.5	3.2	10.3	3.2%
India	0.3	1.4	2.7	3.9	1.2%
Indonesia	1.8	4.9	6.7	6.9	2.1%
Malaysia	-	2.2	4.7	6.3	1.9%
Myanmar	^	0.1	0.8	1.2	0.4%
Pakistan	0.8	1.3	2.4	4.0	1.2%
Thailand	0.1	0.8	2.0	4.0	1.2%
Vietnam	^	^	0.2	0.9	0.3%
Other Asia Pacific	0.8	0.8	1.0	1.7	0.5%
Total Asia Pacific	7.1	16.8	29.1	47.3	14.5%
Total World	141.2	194.7	244.2	324.6	100.0%

NOTE: ♦ Less than 0.05% & ^ Less than 0.05

GLOSSARY OF COMMON OILFIELD TERMS

source: <http://www.glossary.oilfield.slb.com/Search.cfm>

2D seismic data

A vertical section of seismic data consisting of numerous adjacent traces acquired sequentially.

3D seismic data

A set of numerous closely-spaced seismic lines that provide a high spatially sampled measure of subsurface reflectivity. The original seismic lines are called in-lines. Lines displayed perpendicular to in-lines are called crosslines.

4D seismic data

Three-dimensional (3D) seismic data acquired at different times over the same area to assess changes in a producing hydrocarbon reservoir with time. Changes may be observed in fluid location and saturation, pressure and temperature. 4D seismic data is one of several forms of time-lapse seismic data. Such data can be acquired on the surface or in a borehole

Approval For Expenditure (AFE)

A budgetary document, usually prepared by the operator, to list estimated expenses of drilling a well to a specified depth, casing point or geological objective, and then either completing or abandoning the well.

Absolute permeability

The measurement of the permeability, or ability to flow or transmit fluids through a rock, conducted when a single fluid, or phase, is present in the rock. The symbol most commonly used for permeability is k , which is measured in units of darcies or millidarcies.

Acoustic impedance

The product of density and seismic velocity, which varies among different rock layers, commonly symbolized by Z . The difference in acoustic impedance between rock layers affects the reflection coefficient.

Aeromagnetic survey

Measurements of the Earth's magnetic field gathered from aircraft. Magnetometers towed by an airplane or helicopter can measure the intensity of the Earth's magnetic field. The differences between actual measurements and theoretical values indicate anomalies in the magnetic field, which in turn represent changes in rock type or in thickness of rock units.

Alkaline-Surfactant-Polymer flooding

A chemical enhanced oil recovery flood that uses two sources of surfactant and a polymer. Alkaline chemicals such as sodium carbonate react with acidic oil components in situ to create petroleum soap, which is one of the surfactants.

API gravity

A specific gravity scale developed by the American Petroleum Institute (API) for measuring the relative density of various petroleum liquids, expressed in degrees. API gravity is gradated in degrees on a hydrometer instrument and was designed so that most values would fall between 10° and 70° API gravity. The arbitrary formula used to obtain this effect is: $\text{API gravity} = (141.5/\text{SG at } 60^\circ\text{F}) - 131.5$, where SG is the specific gravity of the fluid.

Air drilling

A drilling technique whereby gases (typically compressed air or nitrogen) are used to cool the drill bit and lift cuttings out of the wellbore, instead of the more conventional use of liquids.

Appraisal

The phase of petroleum operations that immediately follows successful exploratory drilling. During appraisal, delineation wells might be drilled to determine the size of the oil or gas field and how to develop it most efficiently.

Asthenosphere

The relatively plastic layer of the upper mantle of the Earth on which the tectonic plates of the lithosphere move. The asthenosphere is approximately 200 km thick warm but not molten.

Attribute

A measurable property of seismic data, such as amplitude, dip, frequency, phase and polarity. Attributes can be measured at one instant in time or over a time window, and may be measured on a single trace, on a set of traces or on a surface interpreted from seismic data. Attribute analysis includes assessment of various reservoir parameters, including a hydrocarbon indicator, by techniques such as amplitude variation with offset (AVO) analysis.

Bottom Hole Assembly (BHA)

The lower portion of the drill string, consisting of (from the bottom up in a vertical well) the bit, bit sub, a mud motor (in certain cases), stabilizers, drill collar, heavy-weight drill pipe, jarring devices ("jars") and crossovers for various thread forms. The bottom hole assembly must provide force for the bit to break the rock (weight on bit), survive a hostile mechanical environment and provide the driller with directional control of the well.

