

STATE REVIEWS



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STATE REVIEWS
(Offshore Regions)

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GOVERNMENT OF INDIA
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OFFSHORE REGIONS

The Government of India notified the Offshore Areas Minerals (Development & Regulation) Act, 2002 (OAMDR Act), No. 17 of 2003 in the Gazette of India, Extraordinary, Part-II, Section-1, No. 17, dated 31.1.2003. The purpose of the Act is to provide for development and regulation of mineral resources in the territorial waters, continental shelf, exclusive economic zone and other maritime zones of India and to provide for matters connected therewith or incidental thereto. The Act is applicable to all minerals in offshore areas including minerals prescribed under Atomic Energy Act, 1962, but excludes oils and related hydrocarbons as there is separate legislation for them in force. The Act came into effect from 15.1.2010 vide S.O.338(E), dated 11.2.2010 notified by the Central Government.

The Act makes it mandatory to undertake reconnaissance, exploration or production operation in the offshore areas in accordance with the prescribed terms and conditions for reconnaissance permit (RP), exploration licence (EL) or production lease (PL) granted under the Act and the rules made thereunder. The availability of the areas for grant of RP, EL or PL shall be notified within six months from the commencement of the Act, and subsequently at such times as considered necessary. The Act empowers the Central Government to make rules for the purpose of the Act including terms and conditions under the RP, EL, PL, etc. The Rules, namely, the Offshore Areas Mineral Concession Rules, 2006 have been framed and notified on 3.11.2006 by G.S.R.691(E) published in the Gazette of India, Extraordinary, Part II, Section 3 (i), No. 539, dated 4.11.2006. The Rules have come into effect on the date on which the Offshore Areas Mineral (Development and Regulation) Act, 2002 came into force, i.e, 15.1.2010.

As a sequel, the Controller General, Indian Bureau of Mines has been notified as the "administering authority" and "authorised officer" under Section 4 and Clause (i) of Section 22 of the Act vide S.O.339(E) and 340(E) dated 11.2.2010. The Secretary, Ministry of Mines has been notified as "authorised officer" to hear and decide cases relating to Clauses (a) and (b) of Section 28(1) vide S.O.341(E) dated 11.2.2010.

As per S.O.134(E) dated 7.6.2010, The Controller General, Indian Bureau of Mines has notified the mineral bearing offshore blocks available for grant of Exploration Licence. As per the attached Schedule to the said Notification, there are 26 offshore areas available in offshore waters of Bay of Bengal and 36 offshore areas in the offshore waters of Arabian Sea for grant of Exploration Licence. The Geological Survey of India and National Institute of Oceanography (NIO) have carried out exploration in these areas.

The Government of India had announced the New Exploration Licensing Policy (NELP) in 2000 under which blocks for exploration of oil and gas were on offer for bidding. The NELP provides an international class fiscal and contract framework for exploration and production of hydrocarbons. The details of the exploration blocks awarded in NELP rounds are as below:

Details of exploration block awarded

Round	Month, year	No. of blocks awarded	Awarded Area (sq km)	Present* Area (sq km)
NELP-I	Apr, 2000	24	230147	47774
NELP-II	July, 2001	23	267883	16154
NELP-III	Feb, 2003	23	204588	100674
NELP-IV	Feb, 2004	20	192810	112487
NELP-V	Dec, 2005	20	115180	58926
NELP-VI	Mar, 2007	52	306389	306227
NELP-VII	Dec, 2008	41	112955	112955
NELP-VIII	Jun, 2010	32	52573	52573
NELP-IX	Mar, 2012	14	14491	14491

* Status of area as on 01.04.2012.

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In order to explore and produce new sources of natural gas from coal-bearing areas, the Government had formulated a CBM Policy in 1997 and implemented in 2000 providing attractive fiscal and contractual framework for exploration and production of CBM which is an environment friendly clean gas fuel similar to conventional natural gas.

