DGH

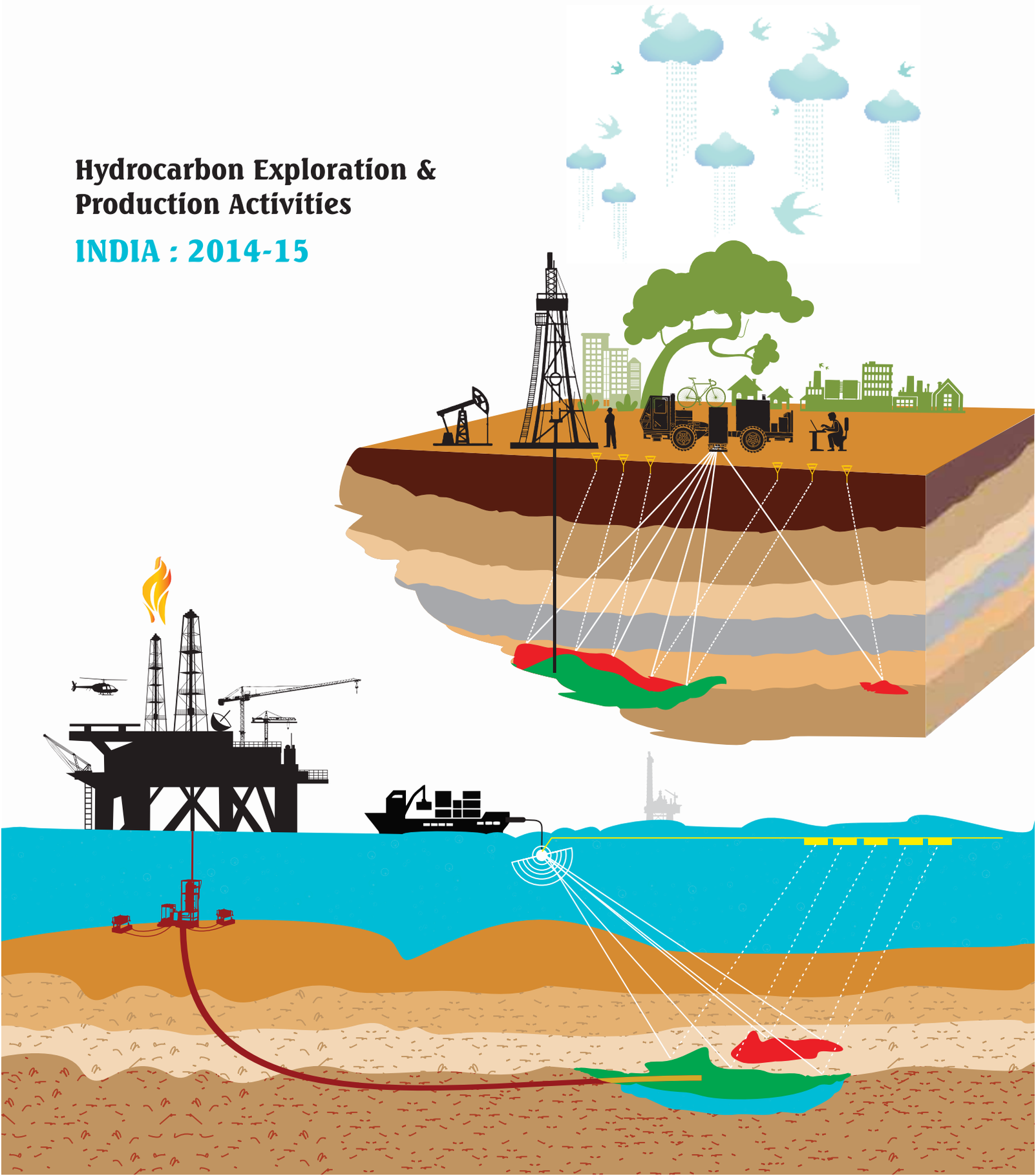
Directorate General of Hydrocarbons

Under Ministry of Petroleum and Natural Gas

Harvesting ENERGY everywhere

Hydrocarbon Exploration & Production Activities

INDIA : 2014-15



Disclaimer

- All boundaries shown in the maps are not authenticated.
- The statistics given in the report are collated from different E&P Companies operating in India and also from available published data in public domain. The correctness of information given herein, is therefore, subjective to that extent.
- Facts and figures given in the report are provisional / indicative and cannot be used for any commercial or legal purpose
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हाइड्रोकार्बन खोज एवं उत्पादन गतिविधियाँ
भारत
Hydrocarbon Exploration & Production Activities
INDIA
2014-15

हाइड्रोकार्बन महानिदेशालय
पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय, भारत सरकार

Directorate General of Hydrocarbons
Under Ministry of Petroleum and Natural Gas, Govt. of India

सत्यमेव जयते

धर्मेन्द्र प्रधान
ଧର୍ମେନ୍ଦ୍ର ପ୍ରଧାନ
राज्यमंत्री (स्वतंत्र प्रभार)
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DHARMENDRA PRADHAN
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MESSAGE

In recent times, the global Oil industry has been fraught with sheer volatility, leading to several highs and lows both on the production and pricing fronts. India, on its part, put forth its agenda strongly through a slew of policy changes with a focus on its core demands and strengths. After decades of stagnation, India's economy has been put back on growth track again. This has elicited a phenomenal demand for energy, which will continue to increase as the Government is aiming at double digit GDP growth in coming years. To meet the demand, various key decisions have been taken on the policy front ranging from the rationalization of domestic gas pricing norms to complete deregulation of diesel prices. MoP&NG has begun reviewing existing policies for ushering in the requisite reforms in the best interest of the industry. We hope that these reforms will help the industry to seamlessly implement their exploration campaigns in Indian sub-surface to unlock new hydrocarbon potential and monetizing them at the earliest.

Hon'ble Prime Minister has set an ambitious target to reduce import dependency by at least 10 percent by 2022, when the country celebrates the 75th Anniversary of its Independence. I strongly believe that we can accomplish this target through sustained efforts of all stakeholders.

Several initiatives have also been taken to boost Oil & Gas production in North East region as well as in the Indian offshore which, I am sure, will result in enhanced output. Alongside, we also need to have a renewed focus on unconventional hydrocarbon assets of the country namely CBM, Shale Gas, Gas Hydrates, etc.

Directorate General of Hydrocarbons (DGH), functioning under the aegis of Ministry of Petroleum and Natural Gas, has come out with its annual publication "Hydrocarbon Exploration and Production Activities 2014-15", that endeavors to encapsulate the E&P activities in India and showcases the performance of all the players involved in the quest for hydrocarbons in our country. I congratulate DGH on this publication and compliment the organization for diligently discharging its role as the upstream regulator of the Indian hydrocarbon sector.

(Dharmendra Pradhan)

सत्यमेव जयते

कपिल देव त्रिपाठी
सचिव
भारत सरकार
पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय
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MESSAGE

The year 2014-15 has been an exciting front in the global Oil and Gas scenario. With USA attaining self-sustaining status in Oil and Gas, the resulting oil glut in the world has resulted in a conspicuous crude oil price drop. India being a net importer of crude, the oil price drop brings a modicum of positive news to the balance of payments. However, it is also imperatively observed that E&P contractors have sharply cut investment/ costs in risky and technically challenging exploration projects. In such a scenario, it is endeavored by the Government to galvanize E&P activities in the country through transparent and consistent framework of policies.

The Ministry of Petroleum and Natural Gas has ironed out a number of rigidities in Production Sharing Contracts to push investment in Exploration and Production. Relaxations were given in milestones like timeline for submission of Commerciality report, Field Development Plans, budgets, etc. With this, the Government has commenced to closely monitor the Exploration and Production activities of the operators by quarterly evaluation of Work Program and Budget targets.

Government's efforts are directed towards early monetization of the existing and new discoveries and undertake initiatives through DGH, to open up new areas by conducting speculative surveys, reprocessing legacy seismic data and promoting exploration acreages. With this said, it is noteworthy that with time the role, functions and responsibilities of DGH have transformed and evolved significantly far beyond the scope initially envisaged.

I am happy that the Directorate General of Hydrocarbons, the technical arm of the Ministry of Petroleum & Natural Gas, is fulfilling its mandated task of increasing the exploration coverage in India and throwing open more and more acreages for exploration besides closely monitoring E&P Operations. This report on the "Hydrocarbon Exploration and Production Activities, India - 2014-15" is an important document that summarizes significant events and achievements of India's upstream sector in an informative manner. I am confident that this report will be a valuable reference to all stakeholders in the Oil industry.

(K.D. Tripathi)

सत्यमेव जयते

B. N. TALUKDAR
DIRECTOR GENERAL

DIRECTORATE GENERAL OF HYDROCARBONS
Ministry of Petroleum & Natural Gas
Government of India

At the time of joining DGH, I realized that the management of Production Sharing Contracts and Arbitration and Legal cases had been keeping our able manpower at DGH away from the real mandate of promoting sound management of the Indian Hydrocarbon Resources. It, therefore, propelled me to take immediate actions to facilitate and strengthen the technical portfolio of DGH, while continuing with the other activities. Adequacy of appropriate resources is imminent for timely achievement of targets and for optimal utilization of all the technical software available at DGH. Software and licenses were updated and renewed; a dedicated team was identified and deployed to carry out the technical work. To efficiently track the ongoing day-to-day activities and ever changing status of the blocks/fields, a Management Information System (MIS) has been implemented at DGH wherein E&P information is being systematically and expeditiously updated on an online portal, thus providing a reliable and readily available information to be used by various sections across and out of DGH.

Monitoring of E&P activities in India by DGH is driven by the Production Sharing Contracts which has water tight compartments as far as the timelines are concerned. Provisions had been made by Government for the timeline extensions within exploration phase in 2006. It was our constant endeavor to provide flexibility in the development phase timelines such as submission of Appraisal Plan, DOC, FDP etc. and other activities such as exploring the new hydrocarbon pool within the development areas during appraisal/ development. It was observed that decisions were pending in many cases with respect to the stringent timelines. The cases were also pending for decision for years where clearances were not accorded in the contracts by the different agencies. DGH made all out efforts in identifying such issues for a proper resolution. Policy decision has been taken by CCEA on nine such issues and about forty long pending cases have been resolved so far. Similarly, the issue of testing requirement (DST) has also been resolved after a long period and decision has been communicated to concerned Operators. This will enable monetization of twelve deepwater discoveries.

Talking of the deliverables in the FY 2014-15; sincere efforts have been made in view of the criticality of timely approval of the yearly Work Program and Budget (WP&B) by Management Committee (MC) and as a result, it is heartening to share that MC meetings have been conducted in all applicable blocks before 31st March, 2015 and approval WP & Budget for the year 2015-16 has been accorded. It is also

noteworthy that the number of pending cases with DGH that were left unattended for a long time have reduced considerably, owing to rigorous actions and follow-ups by DGH.

The progress of National Data Repository (NDR) Project is remarkable and is currently being aggressively expedited in DGH premises. The mechanical set-up of the project is complete and data loading is in progress. Entire country's E&P data will be uploaded in NDR so that any interested party from around the globe can have access to these data and show interest to invest in India.

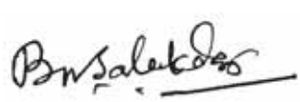
After about 2 decades, a fresh assessment has been steered through ONGC to assess the hydrocarbon potential of the entire 26 basins of India. Also steps are in progress to appraise un-appraised areas which is precisely about 50% of the total sedimentary area of the country. All the onshore areas shall be covered by 2D Seismic Survey within a time span of 5 years through ONGC & OIL. The offshore areas shall be covered under "Multi-client non-exclusive" survey – through which parties from across the globe may carry out seismic surveys at their cost and sell seismic data to the potential investors while submitting only a license fee and data set to the Government. Seismic parties shall commence operations immediately post-monsoon. Preparation of data dockets ttfor the fields to be offered under 'Marginal Field Exploration Policy' is at the verge of completion at DGH.

The Production Sharing Contacts regime has been introduced in our country since more than 2 decades, but two key technical issues are yet to be addressed - codification of Good International Petroleum Industry Practices and Site Restoration Policy. Both of these policies are being formulated with the help of a Standing Committee consisting of members from Industry and Government.

Another milestone in terms of our foray into Alternate Energy is the Second Expedition of Gas Hydrates in Indian Offshore that has commenced since 4th March 2015, where a Japanese drillship 'CHIKYU' has been commissioned to collect Gas Hydrate samples and related information thereof in Deep waters of Krishna Godavari and Mahanadi basins in presence of DGH/ONGC personnel. Based on preliminary interpretation out of the 12 wells completed by March 2015, 8 wells have indicated the presence of Gas Hydrates. Progress in exploration and development activities of Shale Gas and Coal Bed Methane (CBM) resources has been commendable and the outlook is positive.

To summarize, it has been immensely satisfying that together as a team, DGH has been able to identify and mobilize the resources required to enhance our capabilities ahead in such diverse technical projects taken up by the Government in the best interest of the E&P sector of our country. I thank and congratulate my team for its continuous endeavor in providing enriching contributions in the service of the nation and hope that synergistically, we progress toward our ultimate vision of Hydrocarbon self-sufficiency in the country.

DGH Annual publication 'Hydrocarbon Exploration and Production Activities, 2014-15' summarizes the entire gamut of E&P operations carried out in India and achievements made in this sector in 2014-15. I thank Ministry of Petroleum and Natural Gas whose encouraging support and guidance have let us discharge our duties effectively and expeditiously. I am confident that all the current and prospective stakeholders in E&P sector in India shall find this compendium useful and informative.



Baikunth Nath Talukdar

सत्यमेव जयते

बैकुंठ नाथ तालुकदार
महानिदेशक
हाईड्रोकार्बन महानिदेशालय
पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय
भारत सरकार

मैंने जब हाईड्रोकार्बन महानिदेशालय (डीजीएच) का कार्यभार संभाला तो अनुभव किया कि हाईड्रोकार्बन महानिदेशालय के कार्मिक उत्पादन भागीदारी अनुबंधों एवं पंचाटों (आर्बिट्रेशन) और कानूनी मामलों में अत्याधिक व्यस्त हैं और वे भारतीय हाईड्रोकार्बन संसाधनों के प्रबंधन में प्रगति करने सम्बन्धी अपने मूल कार्यो के लिए समय नहीं निकाल पा रहे हैं। अतः डीजीएच के अन्य कार्यो को जारी रखते हुए तकनीकी पोर्टफोलियो को सुसाध्य तथा मजबूती प्रदान करने के लिए मैंने तत्काल कार्रवाई प्रारंभ की। लक्ष्यों को समय पर पूरा करने और उपलब्ध सभी तकनीकी सॉफ्टवेयर के इष्टतम उपयोग के लिए डीजीएच में लगभग पर्याप्त मात्रा में संसाधन हैं। इस प्रक्रिया में सॉफ्टवेयर और अनुज्ञप्तियों (लाइसेंस) का अद्यतन और नवीकरण किया गया। तकनीकी कार्यो के लिए एक समर्पित टीम की पहचान की गई और उन्हें यह कार्य सौंपा गया। दिन–प्रतिदिन के कार्यो और ब्लाक/क्षेत्रों में निरंतर परिवर्तित होती स्थिति पर पूरी निगरानी रखने के लिए डीजीएच में एक प्रबंधन सूचना प्रणाली (एम.आई.एस) लागू की गई। इसके अन्तर्गत अन्वेषण और उत्पादन सम्बन्धी जानकारी ऑनलाइन पोर्टल पर सुव्यवस्थित ढंग से और तत्परतापूर्वक अद्यतन की जा रही है । इस प्रकार उपलब्ध कराई जा रही विश्वसनीय और तत्काल उपलब्ध जानकारी का लाभ डीजीएच तथा डीजीएच के अलावा अन्य वर्ग उठा सकेंगे।

हाईड्रोकार्बन महानिदेशालय द्वारा भारत में होने वाले अन्वेषण और उत्पादन सम्बन्धी कार्यकलापों का मॉनीटरण उत्पादन भागीदारी अनुबंधों के अनुरूप किया जाता है, निर्धारित समय सीमा के भीतर इन्हें पूरा किए जाने की सम्भावना कम है। वर्ष 2006 में सरकार ने अन्वेषण चरण में समय सीमा विस्तार के प्रावधान किए थे। मूल्यांकन योजना, डीओसी, एफडीपी आदि प्रस्तुत करने और मूल्यांकन/विकास के दौरान विकास वाले क्षेत्रों में नए हाईड्रोकार्बन पूल की खोज करने के विकास चरणों जैसी अन्य गतिविधियों की समय–सीमा के भीतर जानकारी उपलब्ध कराने के सम्बन्ध में हमने हमेशा छूट प्रदान करने की कोशिश की है। यह पाया गया कि कठोर समय–सीमा के कारण कई मामलों पर निर्णय नहीं लिया जा सका था। कई वर्षो से ऐसे मामले भी लंबित थे जिनके सम्बन्ध में विभिन्न एजेन्सियों द्वारा अनुबंधों को स्वीकृति प्रदान नहीं की गई थी। डीजीएच ने इस प्रकार के मामलों का पता लगाने के भरपूर प्रयास किए ताकि उनके उपयुक्त हल निकाले जा सकें। आर्थिक कार्यो की कैबिनेट समिति (सीसीईए) ने ऐसे नौ मामलों पर नीतिगत निर्णय लिए और अब तक ऐसे लंबित लगभग 40 मामलों का निपटारा किया जा चुका है। इसी प्रकार लम्बी अवधि के बाद ड्रिल स्टेम टेस्ट (डीएसटी) के मामलों का भी निराकरण कर लिया गया है और सम्बन्धित ऑपरेटरों को निर्णय से अवगत करवाया गया है, इससे 12 गहन पानी में की गई खोजों का मुद्रीकरण (मोनेटाईजेशन) होगा।

वित्त वर्ष 2014–15 में वार्षिक कार्य सम्बन्धी कार्यक्रम और बजट के समयबद्ध अनुमोदन की महत्ता को देखते हुए प्रबंधन समिति ने पूरी मेहनत की और परिणाम उत्साहवर्धक रहा। 31 मार्च 2015 से पहले सभी अनुप्रयोज्य ब्लॉकों में प्रबंधन समिति की बैठकें आयोजित की गई और वर्ष 2015–16 के लिए कार्य सम्बन्धी कार्यक्रम और बजट पर स्वीकृति प्रदान कर दी गई। यह भी दृष्टव्य है कि डीजीएच में लम्बे समय से पड़े

अनिर्णित मामलों की संख्या डीजीएच के अधिकारियों के कठोर परिश्रम और अनुवर्ती कार्रवाई से काफी कम हो गई है।

राष्ट्रीय आँकड़ा आधान (नेशनल डाटा रेपोज़िट्री) परियोजना की प्रगति काफी प्रशंसनीय है और डीजीएच में इस पर काफी रफ्तार से कार्य हो रहा है। परियोजना का तकनीकी ढाँचा पूरा हो गया है और डाटा लोड करने का कार्य हो रहा है। सम्पूर्ण देश के अन्वेषण और उत्पादन आँकड़े राष्ट्रीय आँकड़ा आधान में डाले जाएंगे ताकि आँकड़े विश्वभर की इच्छुक पार्टियों के पास पहुँच सकें और वे भारत में निवेश करने में अपनी रुचि दिखाएं।

लगभग दो दशकों के बाद ओएनजीसी के माध्यम से भारत में पूरे 26 बेसिनों में हाईड्रोकार्बन की सम्भाव्यता के निर्धारण हेतु एक नया मूल्यांकन किया गया है। सभी अमूल्यांकित क्षेत्रों, जो देश के कुल अवसादीय क्षेत्र का लगभग 50% है, के मूल्यांकन के लिए कदम उठाए जा रहे हैं। ओएनजीसी और ऑयल इंडिया लिमिटेड के माध्यम से 5 वर्षों में सभी तटीय क्षेत्रों का 2डी भूकम्पीय सर्वेक्षण किया जाएगा । अपतटीय क्षेत्रों को बहु–ग्राहक और गैर अनन्य सर्वेक्षण में शामिल किया जाएगा जिसके माध्यम से विश्व की पार्टियाँ अपने खर्च पर भूकम्पीय सर्वेक्षण कर सकेंगी और सरकार को मात्र लाइसेंस शुल्क और डाटा सेट प्रदान करके सम्भावित निवेशकों को बेच सकेंगी। भूकम्पीय पार्टियाँ बरसात (मानसून) के तत्काल बाद प्रचालन कार्रवाई प्रारम्भ कर देंगी। डीजीएच में सीमांत क्षेत्र शोषण नीति के अन्तर्गत प्रस्तावित क्षेत्रों के लिए डाटा डॉकेट्स की तैयारी लगभग पूरी हो चुकी है ।

हमारे देश में उत्पादन भागीदारी अनुबंध व्यवस्था शुरू हुए दो दशक से अधिक का समय हो गया है परन्तु अभी भी दो मुख्य तकनीकी मुद्दों पर कार्रवाई की जानी है – अच्छी अंतर्राष्ट्रीय पेट्रोलियम उद्योग पद्धति और स्थल पुनर्निर्माण नीति। यह दोनों नीतियां औद्योगिक और सरकारी सदस्यों से गठित स्थायी समिति की सहायता से तैयार की जा रही हैं।

वैकल्पिक ऊर्जा के क्षेत्र में हमारी एक और महत्वपूर्ण उपलब्धि है – 4 मार्च 2015 को शुरू हुआ भारतीय अपतटीय क्षेत्र में गैस हाईड्रेट्स का दूसरा अभियान। गहरे जलीय कृष्णा गोदावरी और महानदी बेसिनों में गैस हाईड्रेट नमूनों और उससे सम्बद्ध जानकारी एकत्र करने के लिए डीजीएच/ओएनजीसी के कार्मिकों की उपस्थिति में जापान की ड्रिलशिप 'चिक्यू' ने काम किया। मार्च 2015 तक 12 कूपों से प्राप्त प्रारंभिक जानकारी के आधार पर 8 कूपों में गैस हाईड्रेट्स की उपस्थिति के संकेत मिले हैं। शेल गैस और कोल बेड मीथेन संसाधनों की खोज और विकास के कार्य सराहनीय और दृष्टिकोण सकारात्मक है।

संक्षेप में, यह अत्यंत संतोषप्रद है कि एक समूह के रूप में भारत के अन्वेषण और उत्पादन क्षेत्र के सर्वोतम हित में सरकार द्वारा ली गई इस तरह की विभिन्न तकनीकी परियोजनाओं के अपेक्षित कार्यान्वयन में अपनी क्षमताओं को बढ़ाने के लिए आवश्यक संसाधनों की पहचान और उन्हें जुटाने में डीजीएच सक्षम है। मैं राष्ट्र की सेवा में अपनी टीम के सतत् भरपूर योगदान के लिए उनको बधाई देता हूँ और आशा करता हूँ कि हमारी सहक्रियता से देश में हाईड्रोकार्बन के क्षेत्र में आत्म–निर्भरता के हमारे अंतिम लक्ष्य की ओर हम अधिक तेजी से अग्रसर होंगे।

हाईड्रोकार्बन महानिदेशालय का वार्षिक प्रकाशन "हाईड्रोकार्बन खोज तथा उत्पाद गतिविधियाँ, 2014–2015" में भारत में वर्ष 2014–2015 में किए गए अन्वेषण और उत्पादन के क्षेत्र में अन्वेषण और उत्पादन प्रचालनों और उपलब्धियों के सभी पहलुओं का सार है। मैं पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय को धन्यवाद देता हूँ जिनके प्रोत्साहक सहयोग और मार्गदर्शन से हम अपने कर्तव्यों का निर्वाह प्रभावी ढंग से और तत्परतापूर्वक कर सके।

मुझे विश्वास है कि भारत में सभी वर्तमान एवं सम्भावित हिताधिकारियों के लिए यह सार–संग्रह लाभकारी और सूचनावर्धक होगा।

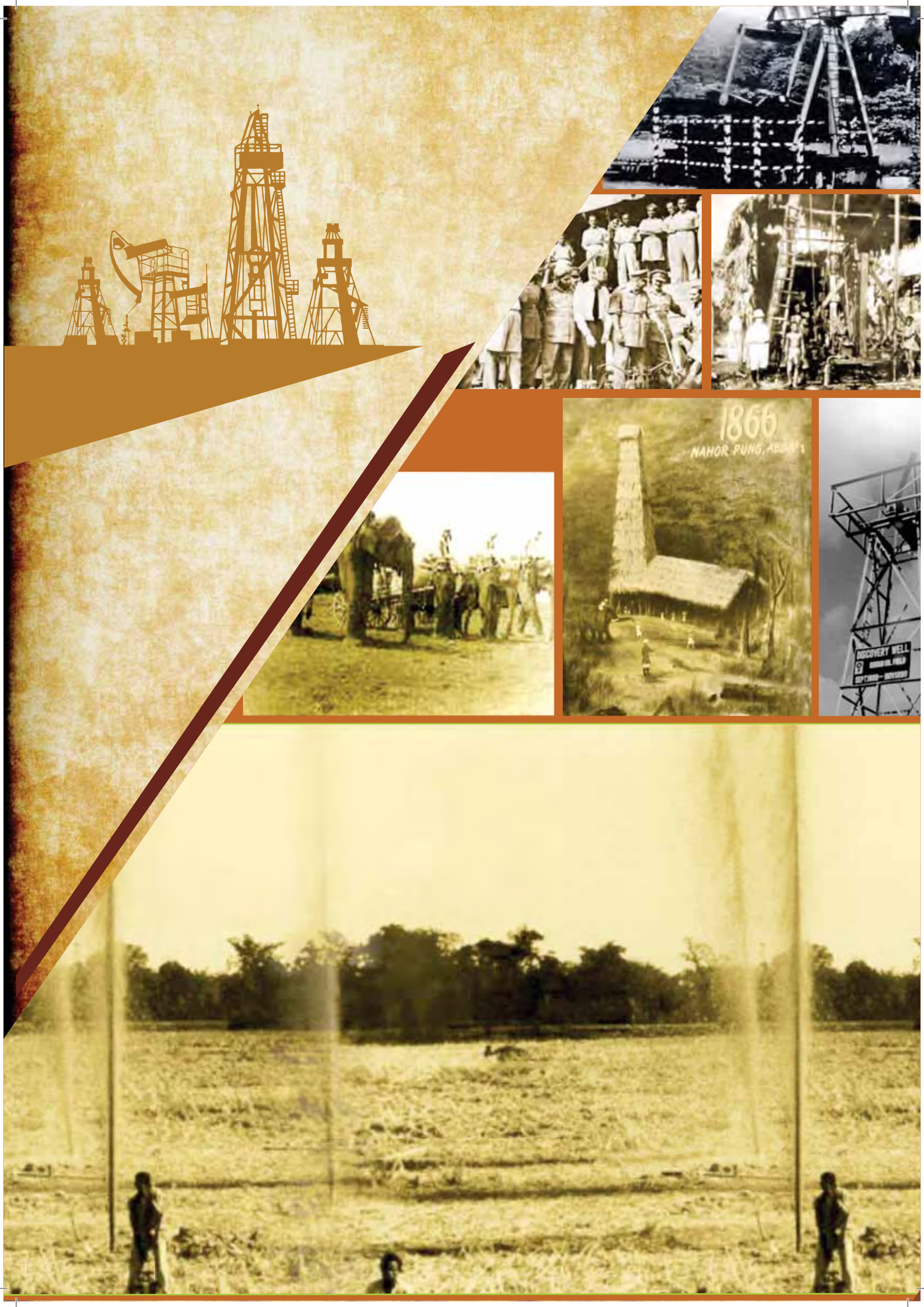
बैकुंठ नाथ तालुकदार

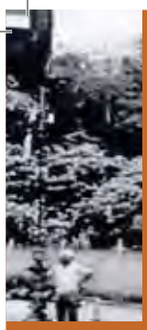
DGH was formed through a Government of India resolution dated 08.04.1993 under the administrative control of Ministry of Petroleum & Natural Gas.