Bright spot

A seismic amplitude anomaly or high amplitude that can indicate the presence of hydrocarbons. Bright spots result from large changes in acoustic impedance and tuning effect, such as when a gas sand underlies a shale, but can also be caused by phenomena other than the presence of hydrocarbons, such as a change in lithology.

British thermal unit

A measure of heat energy required to raise the temperature of one pound of water by one degree Fahrenheit. British thermal unit is abbreviated as BTU.

BBL or bbl

An abbreviation for oilfield barrel, a volume of 42 US gallons [0.16 m³].

Bubble point

The pressure and temperature conditions at which the first bubble of gas comes out of solution in oil. At discovery, all petroleum reservoir oils contain some natural gas in solution.

BHP-Bottom Hole Pressure

The pressure measured in a well at or near the depth of the producing formation. For well-test purposes, it is often desirable to refer the pressure to a datum level chosen at a reference depth by calculating the pressure that would occur if the pressure measurement were made at the datum level rather than at the actual depth of the gauge.

Christmas tree

The set of valves, spools and fittings connected to the top of a well to direct and control the flow of formation fluids from the well.

Condensate

A low-density, high-API gravity liquid hydrocarbon phase that generally occurs in association with natural gas. Its presence as a liquid phase depends on temperature and pressure conditions in the reservoir allowing condensation of liquid from vapour.

Core

A cylindrical sample of geologic formation, usually reservoir rock, taken during or after drilling a well. Cores can be full-diameter cores (that is, they are nearly as large in diameter as the drill bit) taken at the time of drilling the zone, or sidewall cores (generally less than 1 in. [2.5 cm] in diameter) taken after a hole has been drilled.

Common Depth Point (CDP)

In multichannel seismic acquisition where beds do not dip, the common reflection point at depth on a reflector, or the halfway point when a wave travels from a source to a reflector to a receiver.

Dean-Stark Extraction

A method for the measurement of fluid saturations in a core sample by distillation extraction. The water in the sample is vaporized by boiling solvent, then condensed and collected in a calibrated trap. This gives the volume of water in the sample. The solvent is also condensed, then flows back over the sample and extracts the oil.

Depositional System

The three-dimensional array of sediments or lithofacies that fills a basin. Depositional systems vary according to the types of sediments available for deposition as well as the depositional processes and environments in which they are deposited. The dominant depositional systems are alluvial, fluvial, deltaic, marine, lacustrine and eolian systems.

Dew point

The pressure at which the first condensate liquid comes out of solution in a gas condensate.

Diagenesis

The physical, chemical or biological alteration of sediments into sedimentary rock at relatively low temperatures and pressures that can result in changes to the rock's original mineralogy and texture.

Draw Down

The difference between the average reservoir pressure and the flowing bottom hole pressure

Drill Stem Test

Well tests conducted with the drill string still in the hole. Often referred to as DST, these tests are usually conducted with a down hole shut-in tool that allows the well to be opened and closed at the bottom of the hole with a surface-actuated valve. One or more pressure gauges are customarily mounted into the DST tool and are read and interpreted after the test is completed. The tool includes a surface-actuated packer that can isolate the formation from the annulus between the drill string and the casing, thereby forcing any produced fluids to enter only the drill string.

Enhanced Oil Recovery

An oil recovery enhancement method using sophisticated techniques that alter the original properties of oil. Once ranked as a third stage of oil recovery that was carried out after secondary recovery, the techniques employed during enhanced oil recovery can actually be initiated at any time during the productive life of an oil reservoir. Its purpose is not only to restore formation pressure, but also to improve oil displacement or fluid flow in the reservoir.

The three major types of enhanced oil recovery operations are chemical flooding (alkaline flooding or micellar-polymer flooding), miscible displacement (carbon dioxide [CO₂] injection or hydrocarbon injection), and thermal recovery (steam-flood or in-situ combustion). The optimal application of each type depends on reservoir temperature, pressure, depth, net pay, permeability, residual oil and water saturations, porosity and fluid properties such as oil API gravity and viscosity.

Estimated ultimate recovery

The amount of oil and gas expected to be economically recovered from a reservoir or field by the end of its producing life. Estimated ultimate recovery can be referenced to a well, a field, or a basin.