The Government of India has awarded 33 CBM blocks in Jharkhand (7), Madhya Pradesh (7), Chhattisgarh (3), Rajasthan (4), West Bengal (4), Andhra Pradesh (2), Odisha (2), Assam (1), Gujarat (1), Maharashtra (1) and Tamil Nadu (1) in different coalfields of India under CBM-I to IV. Out of 33 CBM awarded, total 3 CBM blocks have already been relinquished in Gujarat, Madhya Pradesh and Maharashtra (one CBM block in each). In CBM-IV, the Government of India awarded 7 CBM blocks in Assam, Chhattisgarh, Madhya Pradesh, Odisha and Tamil Nadu. Exploration activities have established significant finds in eastern and central India. Commercial production of CBM has commenced from July 2007.

The Ministry of Petroleum & Natural Gas has announced a Bio-diesel Purchase Policy effective from 1.1.2006. Under this scheme, Oil-marketing companies would purchase Bio-diesel for blending with High Speed Diesel to the extent of 5% at 20 purchase centres identified across the country. Since, no suppliers have come forward to offer Bio-diesel at these designated centres at the declared prices. As such, blending of Bio-diesel with HSD could not be set in motion.

Resources

Deposits of hydrocarbon are located in the offshore areas in the Mumbai offshore and Cambay basin on the west coast and Cauvery and Krishna-Godavari basins on the east coast. The resources of hydrocarbon in offshore areas are furnished in Table-1. The reserves of crude oil and natural gas in offshore areas accounted for 58% and 77% of total reserves, respectively, in India. As on 1.4.2011, proved and indicated reserves of crude oil and natural gas in offshore areas have been

updated to 429.8 million tonnes and 956.6 billion cu m, respectively.

ONGC

ONGC continued its operations for exploration of oil and gas in offshore areas of the country in Cambay Basin, Gujarat; Krishna-Godavari (Andhra Pradesh); Cauvery (Tamil Nadu); West Bengal and in East Coast and West Coast offshore areas.

During the year 2011-12, ONGC acquired a total of 13605.76 GLK/LKof 2D seismic data which included 11071.00 LK offshore data. During the same period 872.16 Sq km & 6633.44 Sq km of 3D seismic data were also acquired in respect of western & eastern offshore areas respectively.

OIL

Offshore exploration/development operation were reported by OIL during 2011-12. OIL acquired a total of 72.76 Sq km of 2D and 1497.24 Sq km of 3D seismic data.

Reliance Industries Ltd (RIL)

KG-D6 was the single largest source of domestic gas in the country in 2012 and accounted for almost 35% of the total gas consumption in India. The gas from KG-D6 catered to demand from 56 customers in critical sectors like fertilizer, power, CGD, steel, petrochemicals and refineries. The gas from KG-D6 accounted for about 44% of the total domestic gas production paving the way for increased energy independence for the country. An average daily gas production from KG-D6 block for the year was 42.65 MMSCMD. The cumulative gas production was 1,808 BCF since inception, of which 551.31 BCF was produced in FY 2011-12. An average oil and condensate production for the year from the block was 15,481 barrels per day. The cumulative production of oil and condensate was 19.44 MMBL since inception, of which 5.67 MMBL was produced in FY 2011-12.

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Table – 1 : Reserves of Crude Oil & Natural Gas in Indian Offshore Areas (As on 1.4.2012)

Area	(Crude oil in million tonnes) (Natural Gas in billion cu m)	
	Crude oil	Natural gas
India	759.59	1330.26
Onshore : Total	328.88	337.93
Offshore : Total	430.71	992.33
Western Offshore@	406.59	516.03
Eastern offshore#	24.12	476.30

Source: Indian Petroleum & Natural Gas Statistics 2011-12, Ministry of Petroleum & Natural Gas.

@ Includes Bombay High Offshore, Rajasthan and J & C. also includes Madhya Pradesh (Coal Bed Methane) in case of natural gas.

Includes JVC/Private parties in case of crude oil and West Bengal (Coal Bed Methane) in case of natural gas.

In the D1-D3 gas fields, 22 wells have been drilled till date, of which 18 were producer wells. Of these, 2 wells were drilled during this year. Extensive reservoir studies are underway for augmenting additional production with the integrated (or combined or joint) efforts of RIL and BP's technical teams.

6 wells in the D26 field were producer wells. The well MA-2, which was earlier a gas injection well, was converted to a production well since April 2010. Optimised Field Development Plan (OFDP) for the development of 4 satellite discoveries was approved by the Government of India in January 2012. Engineering activities, which are yet to commence will determine the future course of action. There have been re-estimation of reserves in these discoveries and RIL has restated the reserves downwards based on such results.