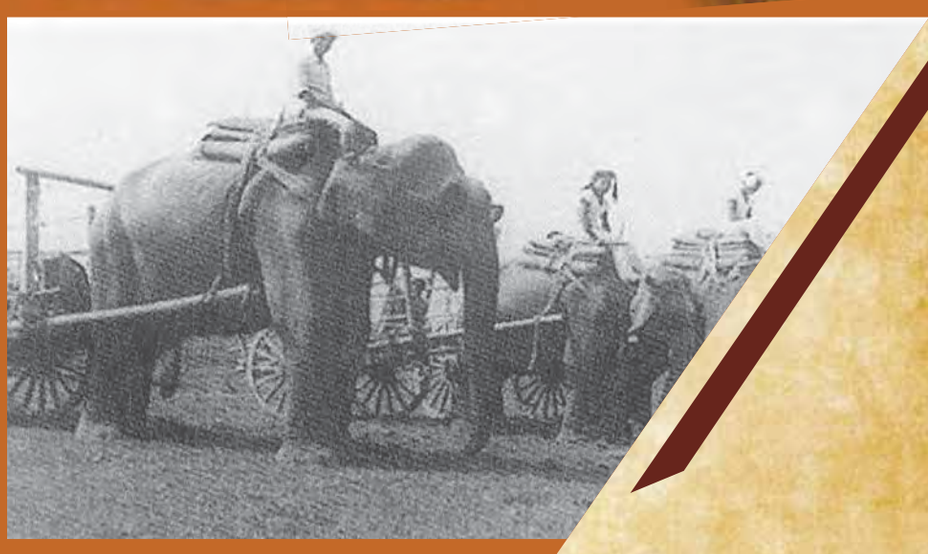
Objective

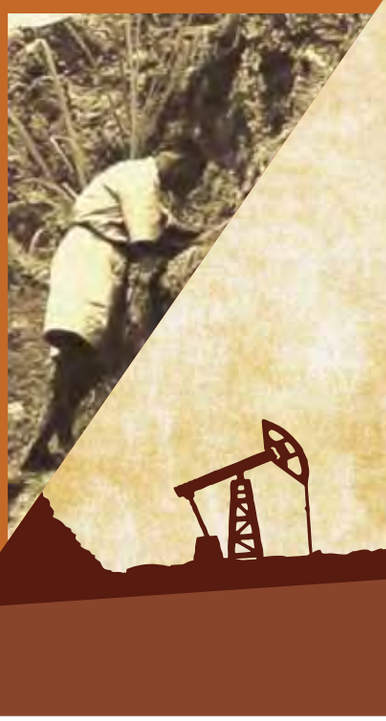
To promote exploration and sound management of the petroleum & natural gas resources and also non-conventional hydrocarbon energy resources while having balanced regard for the environment, safety, technological and economic aspects

CONTENTS


1866
DISCOVERY WELL







Chapter 1 Evolution of Upstream Indian Oil and Gas Industry

1

Evolution of Upstream Indian Oil and Gas Industry

The story of Oil exploration in India began in the dense jungles and swamps and river-valleys of the north-eastern corner of the country. Lt. R. Wilcox, Major A. White, Capt. Francis Jenkins, Capt. P.S. Hanny, W. Griffith, W.Licut Bigge–they all saw at different times petroleum seepages from the banks of river Dihing. Mr. C.A Bruce (1828) and Mr. H.B. Medicott (1865) of the Geological Survey of India also saw oil seepages while prospecting for coal in upper Assam.

Barely seven years after Edwin L. Drake drilled the world's first Oil well in 1859 at Titusville, Pennsylvania, USA, in 1866, Mr. Goodenough of McKillop, Stewart and Company, Calcutta, drilled a hand-dug well of 102 feet at Nahorpung near Jaipur area of Upper Assam but failed to establish satisfactory production. In his second attempt on 26th March 1867, Oil was struck at merely 118 feet (35.97-m) in Asia's first mechanically drilled well at Makum near Margherita area of Upper Assam.

However, the first well dug at Digboi field in Assam in September 1889 and completed in November 1890 at depth of 662 feet by Assam Railways and Trading Company Limited (AR&T Co. Ltd.), registered at London, is regarded as the first commercially successful Oil discovery (200 gallons per day). To add color to geological reasoning, legend was created that during the construction of a railway line by AR&T, in the year 1867, a herd of logging elephants returned to camp with their feet covered in oil after a night time excursion to find food and water. This led men to trail to the salt lick where seepages were prolific. Looking at this, the elated English owner cried out to his men, "Dig boy, dig". Probably the name Digboi itself came from that word.

AR&T subsequently acquired a 77.7 square kilometer petroleum-rights concession in the Makum area of Assam, and by 1893 had drilled 10 wells at Digboi producing 757.08 liters/day. AR&T established Assam Oil Company (AOC) in 1899 with a capital of £310,000 to take over the petroleum interests of AR&T, including the Digboi and Makum concessions and set up a small refinery at Margharita (Upper Assam) with a capacity of 500 bopd to refine the Digboi-Oil. Thereafter, systematic drilling began in 1891 and few years later in 1901, Asia's first Oil refinery was set up at Digboi. It is still functional and the world's oldest operating refinery.

Failure to utilize geologic reasoning, promiscuous wild catting, misguided investment and nonchalance of the management towards technical support led to compounding of errors by AOC which made the company technically and financially impotent. Later on UK based Burma Oil Company (BOC) arrived in 1911 in Upper Assam (Surma Valley) and in 1915, after acquiring Oil interest from Budderpore Oil Co. Ltd (formed by a syndicate of Budderpore tea garden during 1911-13) began testing option in the Badarpur structure in the Surma valley (Upper Assam). Gradually by 1921, in a phase-wise manner, BOC acquired petroleum interests of AOC.

'Torsion balance' which was successfully adapted for geophysical surveys of Oil was used at Bordubi (Assam) by a geophysical team in 1925. The Indian Co. "TATA engineering co." has also drilled several wells in Jagatia, Gujarat and produced small amount of gas in 1930s. In 1937, BOC jointly with British Petroleum (then Anglo Iranian Oil Co.) and Shell proposed to Govt. of India to carry out a geophysical survey of the important plain areas of India. The proposal was accepted and a new form of grant known as geophysical license was issued by Assam Government. In Assam, successful seismic survey was carried out in Nahorkatiya during 1937-39, triggering new enthusiasm in Oil search and it became forerunner of discoveries in Assam basin and others also. The successful outcome of well NHK-1 in 1937 was vindication for geophysical method in Oil exploration.

The world knew importance of Oil and after Independence, Indian leaders realized its utility for rapid industrialization and security of nation. The company rule which were earlier framed to satiate the raw material need of British Empire was re-framed. While framing industrial policy 1948, the development of petroleum industry in the country was given top priority.

By 1948, GSI had started geophysical survey in Cambay area. The first Oil discovery in independent India was made by AOC on 1953 in Nahorkatiya and then in Moran in 1956 both in Upper Assam. The Oil industry, after independence, remained operated by foreign company for a considerable period. Burma Oil Company

(BOC) kept its position as the largest company in India till the end of its operation.

In 1955-56, a delegation led by Mr. K.D.Malviya, Minister of Natural Resources, visited several European countries to study status of Oil industry in those countries and facilitate training of Indian professionals. Foreign experts also visited India to share their know-how. Erstwhile USSR helped to draw a detail plan for geological and geophysical survey and drilling plan in 2nd five year plan (1956-57 & 1960-61).

With the intention of intensifying and spreading exploration to various parts of the country a separate Oil and Natural Gas Directorate (ONGD) was set up in 1955, as a subordinate office under the then Ministry of Natural Resources and Scientific Research. The department ONGC was constituted with a nucleus of geoscientists from Geological Survey of India. But soon after its formation it was realized that the directorate cannot function efficiently with its limited financial and administrative liberty and in early 1956 its status was changed to a commission. In October 1959, ONGC was made a statutory body by an act of parliament delegating it more power but it remained under Ministry. The job of ONGC was defined as "to plan, promote, organize and implement programs for development of Petroleum Resources and the production and sale of petroleum and petroleum products produced by it, and to perform such other function as the central government may, from time to time, assign to it".

ONGC systematically started its geophysical surveys on area considered prospective on the basis of global analogy. Further, thrust was given for survey in area of Himalayan foothills and adjoining Ganga plains, alluvial tracts of Gujarat, upper Assam and basins of Bengal. The exploratory drilling carried out in Himalayan foothill during 1957, remained unsuccessful. Within a year of being formed, ONGC discovered Oil at Cambay. The giant Ankleshwar field in the state of Gujarat in 1960, Kalol in 1961, Lakwa in 1964, Geleki in 1968 and Gas discovery - Manhar tibba in Rajasthan in 1969 were discovered subsequently.

Meanwhile, on 18th February 1959, for development and production of Nahorkatiya and Moran prospects and to increase the pace of exploration in Assam, Oil India Private Limited was incorporated as a rupee company to take over BOCs affairs in Assam. The company was owned 2/3rd by AOC/BOC and 1/3rd by Government of India and in 1961 they became equal partners by transforming OIL into a JV Company. OIL discovered Kusijan Oilfield in 1969 and Jorajan Oilfield in 1972. Later, Eocene gas was discovered by OIL in Tengakhat field of Assam in 1973.

Offshore exploration was initiated by ONGC in the form of experimental seismic survey in 1962 in Gulf of Cambay and later in western offshore. Detailed seismic surveys in western offshore resulted in a discovery of large structure on Bombay-offshore in 1972-73 and drilling lead to India's biggest commercial discovery - Bombay High. Encouraged by this discovery, exploration was furthered in entire western off-shore including Kerala-Konkan basin and eastern offshore area. This led to large discovery of Bassein and Neelam in western offshore and PY-3 & Ravva in Eastern offshore. Oil also ventured from Assam to Orissa both in onshore and offshore. During 1979-89, it went to Andaman offshore and Rajasthan onshore. By the end of 1980s, ONGC and OIL has together drilled nearly 3100 wells totaling 4.9 million metres.

ONGC's geoscientific survey spread out to UP, Bihar, Tamil Nadu, Rajasthan, J & K, Kutch and Andhra Pradesh. By mid 1980s, ONGC successfully discover prospects in Cauvery and KG basin. Kharsang Oilfield was discovered by OIL in 1976 and in the same year ONGC discovered one of India's biggest gas finds of 283.17 BCM in the Bassein fields off Mumbai's coast. Other gas fields discovered by ONGC were mid-Tapti, South Tapti and B-55. In 1978, Oil ventured out of Assam into Orissa offshore and onshore. Oil also ventured into offshore Andamans in 1979-89 and onshore Rajasthan.

Till the end of 1970s, Indian E&P industry was dominated by the two National Oil Companies (NOCs) - ONGC and Oil to whom PELs were granted on nomination basis. Exploration was primarily confined to on land and shallow offshore. In 1979, Govenment of India took the strategic initiative to attract foreign investment, technology and capital to deal with future commitment and challenges of Indian Oil economy by offering 32 exploration blocks (17 offshore & 15 onshore). Government started offering block systematically through bidding. These rounds are also known as Pre-NELP Exploration rounds. The three rounds during 1980-1986 was not very successful.

By 1981 Government took over OIL and it became a full-fledged PSU. In 1982, ONGC made its biggest gas discovery in Gandhar, (Cambay basin, Gujarat) and by 1986 KG basin was put in global map with several substantial discoveries made. By the end of 1986, 3rd round of international bidding for exploration blocks were offered. OIL and ONGC were offered 40% stake in JV if field was found viable. Few foreign companies participated but there was no committed exploration or breakthrough discovery. The foreshore terminal of IOC was commissioned in Madras (Chennai). However OIL and ONGC's effort continued in several parts of India and by 1989 OIL discovered gas in Tanot (Mata Temple) in Rajasthan and ONGC discovered South Heera in Mumbai offshore.

In 1990, 4th round of bidding was invited and for the first time, Indian companies were allowed to participate with foreign companies. However no major discovery was made with these partnerships. In 1991, Government of India (GoI) adopted liberalized economic policy that led to de-licensing of core group including petroleum sector and partial dis-investment of government share including other measures. As a result, ONGC was re-organized as a Limited company (under the Company's Act, 1956) from Oil and Natural Gas Commission to Oil and Natural Gas Corporation Limited. To give momentum to Petroleum sector in India, GoI came up with more lucrative offers in 1994. However this also led to disagreement in Production Sharing Agreement. In couple of years, ONGC ventured into CBM in Damodar valley and explored EOR options in heavy Oil belt of North Gujarat. By 1996, Government conducted 5 rounds of bidding and offered 126 blocks having area in the range of 1 square km to 50,000 sq. km. Besides National Oil Companies and Indian Private Companies, some foreign companies like Shell, Enron, Amoco and Occidental participated in exploration and contracts were awarded to them.

The government efforts particularly during 1991-1996 gave required thrust for opening up Oil and Gas sector in India. After this, the process of opening the sector became more streamlined. Many private players also joined in development of this industry. Hindustan Oil Exploration Company (HOEC) which started its E&P venture in 1991, was among few such initial domestic private players.

In view of the liberalized policy adopted by GoI, a need for an independent upstream regulatory body called the Directorate General of Hydrocarbons (DGH) was envisaged to oversee and review the Oilfield development programs so as to conform to sound

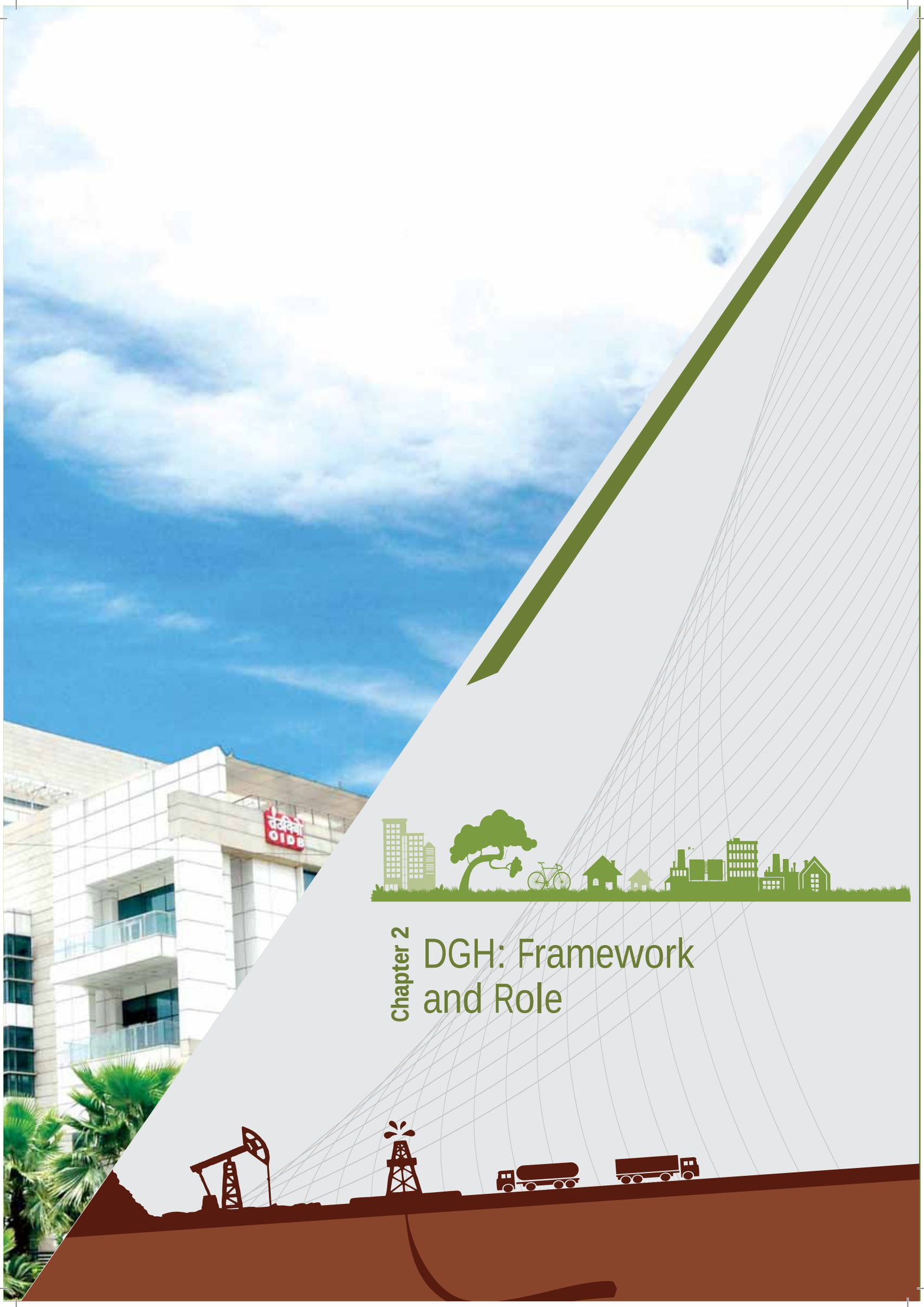
reservoir engineering practices in line with national interests. Thus, DGH was formed vide GoI resolution dated 08.04.1993.

After the Nomination era till late 1970s, Pre-NELP Exploration era (1980-95) and Pre-NELP Field rounds (1992-93), Government of India formulated a policy called as New Exploration Licensing Policy in 1997. The main objective was to attract significant risk capital from Indian and Foreign companies, state of art technologies, new geological concepts and best management practices to explore Oil and Gas resources in the country to meet rising demands of Oil and Gas. This NELP policy was approved in 1997 and it became

effective in February, 1999. Since then licenses for exploration are being awarded only through a competitive bidding system and National Oil Companies (NOCs) are required to compete on an equal footing with Indian and Foreign companies to secure Petroleum Exploration Licenses (PELs). Nine rounds of bids have so far been concluded under NELP, in which production sharing contracts for 254 exploration blocks have been signed.

With huge scope of activities and development in Oil and Gas sector in India, a lot of history in this sector is yet to be written.


DGH



Chapter 2

DGH: Framework and Role

2
DGH: Role and Framework

2.1 Formation and Framework of DGH

The liberalized economic policy adopted by the Government of India (GoI) in July 1991 sought to deregulate and de-license the core sectors (including the petroleum sector) with partial disinvestments of government equity in Public Sector Undertakings along with other measures. The upstream petroleum sector was largely a monopoly of public sector companies till then and the sector was being increasingly opened up to new operating companies in the private and joint sectors. Thus, a need was felt to establish an agency that could effectively supervise the activities of all these companies in the national interest. The same was elucidated by the committee headed by late Dr. A.B. Dasgupta, which recommended for creation of an autonomous conservation board to oversee and review Oilfield development programs for sound reservoir engineering practices in line with national interests. Subsequently, a committee was constituted in 1992 under the chairmanship of late Shri P. K. Kaul, former Cabinet Secretary, to examine the need for restructuring ONGC's organizational structure. This committee also recommended for establishment of an independent regulatory body for discharging the regulatory functions of leasing and licensing, safety and environment and also development, conservation and reservoir management of Hydrocarbon resources in India. Accordingly, a technical advisory - Directorate General of Hydrocarbons was set up through GoI resolution No. O-20013/2/92/ ONG-III dated 08.04.1993 under the administrative control of the Ministry of Petroleum and Natural Gas.

2.2 Objective of DGH

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.

2.3 Role & Function of DGH

- A nodal agency for implementation of NELP and CBM policy on behalf of Ministry of Petroleum & Natural Gas
- 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 programs of companies operating under Petroleum Exploration Licenses 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 programs.
- 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 to 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 prepare data packages of acreages for offer to companies
- All other matters incidental thereto and such other functions as may be assigned by Government from time to time
- Assist Government in Contract management functions
- Exploration & Development of unconventional hydrocarbon resources like Gas Hydrate, Shale Gas/ Oil and Oil Shale

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- Issue Essentiality Certificate for importing goods and services used in E&P sector to avail custom duty concessions

2.4 Advisory & Administrative Council of DGH

2.4.1 Advisory Council

Directorate General of Hydrocarbons has an Advisory Council, which is appointed by the Government comprising of Chairman and members, who are eminent persons in the field of hydrocarbon exploration and production. The Advisory Council is serviced by the Directorate which is headed by a Director General who is also the Member Secretary to the Council.

2.4.2 Administrative Council

Government of India set up an Administrative Council on 02.02.2001 to guide and to take care of all administrative aspects of the functioning of DGH, through Office Memorandum No. O-32012/1/95-ONG-III dated 02.02.2001. The Administrative Council, in particular, takes decisions on various matters concerning establishment, budget and also undertakes periodical review of the functioning of DGH. It is headed by Secretary (P&NG).

Table 2.1 : Composition of Administrative Council

Name	Designation
Secretary, MoP&NG	Chairman
Additional Secretary, MoP&NG	Member
AS&FA, MoP&NG	Member
Joint Secretary (Exploration), MoP&NG	Member
Secretary, OIDB	Member
Director General, DGH	Member - Convener

2.5. Award process under Pre-NELP and NELP Regime

Petroleum Exploration Licenses (PEL) for domestic exploration & production of crude oil and natural gas were granted under four different regimes over a period time.

2.5.1. Nomination Basis:

Till the end of 1970s, Indian E&P industry was dominated by the two National Oil Companies (NOCs) - ONGC and OIL to whom PELs were granted on nomination basis. Exploration was primarily confined to onland and shallow offshore.

2.5.2. Pre-NELP Exploration Blocks:

28 Exploration blocks were awarded to private companies between 1980 and prior to implementation of NELP where ONGC and Oil have the rights for participation in the blocks after hydrocarbon discoveries.

In 1993, GoI offered blocks for geophysical and other surveys to update the information on hydrocarbon potential of India's unexplored sedimentary basins. Once the surveys on these blocks were completed, they were to be offered in subsequent rounds of exploration. The second speculative survey round was launched in 1994 and the third round in 1995. The third round was called as Joint Venture Speculative Survey Round (JVSSR) with a provision of risk participation/cost sharing by DGH up to 50 %.

2.5.3. Pre-NELP Discovered Field or Development Rounds:

Government offered Petroleum Mining Lease (PML) of small/medium sized and discovered fields (proven reserves discovered by ONGC and Oil) to the private sector in August 1992 and October 1993. Production Sharing Contracts (PSCs) awarded during 1992-1993 had the distinctive feature of operators as private companies with ONGC/OIL as having Participating Interest. These rounds received overwhelming response from various private E&P operators.

28 contracts were signed by Government of India for 29 discovered fields. Under this regime, all statutory levies including royalty, cess, customs duties, etc. were payable by Contractor or Coventures. Signature/production Bonus was payable by companies to ONGC & OIL for small fields (1992) and for Medium and Discovered fields it was payable by Coventures. Details of fiscal terms under which blocks were offered under various Pre-NELP discovered/development rounds in India is provided in Table 2.9.

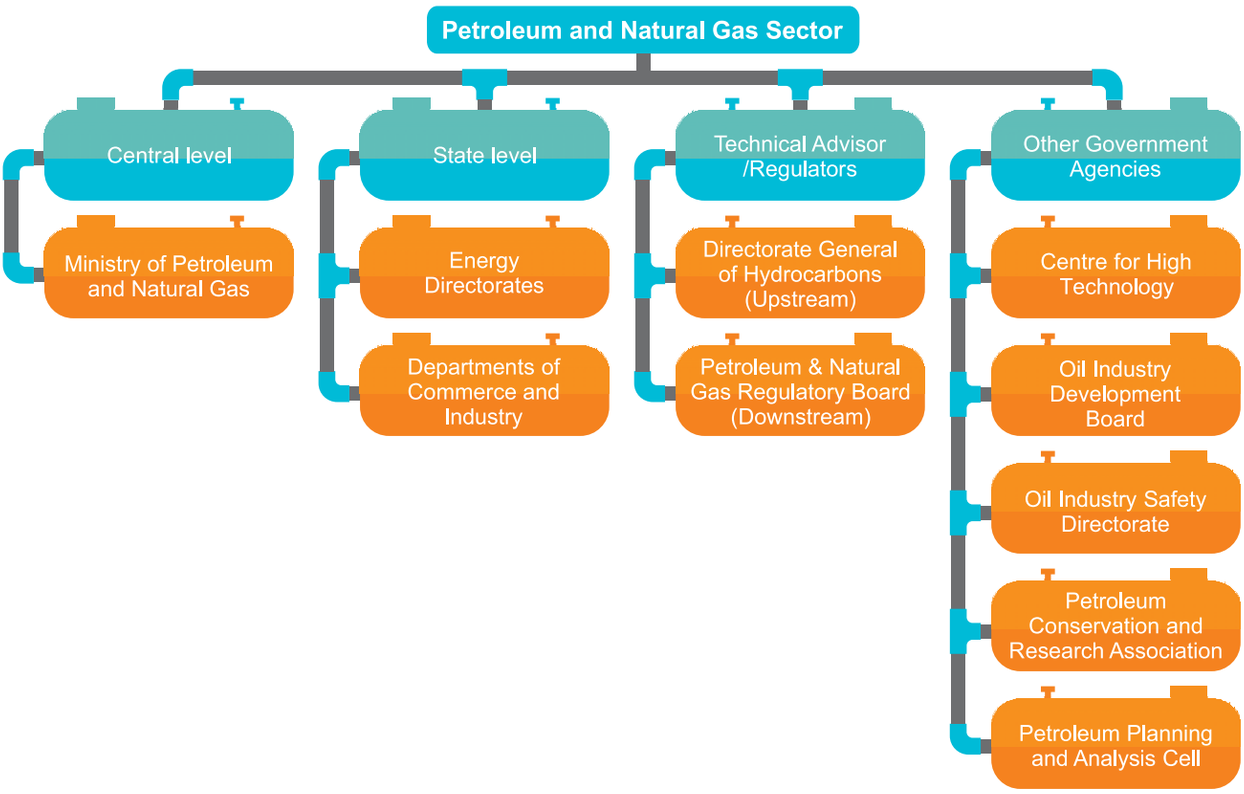


Table 2.2 : Brief Details of the Pre-NELP Exploration Blocks

Year	Rounds	Description	Contracts signed		
			Offshore	Onshore	Total
1980	1st Exploration round	PSC signed with Chevron, USA and 3 wells were drilled without success, block area was relinquished in 1985	1	0	1
1982	2nd Exploration round	No PSC signed	0	0	0
1986	3rd Exploration round	No PSC signed	0	0	0
1991	4th Exploration round		2	3	5
1992		First development round			
1993	5th Exploration round	Second development round	4	2	6
1993	6th Exploration round	First speculative survey round	2	3	5
1994	7th Exploration round		2	3	5
1994	8th Exploration round	Second speculative survey round	1	3	4
1995	9th Exploration round	JV Exploration Program	1	1	2
Total			**13**	**15**	**28**

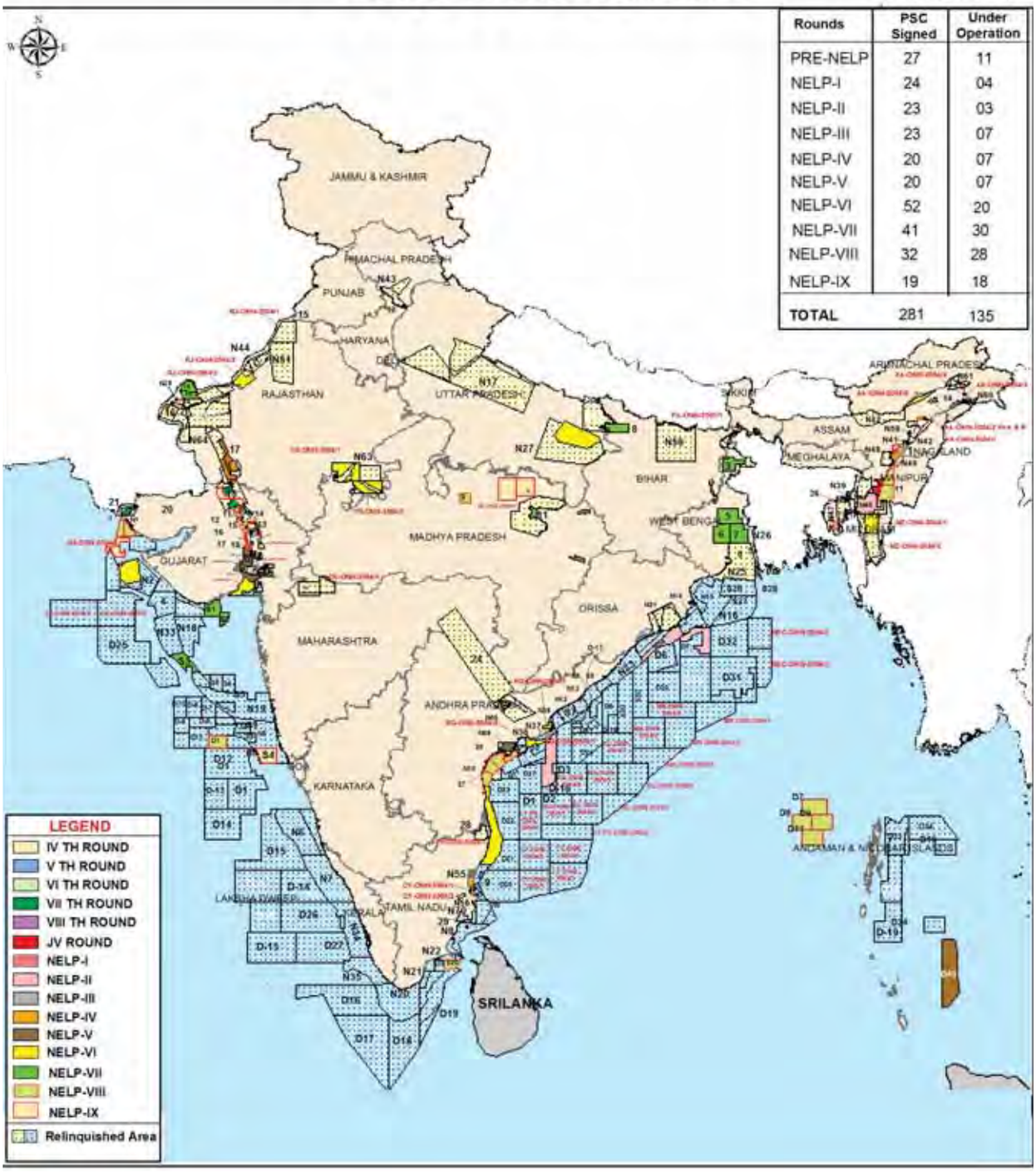
Table 2.3 : Pre-NELP Discovered Field or Development Rounds

Month/Year of award	Round	Blocks offered in Medium sized field Round		Blocks offered in Small sized field Round		Contracts signed
		Offshore	Onshore	Offshore	Onshore	
August 1992	1	6	6	10	21	18
October 1993	2	2	6	4	29	10
Total Contracts signed:						**28**

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

(AS ON 01-04-2015)

Rounds	PSC Signed	Under Operation
PRE-NELP	27	11
NELP-I	24	04
NELP-II	23	03
NELP-III	23	07
NELP-IV	20	07
NELP-V	20	07
NELP-VI	52	20
NELP-VII	41	30
NELP-VIII	32	28
NELP-IX	19	18
TOTAL	281	135



2.5.4. New Exploration Licensing Policy (NELP):

Under NELP, blocks were awarded to Indian, private and foreign companies through International Competitive Bidding process where NOCs viz. ONGC and Oil are also competing on equal footing.