Facies modelling

The act of modelling a reservoir using knowledge of the facies that make up the reservoir and the depositional environments that the facies represent. The depositional characteristics will suggest rules concerning the geometries of the facies and the possible relationships between facies, especially where the facies have been related to each other within a stratigraphic sequence or a cyclothem.

Formation factor

The ratio of the resistivity of a rock filled with water (R_o) to the resistivity of that water (R_w). G.E. Archie postulated that the formation factor (F) was a constant independent of R_w and solely a function of pore geometry (the Archie equation I). It has since been shown that F is independent of R_w only for a certain class of petrophysically simple rocks (Archie rocks).

F has been related to porosity (phi) by several formulae (Archie, Humble and others) that have the general expression $F = a / \phi^m$, where a is a constant and m the porosity

Fold-Seismic Data

A measure of the redundancy of common midpoint seismic data, equal to the number of offset receivers that record a given data point or in a given bin and are added during stacking to produce a single trace. Typical values of fold for modern seismic data range from 60 to 240 for 2D seismic data, and 10 to 120 for 3D seismic data. The fold of 2D seismic data can be calculated by dividing the number of seismometer groups by twice the number of group intervals between shotpoints.

Fishing

The application of tools, equipment and techniques for the removal of junk, debris or fish from a wellbore.

Gamma ray log

A common and inexpensive measurement of the natural emission of gamma rays by a formation. Gamma ray logs are particularly helpful because shales and sandstones typically have different gamma ray signatures that can be correlated readily between wells.

Gas lift

An artificial-lift method in which gas is injected into the production tubing to reduce the hydrostatic pressure of the fluid column. The resulting reduction in bottomhole pressure allows the reservoir liquids to enter the wellbore at a higher flow rate.

Gathering system

The flowline network and process facilities that transport and control the flow of oil or gas from the wells to a main storage facility, processing plant or shipping point. A gathering system includes pumps, headers, separators, emulsion treaters, tanks, regulators, compressors, dehydrators, valves and associated equipment.

Geochemistry

The study of the chemistry of the Earth and within solid bodies of the solar system, including the distribution, circulation and abundance of elements (and their ions and isotopes), molecules, minerals, rocks and fluids.

Geophysical migration

A step in seismic processing in which reflections in seismic data are moved to their correct locations in the x-y-time space of seismic data, including two-way traveltime and position relative to shotpoints.

Gravel pack

A sand-control method used to prevent production of formation sand. In gravel pack operations, a steel screen is placed in the wellbore and the surrounding annulus packed with prepared gravel of a specific size designed to prevent the passage of formation sand. The primary objective is to stabilize the formation while causing minimal impairment to well productivity.

Horizontal drilling

A subset of the more general term “directional drilling,” used where the departure of the wellbore from vertical exceeds about 80 degrees. Because a horizontal well typically penetrates a greater length of the reservoir, it can offer significant production improvement over a vertical well.

High Pressure High Temperature (HPHT)

Pertaining to wells that are hotter or higher pressure than most. The term came into use upon the release of the Cullen report on the Piper Alpha platform disaster in the UK sector of the North Sea, along with the contemporaneous loss of the Ocean Odyssey semisubmersible drilling vessel in Scottish jurisdictional waters. In the UK, HPHT is formally defined as a well having an undisturbed bottom hole temperature of greater than 300°F [149°C] and a pore pressure of at least 0.8 psi/ft (~15.3 lbm/gal) or requiring a BOP with a rating in excess of 10,000 psi [68.95 MPa]. Although the term was coined relatively recently, wells meeting the definition have been safely drilled and completed around the world for decades.

Hydrate

An unusual occurrence of hydrocarbon in which molecules of natural gas, typically methane, are trapped in ice molecules. More generally, hydrates are compounds in which gas molecules are trapped within a crystal structure. Hydrates form in cold climates, such as permafrost zones and in deep water. To date, economic liberation of hydrocarbon gases from hydrates has not occurred, but hydrates contain quantities of hydrocarbons that could be of great economic significance. Hydrates can affect seismic data by creating a reflection or multiple.

Hydraulic fracturing

A stimulation treatment routinely performed on oil and gas wells in low-permeability reservoirs. Specially engineered fluids are pumped at high pressure and rate into the reservoir interval to be treated, causing a vertical fracture to open.

Improved Oil Recovery

A method for recovering additional oil beyond fluid expansion, rock compressibility, gravitational drainage, pressure decline and natural water-drive or gas-drive.