Table – 2 : Exploration for Petroleum & Natural Gas By ONGC during 2011-12

Area	Drilling					
	Seismic Survey		Exploratory		Development	
	2D(GLKM)	3D(SQKM)	Wells	Meterage(Km)	Wells	Meterage
Western Offshore	-	872.16	19	54.5	42	113.11
Eastern Offshore	11071.0	6633.44	17	78.29	-	-

In addition, RIL has declared the commerciality of discovery D34 of KG-D6 and restated the Proved Reserves upwards based on re-estimation.

Revised plan of development for D26 field submitted to the DGH. Further, an integrated development plan for gas discoveries in the KG-D6 block is being conceptualised to maximise capital efficiency and accelerate monetisation.

The Company made a discovery in the first well drilled in CY-D6 block – Well SA1 – Discovery

Dhirubhai 53. The appraisal work programme submitted which is under review with DGH.

The Company submitted a proposal for commerciality of 8 discoveries in CB-10 block and also notified declaration of commerciality for D32 and D40 in NEC-25 block.

During the year, as part of reassessment of its portfolio together with BP, RIL has considered 5 blocks as relinquished in its books and initiated the formal process of relinquishing these blocks. In addition to the above, RIL also relinquished 5 additional blocks from its portfolio. Consequently

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RIL's domestic oil and gas portfolio consists of 17 exploration blocks excluding KG-D6, CBM, Panna-Mukta and Tapti.

The Panna-Mukta fields produced 10.06 MMBL of crude oil and 71.24 BCF of natural gas in FY 2011-12, growing 8% and 37%, respectively over the previous year, which was impacted due to a shutdown on account of a failure of sub-sea hose system and parting of anchor chains to the SBM.

Tapti fields produced 0.88 MMBL of condensate and 73.79 BCF of natural gas in FY 2011-12, a decline of 28% and 22%, respectively over the previous year. This decrease in production was due to a natural decline in the reserves.

Reliance has 10 blocks in its international conventional portfolio, including 3 in Yemen (1 producing and 2 exploratory), 2 each in Kurdistan, Peru and Colombia and 1 in Australia amounting to a total acreage of over 51,000 sq km. During the year, the following activity was undertaken as part of the exploratory campaign: (i) 2D seismic data acquisition of 42 LKM in Yemen block 37 (ii) 3D seismic data acquisition of 500 sq km in Colombia blocks (iii) Well testing in Sarta block in Kurdistan.

RIL holds 3 CBM blocks in Central India, which include Sohagpur (East), Sohagpur (West) and Sonhat (North) in the domestic unconventional portfolio. Exploration phases for Sohagpur East and West blocks were completed and these blocks entered their development phase. RIL has completed the following operations in these blocks: (i) Drilled, logged and tested over 45 core holes for gas content, permeability and coal properties (ii) Drilled over 85 production wells.

Further, RIL plans to achieve first gas production in FY 2015 subject to necessary approvals from regulatory authorities.

Coal Bed Methane

Coal bed Methane (CBM), is an eco-friendly natural gas, stored in coal seams, generated during the process of the coalification. The coal and lignite seams contain varying amounts of methane depending on the rank of the carbonaceous matter, the depth of burial and the geotectonic setting of

basins. CBM exploration and exploitation has an important bearing on reducing the green house effect and extraction of the CBM through degassing of the coal seams prior to mining of coal is a cost effective means of boosting coal production and maintaining safe methane level in working mines.

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 to provide level playing platform for exploration and commercial exploitation of CBM by national and international entrepreneurs.

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, 8.92 TCF (252.8 BCM) has been established as Gas in Place (GIP).

Commercial CBM production has started from one block i.e. Raniganj (south) since 14th July 2007 which contributes about 0.25 MMSCMD of CBM production. In addition to this incidently produced CBM is also being sold in small quantities from Raniganj (East) and Jharia blocks to avoid wastage of gas through flaring. Four 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. Within the next few years, CBM is expected to emerge as a new source of natural gas production in the country. India has emerged as the fourth country in the world capable of producing CBM on commercial scale with the commencement of commercial production from July 2007.