The Government has taken number of measures to bring in healthy competition and public participation by the way of NELP for exploration & production of Oil & gas in the country. NELP has not only accelerated the quest for hydrocarbon exploration, but has also brought the state of the art technology and efficiency of operations / management to the country.

Government of India has signed 28 contracts for 29 discovered fields (1 PSC for Panna Mukta), 28 exploration blocks under Pre-NELP Exploration regime and 254 blocks under NELP regime with National Oil Companies and private (Both Indian and foreign)/ Joint Venture companies. At present, out of 311 exploration blocks/fields awarded so far under various bidding rounds (Discovered Field, Pre-NELP & NELP), 178 blocks/ fields are operational.

The awarded 254 blocks are located in onland (114), offshore shallow water (59) and deepwater (81) areas. As a result of exploratory activities, several unexplored and poorly explored areas, in particular offshore and deepwater areas have been appraised through geophysical surveys and exploratory drilling. So far a total of 140 hydrocarbon discoveries (49 Oil and 91 Gas). Most of the gas discoveries have been made in shallow water offshore (39) and deepwater blocks (46).

NELP bidding rounds have also attracted many Private and Foreign Companies in addition to PSUs. Before the NELP, a total 35 E&P Companies (5 PSUs, 15 Private and 15 Foreign) were working in Nomination and Pre-NELP regime. After the conclusion of nine rounds of NELP bidding, the total number of companies have increased to 117 (11 PSUs, 58 Private and 48 Foreign Companies as Operators and Non-operators/Consortium Partners). Major Private Companies were RIL, Jubilant and Essar. The major foreign companies were British Gas, British Petroleum, Cairn Energy, ENI, Santos and BHP Billiton.

Public Sector Undertakings (PSU) IOCL, GAIL, BPCL working under MoP&NG and their subsidiaries like Bharat Petro Resources Ltd. (Subsidiary of BPCL), Prize Petroleum Company Limited (Subsidiary of HPCL), have participated in various NELP bidding rounds and have been awarded exploration blocks in various NELP bidding rounds. In addition to central PSU, state PSU like GSPC have participated in various NELP bidding rounds and have been awarded exploration blocks.

The domestic crude Oil/gas production in the country consists of Oil production from Nomination Blocks/ Fields under ONGC and Oil and from the discovered fields and producing Pre-NELP and NELP blocks under the Production Sharing Contract (PSC) regime.

Table 2.4 : Status of Blocks under NELP

Round	Awarded				Relinquished				Operational			
	Deep-water	Shallow Water	Onland	Total	Deep-water	Shallow Water	Onland	Total	Deep-water	Shallow Water	Onland	Total
NELP-I	7	16	1	24	4	15	1	20	3	1	0	4
NELP-II	8	8	7	23	8	6	5	19	0	2	2	4
NELP-III	9	6	8	23	8	5	5	18	1	1	3	5
NELP-IV	10	0	10	20	10	0	5	15	0	0	5	5
NELP-V	6	2	12	20	5	1	8	14	1	1	4	6
NELP-VI	21	6	25	52	21	2	15	38	0	4	10	14
NELP-VII	11	7	23	41	11	4	8	23	0	3	15	18
NELP-VIII	8	11	13	32	3	4	0	7	5	7	13	25
NELP-IX	1	3	15	19	1	0	1	2	0	3	14	17
Total	**81**	**59**	**114**	**254**	**71**	**37**	**48**	**156**	**10**	**22**	**66**	**98**

Table 2.5 : Chronology of NELP Bidding Rounds

Round	Launch Year	Signing Year
PRE-NELP Exploration	1980	1980-1995
PRE-NELP Field	1992	1992-1993
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

Table 2.6 : Investment made in NELP blocks in FY 2014-15

NELP Rounds	Exploration Investment Commitment (US$ Million)	Actual Exploration Investment (US$ Million)	Actual Development Investment (US$ Million)	Total Investment (US$ Million)
NELP-I	310.37	4,605.29	7,799.47	12,404.76
NELP-II	99.59	908.73	33.94	942.67
NELP-III	45.12	3,342.62	1,818.43	5,161.05
NELP-IV	19.70	2,095.39	4.54	2,099.93
NELP-V	22.07	1,002.21	0.37	1,002.58
NELP-VI	220.24	2,299.03	0.00	2,299.03
NELP-VII	58.99	694.65	0.00	694.65
NELP-VIII	367.05	379.10	0.00	379.10
NELP-IX	43.18	73.75	0.00	73.75
Grand Total	**1,186.32**	**15,400.77**	**9,656.75**	**25,057.52**

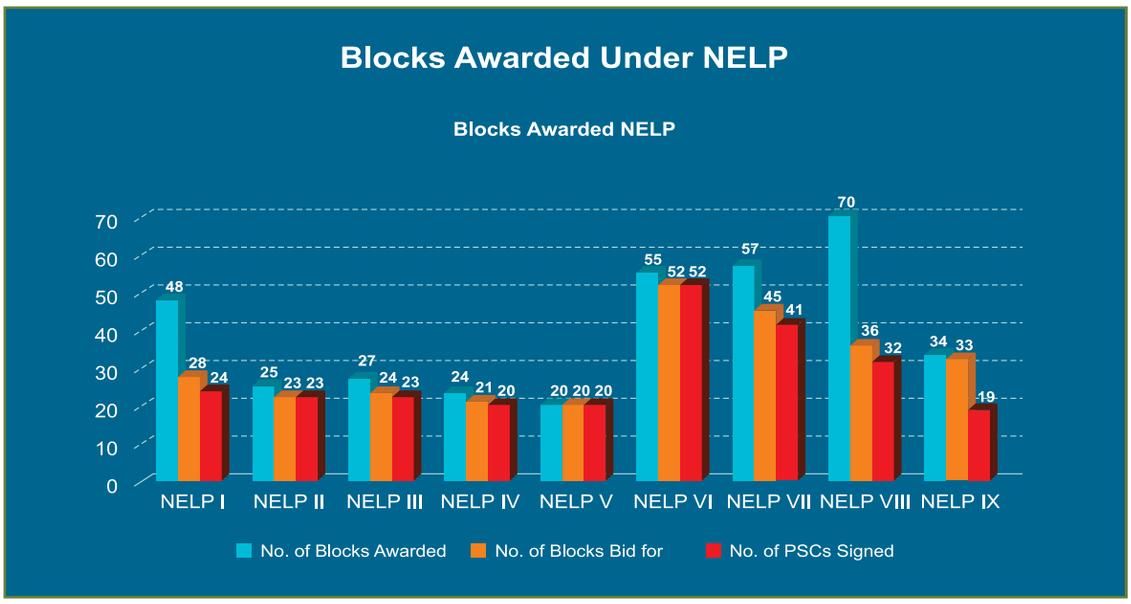


Table 2.7 : Salient features of four main regimes in Indian Oil and Gas industry

Item	Nomination	Pre-NELP Exploration Blocks
Bonus	NA	No signature or production bonus
Royalty	Royalty : For Crude Oil: 20% for Onshore, 10% for Offshore,10% for Deepwater Natural Gas: 10% for all Onshore and Offshore	No royalty payment OR No royalty payment No custom duty
Government of India (GoI) interest	Government owned	GoI or its nominee will have carried interest of 30% from the date of signing of contract,with the option to convert it into a working interest after the decision to proceed with the development and production of discovered hydrocarbons has been taken. GoI or its nominee may also acquire 10% working interest in any block it chooses at the time of signing of contract, thereby sharing 10% of exploration cost OR ONGC or Oil will have a participating interest of between 25% to 40% in the JV from the date of signing of contract, thereby sharing the exploration cost in proportion to their participating interest
Pricing of Crude Oil and Natural Gas	As per prevailing rate and subsidy arrangement	International market price for Oil produced. The pricing formula for associated gas would be on a cost plus basis, while for non-associated gas it would be related to the international price of fuel Oil, the exact relationship being negotiable. The price payable for both associated and non-associated gas would not exceed the price paid to the producing National Oil Companies (exclusive of cess, taxes and royalty). OR The pricing formula for gas would be on internationally accepted principles Arrangement for marketing of the gas produced would be negotiable between GoI and the Company OR The JV will have freedom to make arrangements for marketing the gas
Sharing of profit	In the pattern of shareholding	Profit Oil shall be bid based on sliding scale tied to post tax rates of return or multiples of investment recovered
Minimum expenditure	NA	No minimum expenditure commitment No ring fencing of blocks for corporate tax purposes
Operatorship	NOC (ONGC/OIL)	Company will be operator for exploration and appraisal period. Time of transfer of operatorship to GoI or its nominee during development and production phase is negotiable OR Operatorship is negotiable. Time of transfer of operatorship to ONGC/OIL during development and production phase is also negotiable. OR NA

	Pre NELP Discovered Fields (Small or Medium or Discovered)	NELP (1999 till date)
	Signature/production bonuses payable by companies to ONGC and OIL OR Signature/production bonuses payable by coventures	No signature, discovery or production bonus
	All statutory levies including royalty, cess, customs duties, etc. payable by Contractor OR All statutory levies, including royalty, cess , customs duties, sales tax etc. payable by Coventure	Royalty : Crude Oil: Onshore-12.5%; Offshore-10% ; Deepwater-5% Natural Gas: Onshore 10%; Offshore-10%; Deepwater-5% ad valorem applicable to all companies No custom duty on imports for Petroleum Operations Income Tax holiday of 7 years for Mineral Oil
	ONGC/OIL would have no participating or carried interest in the Contract. NOCs not allowed to bid. OR ONGC/OIL will have upto 40 % Participating Interest OR ONGC/OIL will have upto 40 % Participating Interest in medium size fields ONGC/OIL would have no participating or carried interest in the Contracts of small fields. NOCs not allowed to bid for small size fields.	No State participation or any carried interest, NOCs to compete for acreage with Private
	First right of refusal to Government of India in respect of purchase of crude Oil produced. International market price for Oil produced. OR In case of natural gas, related to international price of fuel Oil for Non-associated gas and determined on a cost plus basis for associated gas OR Domestic market would have the first call on natural gas produced, Arrangements for marketing of gas produced would be negotiable between GoI and the Company. The pricing would be based on internationally accepted principles	International Crude Oil price at arms'-length Gas pricing requires approval of GoI
	Sharing of the profit Oil shall be bid, based on a sliding scale tied to post tax rates of return or multiples of investment recovered and shall be specified in each Contract OR NA OR Sharing of the profit Oil/Gas would have to be indicated in the offer, based on a sliding scale tied to post tax rates of return or multiples of investment recovered as in the Rounds of bidding for exploration blocks	Sharing of Profit Petroleum with Government on biddable pre-tax investment multiple NELP I to VI :Step ladder based system of Investment Multiple for GoI Share NELP VII to IX: Linear based system of Investment Multiple for GoI Share
	Percentage of annual production of crude Oil expected to be allocated for recovery of costs should be indicated in the offer OR Preferential treatment to companies taking up exploration blocks under round the year bidding scheme of the Government of India. OR Flexibility of negotiations: The terms and conditions are indicative and companies can state in their bids the specific assumptions made in respect of these terms. While the Government of India has a flexible approach to these terms, it reserves to itself the right to accept or reject any bid in its sole discretion	No ring fencing of expenditures Tax Incentives for Site Restoration Fund Scheme (SRFS)
		As per Article 7 of PSC

Table 2.8 : Details of Fiscal terms under which blocks were offered under various Pre-NELP Exploration rounds in India

Item	Round,1991	Round,1993	Round,1993
Bonus	No signature or production bonus	No signature or production bonus	No signature or production bonus
Royalty	No royalty payment	No royalty payment. No custom duty	No royalty payment
GOI interest	GoI or its nominee will have carried interest of 30% from the date of signing of contract, with the option to convert it into a working interest after the decision to proceed with the development and production of discovered hydrocarbons has been taken. GoI or its nominee may also acquire 10% working interest in any block it chooses at the time of signing of contract, thereby sharing 10% of exploration cost	GoI or its nominee will have carried interest of 30% from the date of signing of contract, with the option to convert it into a working interest after the decision to proceed with the development and production of discovered hydrocarbons has been taken. GoI or its nominee may also acquire 10% working interest in any block it chooses at the time of signing of contract, thereby sharing 10% of exploration cost	GoI or its nominee will have carried interest of 30% from the date of signing of contract, with the option to convert it into a working interest after the decision to proceed with the development and production of discovered hydrocarbons has been taken. GoI or its nominee may also acquire 10% working interest in any block it chooses at the time of signing of contract, thereby sharing 10% of exploration cost
Pricing of crude Oil and natural gas	International market price for Oil produced. The pricing formula for associated gas would be on a cost plus basis, while for non-associated gas it would be related to the international price of fuel Oil, the exact relationship being negotiable. The price payable for both associated and non-associated gas would not exceed the price paid to the producer National Oil Companies (exclusive of cess, taxes and royalty)	International market price for Oil produced. The pricing formula for associated gas would be on a cost plus basis, while for non-associated gas it would be related to the international price of fuel Oil, the exact relationship being negotiable. The price payable for both associated and non-associated gas would not exceed the price paid to the producer National Oil Companies (exclusive of cess, taxes and royalty)	International market price for Oil produced. The pricing formula for gas would be on internationally accepted principles. Arrangement for marketing of the gas produced would be negotiable between the GoI and the Company
Sharing of profit	Profit Oil shall be bid based on sliding scale tied to post tax rates of return or multiples of investment recovered	Profit Oil shall be bid based on sliding scale tied to post tax rates of return or multiples of investment recovered	Profit Oil and profit gas share based on sliding scale tied to post tax rates of return or multiples of investment recovered
Minimum expenditure	No minimum expenditure commitment No ring fencing of blocks for corporate tax purposes	No minimum expenditure commitment No ring fencing of blocks for corporate tax purposes	No minimum expenditure commitment during the Exploration period No ring fencing of blocks for corporate tax purposes
Operatorship	NA	Company will be operator for Exploration and Appraisal period. Time of transfer of operatorship to GoI or its nominee during development and production phase is negotiable	Company will be operator for Exploration & Appraisal period. Time of transfer of operatorship to GoI or its nominee during development and production phase is negotiable

	Round,1994	Round,1994	JV Exploration Program,1995
	No signature or production bonus	No signature or production bonus	No signature or production bonus
	No royalty payment	No royalty payment	No royalty payment/cess payment
	GoI or its nominee will have carried interest of 30% from the date of signing of contract, with the option to convert it into a working interest after the decision to proceed with the development and production of discovered hydrocarbons has been taken. GoI or its nominee may also acquire 10% working interest in any block it chooses at the time of signing of contract, thereby sharing 10% of exploration cost	GoI or its nominee will have carried interest of 30% from the date of signing of contract, with the option to convert it into a working interest after the decision to proceed with the development and production of discovered hydrocarbons has been taken. GoI or its nominee may also acquire 10% working interest in any block it chooses at the time of signing of contract, thereby sharing 10% of exploration cost	ONGC or OIL will have a participating interest of between 25% to 40% in the JV from the date of signing of contract, thereby sharing the exploration cost in proportion to their participating interest
	International market price for Oil produced. The pricing formula for gas would be on internationally accepted principles. Arrangement for marketing of the gas produced would be negotiable between the GoI and the Company	International market price for Oil produced. The pricing formula for gas would be on internationally accepted principles. Arrangement for marketing of the gas produced would be negotiable between the GoI and the Company	International market price for Oil produced. The JV will have freedom to make arrangements for marketing the gas
	Profit Oil and profit gas share based on sliding scale tied to post tax rates of return or multiples of investment recovered	Profit Oil and profit gas share based on sliding scale tied to post tax rates of return or multiples of investment recovered	Sharing of Profit petroleum based on sliding scale tied to post tax rates of return or multiples of investment recovered
	No minimum expenditure commitment during the exploration period No ring fencing of blocks for corporate tax purposes	No minimum expenditure commitment during the exploration period No ring fencing of blocks for corporate tax purposes	No minimum expenditure commitment during the exploration period No ring fencing of blocks for corporate tax purposes
	Company will be operator for exploration and appraisal period. Time of transfer of operatorship to GoI or its nominee during development and production phase is negotiable	Company will be operator for exploration and appraisal period. Time of transfer of operatorship to GoI or its nominee during development and production phase is negotiable	Operatorship is negotiable Time of transfer of operatorship to ONGC/OIL during development and production phase is also negotiable

Table 2.9 : Details of Fiscal terms under which blocks were offered under various Pre-NELP Field rounds in India

Item	Small fields,1992
Bonus	Signature/production bonuses payable by companies to ONGC and OIL
Royalty	All statutory levies including royalty, cess, customs duties, etc. payable by Contractor
GOI interest	ONGC/OIL would have no participating or carried interest in the Contract. NOCs not allowed to bid.
Pricing of crude Oil and natural gas	First right of refusal to Government of India in respect of purchase of crude Oil produced. International market price for Oil produced.
Sharing of profit	Sharing of the profit oil shall be bid, based on a sliding scale tied to post tax rates of return or multiples of investment recovered and shall be specified in each Contract
Minimum expenditure	Percentage of annual production of Crude Oil expected to be allocated for recovery of costs should be indicated in the offer

	Medium fields,1992	Discovered fields,1993
	Signature/production bonuses payable by coventures	Signature/production bonuses payable by coventures
	All statutory levies, including royalty, cess , customs duties, sales tax etc. payable by Coventure	All statutory levies, including royalty, cess, customs duties, etc.payable
	ONGC/OIL will have upto 40% Participating Interest	ONGC/OIL will have upto 40 % Participating Interest in medium size fields ONGC/OIL would have no participating or carried interest in the Contracts of small fields. NOCs not allowed to bid for small size fields.
	First right of refusal to Government of India in respect of purchase of Crude Oil & Natural Gas Produced International market price for Oil produced and in case of natural gas, related to international price of fuel oil for Non-associated gas and determined on a cost plus basis for associated gas	First right of refusal to Government of India in respect of purchase of Crude Oil produced. International market price for Oil purchased by GoI Domestic market would have the first call on natural gas produced; arrangements for marketing of gas produces would be negotiable between GoI and Company. The pricing would be based on internationally accepted principles
	NA	Sharing of the profit oil/gas would have to be indicated in the offer, based on a sliding scale tied to post tax rates of return or multiples of investment recovered as in the rounds of bidding for exploration blocks
	Preferential treatment to companies taking up exploration blocks under round the year bidding scheme of the Government of India.	Flexibility of negotiations: The terms and conditions are indicative and companies can state in their bids the specific assumptions made in respect of these terms. While the Govt. of India has a flexible approach to these terms, it reserves to itself the right to accept or reject any bid on its sole discretion

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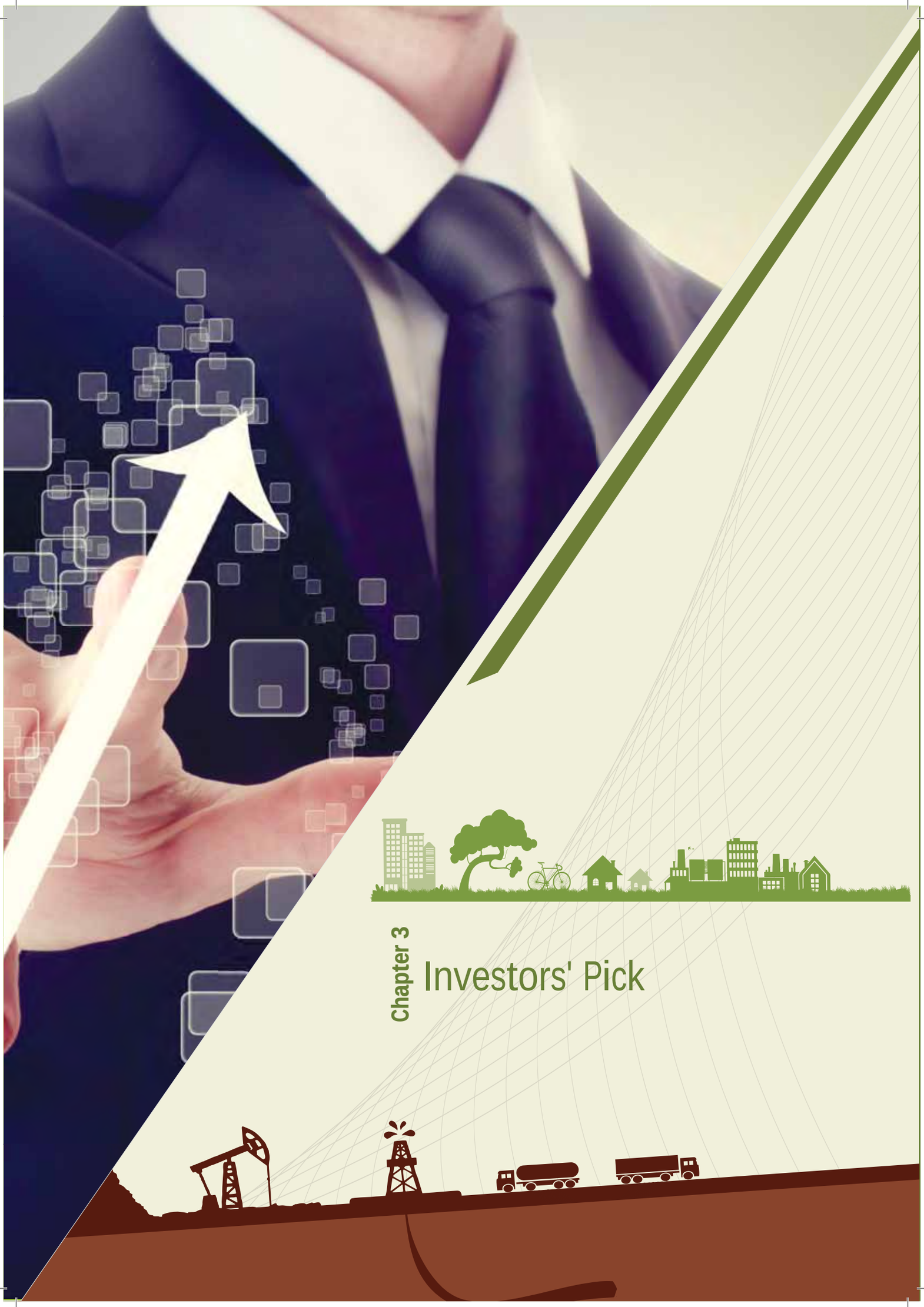
Table 2.10 : Progressive modifications of terms & conditions in different NELP rounds

Item	NELP-I to V	NELP-VI
Categorization of blocks	▸ Blocks categorized as Deepwater blocks, shallow offshore blocks and onland blocks. ▸ No sub-categorization of blocks.	▸ Each category is sub categorized as Type A and Type B.
Exploration phases	Three exploration phases	Two exploration phases
Work Program	No mandatory work program	Mandatory work specified in the NIO for some of the blocks.
Bid Evaluation Criteria	1. Technical capability 2. Financial capability 3. Work Program 4. Fiscal Package	1. Technical capability 2. Work Program 3.Fiscal Package
Investment Multiple and GoI share	Stair-step based system of Investment Multiple for GoI Share	Stair-step based system of Investment Multiple for GoI Share
Part Relinquishment	Part area relinquishment, after phase –I and after phase-II	Part area relinquishment, after phase–I
Liquidated Damages	No Liquidated Damages (LD) specified. Penalties for unfinished work program computed case-to-case basis.	No Liquidated Damages (LD) specified. Penalties for unfinished work program computed case-to-case basis.
Bank Guarantee	Bank Guarantee @ 35% of Annual work program.	Bank Guarantee @ 35% of Annual work program.
Bid Bond	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.

NELP-VII	NELP-VIII & IX
▸ 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.	▸ Type A & B classification among onland, shallow water and deepwater blocks removed. ▸ Category Type S continued.
Two exploration phases	Two exploration phases
Mandatory work specified in the NIO for some of the blocks.	Mandatory work specified in the NIO for some of the blocks.
1. Technical capability 2. Work Program 3. Fiscal Package	1. Technical capability 2. Work Program 3. Fiscal Package
Linear based system of Investment Multiple for GoI Share	Linear based system of Investment Multiple for GoI Share
Part area relinquishment, after phase–I	No part area relinquishment after phase-I
No Liquidated Damages (LD) specified. Penalties for unfinished work program computed case-to-case basis.	Liquidated damages (LD) specified upfront for unfinished work program
Bank Guarantee @ 35% of Annual work program.	One time BG introduced @ 7.5% of total committed work program.
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.



Chapter 3

Investors' Pick

3
INVESTORS' PICK

To increase domestic production of Oil & Gas, Government of India has rolled out number of new initiatives and policy reforms. Last year has seen implementation of some of such policy reformation decisions, while many other are under consideration. To instill confidence among investors and to ensure that work which was stuck in a number of blocks takes off in right earnest and without delay, relaxations have been given in milestones like timelines for submission of commerciality report, field development plan, submission of work program and budgets. All such policy/guidelines being considered or implemented by the Government in the interest of the upstream Oil and Gas sector of the country are listed in the chapter.

3.1. Policy Implementation

3.1.1. New domestic Natural Gas pricing guidelines:

As part of pricing reforms for the Natural Gas sector, the government approved a new pricing scheme to further align domestic prices with international market prices and to raise investment for the sector. The same was notified on 18.10.2014 with a revision cycle of every six months based on the prevailing hub prices of United States, Alberta, United Kingdom and Russia. The price determined under this policy shall be applicable to all sectors uniformly. Further, under this policy government has decided to offer a premium on the gas to be produced from Deepwater areas, Ultra deepwater areas and High Pressure High Temperature (HPHT) areas. The guidelines will boost domestic gas production in coming years by incentivizing gas producers to invest in gas exploration and production in India and improving viability of many gas fields which were otherwise not viable at current low gas prices.

The detailed policy is available in public domain at URL:-http://petroleum.nic.in/docs/NewNaturalGasPricingGuidelines.pdf

3.1.2. Policy Framework for Relaxations, Extensions and Clarifications at the Development and Production stage under PSC regime for early Monetization of Hydrocarbon Discoveries:

The Cabinet Committee of Economic Affairs (CCEA) has approved the proposal regarding relaxations, extensions and clarifications at the Development and Production stage under PSC regime for early Monetization of hydrocarbon discoveries. These reform initiatives will help in monetization of some of the pending discoveries, leading to resolution of various long pending operational issues which are hampering E&P operations and create better climate for investment. The detailed policy is available in public domain at url petroleum.nic.in/docs/gp/ONG-V.pdf

Major achievements of this policy as on 31.03.2015 are as follows:

a. Under this policy thirty (30) long pending issues have been resolved since the commencement of the policy. This has enabled early monetization of Oil and gas discoveries in 2 blocks of GSPC, 2 blocks of ONGC and 1 block of Focus.

b. The decision taken in accordance with policy will further help in drilling appraisal wells after submission of DoC in five blocks of ONGC namely CY-ONN-2004/2, AA-ONN-2001/1, KG-DWN-98/2, MN-DWN-98/3 and MN-OSN-2002/2. This will also help in probing additional reservoir extent and submission of robust field development plan in three blocks.

c. There were 12 blocks where clearances were not accorded in entire block area or in part of block area because of overlapping with special economic zone, reserve forest, naval exercise area, DRDO danger zone, national parks and firing range of Defence. The cases in 11 blocks have been resolved and the case in one block is under consideration.

d. The policy framework has also helped in taking technical decisions based on merits for swapping of 2D seismic work program with 3D seismic work program and vice-versa in five blocks.