Inflow Performance Relationship

A mathematical tool used in production engineering to assess well performance by plotting the well production rate against the flowing bottom hole pressure (BHP). The data required to create the IPR are obtained by measuring the production rates under various drawdown pressures.

Inversion

A mathematical process by which data are used to generate a model that is consistent with the data, the process of solving the inverse problem. In seismology, surface seismic data, vertical seismic profiles and well log data can be used to perform inversion, the result of which is a model of Earth layers and their thickness, density and P- and S-wave velocities.

Jackup rig

A self-contained combination drilling rig and floating barge, fitted with long support legs that can be raised or lowered independently of each other. The jackup, as it is known informally, is towed onto location with its legs up and the barge section floating on the water. Upon arrival at the drilling location, the legs are jacked down onto the seafloor, preloaded to securely drive them into the sea bottom, and then all three legs are jacked further down. Since the legs have been preloaded and will not penetrate the seafloor further, this jacking down of the legs has the effect of raising the jacking mechanism, which is attached to the barge and drilling package. In this manner, the entire barge and drilling structure are slowly raised above the water to a predetermined height above the water, so that wave, tidal and current loading acts only on the relatively small legs and not the bulky barge and drilling package.

Leak-off test

A test to determine the strength or fracture pressure of the open formation, usually conducted immediately after drilling below a new casing shoe. During the test, the well is shut in and fluid is pumped into the wellbore to gradually increase the pressure that the formation experiences. At some pressure, fluid will enter the formation, or leak off, either moving through permeable paths in the rock or by creating a space by fracturing the rock. The results of the leak-off test dictate the maximum pressure or mud weight that may be applied to the well during drilling operations. To maintain a small safety factor to permit safe well control operations, the maximum operating pressure is usually slightly below the leak-off test result.

Light crude oil

Crude oil that has a high API gravity, usually more than 40°.

Limestone

A carbonate sedimentary rock predominantly composed of calcite of organic, chemical or detrital origin. Minor amounts of dolomite, chert and clay are common in limestones. Chalk is a form of fine-grained limestone.

Lithosphere

The brittle outer layer of the Earth that includes the crust and uppermost mantle. It is made up of six major and several minor tectonic plates that move around on the softer asthenosphere.

Logging while drilling

The measurement of formation properties during the excavation of the hole, or shortly thereafter, through the use of tools integrated into the bottom hole assembly.

Timely LWD data can also be used to guide well placement so that the wellbore remains within the zone of interest or in the most productive portion of a reservoir, such as in highly variable shale reservoirs.

Material Safety Data Sheet

A specific document that shows important physical and chemical characteristics of a chemical or product to alert a user, transporter or other interested party to potential safety hazards that may be associated with the material.

Matrix stimulation

A treatment designed to treat the near-wellbore reservoir formation rather than other areas of the production conduit, such as the casing across the production interval, production tubulars or the perforations. Matrix stimulation treatments include acid, solvent and chemical treatments to improve the permeability of the near-wellbore formation, enhancing the productivity of a well.

Measurements-while-drilling

The evaluation of physical properties, usually including pressure, temperature and wellbore trajectory in three-dimensional space, while extending a wellbore. MWD is now standard practice in offshore directional wells, where the tool cost is offset by rig time and wellbore stability considerations if other tools are used.

Newtonian fluid

A fluid that has a constant viscosity at all shear rates at a constant temperature and pressure, and can be described by a one-parameter rheological model.

NODAL analysis

An analytical tool used in forecasting the performance of the various elements comprising the completion and production system. NODAL analysis is used to optimize the completion design to suit the reservoir deliverability, identify restrictions or limits present in the production system and identify any means of improving production efficiency. NODAL (production system analysis) is a mark of Schlumberger.

Numerical reservoir simulation

The mathematical simulation of a numerical model of a reservoir's petro-physical characteristics to analyze and predict fluid behaviour in the reservoir over time.

Oil Kitchen

An area of the subsurface where source rock has reached appropriate conditions of pressure and temperature to generate liquid hydrocarbons as opposed to gas.

Open-flow potential

The calculated maximum flow rate that a system may provide in the absence of restrictions. The term may be qualified as relating to a specific zone, such as a perforated interval or be used in referring to the production capability of the well.

Open-hole completion

A well completion that has no casing or liner set across the reservoir formation, allowing the produced fluids to flow directly into the wellbore.