Reconnaissance survey for glass sand in the coastal area between Yermal and Mukka, District Dakshina Kannada, Karnataka:

This reconnaissance survey (G-4) for glass sand in the coastal area between Yermal in the north and Mukka in the south was carried out during FS 2010-12 based on the reported occurrence of high silica in the sand collected from a few samples along the beach earlier. Mulki and Pavanje are the rivers flowing in the area. Sampling carried out along the beach as well as from berm/dune indicated that the sand is fine to medium sized and is almost devoid of shell fragments. The beach is straight and wider and the dunes are well developed though not so high. A spit is formed on the left bank of the Mulki-Pavanje river mouth, which contains very fine sand. Presence of thin layers of heavy minerals were also noticed here. Laboratory work is in progress.

Placer Mineral Resource Evaluation in the Territorial Waters off North of Bhimunipatnam, Andhra Pradesh:

ST-216 cruise was carried out to evaluate placer mineral resources in the Territorial Waters off North Bhimunipatnam by vibro core sediment sampling. The samples were collected within the water depths of 13.10 m to 20.70 m. Length of the cores vary from a minimum of 0.10 m to a maximum of 3.30 m with an average of 0.84 m. The sedimentological studies indicate that the sediment type at surface and sub-surface levels is sand in the area and consists of medium sand, coarse sand, fine sand and very coarse sand in order of abundance in the area. Rivers, such as, Vamsadhara, Nagavalli, Gostani, Sarada, Varaha and Mahendratana drain through the rocks of EGMB have contributed the sediments to the offshore. Heavy Mineral (HM) Analyses of the sea bed sediment samples, in general, indicate that the weight percentage of total heavy minerals varies from 1.4021 to 8.7745 wt% with an average of 3.4745 wt% indicating overall decrease in the average weight percentage of heavy minerals towards subsurface up to 1.00 m level. The studies also show high concentration of heavy minerals in medium sand followed by coarse sand. The approximate total Heavy Mineral resources

estimated is 1.69 million tonnes.

The assemblage of heavy minerals present in the sediments is ilmenite, sillimanite, garnet, monazite, zircon, rutile and others (pyroxenes/epidote and etc).

Search for possible occurrence of phosphatic sediments off Okha, Gujarat

SM 223 cruise was carried out to search for possible occurrence of phosphatic sediments off Okha, Gujarat. Multibeam survey was carried out in the area to bring out detailed geomorphology for identifying the topographic domains favourable for phosphorite formation and sampling was carried out in these domains. Preliminary processing of the multibeam survey data has brought out 2207 m relief of the area with the depth to sea bed varying from 112 to 2319 m. The shelf breaks at about 380 to 420 m water depths. The survey also brought to light the presence of a detached plateau. The detached plateau rises from the sea floor at about 1110 m water depth and forming a flat surface between 350 and 500 m water depths covering an area of about 200 sq km. Numerous valleys have been originated from the shelf edge. The phosphatic materials occur on the circumferal edge of the detached plateau and on the western slope between 360 and 800 water depths. In the central part of the detached plateau, olive colour silty clay covers the phosphatic sediment. In the slope area in few locations phosphatic nodules occur as a layer over sticky clay. Phosphatic material occurs as nodules and as phosphatised limestone and pellets. They range in size from a few mm to 10 cm with wide variation in concentration.

It appears that the detached plateau surface is phosphatised and the small depressions on this surface are filled with recent sediments. In many places only the hard phosphatised surface is exposed and hence no sample could be collected from this hard surface. The E-W sub bottom profile also indicated the presence of hard ground with a depression at the centre filled with sediment. Onboard rapid analysis for phosphorite has indicated presence of phosphatic material in few surface samples.

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Marine Survey

GSI's Marine Wing continued its offshore geoscientific studies both in Exclusive Economic Zone (EEZ) and Territorial Waters (TW) along the East and West Coasts of India. Surveys in the near-shore zones (0 m - 10 m isobaths) were carried out using hired small mechanical boats.

During 2011-12, a total of seventeen cruises were undertaken using three vessels.