3.1.3. Exploration in Mining Lease (ML) areas:

Government of India has formulated a policy to allow exploration in Mining Lease Area with cost recovery subject to establishment of commerciality. This provides a way forward for development of any discoveries arising out of further exploration in the Mining Lease area. Existing discoveries, if any, in the ML area which

could not be developed or monetized earlier for some reasons, would be allowed to be developed provided that commerciality and techno-economic feasibility is established at FDP stage. Under this policy more than 31 discoveries may be monetized in four blocks/fields viz. RJ-ON-90/1, KG-DWN-98/3, RJ-ON/6 and Ravva. The discoveries are under various stages, from submission of Potential Commercial Interest (PCI) to appraisal. The detailed policy is available in public domain at url http://petroleum.nic.in/docs/exp.policy.exploreinmining2015.pdf

3.1.4. Policy guidelines of Exploration and Exploitation of Shale Gas and Oil:

Shale Gas and Oil Policy was announced on 14th Oct 2013 and under this Policy the right to exploration and exploitation of Shale Gas & Oil has been granted to the National Oil Companies (NOCs) holding Petroleum Exploration License (PEL) / Petroleum Mining Lease (PML) granted under the nomination regime. NOCs has identified 55 blocks for Assessment Studies during the Phase-I of three years. Currently, 12 wells have been drilled by ONGC and results are encouraging. Further NOCs will identify 80 blocks under Phase-II of three years and 55 blocks in Phase-III. Each Phase will culminate in a development and production phase depending on the results of the Assessment Phase. ONGC has proposed to carry out Shale Gas and Oil exploration activities in Cambay, Cauvery, Krishna-Godavari and Assam and Arakan Basins and OIL has proposed to carry out Shale Gas and Oil exploration activities in Assam and Rajasthan basins. ONGC has drilled 12 wells and 27 cores have been collected so far and OIL is currently carrying out G&G studies and data collection. The details of policy is available in public domain at url http://petroleum.nic.in/docs/exp/circulars%20&%20notifications3.pdf

3.2 Policy Initiatives

3.2.1. Site Restoration guidelines on petroleum operations:

A need is felt to formulate specific guidelines for field abandonment and site restoration in offshore and onshore fields in conformance with the best international practices/norms, applicable standards / legislations and prevalent regulatory regime. Government of India has constituted a committee for formulation of Site Restoration guidelines for petroleum operations. The committee met four times and shared their learning and experiences with respect to Field abandonment and Site Restoration. An internationally reputed consultant has been hired. The consultant has

DGH Stall at 3rd South Asian Geoscienes Conference & Exhibition - GEO India, January 2015

submitted draft report, which was reviewed by the committee members. These guidelines will establish the transparent policies and procedure for abandonment and decommissioning of petroleum operational activities in India towards the end of field life for Onshore and Offshore petroleum operations. Further, the guidelines will also develop a clear understanding regarding Site Restoration and Field Abandonment between Oil and Gas operators and various Governmental organizations.

3.2.2. Standing Committee on Petroleum Industry Practices:

In India , Oil & Gas exploration and production activities are carried out under Production Sharing Contract. The PSC provides adoption of Good International Petroleum Industry Practices (GIPIP) in carrying out petroleum operations efficiently, safely and in an environmentally safe manner. Though, the term ''Good International Petroleum Industry Practices'' (GIPIP) has been referred in many places in Production Sharing Contracts, the exact scope of the term was unclear. Government of India has constituted Standing Committee on Petroleum Industry Practices, to identify the areas requiring codification of "Good International Petroleum Industry Practices (GIPIP)" and to prepare national codes for petroleum operations. The objective of the work is to provide guidelines for practices that are considered technically reasonable for different aspects of E&P activities. An internationally reputed consultant has been hired. The consultant has submitted the interim reports and comments of the Standing Committee members have been offered to the consultant for suitably modifying the reports. Once the codification is in place, the operators will be aware of scope of GIPIP and Government's expectation from the Operators.

3.2.3. Policy for Extension of Production Sharing Contracts (PSC):

To enable Oil and Gas companies recover the balance reserves from fields after expiry of PSC, Government of India is formulating a policy for grant of extension to Production Sharing Contracts signed by Government for small and medium size discovered fields/blocks with Private / Joint Ventures. The policy will set a clear and transparent process of extension of contracts instead of case to case basis of extension. This will enable Oil and Gas companies in making capital intensive decisions for prolonging Field life. The policy is in advanced stage of finalization.

3.2.4. Uniform Licensing Policy:

Government of India in considering Uniform Licensing Policy (ULP) to facilitate Exploration and Exploitation of both Conventional and Unconventional hydrocarbon resources together, in an awarded block.

3.2.5. Marginal Field Policy:

The Exploration and Exploitation of Hydrocarbons is a keystone for India in achieving energy security. To reduce the import dependency, it is pertinent to effectively exploit the established reserves and increase the indigenous production. It was observed that many discoveries made in Nomination blocks are not monetized and such discoveries are categorized as Marginal fields. Offer of such fields is under consideration of Government of India through Marginal Field Policy through International Competitive Bidding. It is expected that this policy would help in monetization of more than 85 MMT (O+OEG) reserves. Further, it will boost production and provide increased revenue to both Government and Contractor. The policy is in advanced stage of finalization.

3.2.6. Open Acreage Licening Policy (OALP)

Setting up of National Data Repository is one of the milestones achieved for Open Acreage Licensing Policy. To make India a favorable destination globally for Exploration of Crude Oil and Natural Gas, the Government plans to move to the OALP regime soon. This will enable upstream companies to bid for any Oil and Gas block without waiting for the announcement of bidding as currently under the NELP regime.

3.3. Other Initiatives

3.3.1. Re-Assesment of Prognosticated Hydrocarbon Resources

The Hydrocarbon Resource assessment for 15 sedimentary basins (combining Category-I, II and III basins) was carried out approx. two decades ago and became overdue at present in light of enormous geo-scientific data acquired during G&G activities in Pre-NELP, NELP & Nomination Blocks. Government of India has rolled out an elaborate plan to re-assess hydrocarbon resources in Indian sedimentary basin. A Multi Organization team has been constituted to implement the project. The report is likely to be completed by March, 2016. The exercise will cover assessment of all the 26 sedimentary basins of India. It will generate

better understanding of Indian sedimentary basins with integration of data and new interpretation techniques. This information will provide greater clarity to future investors in the prospects of the basin.

3.3.2. Encouraging E&P Activites in North East

The first oil in India was found in North East part of India a century ago, beside that the Oil and Gas sector development is not been up to the mark in North Eastern India. A need was felt to identify the reasons for the slow development of Oil and Gas sector. A Consultant has been hired to conduct a specialized study for the same. The study will help in framing a policy for encouraging hydrocarbon E&P activities in the North East India.

3.3.3. Multi Client Geo-Sceintific Surveys:

In order to acquire Geophysical data in poorly explored and unexplored areas, the Government has formulated a new policy for geo-scientific data generation in Indian sedimentary basins. GoI on 27.02.2014 and 20.05.2014 has approved the Data Policy and agreement to carry out Non-exclusive Multi-Client Geo-scientific surveys/ activities relating to hydrocarbon in Offshore and/or Onland part of India. The offer to undertake such studies through non-exclusive Multi-client Business Model is open throughout the year. Seven proposals have been received for generation of approx. 107,386 LKM 2D Seismic data, under this policy. All the seven proposals have received clearances from Ministry of Defense (MoD) and Ministry of Home Affairs (MoHA). DGH has issued provisional letter of consent to all the proposals.

3.3.4. National Data Repository (NDR)

To consolidate and store all the Geoscientific data available in the country and to create a base for Open Acreage Licensing Policy, GoI has taken initiative to build National Data Repository (NDR) for Oil and Gas Industry in India. NDR will be built up, populated and operated in a perpetual manner. Once NDR becomes fully operational, the companies can view geo-scientific data from anywhere in the world and firm up an opinion regarding prospectivity of the blocks prior to bidding for the block. This will enhance the exploration activity in the country. NDR would provide long term storage for future use. In order to ensure that data retains value into the future, Contract for establishment and operationalization of NDR was awarded to M/s. Halliburton Offshore Services Inc. on 28.02.2014. Site preparation work for NDR project at 5th and 6th floor of DGH office, Noida and commissioning of hardware and integration of software at the site has been completed. User Accepting Test (UAT) is successfully completed. Initial population of data is in progress and the priority data pertaining to reassessment of 26 sedimentary basins is being loaded.

DGH Stall at Biennial Investors' Summit - Vibrant Gujarat, January 2015

Chapter 4

E&P Activities : 2014-15

4
E&P Activities : 2014-15

For enhancing Crude Oil & Natural Gas supply in the country, hydrocarbon potential in Indian sedimentary basins needs to be intensively explored. National Oil Companies, viz, ONGC and OIL are carrying out hydrocarbon exploration and production (E&P) activities in the country since inception. Consequent upon liberalization in petroleum sector in 1990s, the participation of foreign and private Indian companies in the exploration and development activities have supplemented the efforts of NOCs. The pace of exploration for oil and gas has increased after the introduction of NELP regime.

The companies operating in various Oil and Gas blocks under Production Sharing Contract (PSC) regime has to undertake Minimum Work Program (MWP).

MWP comprises exploration surveys like 2D, 3D seismic, Gravity, Magnetic, Geo-chemical surveys and Seismic processing & interpretation, etc. along with drilling of exploratory wells. Brief summary of Exploration activities (data – 2D, 3D, Exploratory wells drilled, Exploratory meterage drilled) carried out in FY 2014-15 by NOCs (in Nomination as well as in PSC regime), Private and Foreign companies under PSC regime is provided in Table 4.1.

4.1. Exploration Activities in PSC Regime :

PSUs in E&P sector have carried out 259 line kilometer (LKM) of 2D seismic survey, 2546 Square Kilometer (SKM) of 3D seismic survey and drilled 29 exploratory wells in FY 2014-15. Indian Private Companies have carried out 5236 Line Kilometer (LKM) of 2D seismic survey and 2184 Sq. Km of 3D seismic survey and drilled 61 Exploratory wells in FY 2014-15.

The Company wise exploratory inputs for FY 2014-15 is provided in Table 4.2.

Table 4.1 Exploratory efforts in Nomination & PSC regime in FY 2014-15

Sl. No.	Subject	Parameter	ONGC* (Nomination)	OIL* (Nomination)	Pvt/JVs	Total
1	2D seismic data acquired	Onland (GLKM)	463.98	175.80	609.00	1,248.78
		Offshore (GLKM)	0.00	0.00	4,886.00	4,886.00
Total 2D Seismic			**463.98**	**175.80**	**5,495.00**	**6,134.78**
2	3D seismic data acquired	Onland (SKM)	859.33	1.13	1,538.00	2,398.46
		Offshore (SKM)	7,755.71	0.00	3,193.00	10,948.71
Total 3D Seismic			**8,615.04**	**1.13**	**4,731.00**	**13,347.17**
3	Exploratory wells drilled	Onland	45.00	12.00	70.00	127.00
		Offshore	30	0	20	50.
Total Exploratory wells			**75.00**	**12.00**	**90.00**	**177.00**
4	Exploratory meterage drilled	Onland ('000 M)	109.02	47,631.00	156.41	47,896.43
		Offshore ('000 M)	74.43	0.00	67.06	141.49
Total Exploratory meterage drilled			**183.45**	**47,631.00**	**224.22**	**48,037.92**

*As per inputs received from ONGC and Oil & PVT/JV Cos.

Table 4.2 : Exploratory efforts by Companies in FY 2014-15 under PSC regime:

Operator	2D (LKM)	3D (SKM)	Expl. Wells
India Private			
Cairn India Ltd.	2128	1995	48
Focus Energy Ltd.	2758	106	6
Mercator Petroleum Private Limited.	0	0	2
Omkar Natural Resources Pvt. Ltd.	350	83	0
Reliance Industries Ltd.	0	0	2
Selan Expl. Tech. Ltd.	0	0	3
Sintex Oil & Gas Pvt. Ltd.	0	0	0
India Private Total	**5236**	**2184**	**61**
PSU			
Bharat Petro Resources Ltd.	10	90.55	0
Indian Oil Corporation Ltd.	0	0	4
National Thermal Power Corporation	0	0	2
Oil and Natural Gas Corporation Ltd.	185.1	2047.24	21
Oil India Ltd.	64.2	408.64	2
PSU Total	**259.3**	**2546.43**	**29**
Grand Total	**5495.3**	**4730.43**	**90**

4.2. Oil and Gas Discoveries in 2014-15

Table 4.3 : 15 Discoveries in Nomination Blocks by ONGC in FY 2014-15

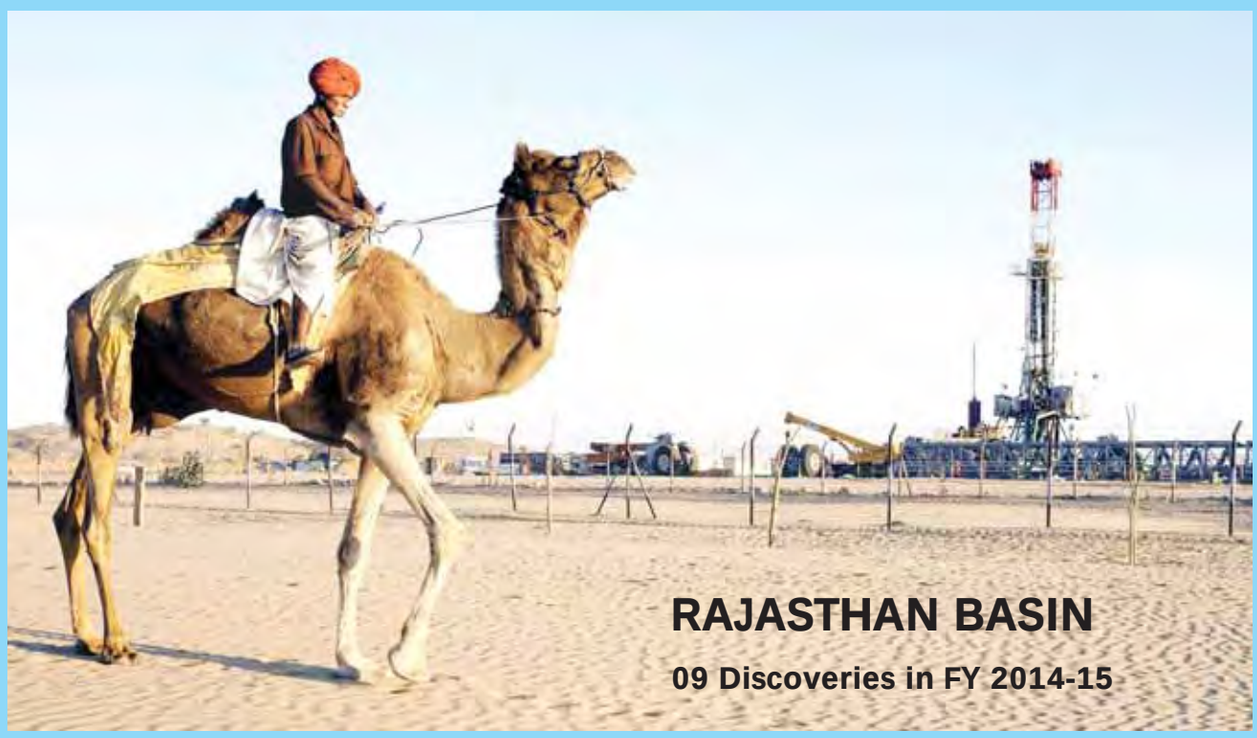
S. No.	Name of ML/(PEL)	Date of Notification	Well Name (Drilled depth)	Oil/Gas	
1	Yanam	19.05.2014	YSAB SHIFT /YS-9-1(2800m)	Gas	
2	North Tapti	27.05.2014	C-1-7 / (C-1-H) (2030m)	Oil & Gas	
3	North Tapti	27.05.2014	C-1-8 / (C-1-F) (1630m)	Oil & Gas	
4	Gandhar Extn. VI	25.06.2014	GGAG/ Gandhar (699m)	Oil & Gas	
5	GS-29 Extn.	25.07.2014	GS-29-10 (AJ) (2712m)	Oil & Gas	
6	Sector V-C (PEL)	17.09.2014	TK-3A (1020m)	Gas	
7	BOFF	26.11.2014	WO-5-11 (2265m)	Oil & Gas	
8	Rudrasagar	04.12.2014	R-184 (RSAK) (3601m)	Oil	
9	KG-OS-DW-III (PEL)	10.12.2014	GD-11-1 (AA) (2810m)	Gas	
10	Damoh-Jabera-Katni (PEL)	26.12.2014	RDMD/Damoh-4 (1650m)	Gas	
11	Vasishta	05.02.2015	G-1-NE-1 (2790m)	Oil & Gas	
12	Vasishta	11.02.2015	G-1-NE-2 (2790m)	Oil & Gas	
13	Tatipaka-Pasarlapudi	05.03.2015	South Pasarlapudi-1 (3320m)	Oil & Gas	
14	Nambar	20.03.2015	KH-35 (KHAS) (3238-m MD, 3202-m-TVD)	Oil & Gas	
15	Nambar	27.03.2015	KH-37 (KHBA) (2529m MD 2188m-TVD)	Oil & Gas	

Table 4.4 : 11 Discoveries in Nomination Blocks By OIL in FY 2014-15

S.No.	Name of ML	Date of Notification	Well Name (Drilled depth)	Oil/Gas	
1	Mechaki Extn.	22.05.2014	Mechaki-3 (Loc. MKA) (5636m)	Oil	
2	Hugrijan	12.06.2014	NHK-466 (4561m)	Oil	
3	Hugrijan	12.06.2014	NHK-405 (3592m)	Gas	
4	Nahorkatiya Extn.	12.06.2014	NHK-614 (3233m)	Oil	
5	Chabua	18.07.2014	Nadua-1 (3693m)	Oil	
6	Borhat	29.09.2014	Balimara-2 (4408m)	Oil	
7	Tinsukia	17.11.2014	Rangmala-1 (3930m)	Gas	
8	Nahorkatiya Extension	24.11.2014	NHK-616 (3005m)	Oil	
9	Hugrijan	26.11.2014	Hapjan-28 (4550m)	Gas	
10	Dumduma	26.11.2014	Barekuri-2 (4070m)	Gas	
11	Hugrijan	17.12.2014	Hapjan-24 (2892m)	Oil	

	Rate	Zone, Formation & Age
	32/64" bean, Gas: 3,00,694 SCMD	Obj-I 1701-1707m, Formation: Rawa, Age: Miocene
	5/8" Choke, Oil: 1,634 BOPD and Gas: 17918 SCMD ½" Choke, Gas 169,553 SCMD	Obj-I: 995-96, 985-87, 978.5-80, 972-75 and 961-962.5m Obj-II: 909-19, 891-902 and 852-861m Formation: Mahuva, Age: Lr. Oligocene
	Obj-I: ½" Choke, Oil: 1105 BOPD and Gas: 101203 SCMD Obj-II: ½" Choke, Oil: 82 BOPD and Gas: 75903 SCMD Obj-III: ½" Choke, Gas: 2804 SCMD	Obj-I: 1100.5-1102.0m Obj-II: 1059.0-1061.5m & 1052.5-1054m Obj-III: 1006.0-1009.5m Formation: Mahuva, Age: Lr. Oligocene
	Obj-I 6mm bean, Oil: 38 SCMD Gas: 20069 SCMD	Obj-I: 2580-2577.5m, Age: Middle Eocene
	32/64" bean, Oil: 2479 BOPD and Gas: 61267 SCMD	Obj-I: 2397-2402m, Formation: Godavari, Age: Pliocene
	6mm bean, Gas: 13,000 SCMD	Obj-I: 968.0-972.0m, Formation: Upper Bhuban
	1/2" Choke, Oil: 1539 BOPD, 3/8" ChokeGas: 5781 SCMD	Obj-I: 2208m – 2215.0m, Formation: Panna, Age: Paleocene
	6mm bean, Oil: 47.8 SCMD	Obj-II: 3294-3291.5m, Age: Oligocene
	32/64" Choke, Gas: 648,152 SCMD	Obj-II: 2557-2575m, Formation: Godavari, Age: Pliocene
	4mm bean, Gas: 443 SCMD	Obj-I: 1550.4-1544m, Age: Meso-Neo Proterozoic
	24/64" bean, Oil: 1683 BOPD, Gas: 33298 SCMD	Obj-I: 2331-2349m, Age: Pliocene
	24/64" bean, Oil: 304 BOPD, Gas: 232279.69 SCMD	Obj-I: 2344-2362m, Age: Pliocene
	Obj-I: 7mm bean, Oil: 9.45 SCMD Gas: 37422 SCMD Obj –III: 7mm bean, Oil: 13.08 SCMD Gas: 156885 SCMD	Obj-I: 2694-2697m, Age: Eocene Obj-III: 2621-2618m, Age: Eocene
	4mm bean, Oil: 9 SCMD, Gas: 32000 SCMD	Obj-VI: 2412.5-2410.5m, Formation: Middle Bokabil, Age: Miocene
	5mm bean, Gas: 13963 SCMD	Obj-V: 2230.5-2228.5m, Formation: Kopili, Age: Up. Eocene

	Rate	Zone & Age
	Oil: @ 1-2 KLPD	Obj: 5410.0-5416.0, Formation: Narpuh
	12mm bean, Oil: @18 KLPD	Obj: 3802.-3808, Formation: Kopili, Age: Eocene
	6/7mm bean, Gas: @ 45000 SCMD	Obj: 2877.5-79.5 & 2880.5-2883m, Formation: Lower Tipam
	Oil: 8 KLPD + 1 klpd water	Obj: 2873-76 & 2865-71m, Formation: Middle Tipam
	4.5mm bean, Oil: @ 48 KLPD	Obj: 3634.0-35m, Formation: Lk+Th, Age: Eocene
	12mm bean, Oil: @ 8 KLPD	Obj: 4224.0-4265.0m, Formation: Tipam
	Gas: @ 17500 SCMD	Obj: 3787-3797m, Formation: Lk+Th, Age: Eocene
	Produced Oil during testing. Oil: 92.8%	Obj: 2577-98.8m
	6mm bean, Gas: 28000 SCMD	Obj: 4323.5-31m, Formation: Lk+Th, Age: Eocene
	5mm bean, Gas: 1,00,000 SCMD	Obj: 3789.5-96.0m, Formation: Narpuh
	Oil: @12 KLPD	Obj: 2712.5-16.5 & 2713-17m, Formation: Barail (extra sand)

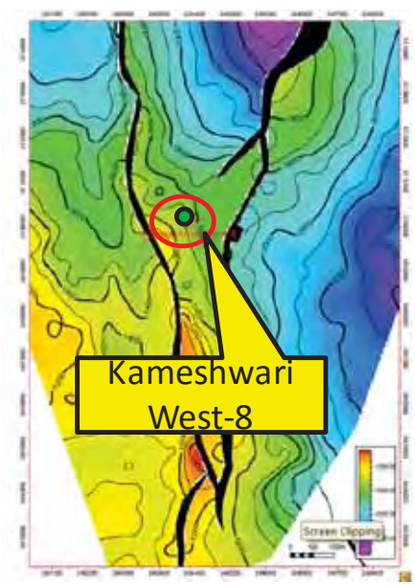


RAJASTHAN BASIN

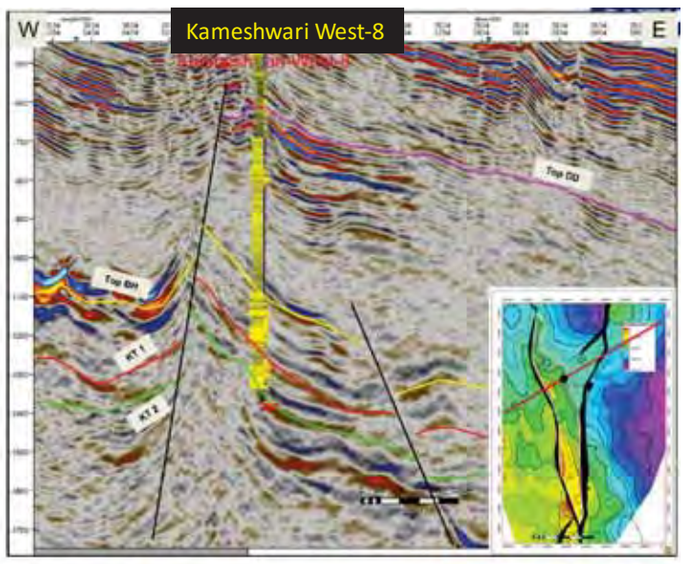
09 Discoveries in FY 2014-15

KW-8 (RJ-ON-90/1) **OPERATOR: CAIRN**

Structure/ Location name & Well Name	Testing Result	Leads/ Expl. Efficacy
Garal East & Kameshwari West-8	KT Sandstones Comingled Production Obj.-1 : Interval 1650.0-1656.0 m MD;KT-1 Formation of Cretaceous-Tertiary age. Obj.-2 : Interval 1798.8-1804.8 m MD;KT-2 Formation of Cretaceous-Tertiary age. Flow rate: 117 BOPD Oil (28/64")	1st time Hydrocarbon discovery in Cretaceous KT formation, which lead to open an area for hydrocarbon exploration towards southern side of fault closure.



Depth Contour Map KT-1 Sand



Seismic Section Along Well KW-8

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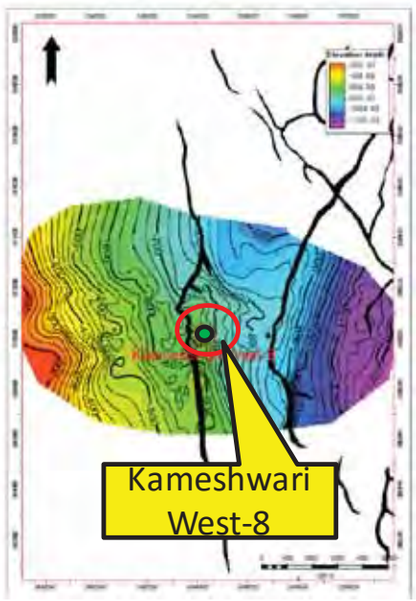
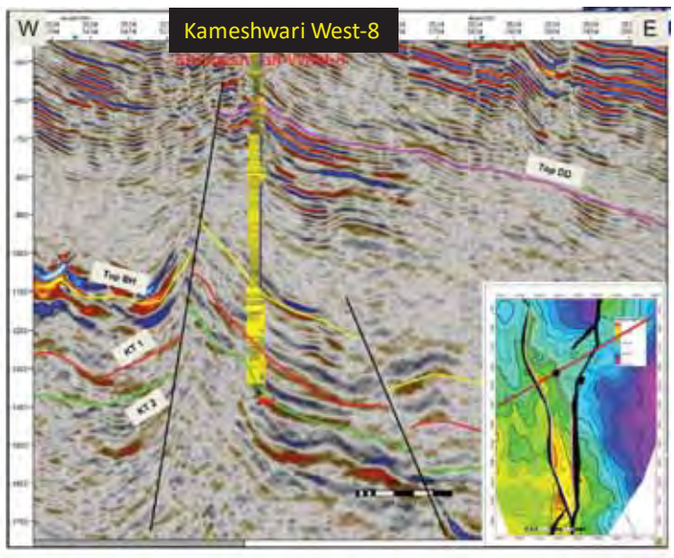
KW-8 (RJ-ON-90/1) **OPERATOR: CAIRN**

Structure/ Location & Well No.	Testing Results	Leads/ Expl. Efficacy
Garal East & Kameshwari West-8	DD-1 & DD-2 Commingled Production Obj.-3 : Interval 762.1-66.1 m MD DD-1 Formation of Eocene age. Obj.-4 : Interval 792.2-796.2 m MD DD-2 Formation Flow rate: 46 BOPD Oil (12/64") of Eocene age.	Oil has been discovered and tested for the first time in Dharvi Dungar sands of Eocene age within Raageshwari-Tukaram area, where previous discoveries were in the shallower Thumbli sands.



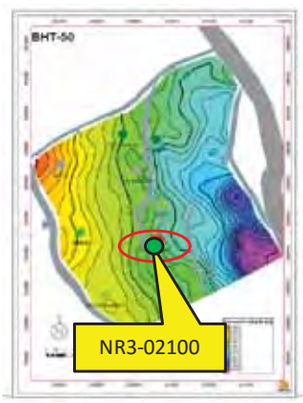
Depth Contour Map DD Sand



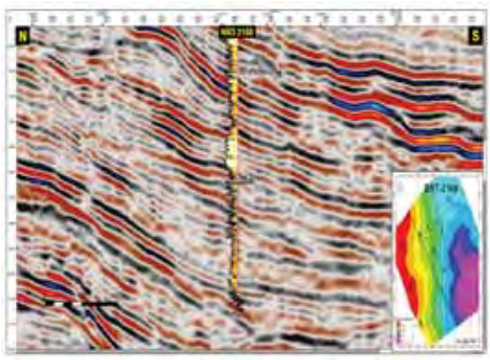
Seismic Section Along Well KW-8

NR3-2100 (RJ-ON-90/1) **OPERATOR: CAIRN**

Structure/ Location & Well No.	Testing Results	Leads/ Expl. Efficacy
Madpura Barwala SE & NR3-2100	Obj.-1 : Interval 2584.0-2821.0 m BHT-40 of Barmer Hill Formation of Paleoeocene age. Flow rate: 10-51 BOPD Oil (12/64") Obj.-2 : Interval 2965.0-3029.0 m MD BHT-50 of Barmer Hill Formation of Paleoeocene age. Flow rate: 11.6 BOPD Oil (10/64")	



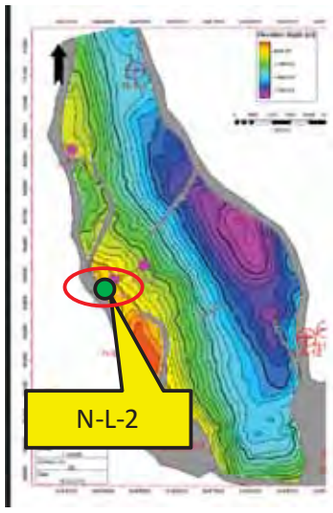
Structure Contour Map BHT-50



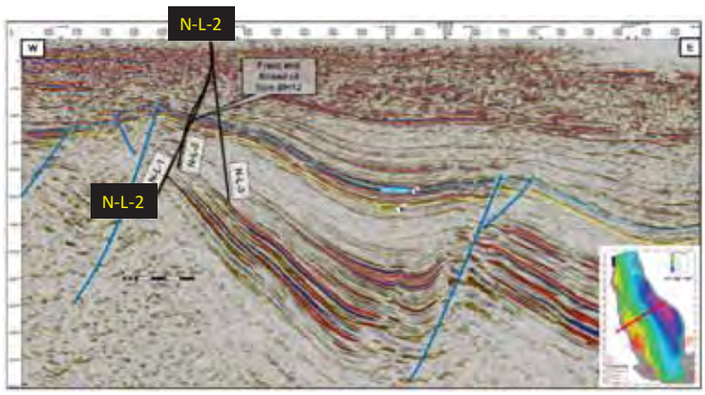
Seismic Section Along Well NR3-2100

N-L-2 (RJ-ON-90/1) **OPERATOR: CAIRN**

Structure/ Location & Well No.	Testing Results	Leads/ Expl. Efficacy
N-L-B & N-L-2	Obj.-1 : Interval 1106.5-1111.5 m MD BH-12 Porcellanite of Barmer Hill Formation of Paleoeocene age Flow rate: 62-250 BOPD Oil (10/64") Obj.-2 : Interval 1125.5-1130.5 m MD BH-10 Barmer Hill Formation of Paleoeocene age. Flow rate: 30 BOPD Oil (10/64")	Hydrocarbon discovery in Barmer Hill formation of Paleocene age.