Perforation

The communication tunnel created from the casing or liner into the reservoir formation, through which oil or gas is produced.

Permeability

The ability, or measurement of a rock's ability, to transmit fluids, typically measured in darcies or millidarcies. Absolute permeability is the measurement of the permeability conducted when a single fluid, or phase, is present in the rock. Effective permeability is the ability to preferentially flow or transmit a particular fluid through a rock when other immiscible fluids are present in the reservoir (for example, effective permeability of gas in a gas-water reservoir). The relative saturations of the fluids as well as the nature of the reservoir affect the effective permeability. Relative permeability is the ratio of effective permeability of a particular fluid at a particular saturation to absolute permeability of that fluid at total saturation. If a single fluid is present in a rock, its relative permeability is 1.0. Calculation of relative permeability allows for comparison of the different abilities of fluids to flow in the presence of each other, since the presence of more than one fluid generally inhibits flow.

Petroleum systems modelling

A technique used to represent the history of a sedimentary basin, including the processes and components necessary to form petroleum: a petroleum source rock, a reservoir, a trapping mechanism, a seal, and the appropriate relative timing of formation of these.

Pipeline capacity

The quantity (volume) of oil and gas required to maintain a full pipeline. The static capacity of a pipeline is usually expressed as a volume per unit length (for example, bbl/ft). Nevertheless, the fluid volume passing through a pipeline in a specific time period will depend on initial pressure, flow characteristics, ground elevation, density and delivery pressure.

Play

A conceptual model for a style of hydrocarbon accumulation used by explorationists to develop prospects in a basin, region or trend and used by development personnel to continue exploiting a given trend. A play (or a group of interrelated plays) generally occurs in a single petroleum system.

Plug and Abandon

To prepare a wellbore to be shut in and permanently isolated. In most cases, a series of cement plugs is set in the wellbore, with an inflow or integrity test made at each stage to confirm hydraulic isolation.

Porosity

The percentage of pore volume or void space, or that volume within rock that can contain fluids. Porosity can be a relic of deposition (primary porosity, such as space between grains that were not compacted together completely) or can develop through alteration of the rock (secondary porosity, such as when feldspar grains or fossils are preferentially dissolved from sandstones).

Porosity can be generated by the development of fractures, in which case it is called fracture porosity. Effective porosity is the interconnected pore volume in a rock that contributes to fluid flow in a reservoir. It excludes isolated pores. Total porosity is the total void space in the rock whether or not it contributes to fluid flow. Thus, effective porosity is typically less than total porosity.

Shale gas reservoirs tend to have relatively high porosity, but the alignment of platy grains such as clays makes their permeability very low.

Pour point

The lowest temperature (in °F or °C) at which a liquid remains pourable (meaning it still behaves as a fluid). Oil or synthetic muds with high pour points may suffer from poor screening and excessive pressure, surges in deepwater wells or other operations subject to low temperatures. In oils, the pour point is generally increased by a high paraffin content.

Pressure build-up analysis

An analysis of data obtained from measurements of the bottom hole pressure in a well that is shut-in after a flow period. The profile created on a plot of pressure against time is used with mathematical reservoir models to assess the extent and characteristics of the reservoir and the near-wellbore area.

Productivity Index (PI)

A mathematical means of expressing the ability of a reservoir to deliver fluids to the wellbore. The PI is usually stated as the volume delivered per psi of drawdown at the sand face (bbl/d/psi).

Prospect

An area of exploration in which hydrocarbons have been predicted to exist in economic quantity. A prospect is commonly an anomaly, such as a geologic structure or a seismic amplitude anomaly, that is recommended by explorationists for drilling a well.

Production sharing contract

An agreement between the resource(oil) extraction parties and a host country regarding the percentage of production each party will receive after the participating parties have recovered a specified amount of costs and expenses.

Recovery Factor

The recoverable amount of hydrocarbon initially in place, normally expressed as a percentage. The recovery factor is a function of the displacement mechanism. An important objective of enhanced oil recovery is to increase the recovery factor.

Remotely Operated Vehicle (ROV)

An unmanned submersible vehicle controlled from surface. In deepwater operations, remotely operated vehicles are used to inspect subsea structures and equipment, and to control or manipulate valves.

They can operate at depths from 1500 to 10,000 ft [457 to 3048 m]. This term is commonly abbreviated as ROV.