The following marine geoscientific surveys were carried out during 2011-12 Field Season:

1. Six cruises aboard R.V. Samudra Manthan within EEZ conducted the following:

a) Multibeam bathymetric survey of the continental slope off Gopalpur-Kalingapatnam-Pudimadaka, Odisha-Andhra Pradesh coast (SM-218).

b) Study of the sea bed morphology and magnetic anomaly pattern across the arc-trench gap off Great Nicobar Island (SM-219).

c) Monitoring of changes of Curie Isotherm around Barren Island and Multibeam bathymetric survey around Barren Islands (SM-220).

d) Multibeam bathymetric survey to the east of Nicobar Islands on the Sewell Rise (SM-221).

e) Multibeam bathymetric survey of the continental slope off Pudimadaka-Godavari, Andhra Pradesh (SM-222).

f) Preliminary survey for phosphatic sediments off Okha, Gujarat (SM-223).

2. Seven cruises aboard R.V. Samudra Kaustubh within the Territorial Waters (TW) off the east coast conducted:

a) Parametric (magnetic & seismic) Survey within TW off north Andhra Pradesh coast (ST-215).

b) Placer mineral resource evaluation in the TW off north of Bhimunipatnam, Andhra Pradesh (ST-216).

c) Study of the sea bed morphology in the outer continental shelf off Gopalpur-Chhatrapur, Odisha (217).

d) Geotechnical surveys off Puri, Odisha (ST-218).

e) Parametric (magnetic) surveys between Puri and Kushabhadra river mouth off Odisha coast (ST-218A).

f) Multibeam bathymetry off Malud, Odisha (ST-219).

g) Mapping of sea bed within Territorial Waters (TW) off Point Calimere, Tamil Nadu (ST-220).

3. Four cruises aboard R.V. Samudra Shaudhikama within the Territorial Waters (TW) off the West Coast conducted:

a) Parametric (magnetic) survey within Territorial Waters (TW) off Gulf of Mannar (SD-235).

b) Mapping of the sea bed off Okha, Gujarat (SD-236).

c) Evaluation of relict sand body off Ponnani, Kerala (SD-239).

d) Parametric (seismic and magnetic) survey within Territorial Waters (TW) off Kanyakumari-Tuticorin Coast (SD-240).

Production

Petroleum (crude) and natural gas (utilised) are the mineral items produced from offshore regions. The value of production of these two items in 2011-12 at ₹ 61,259 crore increased by 8% in the region as compared to that of the previous year. Offshore regions accounted for 24% of total value of mineral production in India.

Offshore accounted for 53% production of petroleum (crude) and 81% of natural gas (utilised) in the country during 2011-12. The production of natural gas (utilised) decreased 12% over previous year while a decline of about 6% was indicated in case of petroleum (crude) [Table-3].

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**Table – 3 : Mineral Production in Offshore Region, 2009-10 to 2011-12
(Excluding Atomic Minerals)**

(Value in ₹ '000)

Mineral	Unit	2009-10		2010-11		2011-12 (P)	
		Quantity	Value	Quantity	Value	Quantity	Value
All Minerals			539847278		667449261		612592340
Natural gas (utilised)	m c m	38811	145248072	43645	279371645	38475	246278475
Petroleum (crude)	'000t	21869	394599206	21255	388077616	20063	366313865

The Government has decided to build a Strategic Crude Oil Reserve of 5 million tonnes through a special purpose vehicle (SPV) named Indian Strategic Petroleum Reserves Ltd (ISPRL) - a subsidiary company of OIIB. The locations selected are: (i) Visakhapatnam, Andhra Pradesh, (storage capacity 1.33 million tonnes), (ii) Mangalore, Karnataka (1.5 million tonnes), and (iii) Padur, Karnataka (2.5 million tonnes). The construction works are in progress at all these project. The project at Visakhapatnam, Mangalore and Padur are expected to be commissioned in 3rd quarter of 2013-14, 4th quarter of 2013-14 and 1st quarter of 2014-15, respectively.

The Government had initiated bids under the New Exploration Licensing Policy (NELP) in 2000 to accelerate and expand exploration of oil and gas in the country. A total of 249 blocks were awarded in various rounds of NELP, spanning 2000-2012. Recently in March, 2012, 14 blocks covering area 14491 sq km were awarded under NELP - IX round.

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