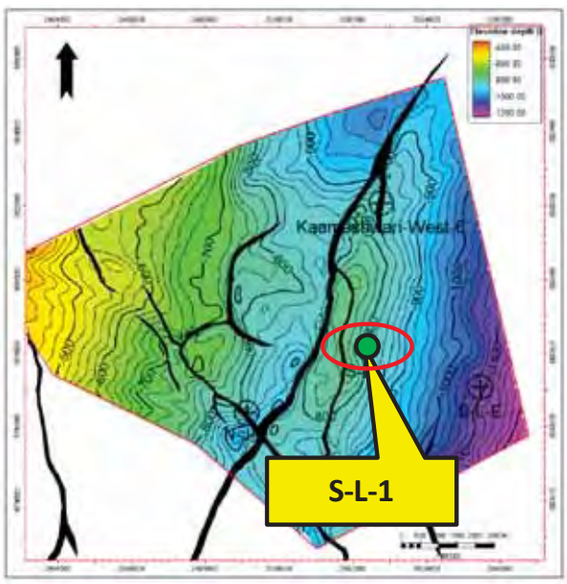
Depth Contour Map Barmer Hill



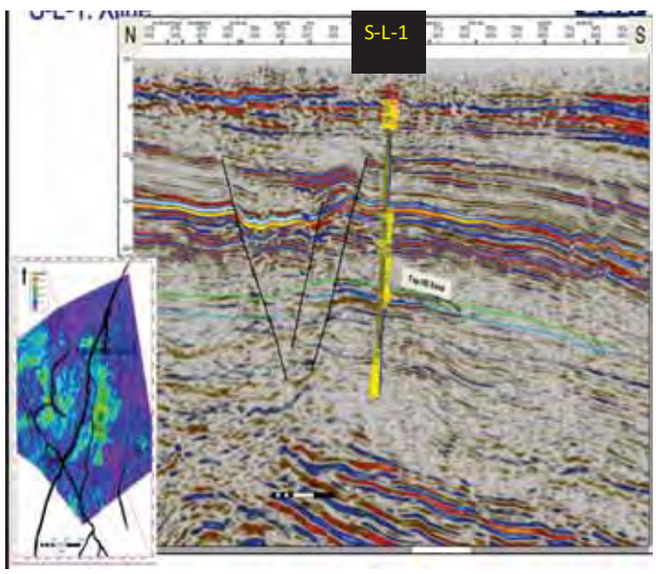
Seismic Section Along Well NL-2

S-L-1 (RJ-ON-90/1) **OPERATOR: CAIRN**

Structure/ Location & Well No.	Testing Results	Leads/ Expl. Efficacy
Gangasar NW & S-L-1	Obj.-1 : Interval 982.0-987.0 m MD DD-3 Dharvi Dungar Formation of Eocene age. Flow rate: 10-117.5 BOPD Oil (28/64")	Hydrocarbon discovery in Dharvi Dungar formation of Eocene age.



Depth Contour Map DD Formation



Seismic Section Along Well S-L-1

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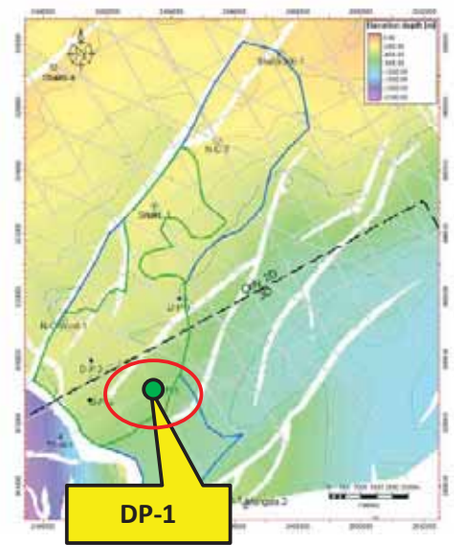
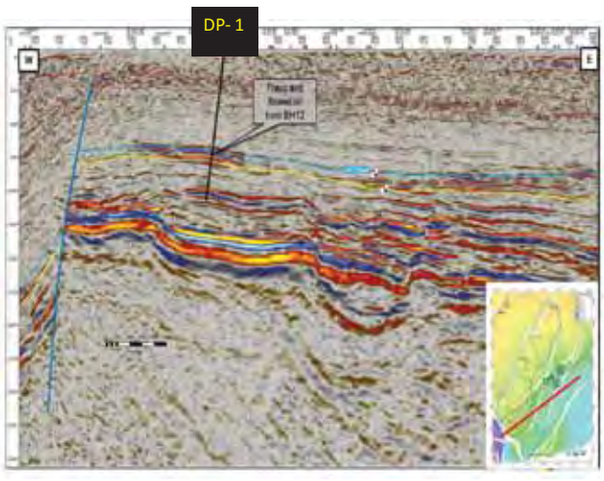
DP-1 (RJ-ON-90/1) **OPERATOR: CAIRN**

Structure/ Location & Well No.	Testing Results	Leads/ Expl. Efficacy
DP-1	Obj.-1 : Interval 952.8-958.8, 933.0-936.0 and 943.0-946.0 m MD BH-12 Porcellanite of Barmer Hill Formation of Paleocene age. Flow rate: 315.8 BOPD Oil (28/64")	Hydrocarbon discovery in Barmer Hill formation of Paleocene age.



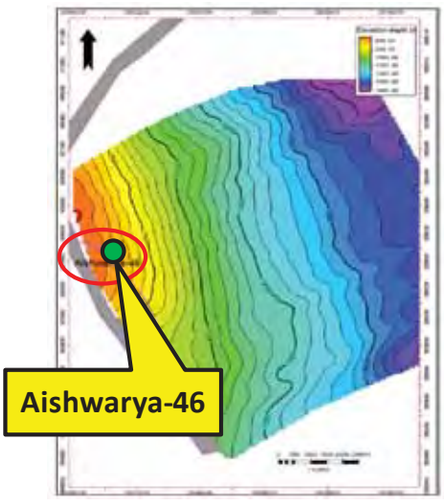
Structure Contour Map BH-12 Lower



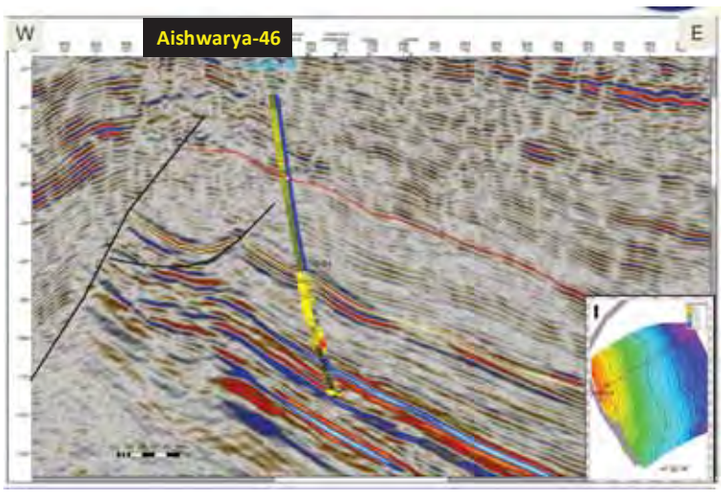
Seismic Section Along Well DP-1

Aish-046-03-105 (RJ-ON-90/1) **OPERATOR: CAIRN**

Structure/ Location & Well No.	Testing Results	Leads / Expl. Efficacy
Aish-046-03-105 & Aishwarya-46	Obj.-1 : Interval 816.4-819.4 m MD of Dharvi Dungar Formation of Eocene age. Flow rate: 182.1 BOPD Oil (16/64")	The well Aish-046-03-105 was drilled as a development well (water injector) for Fategarh zone. However, Dharvi Dungar sand was found HC bearing. The well has been completed as injector well in Fatehgarh.This well represents the first Dharvi Dungar Oil discovery in the northern part of Barmer basin, closer to several other discoveries and key infrastructure.



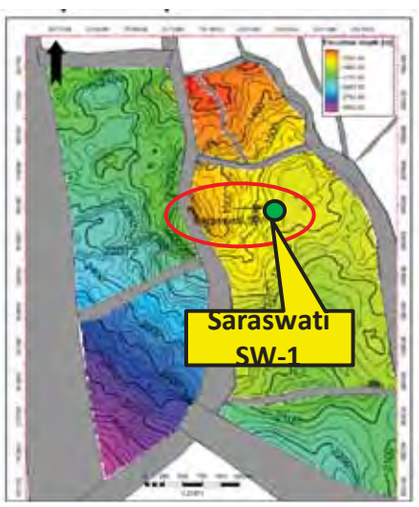
Depth Contour Map DD Sand



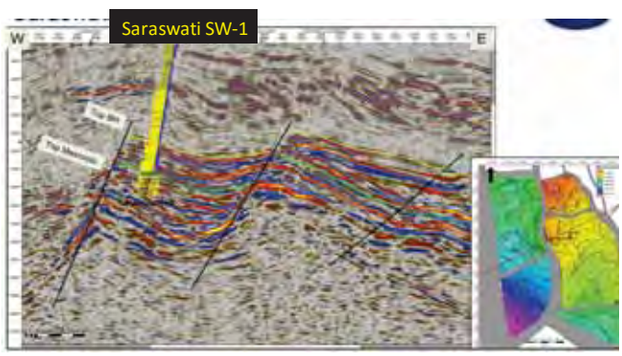
Seismic Section Along Well Aish-046-03-105

Saraswati SW-1 (RJ-ON-90/1) **OPERATOR: CAIRN**

Structure/ Location & Well No.	Testing Results	Leads / Expl. Efficacy
Koslu-South & Saraswati SW-1	Obj.-1 : Interval 1715.8-1719.8 m MD Mesozoic sand Flow rate: 246.76 BOPD Oil (24/64")	Hydrocarbon discovery in Mesozoic sands, which is located below the Fatehgarh formation from where the Mangala, Bhagyam and Aishwariya fields are Oil bearing.



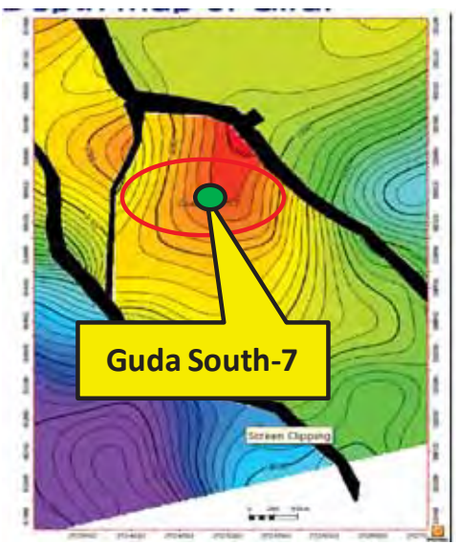
Depth Contour Map Mesozoic Sand

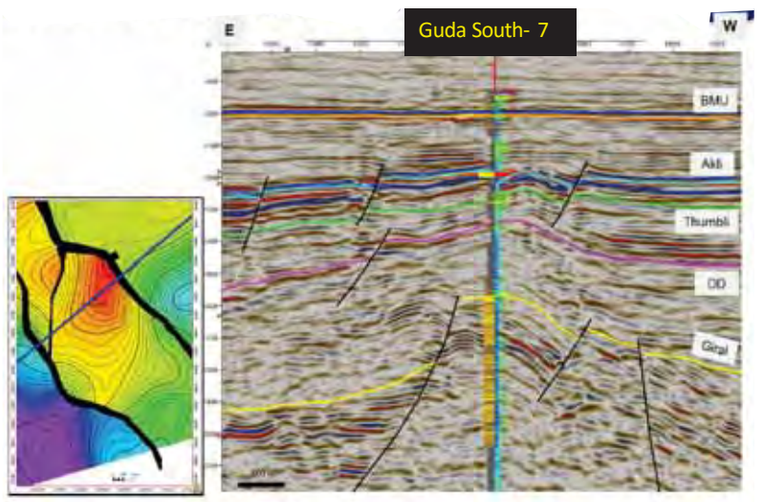


Seismic Section Along Well Saraswati SW-1

Guda South-7 (RJ-ON-90/1) **OPERATOR: CAIRN**

Structure/ Location & Well No.	Testing Results	Leads/ Expl. Efficacy
GRF South-CT & Guda South-7	Obj.-1 : Interval 2463.1-2469.1 m MD Zone DDCS-9 Flow rate: 37 BOPD Oil (20/64"), Obj.-2 : Interval 2230.6-2233.6, 2267.2-2272.4, 2295.9-2298.5 m MD Zone DDCS-3+4+5 Flow rate: 55 BOPD Oil (8/64"), Obj.-3 : Interval 1557.2-1560.0, 1547.8-1550.8 m MD Zone Thumbli 1+2 Flow rate: 50-120 BOPD Oil (14/64") in Dharvi Dungar Formation of Eocene age.	Hydrocarbon discovery in Thumbli formation of Eocene age and Dharvi Dungar Formation of Lower Paleocene –Eocene age.





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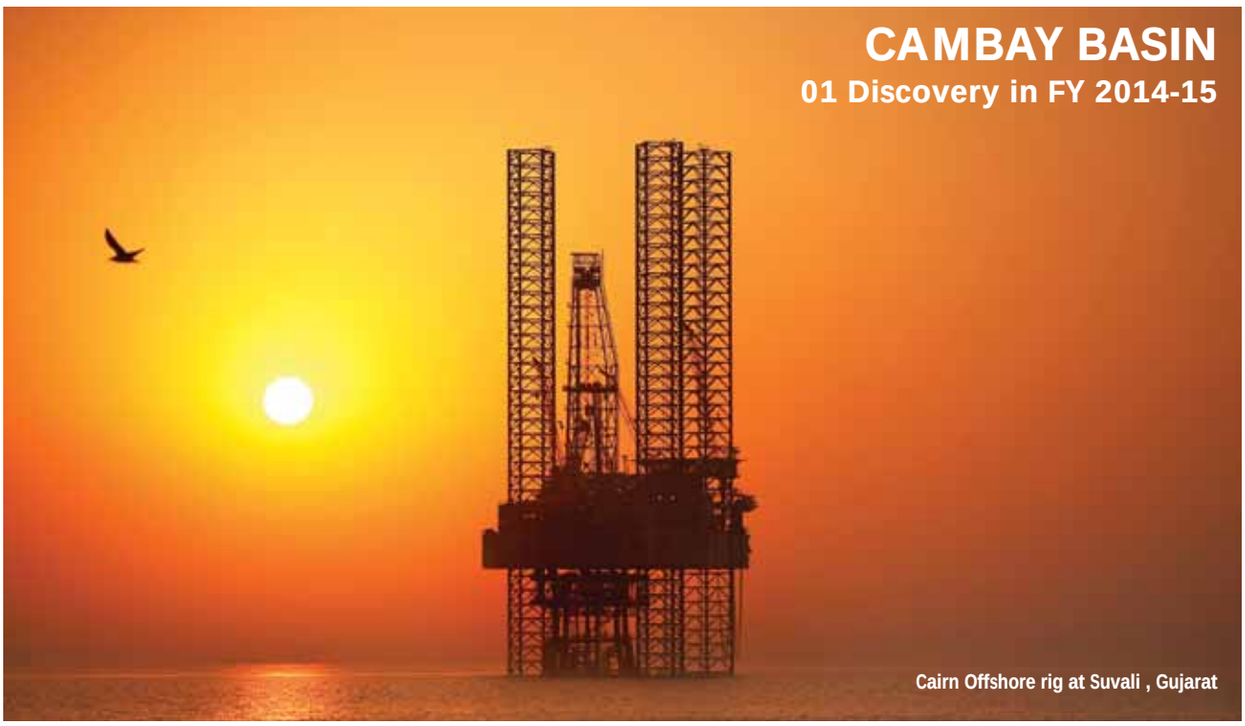
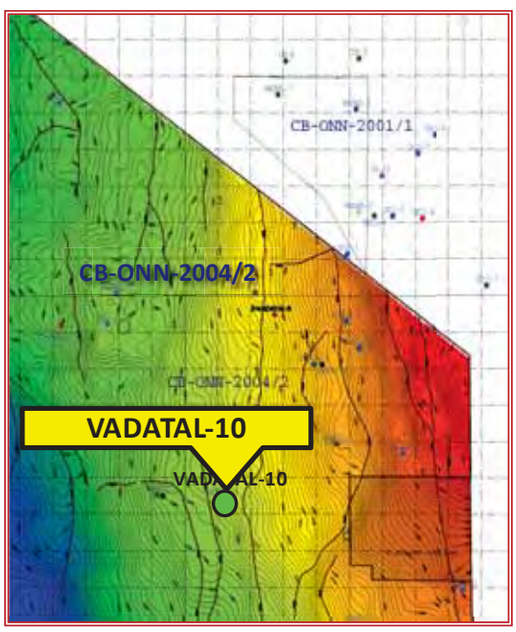
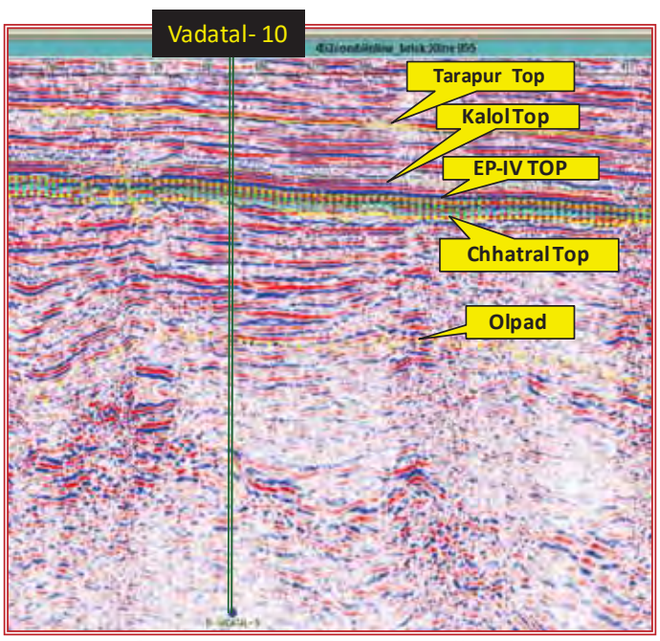


VADATAL-10 (CB-ONN-2004/2) NELP-VI **OPERATOR-ONGC**

Structure/ Location & Well No.	Testing Results	Leads/ Expl. Efficacy
Vadadal / VDAH & Vadatal-10	Obj-I: 1295-1289 m: A total of 11.35 SCM of Oil recovered during activation by WOR.	This discovery in NELP block, CB-ONN-2004/2 has established the presence of hydrocarbon in Chhatral pay of early Eocene age in the up-dip corridor to the east of Vadatal-3 fault block and has opened up scope for Oil exploration in Chhatral pays in the eastern part of the NELP Block.



Time Map Close to Chhatral Top



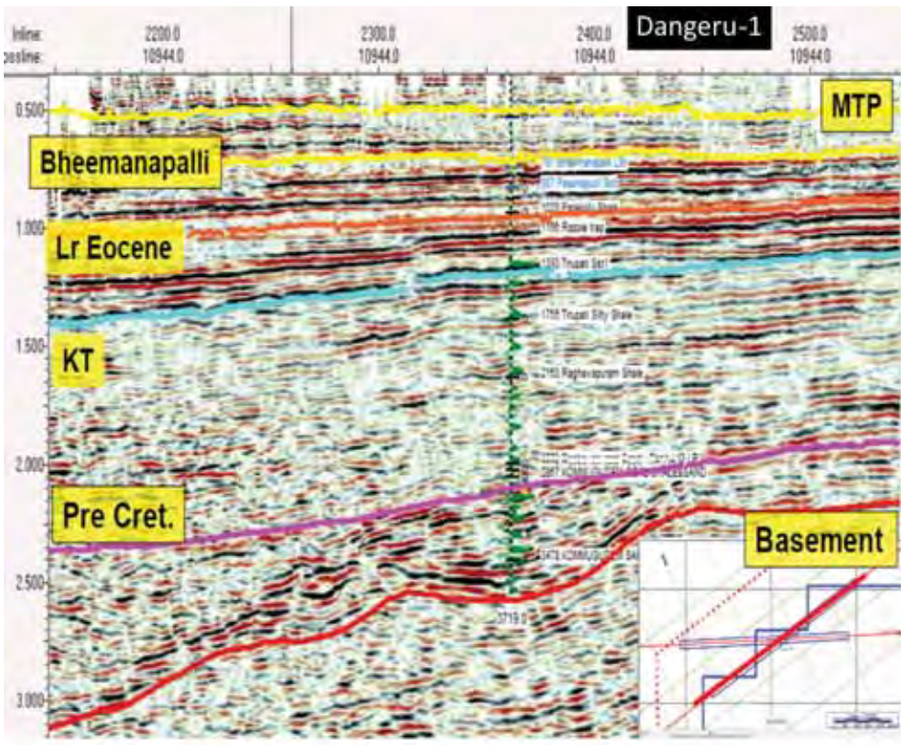
Part of XL 955 Passing Through Well Vadatal-10

KRISHNA GODAVARI BASIN

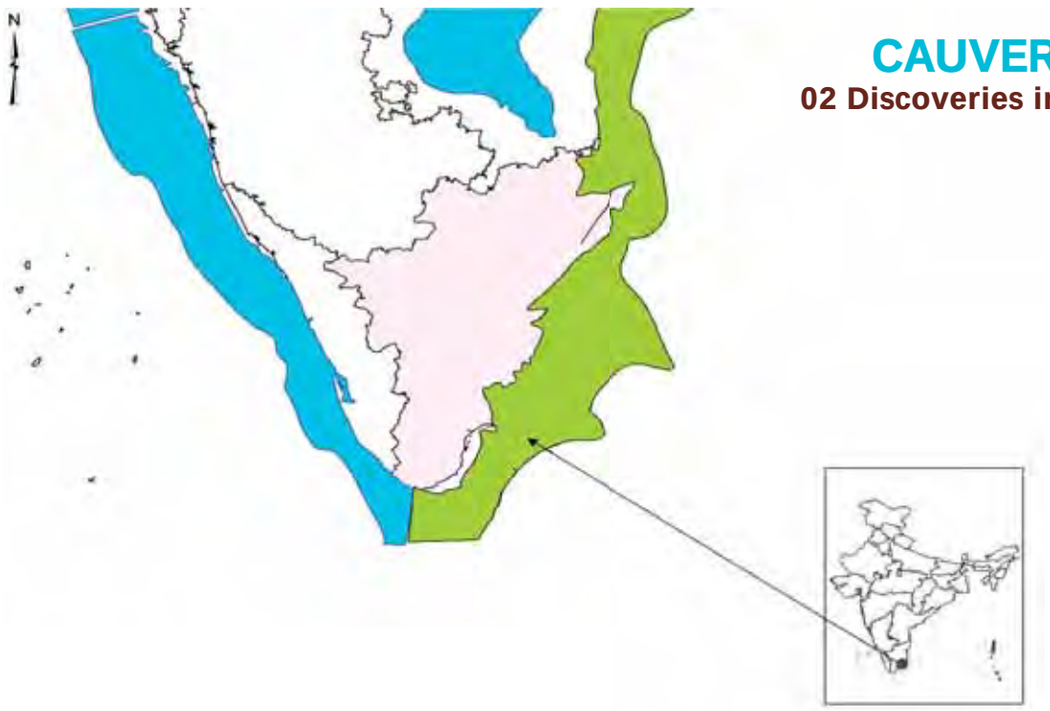
01 Discovery in FY 2014-15

July, 2008 : Shri Narendra Modi
at KG-22 Oil & Gas Exploration Rig
in Deendayal Block of Krishna Godavari Basin

KGONN2004/1-W0011 (KG-ONN-2004/1)	20.11.2014	OPERATOR: OIL
Structure/ Location & Well No.	Testing Results	Leads / Expl. Efficacy
KGONN2004/1-W0011/Dangeru-1	Object: 3281-3287 m, flowed gas @ 25,788 SCMD through ¼" bean.	The discovery is in Kommugudem formation of Permo-Triassic age. The pool is stratigraphic in nature. Estimated areal extent is 5.6 SKM is P50 based on seismic attribute study.



SEISMIC SECTION XL-10944 PASING THROUGH DNG#1 (LOC-11)

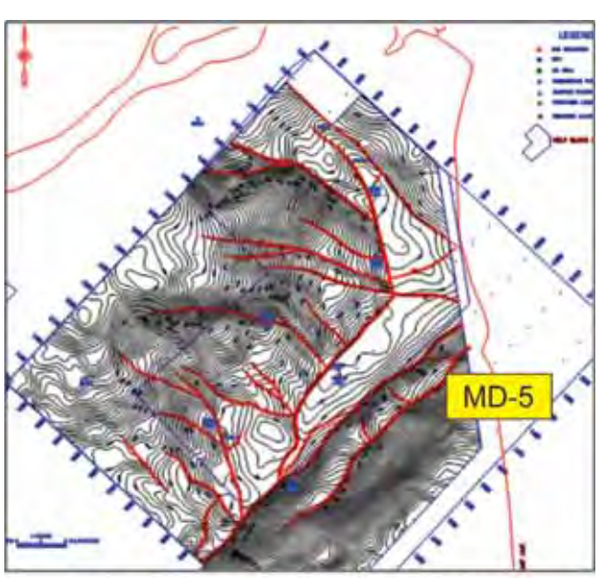


CAUVERY BASIN

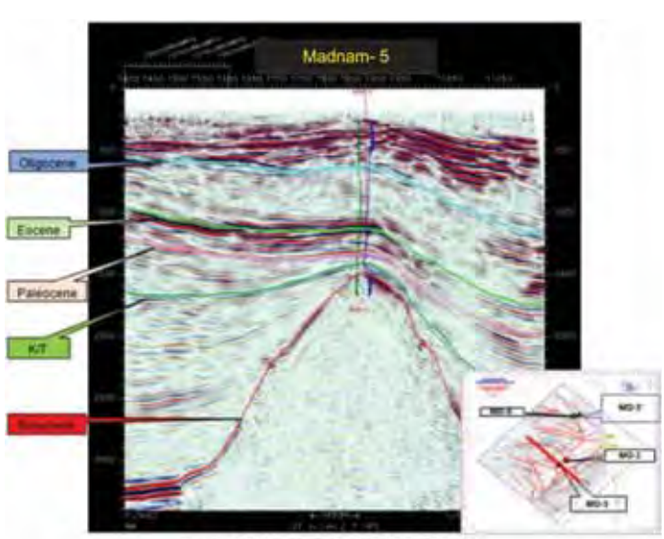
02 Discoveries in FY 2014-15

MADANAM-5 (CY-ONN-2002/2) **OPERATOR: ONGC**

Structure/ Location & Well No.	Testing Results	Leads / Expl. Efficacy
Thirunagari / Madanam-5 (NAME) & Thirunagari -1 appraisal well	Obj-I: 2175-1675 m: Flowed gas @ 61,800 SCMD & Cond. @ 9.6 SCMD through 7 mm bean. Object-II (1496-1492 m, Kamalapuram Fm.) flowed gas @ 52,000 SCMD & traces of condensate through 7 mm bean.	This is the second discovery well (gas from Basement) after discovery well, MD-3 (Oil from Basement) in the NELP block, CY-ONN-2002/2 in a separate fault block. This discovery is envisaged to enhance the commercial viability of the CY-ONN-2002/2 block.