Reservoir-drive mechanisms

Natural forces in the reservoir that displace hydrocarbons out of the reservoir into the wellbore and up to surface.

Reservoir-drive mechanisms include gas drive (gas cap or solution gas drive), water drive (bottom water drive or edge water drive), combination drive, and gravity drainage. Water drive is the most efficient drive mechanism, followed by gas drive and gravity drainage.

Reservoir-drive mechanisms are also called natural drives.

Resistivity log

A log of the resistivity of the formation, expressed in ohm-m. The resistivity can take a wide range of values, and, therefore, for convenience is usually presented on a logarithmic scale from, for example, 0.2 to 2000 ohm-m. The resistivity log is fundamental in formation evaluation because hydrocarbons do not conduct electricity while all formation waters do. Therefore a large difference exists between the resistivity of rocks filled with hydrocarbons and those filled with formation water.

Retrograde condensation

The formation of liquid hydrocarbons in a gas reservoir as the pressure in the reservoir decreases below dewpoint pressure during production. It is called retrograde because some of the gas condenses into a liquid under isothermal conditions instead of expanding or vaporizing when pressure is decreased.

Rotary steerable system

A tool designed to drill directionally with continuous rotation from the surface, eliminating the need to slide a steerable motor. Rotary steerable systems typically are deployed when drilling directional, horizontal, or extended-reach wells.

Sequential Gaussian simulation

A procedure for estimating the reservoir characteristics between data points. Based on the idea of iterating from a first guess and refining through reduction of errors, the procedure generally transforms the model to normality, simulating the normally distributed transform, and then back-transforming to the original variable of interest.

Seismic Acquisition

The generation and recording of seismic data. Acquisition involves many different receiver configurations, including laying geophones or seismometers on the surface of the Earth or seafloor, towing hydrophones behind a marine seismic vessel, suspending hydrophones vertically in the sea or placing geophones in a wellbore (as in a vertical seismic profile) to record the seismic signal.

Seismic Event

An appearance of seismic data as a diffraction, reflection, refraction or other similar feature produced by an arrival of seismic energy. An event can be a single wiggle within a trace, or a consistent lining up of several wiggles over several traces. An event in a seismic section can represent a geologic interface, such as a fault, unconformity or change in lithology.

Solution gas drive

A type of reservoir-drive system in which the energy for the transport and production of reservoir fluids is derived from the gas dissolved in the fluid. As reservoir fluids enter the wellbore, changing pressure conditions cause the gas to break from solution to create a commingled flow of gas and liquid that aids production.

Spectral density analysis

A technique for utilizing fractal geometry to produce reservoir descriptions.

Synthetic seismogram

The result of one of many forms of forward modeling to predict the seismic response of the Earth. A more narrow definition used by seismic interpreters is that a synthetic seismogram, commonly called a synthetic, is a direct one-dimensional model of acoustic energy traveling through the layers of the Earth. The synthetic seismogram is generated by convolving the reflectivity derived from digitized acoustic and density logs with the wavelet derived from seismic data.

Sweet spot

Colloquial expression for a target location or area within a play or a reservoir that represents the best production or potential production. Geoscientists and engineers attempt to map sweet spots enable wellbores to be placed in the most productive areas of the reservoir.

Simultaneous operation (SIMOP)

A term used mainly on offshore platforms, or installations with multiple wellheads, where more than one wellbore is being accessed, such as where a drilling rig, slickline unit or coiled tubing unit may be operating at the same time.

Thermal maturity

The degree of heating of a source rock in the process of transforming kerogen into hydrocarbon. Thermal maturity is commonly evaluated by measuring vitrinite reflectance or by pyrolysis.

Thief zone

A formation encountered during drilling into which circulating fluids can be lost.

Time-lapse seismic data

Seismic data from the surface or a borehole acquired at different times over the same area to assess changes in the subsurface with time, such as fluid movement or effects of secondary recovery.

Transient-pressure response

The pressure response resulting from changes in a well's production rate. This includes drawdown, in which the pressure falls in response to the production of fluids; buildups, in which the pressure rises after a well is shut in; and falloffs, in which the pressure falls after an injection well is shut in.

Type-curve analysis

A method for quantifying well and reservoir parameters such as permeability, skin, fracture half-length, dual-porosity parameters, and others, by comparing the pressure change and its derivative of the acquired data to reservoir model curve families, called type curves. When a match is found between data and a type curve, the parameters that characterize the behaviour of the model providing a match are thereby determined.