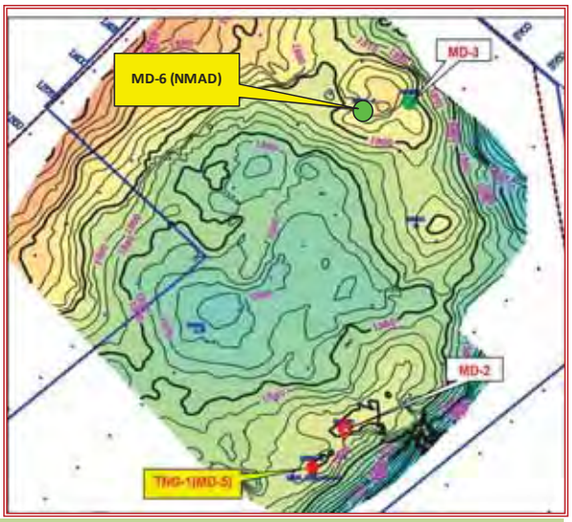
STRUCTURE MAP ON TOP OF BASEMENT



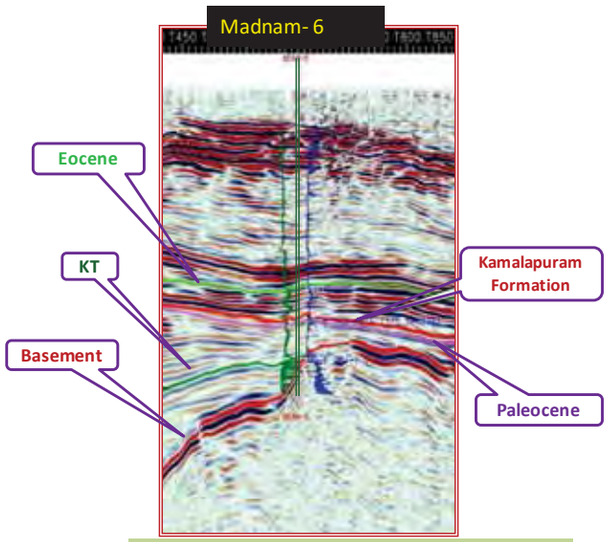
IL 310 through TNG-1/MD-5 (NMAE)

MADANAM-6 (CY-ONN-2002/2) **OPERATOR: ONGC**

Structure/ Location & Well No.	Testing Results	Leads/ Expl. Efficacy
Madanam/ NMAD & Madanam-6 Appraisal well	Obj-II: 1375.5 – 1374.5 m: Flowed Oil @ 24 SCMD and gas @ 35,000 SCMD through 6 mm bean within Kamlapuram formation of early Eocene age.	This new pool discovery in Kamalapuram Formation (Early Eocene age) is expected to enhance the commercial viability of the NELP block, CY-ONN-2002/2.



Time Structure Map: Kamalapuram Formation



In-line 478 passing through well MD-6

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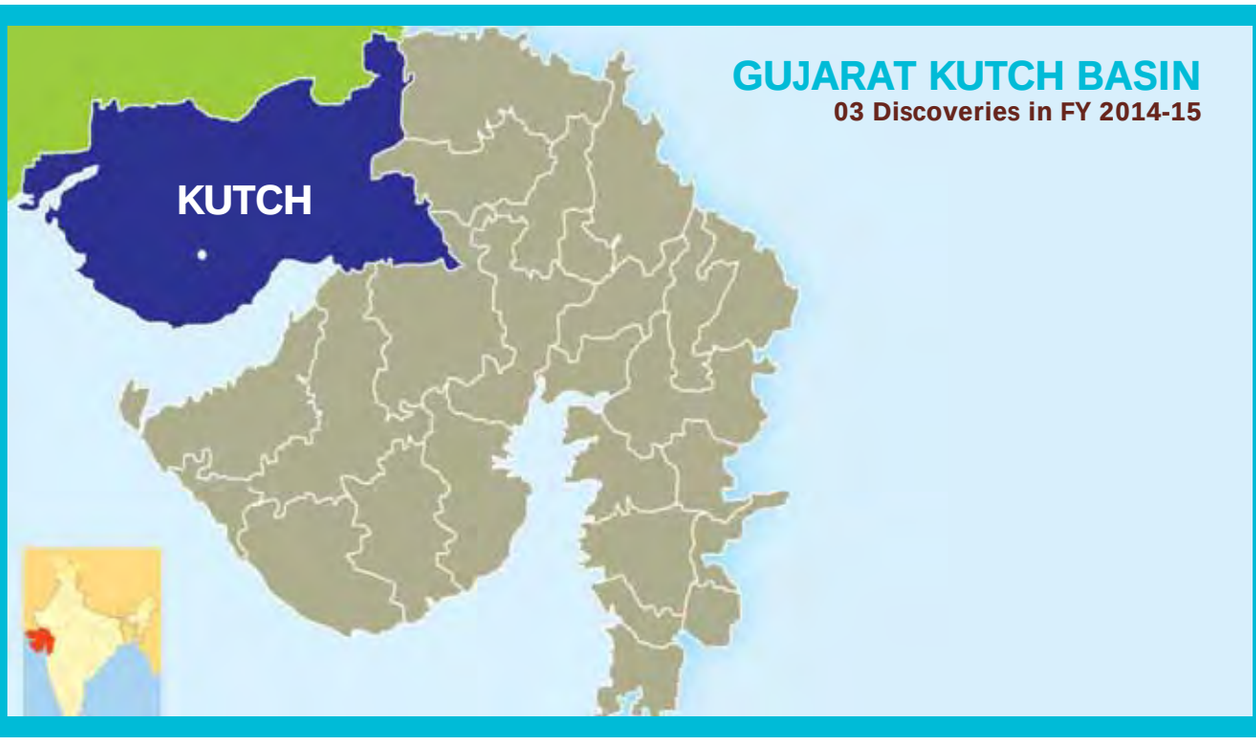
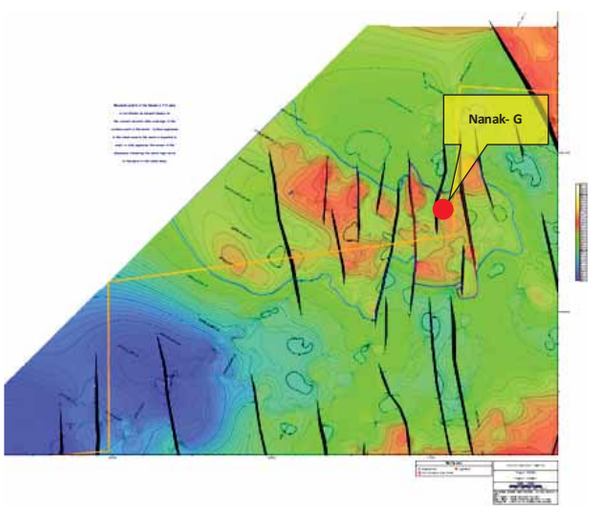
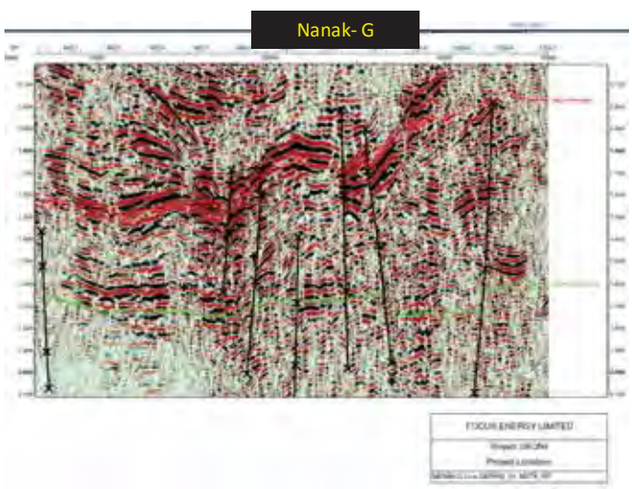


NANAK G (GK-ON-4) **OPERATOR: FOCUS ENERGY LTD.**

Structure/ Location & Well No.	Testing Results	Leads / Expl. Efficacy
NANAK-G	Object : 2581.7-2587.7m, flowed dry combustible gas @ 0.087 MMSCFD at tubing shut in pressure 105 psi & casing shut in pressure 226 psi	The discovery is in Jhurio formation of Jurassic age.



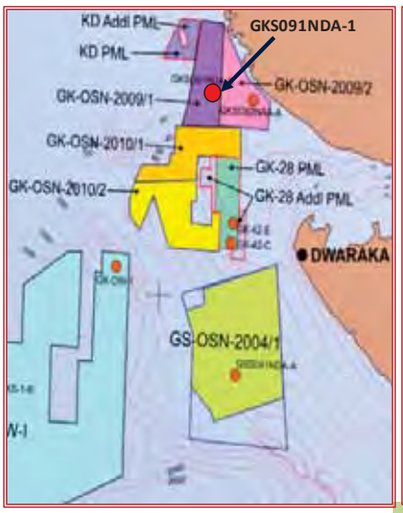
Top of Mid- Jurassic Depth Structure Map



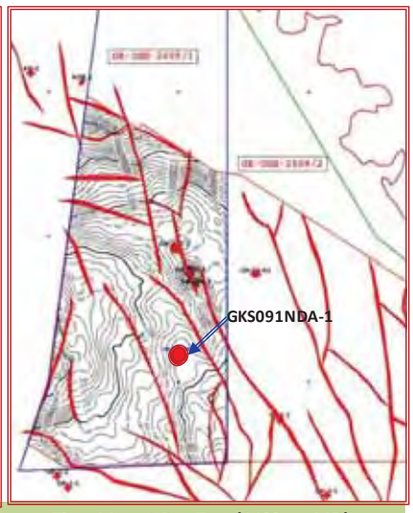
Location Nanak-G passing through line GKPH05_21_MSTK_RP

GKS091NDA-1 (GK-OSN-2009/1) **OPERATOR: ONGC**
NELP-VIII

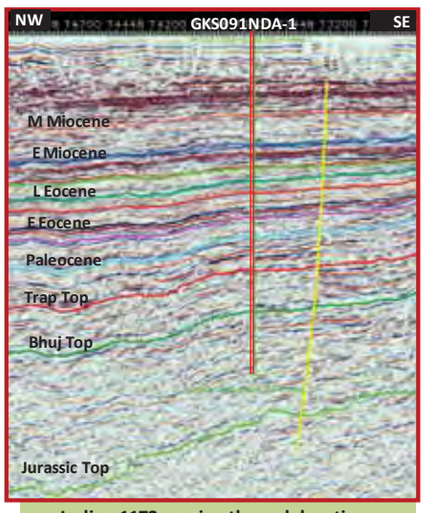
Structure/ Location & Well No.	Testing Results	Leads / Expl. Efficacy
GKS091NDA / GKS091NDA-A & GKS091NDA-1	Obj-II: 1482-1485 m: Gas flow @ 1,94,360 SCMD through ½" choke from Jakhau Formation of Eocene age.	This gas discovery in Jakhau Fm. in the block has enhanced prospectivity perception of the area. Early Eocene gas discovery has also been reported in adjacent block, GK-OSN-2009/2.



Prospect Map of Kutch Offshore Showing GK-OSN-2009/1



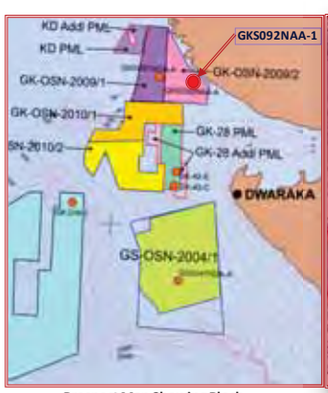
Time Map at Pay Top (1482 m MD)



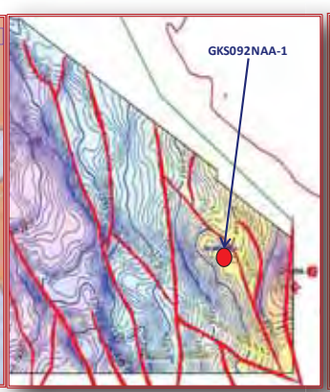
In-line 1173 passing through location, GKS091NDA-A

GK092NAA-1 (GK-OSN-2009/2) **OPERATOR: ONGC**
NELP-VIII

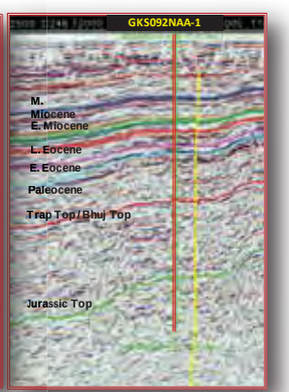
Structure/ Location & Well No.	Testing Results	Leads/ Expl. Efficacy
GK092NAA & GK092NAA-1	Obj-II: 898-900 m: Gas flow @ 1,15,168 SCMD through ½" choke.	This is the first discovery in NELP blocks in Kutch Offshore. In view of the testing results, new area has opened up for further exploration in Kutch Offshore.



Prospect Map Showing Block, GK-OSN-2009/2



Time Map at Pay Top (898 m MD)



Inline 504 passing through Well, GKS092NAA-1

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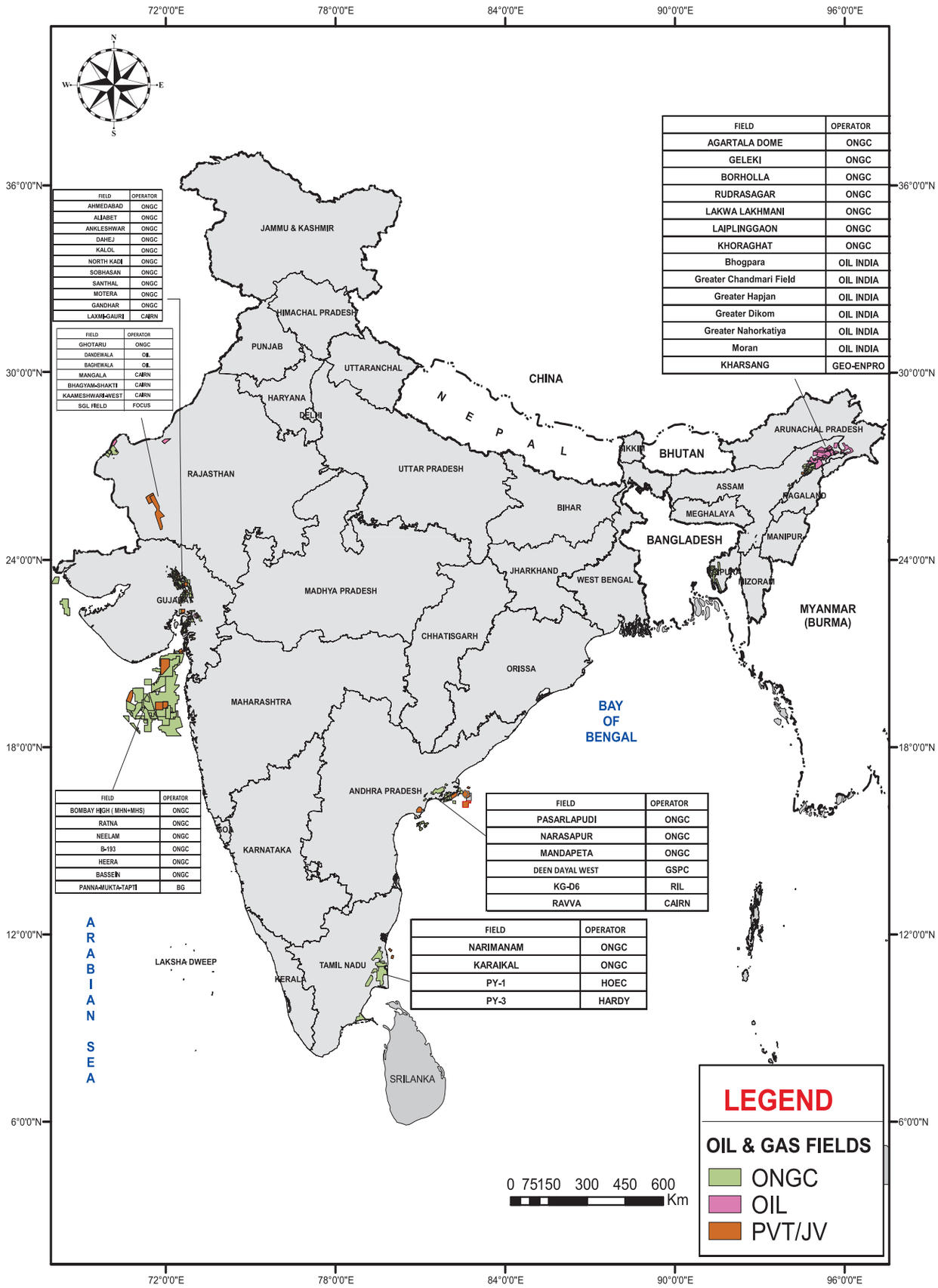
MAJOR OIL & GAS FIELDS OF INDIA



FIELD	OPERATOR
AHMEDABAD	ONGC
ALIABET	ONGC
ANKLESHWAR	ONGC
DAHEJ	ONGC
KALOL	ONGC
NORTH KADI	ONGC
SOBHASAN	ONGC
SANTHAL	ONGC
MOTERA	ONGC
GANDHAR	ONGC
LAXMI-GAURI	CAIRN

FIELD	OPERATOR
GHOTARU	ONGC
DANDEWALA	OIL
BAGHEWALA	OIL
MANGALA	CAIRN
BHAGYAM-SHAKTI	CAIRN
KAAMESHWARI-WEST	CAIRN
SGL FIELD	FOCUS

FIELD	OPERATOR
AGARTALA DOME	ONGC
GELEKI	ONGC
BORHOLLA	ONGC
RUDRASAGAR	ONGC
LAKWA LAKHMANI	ONGC
LAIPLINGGAON	ONGC
KHORAGHAT	ONGC
Bhogpara	OIL INDIA
Greater Chandmari Field	OIL INDIA
Greater Hapjan	OIL INDIA
Greater Dikom	OIL INDIA
Greater Nahorkatiya	OIL INDIA
Moran	OIL INDIA
KHARSANG	GEO-ENPRO

FIELD	OPERATOR
BOMBAY HIGH (MHN+MHS)	ONGC
RATNA	ONGC
NEELAM	ONGC
B-193	ONGC
HEERA	ONGC
BASSEIN	ONGC
PANNA-MUKTA-TAPTI	BG

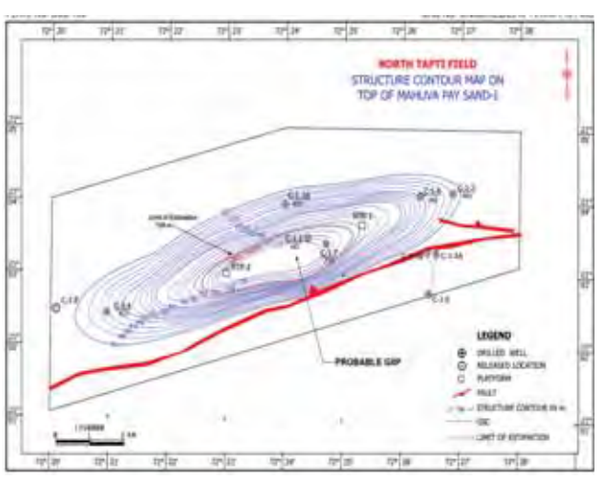
FIELD	OPERATOR
PASARLAPUDI	ONGC
NARASAPUR	ONGC
MANDAPETA	ONGC
DEEN DAYAL WEST	GSPC
KG-D6	RIL
RAVVA	CAIRN

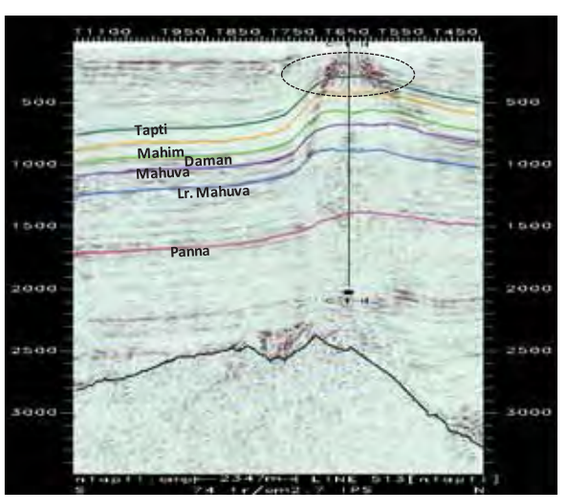
FIELD	OPERATOR
NARIMANAM	ONGC
KARAIKAL	ONGC
PY-1	HOEC
PY-3	HARDY

15 Discoveries in Nomination Blocks By ONGC Limited in FY 2014-15

Western Offshore/ C-1-7 **OPERATOR: ONGC**

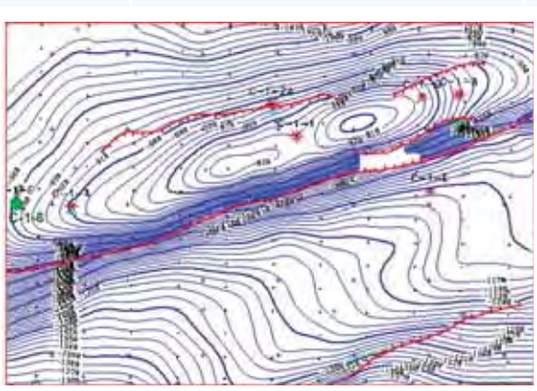
Structure/ Location & Well No.	Testing Results	Leads/ Expl. Efficacy
C-1 / North Tapti (C-1-H) & C-1-7	Obj-II: 852-861, 909-19, 891-902 m, produced gas @ 1,69,553 SCMD through ½" choke. Obj-III: 826.5-27, 822-22.5, 809.5-10, 801.5-02, 796.5-97 m, C/O Straddle Packer MDT-collected Oil & gas. Obj-IV: 771-778, 758-762 m, produced gas @ 1,46,138 SCMD through ½" choke. All objects is from Mahuva Formation of Lower Oligocene age.	Discovery of new Oil & gas pool in Mahuva Formation (sixteen new Oil & gas bearing layers) in this well would add to the available reserve base of North Tapti Field and augment the on-going development efforts.

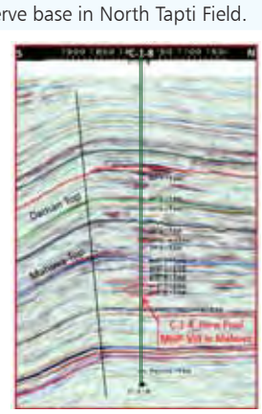




Western Offshore (SW) C-1-8 **OPERATOR-ONGC**

Structure/ Location & Well No.	Testing Results	Leads/ Expl. Efficacy
C-1/ North Tapti (C-1-F) & C-1-8	Obj-I: 1102 – 1100.5 m, produced Oil @ 1105 BOPD and gas @ 1,01,203 SCMD through ½" choke within Mahuva formation of Lower Oligocene age.	This discovery has extended the limits of hydrocarbon occurrence down-dip towards SW of North Tapti Field and provided new impetus to exploration in the area within Mahuva Formation. It will also enhance the reserve base in North Tapti Field.





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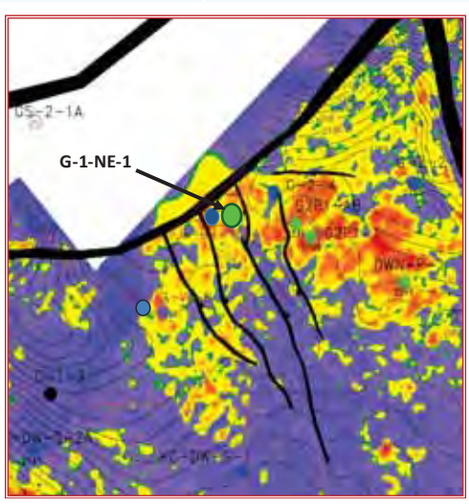
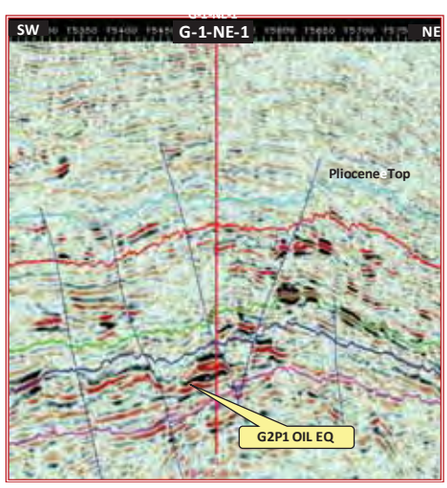
KG Offshore G-1-NE-1 **OPERATOR-ONGC**

Structure/ Location & Well No.	Testing Results	Leads/ Expl. Efficacy
G-1-NE/ Vasishta (G-1-NE) & G-1-NE-1	Obj-I: 2349-2331 m: flowed Oil @ 2842 BOPD and gas @ 74,198 SCMD through ½"choke.	This new pool discovery has enhanced the prospectivity of the area for further exploration within Godavari clay formation of Pliocene age.



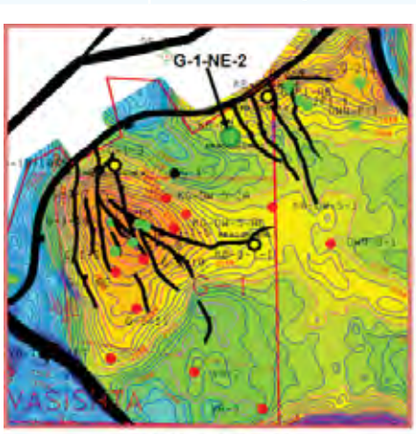
Far Angle RMS Attribute Zone 18



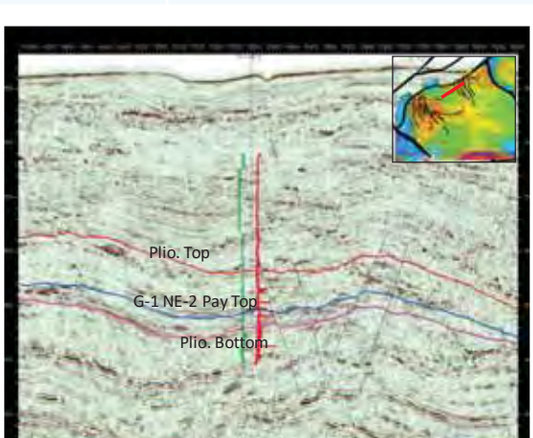
Inline 2068 showing location G-1-NE-1

KG Offshore G-1-NE-2 **OPERATOR-ONGC**

Structure/ Location & Well No.	Testing Results	Leads/ Expl. Efficacy
G-1-NE/ Vasishta (G-1-NE-AB) & G-1-NE-2	Obj-I: 2344-2362 m: flowed gas @ 2,32,280 SCMD and condensate @ 304 BPD through 24/64" bean During subsequent multi-bean studies, the object flowed gas @ 5,86,016 SCMD and condensate @ 1400 BPD through 15 mm bean.	This discovery has opened up scope of further exploration in Pliocene section in the surrounding areas. The discovery being close to G-1 Field will also help in augmenting gas production from G-1 Field within Godavari clay formation of Pliocene age.



RMS Attribute Zone 18

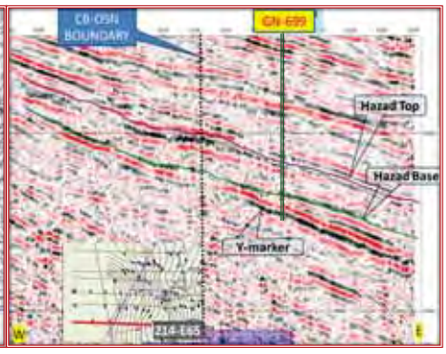


Western Onshore GN-699 **OPERATOR-ONGC**

Structure/ Location & Well No.	Testing Results	Leads/ Expl. Efficacy
Gandhar/ Gandhar Extn. VI (GGAG) & GN-699.	Obj-III: 2577.5-2580 m, produced Oil @ 38 SCMD and gas @ 20,069 SCMD through 6 mm bean from Hazad Sands of Middle Eocene age.	This new pool discovery of GS-6B Pay in the south western part of Gandhar has opened up new area for further exploration of Hazad Sands of Middle Eocene age.

Prospect Map Of Gandhar Field

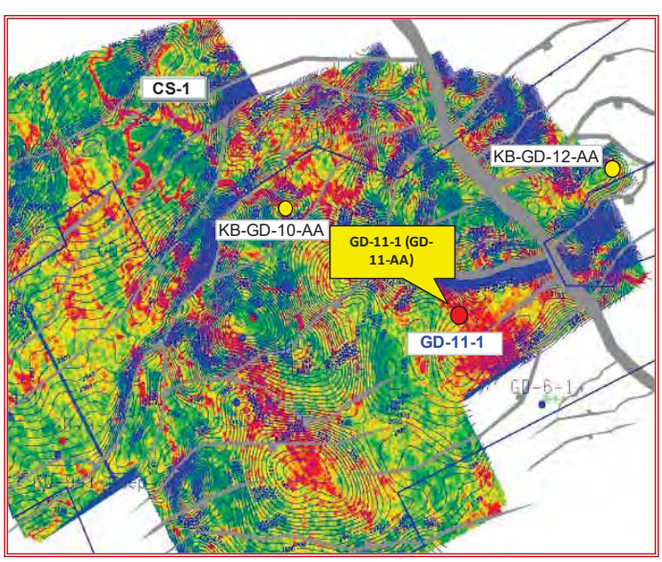
Time Structure Map close to Hazad Top

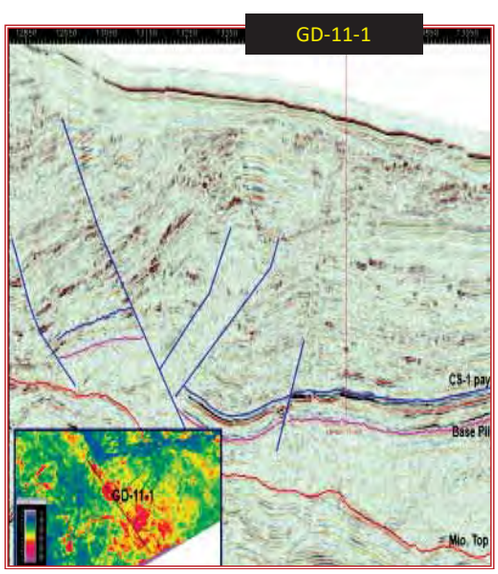


2D Line 214-E65 Passing close to Well, GN-699

KG Onshore GD-11-1 **OPERATOR-ONGC**

Structure/ Location & Well No.	Testing Results	Leads/ Expl. Efficacy
GD-11/ KG-OS-DW-III PEL (GD-11-AA) & GD-11-1	Obj-I: 2557-2575 m: flowed gas @ 6,48,152 SCMD through ½" choke from CS-1 pay sand of Pliocene age.	This discovery will facilitate upgradation of DW PEL block KG-OS-DW-III.





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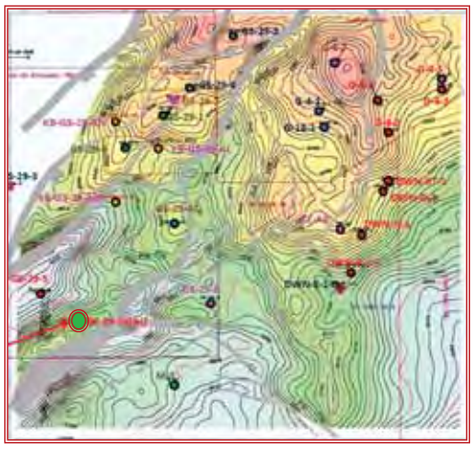
KG Offshore (SW) GS-29-10 **OPERATOR-ONGC**

Structure/ Location & Well No.	Testing Results	Leads/ Expl. Efficacy
GS-29/ GS-29-AJ & GS-29-10	Obj-I: 2402-2397 m: flowed Oil @ 2479 BOPD and gas @ 61,267 SCMD through ½" choke from Pliocene section in the area.	This discovery is in a different fault block, to the north of the recent major Oil discovery, M-3 Field in KG-DWN-98/2 and has given an impetus to development activities of GS-29 Field along with further exploration of Oil & gas in Pliocene section in the area.

Prospect Map Showing GS-29 PML

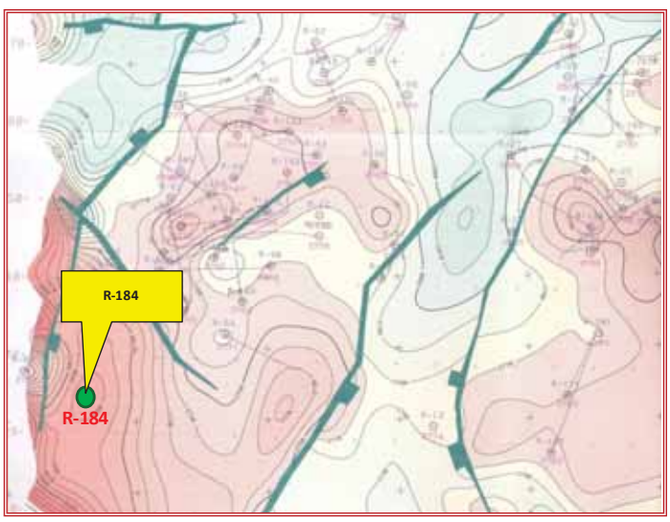


Time Structure Map Close To Pliocene Base

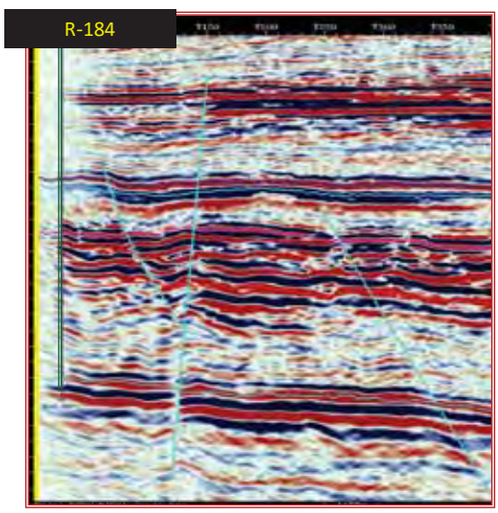
Inline 3020 Passing Through Well, GS-29-10

AA – NAS Rudrasagar-184 **OPERATOR-ONGC**

Structure/ Location & Well No.	Testing Results	Leads/ Expl. Efficacy
Rudrasagar/ Rudrasagar ML (RSAK) & Rudrasagar- 184	Obj-II: 3294-3291.5 m: flowed Oil @ 47.8 SCMD through 6 mm bean from BCS of Oligocene age.	The success in this well has opened another structural culmination with upside potential for exploration & delineation of SW part of the main Rudrasagar Field. Further exploration potential may extend beyond the presently held acreage.



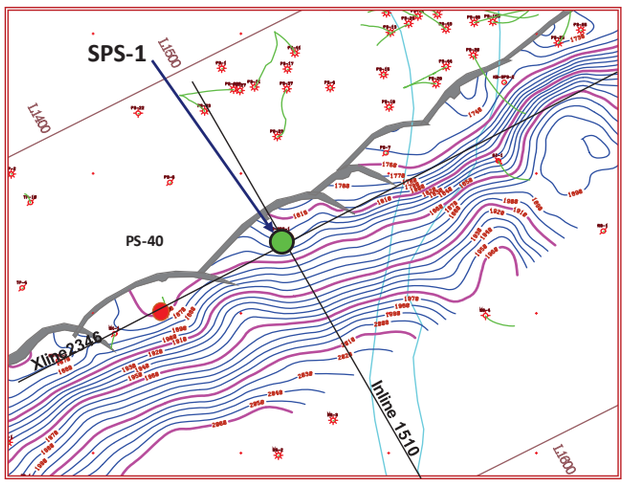
Structure Contour Map at BCS Top



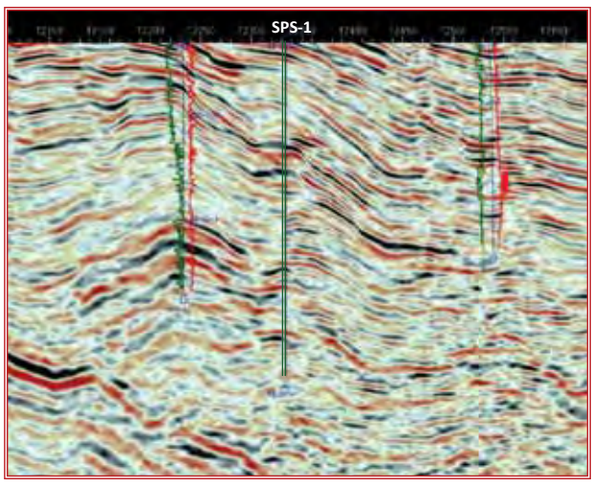
Inline-18 Depth Section passing through Well, R-184

KG Onshore South Pasarlapudi-1 **OPERATOR-ONGC**

Structure/ Location & Well No.	Testing Results	Leads/ Expl. Efficacy
South Pasarlapudi / Tatipaka-Pasarlapudi PML & South Pasarlapudi-1	Obj-I: 2694-97 m: flowed Oil @ 3.5 SCMD and gas @ 32,894 SCMD (5 mm bean). Obj-IIIa: 2621-18 m: flowed gas @ 1,56,885 SCMD and condensate @ 13.06 SCMD (7 mm bean). Both the Objects flowed hydrocarbon from Vadaparu formation of Eocene age	New pool discovery within Vadaparu formation of Eocene age gives a renewed focus to exploration of Vadaparu play in this area. This discovery and has opened up area for exploration of deeper Tertiary plays in the Southern part of Pasarlapudi Field.



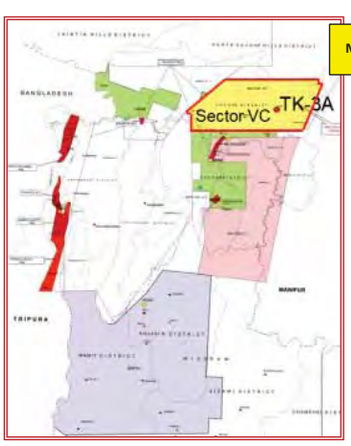
Time Structure Map close to Top of PS SD-26
Amplitude Attribute Map - CS-1 Pay Sand
(M40P160MSEC) with overlay of Time Structure Map



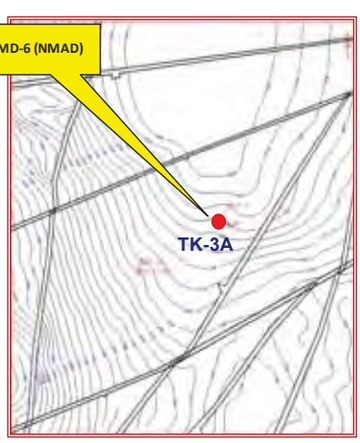
Line 1505 passing through Well, SPS-1 & others
Inline 1818 passing through well GD-11-1

A&AA TK-3 A **OPERATOR-ONGC**

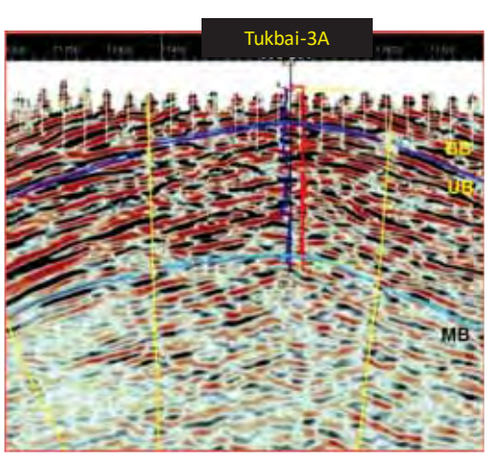
Structure/ Location & Well No.	Testing Results	Leads/ Expl. Efficacy
Tukbai / AAFB-Cachar (TKAC-ST) & Tukbai-3A	Obj-I: 968-972 m: produced gas @ 13,000 SCMD through 6 mm bean.	This new prospect discovery in Upper Bhuban Pay in the Tukbai part of Sector VC PEL of AAFB-Cachar has opened up area for further exploration and regain confidence of hydrocarbon potential in Cachar region.



Prospect Map Showing well, TK-3A in Sector VC block



Structure Map Close to Middle Bhuban Top



In line 971 passing through TK-3

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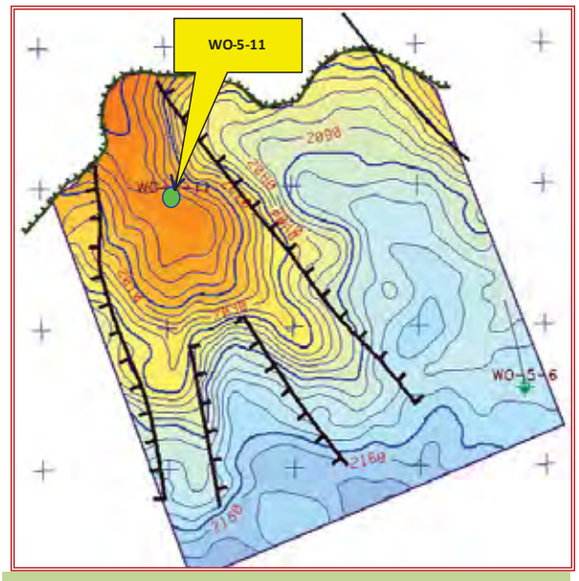
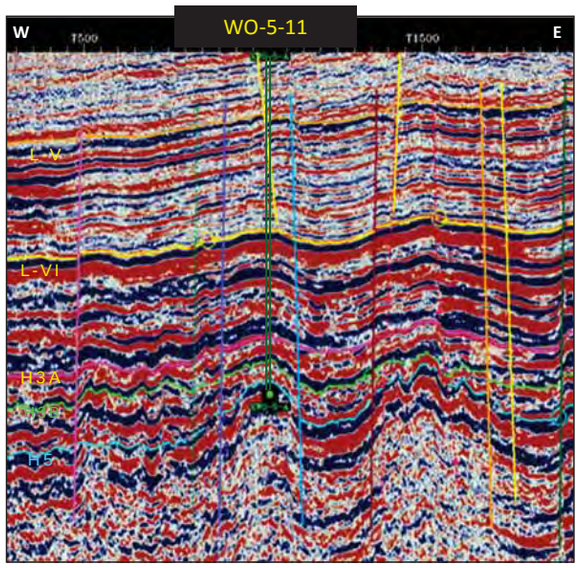
Western Offshore WO-5-11 **OPERATOR-ONGC**

Structure/ Location & Well No.	Testing Results	Leads/ Expl. Efficacy
WO-5/ BOFF PML (WO-5-G) & WO-5-11	Obj-I: 2208-2215 m: Flowed Oil @ 1539 BOPD and gas @ 9974 SCMD through ½" choke from Panna (Basal Clastics) formation of Lower Eocene age.	This is the first Oil discovery from Panna (Basal Clastics) in WO-5 Structure. This discovery has provided significant leads for Oil exploration in this sector.



Time Structure map at Panna top

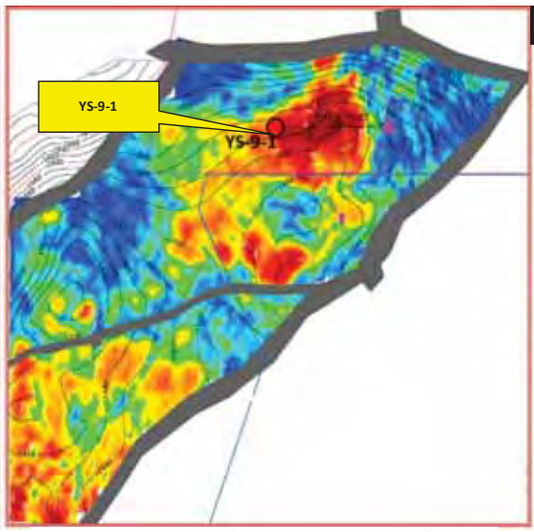


Inline 100 passing through WO-5-11

KG Offshore (SW) YS-9-1 **OPERATOR-ONGC**

Structure/ Location & Well No.	Testing Results	Leads/ Expl. Efficacy
YS-9/ YS-AB-Shift & YS-9-1	Obj-I: 1701-1707 m, produced gas @ 3,00,694 SCMD through ½" choke from Ravva formation of Mio-Pliocene age.	This is the first well which established the prospectivity of Ravva Formation in this block and has opened up new play for further exploration in the area.

Location Map

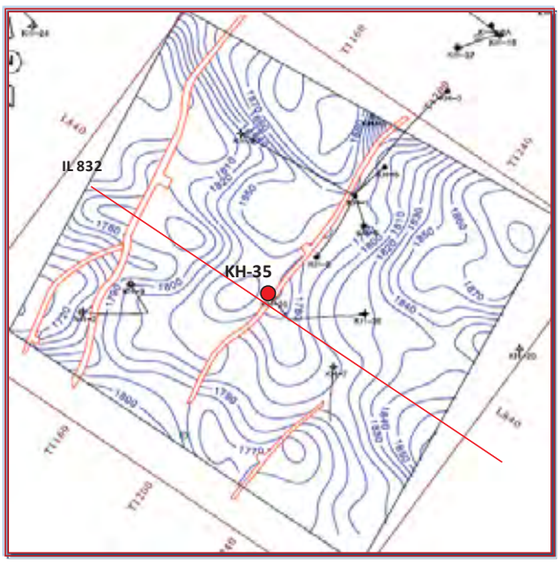


RMS Amplitude Map of Horizon Close to Top of Ravva Formation.

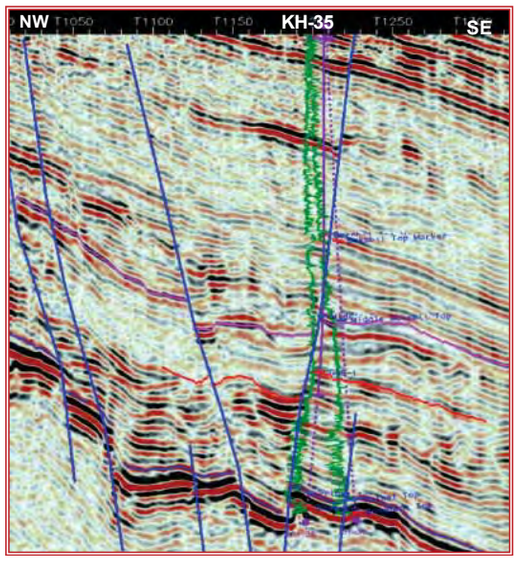
Inline 10189 through Well, YS-9-1

A&AA – SAS Khoraghat-35 **OPERATOR-ONGC**

Structure/ Location & Well No.	Testing Results	Leads/ Expl. Efficacy
Khoraghat / Nambar ML (KHAS) & KH-35	Obj-VI: 2410.5-2412.5 m: flowed gas @ 32,000 SCMD and condensate @ 9 SCMD through 4 mm bean within Bokabil Formation of Middle Miocene age.	This new pool discovery within Bokabil Formation has further reinforced prospectivity perception of Bokabil sands in Khoraghat area of South Assam Shelf and would open up prospective areas for further exploration.



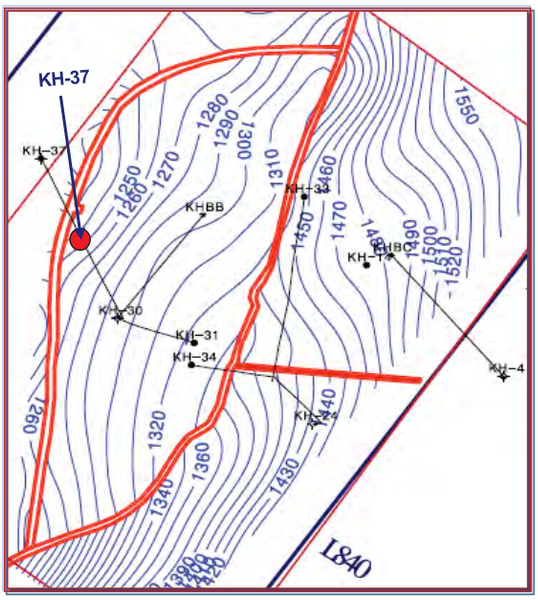
Time Map Close to Pay Sand, (Mid. Bokabil)



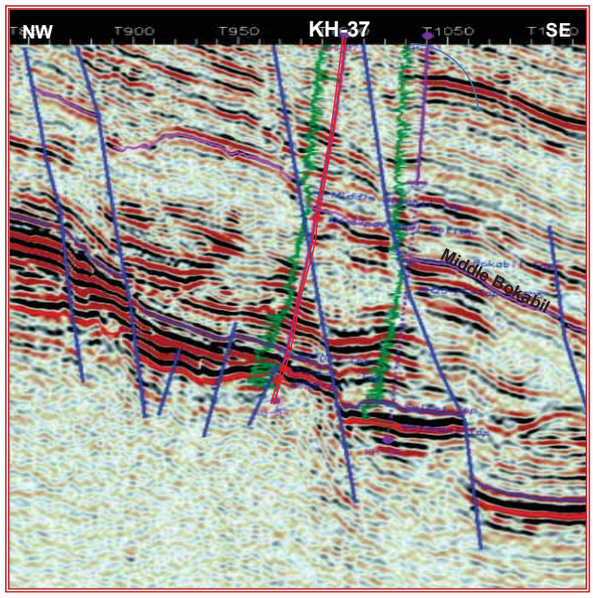
Inline-832 Passing Through Well, KH-35

A&AA – SAS Khoraghat-37 **OPERATOR-ONGC**

Structure/ Location & Well No.	Testing Results	Leads/ Expl. Efficacy
Khoraghat/ Nambar ML (KHBA) & KH-37	Obj-V: 1594-1597.5 m: flowed gas @ 13,963 SCMD through 5 mm bean within Bokabil Formation of Middle Miocene age.	This new pool discovery has opened up area for further exploration of Bokabil in West Khoraghat area of South Assam Shelf.



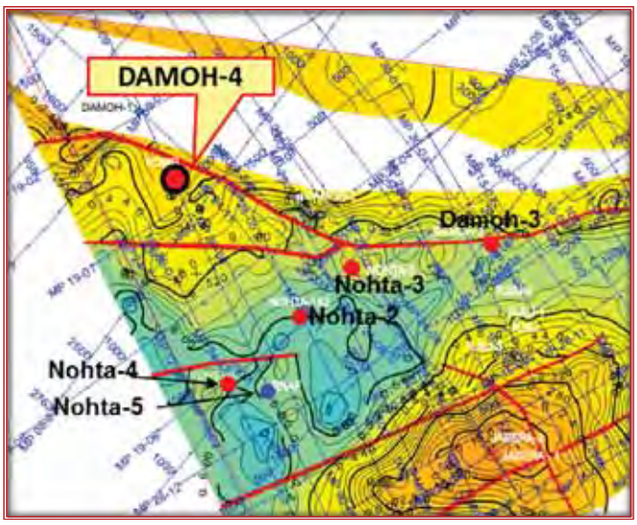
Structure Map Close to Bokabil Pay Sand



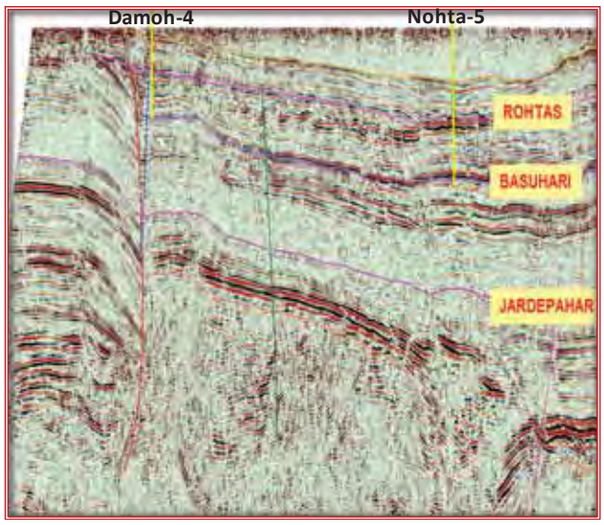
Inline 860

Vindhyan - Son Valley DAMOH-4 **OPERATOR-ONGC**

Structure/ Location & Well No.	Testing Results	Leads/ Expl. Efficacy
Damoh / Damoh-Jabera-Katni PEL (RDMD)& Damoh-4	Obj-I: 1544 – 1550.4 m: flowed gas @ 443 SCMD (after stimulation) through 4 mm bean from Lower Vindhayans of Meso- Neoproterozoic age.	Presence of gas in Mohana Fawn Limestone Formation has been established for the first time in Vindhyan Basin through drilling of this well. This lead has enhanced the prospectivity of the area for further exploration.



Time Structure Map close to Rohtas Top



Seismic Line Mp-30-09 Showing Well Damoh-4

11 Discoveries in Nomination Blocks By Oil India Limited in FY 2014-15

Balimara-2 **OPERATOR-OIL**

Structure/ Location & Well No.	Testing Results	Leads/ Expl. Efficacy
Balimara-2, Borhat	Object: 4224.0-4265.0m /Tipam Formation, Oil: @ 8 KLPD Through 12 mm bean	

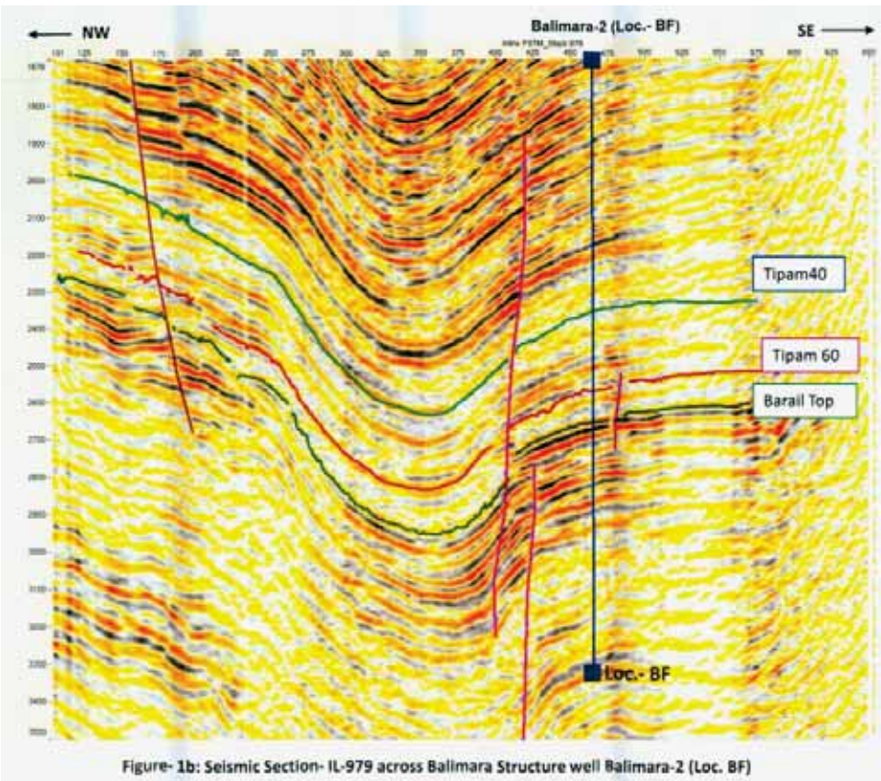


Figure- 1b: Seismic Section- IL-979 across Balimara Structure well Balimara-2 (Loc. BF)

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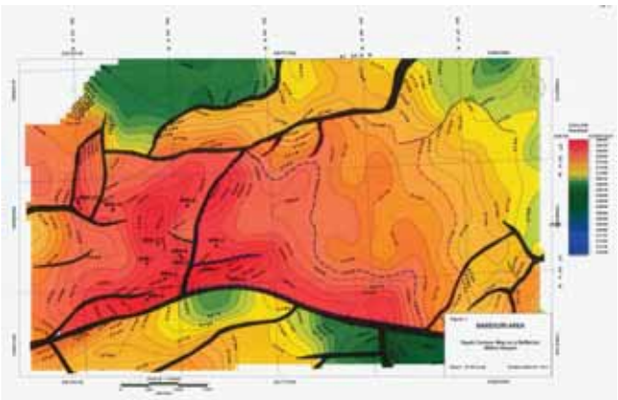
Barekuri-2 **OPERATOR-Oil**

Structure/ Location & Well No.	Testing Results	Leads/ Expl. Efficacy
Barekuri-2, Dumduma	Object: 3789.5-3796.0 /Narpuh Formation /Gas: 1,00,000 SCMD through 5 mm bean	



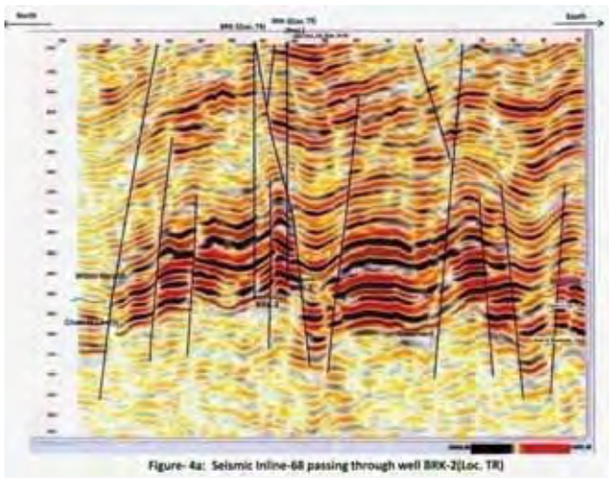


Figure- 4a: Seismic Inline-68 passing through well BRK-2(Loc. TR)

Nadua-1 **OPERATOR-OIL**

Structure/ Location & Well No.	Testing Results	Leads/ Expl. Efficacy
Nadua-1, Chabua	Object: 3634.0-3635m/ Oil: @ 48 KLPD through 4.5 mm	

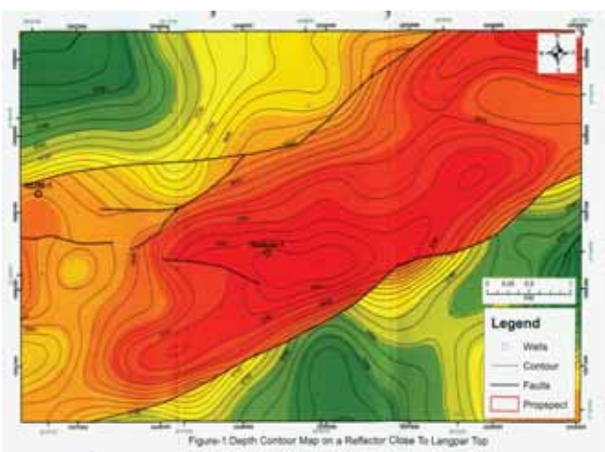


Figure-1 Depth Contour Map on a Reflector Close To Langpar Top

Depth Structure map

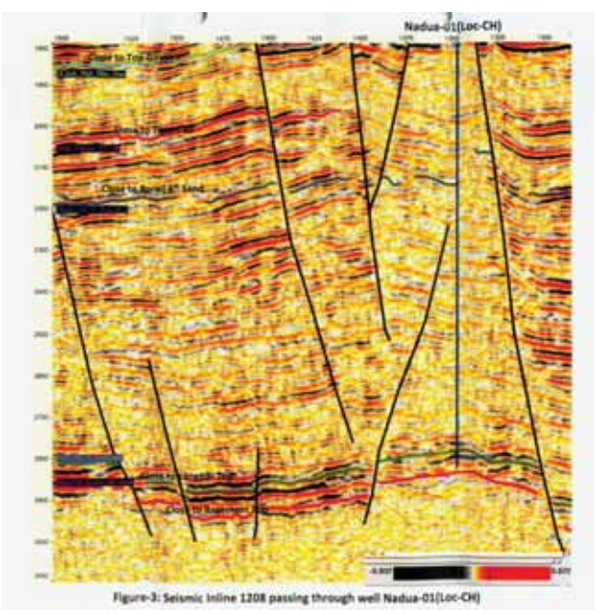
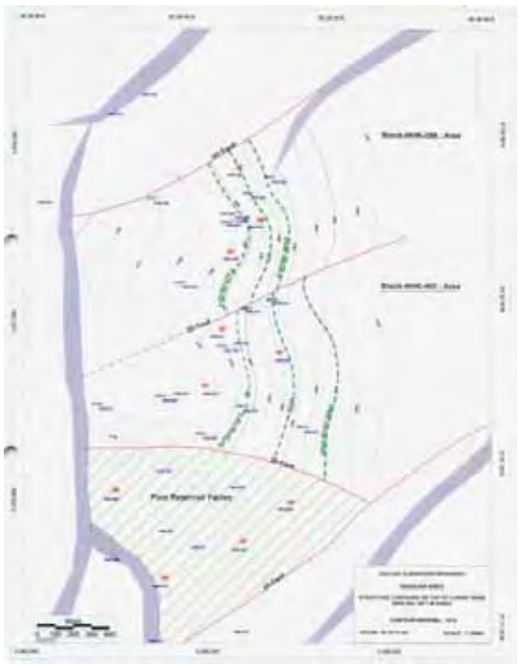


Figure-3: Seismic Inline 1208 passing through well Nadua-01(Loc-CH)

NHK-405 **OPERATOR-OIL**

Structure/ Location & Well No.	Testing Results	Leads/ Expl. Efficacy
NHK-405, Hugrijan	Object: 2877.5-2879.5 & 2880.5-2883 m /Lower Tipam & Gas: @ 45000 SCMD through 6/7 mm bean.	