Udden-Wentworth scale

A grade scale for classifying the diameters of sediments. Particles larger than 64 mm in diameter are classified as cobbles. Smaller particles are pebbles, granules, sand and silt. Those smaller than 0.0039 mm are clay. Several other grain size scales are in use, but the Udden-Wentworth scale (commonly called the Wentworth scale) is the one that is most frequently used in geology.

Unitized production

Pooled production from wells or a reservoir. The proceeds of this pooled production are distributed to the participants according to an agreed-upon formula.

Vertical seismic profile

A class of borehole seismic measurements used for correlation with surface seismic data, for obtaining images of higher resolution than surface seismic images and for looking ahead of the drill bit; also called a VSP. Purely defined, VSP refers to measurements made in a vertical wellbore using geophones inside the wellbore and a source at the surface near the well.

Vitrinite reflectance

A measurement of the maturity of organic matter with respect to whether it has generated hydrocarbons or could be an effective source rock.

Water drive

A reservoir-drive mechanism whereby the oil is driven through the reservoir by an active aquifer. As the reservoir depletes, the water moving in from the aquifer below displaces the oil until the aquifer energy is expended or the well eventually produces too much water to be viable.

Well interference testing

The pressure variation with time recorded in observation wells resulting from changes in rates in production or injection wells. In commercially viable reservoirs, it usually takes considerable time for production at one well to measurably affect the pressure at an adjacent well.

Well plan

The description of a proposed wellbore, including the shape, orientation, depth, completion, and evaluation. Well plans might be relatively simple for vertical wellbores.

Wellbore damage

Any restriction to flow from near-well reductions in flow capacity. This damage is thought to result from reductions in near-well permeability caused by perforating debris or from the solids or mud filtrate invasion caused by the drilling process.

Wireline formation tester

A tool run on an electric logging cable that pushes a probe into the formation, which then allows production into a small closed chamber. The tool is primarily used to obtain formation pressures at chosen locations in an interval, and, with an accurate quartz gauge, permeability estimates may be obtained. Modern variations on this tool have been developed to acquire formation-fluid samples.

Well servicing

The maintenance procedures performed on an oil or gas well after the well has been completed and production from the reservoir has begun. Well service activities are generally conducted to maintain or enhance the well productivity, although some slickline and coiled tubing applications are performed to assess or monitor the performance of the well or reservoir. Slickline, coiled tubing, snubbing and workover rigs or rod units are routinely used in well service activities.

X-radiography

A technique for imaging a core by moving a source of X-rays along a core and recording the attenuated X-rays on the other side on a suitable photographic film.

X-ray diffraction

A technique for the semi-quantitative mineralogical analysis of a sample of rock by measuring the diffraction peaks in X-rays diffracted by the sample. The position of the diffraction peaks is a measure of the distance between discrete crystallographic diffracting planes within minerals, while their intensity indicates the quantity of the mineral. The technique is only semi-quantitative because the size and shape of the diffraction peak are strongly influenced by the geometry of the measurement, for example orientation of the minerals, and sample preparation.

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Andhra Pradesh Gas Infrastructure Corp. Pvt. Ltd.

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CoalGas / Deep Industries Ltd. (CBM)

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Dart Energy (India) Pty. Ltd. (CBM)

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Quest Petroleum Pvt. Ltd.

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H Block, Dhirubhai Ambani Knowledge City
Navi Mumbai – 400710

Sankalp Oil and Natural Resources Ltd,

W-120, Greater Kailash Part-II,
New Delhi

Santos International Operations Pvt. Ltd.,

Narain Manzil 1401 & 1402, 14th Floor,
23, Barakhamba Road,
New Delhi – 110 001

Selan Exploration Technology Limited

25, Sukh Chan Marg, DLF-Phase-I
Gurgaon (Haryana)

Suntera Energy India

Plot 39, Institutional Area,
Sector 32, Gurgaon - 122 001

Tata Petrodyne Ltd,

10G, A Wing,
Technopolish Knowledge Park
Mahakali Caves Road Andheri (East),
Mumbai – 400 003

Vasundhara Resources Limited

6th Floor, Lansdowne Towers
2/1A, Sarat Bose Road
Kolkata - 700020

Videocon Petroleum Ltd.

1601, Maker Chambers V,
16th Floor, Nariman Point
Mumbai - 400021

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