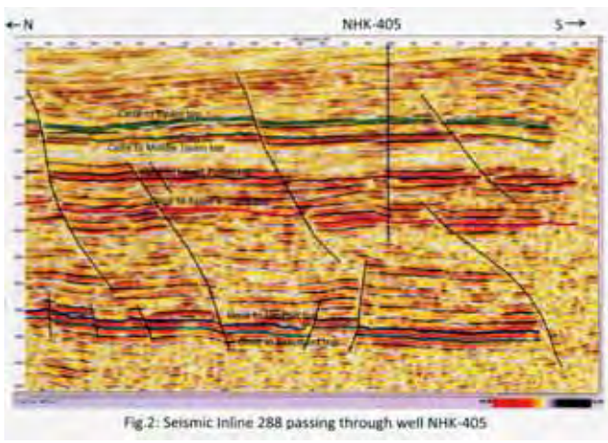
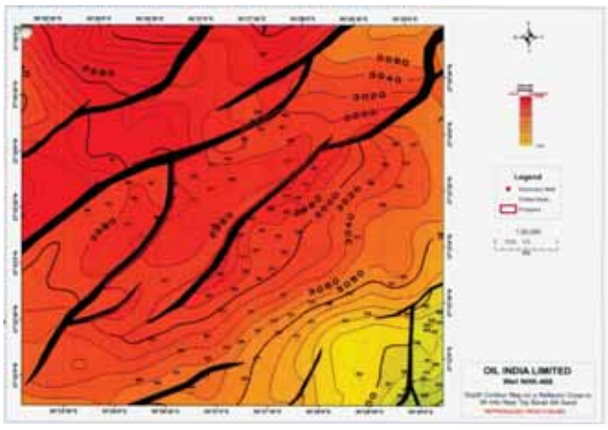


Fig.2: Seismic Inline 288 passing through well NHK-405

NHK-466 **OPERATOR-OIL**

Structure/ Location & Well No.	Testing Results	Leads/ Expl. Efficacy
NHK-406, Hugrijan	Object: 3802-3808 /Kopili, Eocene & Oil: @18 KLPD through 12 mm bean.	



Depth Structure map

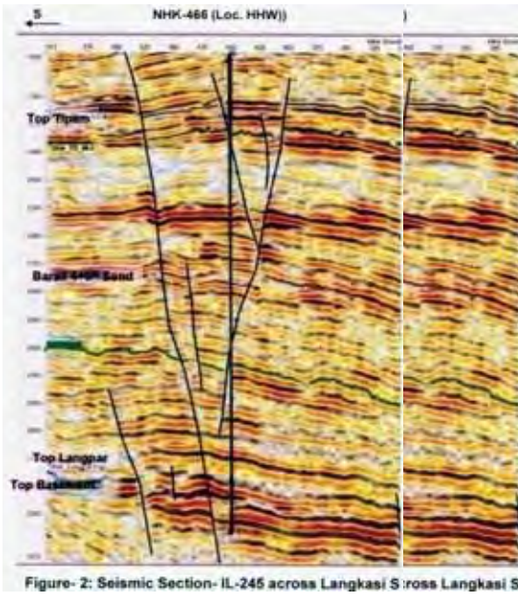


Figure- 2: Seismic Section- IL-245 across Langkasi S :ross Langkasi S

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NHK-614 **OPERATOR-OIL**

Structure/ Location & Well No.	Testing Results	Leads/ Expl. Efficacy
NHK-614, Nahorkatiya Extn.	Object: 3802-3808, 2873-2876 & 2865-2871m. /Middle Tipam & Oil: @ 8 KLPD with 1 KLPD water	

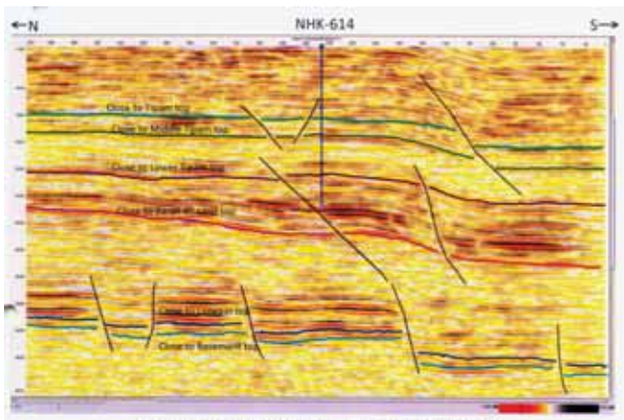


Fig.2: Seismic Inline 411 passing through well NHK-614

Rangmala-1 **OPERATOR-OIL**

Structure/ Location & Well No.	Testing Results	Leads/ Expl. Efficacy
Rangmala-1, Tinsukia	Object: 3787-3797m /Lakadong+Therria & Gas: @ 17500 SCMD	

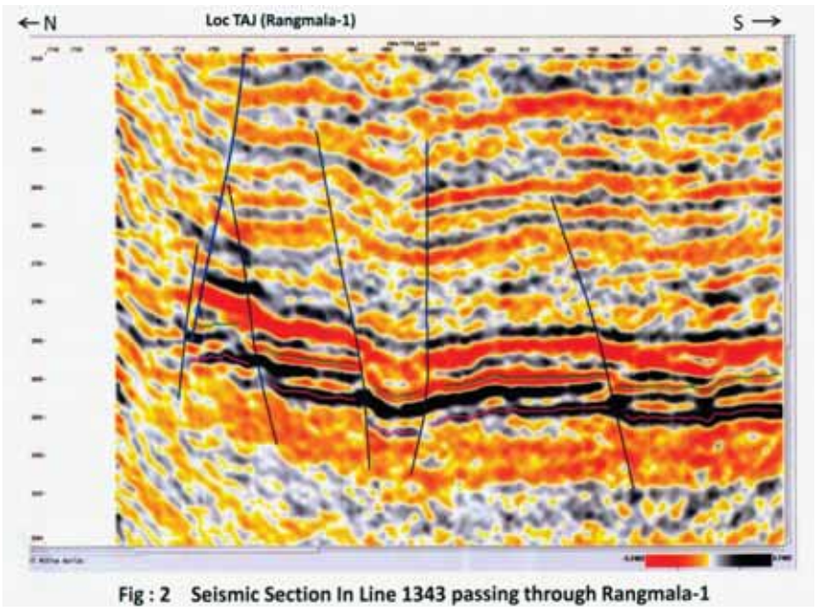
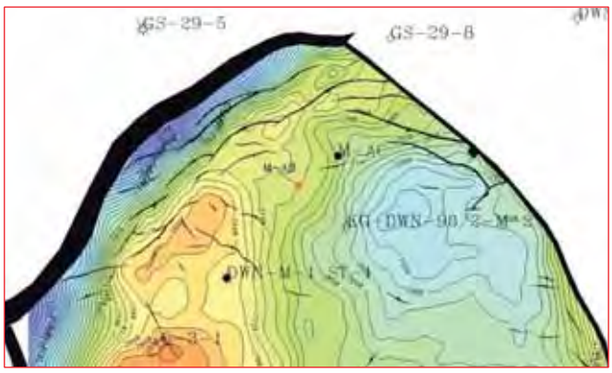


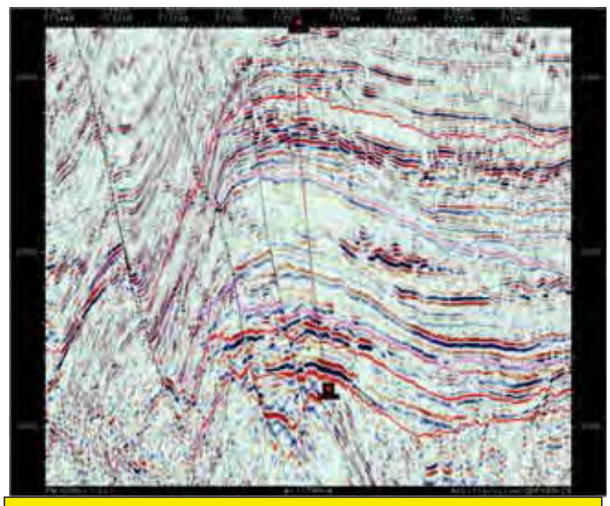
Fig : 2 Seismic Section In Line 1343 passing through Rangmala-1

OTHER DISCOVERIES SLIDES

M-4 (KG-DWN-98/2) **OPERATOR: ONGC**

Structure/ Location & Well No.	Testing Results	Leads/ Expl. Efficacy
M-4(AD)	OBJ-I Testing results: 40/64" choke; FTHP: 2235 psi; FTHT: 95°F): QOil: 3157 BOPD, Qgas: 319,483 SCMD, API Oil: 36.8 at 60degF, Sp. Gravity of gas: 0.692, CO_2: 0.25%, BS&W: Nil, H_2S: Nil, Sand: nil	

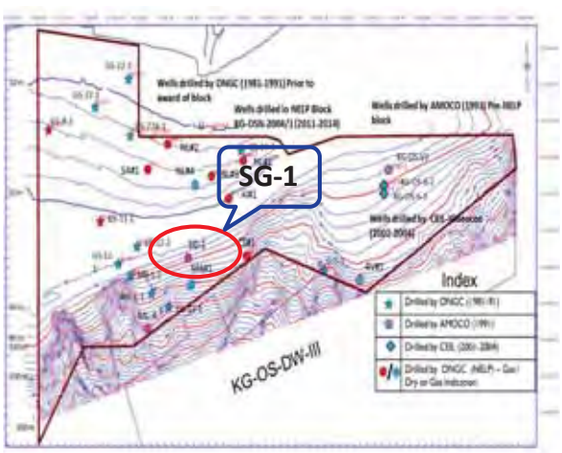




Well Seismic Line through Location M-AD

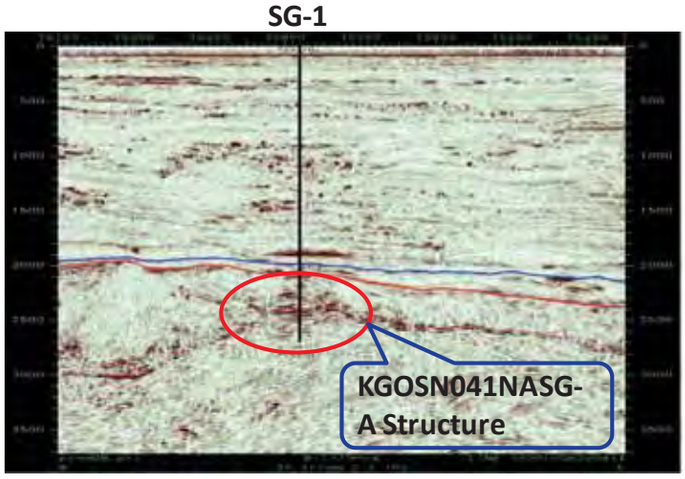
KGOSN041NASG-A (KG-OSN-2004/1) **OPERATOR: ONGC**

Structure/ Location & Well No.	Testing Results	Leads/ Expl. Efficacy
KGOSN041NASG-A/SG-1(Sarangi-1)	Object: 1727-1737m, flowed gas @ 320,858 SCMD through ½" choke at FTHP 1900 psi and FTHT 91°F	The discovery is in Godavari clay of Pliocene age. SG-1 is seventh discovery in the block KG-OSN-2004/1



Location map-KGOSN20041NASG-A

SG-1



IL 1600 passing through location KGOSN041NASG-A

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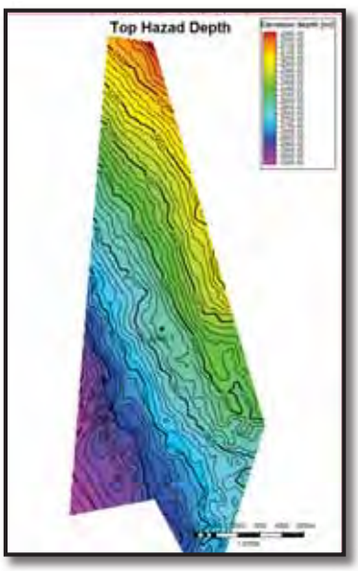
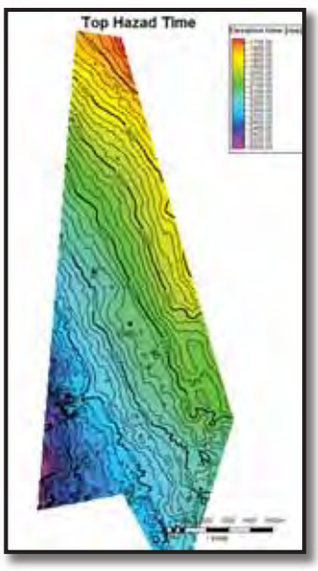
JYOTI-1 (CB-ONN-2005/9) **OPERATOR-MERCATOR**

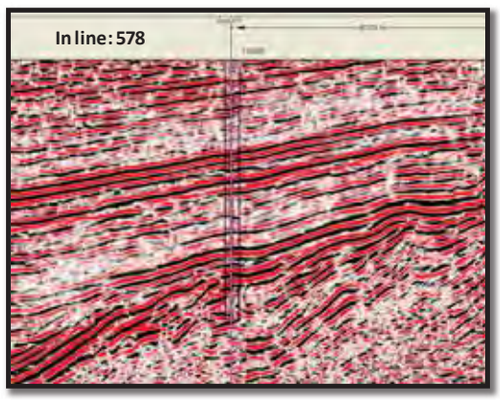
Structure/ Location & Well No.	Testing Results	Leads/ Expl. Efficacy
Jyoti-1, Kargat	Object III: 2575m-2580m, Ankleswar formation Mid upper Eocene Flowed Oil upto 830 BOPD at 32/64 inch choke Well head pressure: 286 psi/ 390 C	Hydrocarbon potentiality of Ankleswar formation has been established by this discovery



Depth Structure map



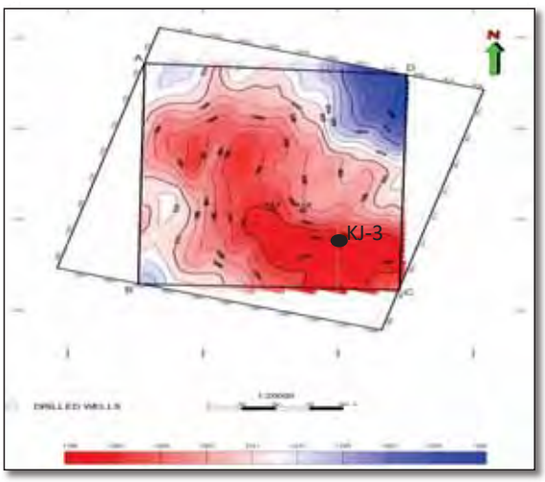
Depth Structure map



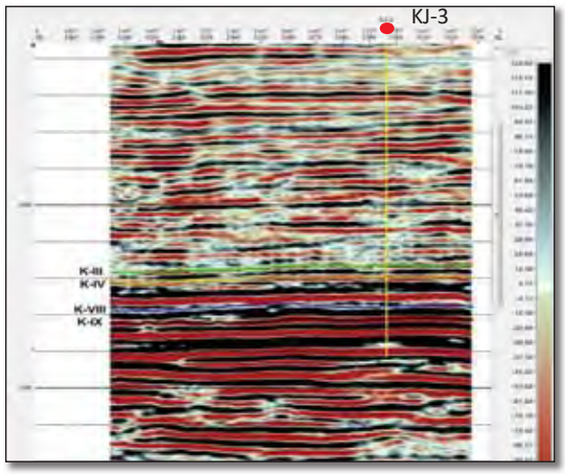
Depth Structure map

Karjisan-3 (Karjisan Field) **OPERATOR: SELAN**

Structure/ Location & Well No.	Testing Results	Leads/ Expl. Efficacy
Karjisan#3	Object III: 1336-1338m, Kalol (K-IV) Oil flowed @ 46 SCMD under SRP	Kalol-IV zone has been established as a hydrocarbon (Oil) bearing zone.



Time Structure Map at K-IV level

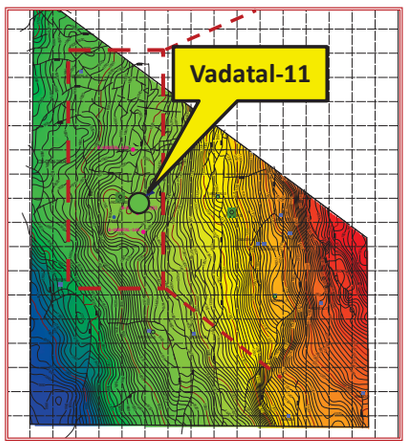


Inline showing KJ-3 location

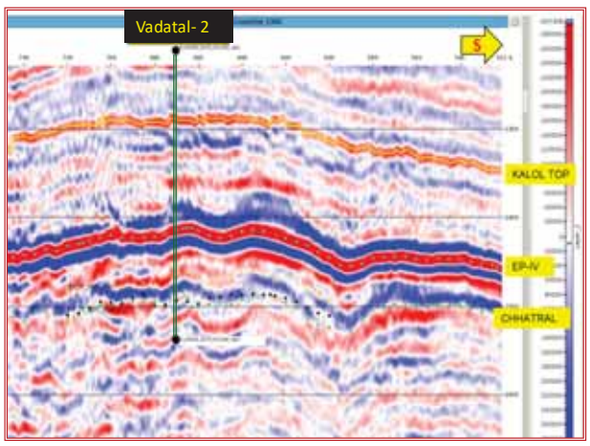
Format A is yet to be received from Operator. Details filled above are as per the witnessing report submitted by DGH representative. As per the N.O., there are some delivery point /PSC related issues. On the basis of the decision on delivery point, Operator will submit Format-A for the said discovery.

Western Onshore VADATAL-11 (CB-ONN-2004/2) **OPERATOR-ONGC**

Structure/ Location & Well No.	Testing Results	Leads/ Expl. Efficacy
Vadatal/ Vadatal-11 (VDAI)	Object IV: 1515.5- 1506.5m, K-VIII / Middle EoceneTotal Oil influx of 23.2 SCM during activation & reverse out (HF job) . API gravity of Oil: 31.50 Oil producer from Chhatral on SRP @ ~0.5 SCMD	This discovery has opened up new area for K-VIII pays in the Vadatal and adjoining area which needs to be chased for further success. The testing results of Vadatal-11 has established presence of hydrocarbon in K-VIII Pay Sand in the block, CB-ONN-2004/2 which has provided leads for further exploration in the area. New pay within Chhatral Formation. Kalol formation of Eocene age. New propspect discovery of Oil in Kalol pay in this block adds value to already established EP-IV and Chhatral pays in the block.



TWT Close to Chhatral Top

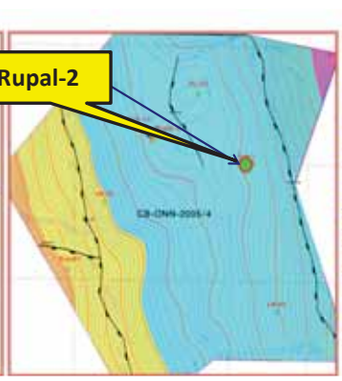


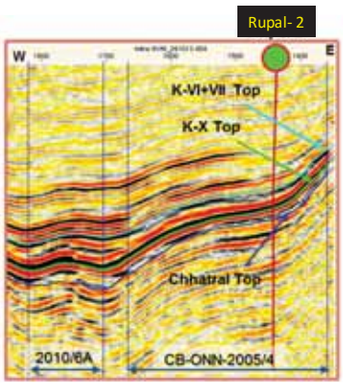
XL-380 Passing Through Well, VD-11

Rupal-2(CB-ONN-2005/4) **OPERATOR-ONGC**

Structure/ Location & Well No.	Testing Results	Leads/ Expl. Efficacy
Rupal / Rupal-2	Obj-I: 1636-28 & 1622-1615.5 m, Observed flow of thick Oil – total Oil recovered: approx. 7.5 SCM.	Operator has carried out feasibility of MOER job in Rupal-2 to improve flow assurance of waxy Oil from Chhatral formation. However, the MOER lab study has not given the encouraging results. On the basis of the said result discovery appears to be uneconomical and hence ONGC is intending to relinquish the block. However , this is the first discovery made in the NELP block, CB-ONN-2005/4. The presence of hydrocarbon in Chhatral Pay has provided leads for further exploration in the area.

Prospect Map of Ahmedabad Block

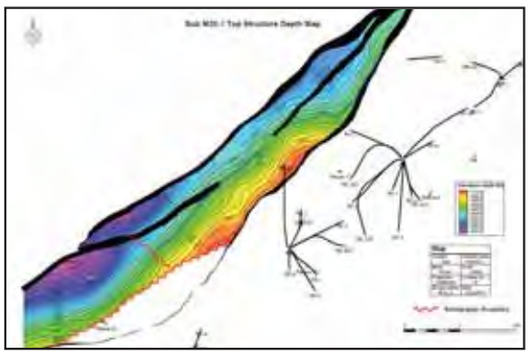

Time structure map close to Chhatral Top



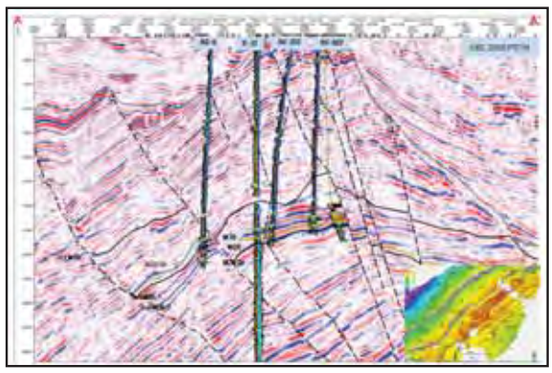
3D Seismic Inline Thru Well, Rupal-2

RE-6/RAVVA **OPERATOR: CAIRN**

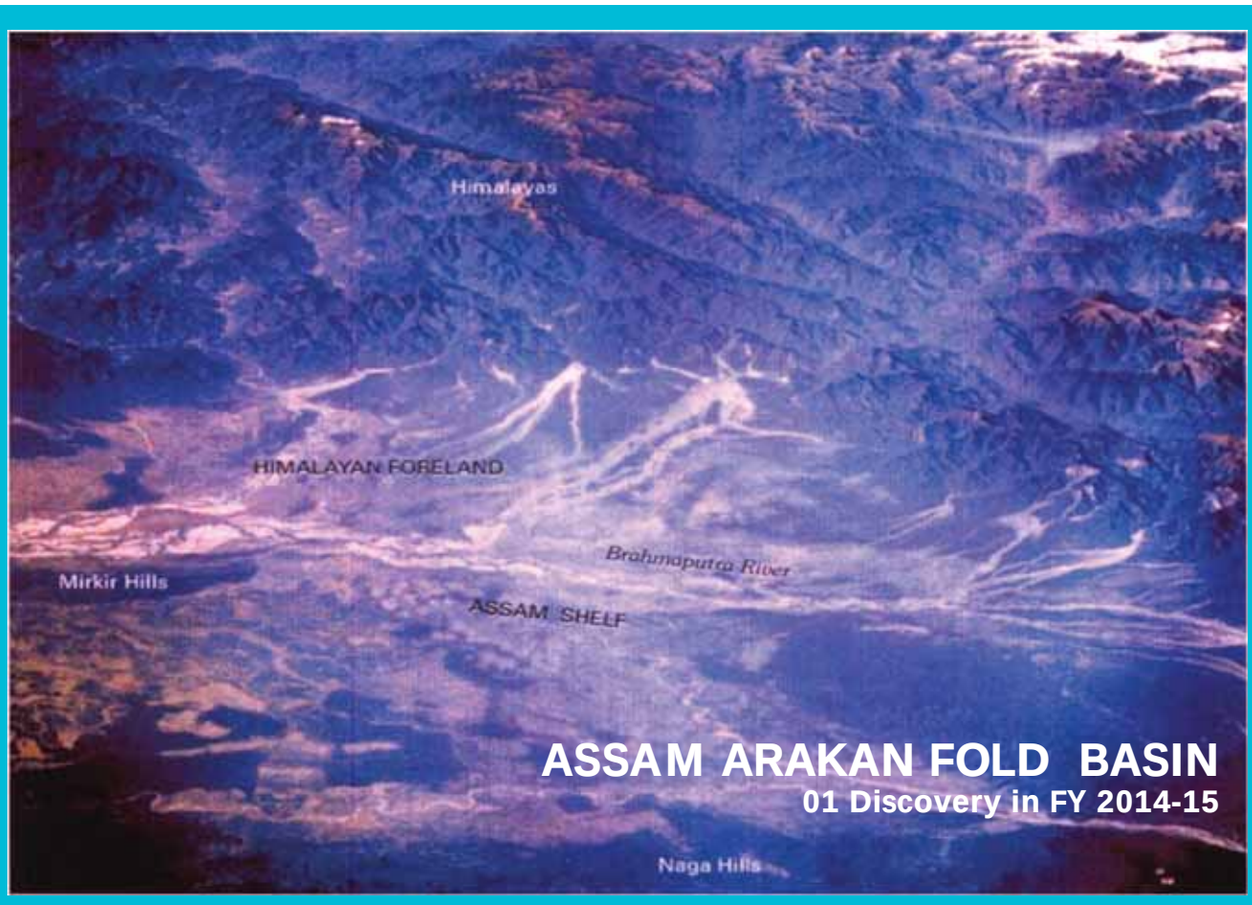
Structure/ Location & Well No.	Testing Results	Leads/ Expl. Efficacy
Ravva Block (PKGM-1)/ RE-6	M30 (2443.9- 2483.5 m MD): Qo- 4335 BOPD and Qg- 552220 SCMD through choke 72/64", M20 (2489.4- 2506.7 m MD): Qo- 1206 BOPD and Qg- 275664 SCMD through choke 56/64" and Sub M20 (2510.9- 2522.0 m MD): Qo- 6630 BOPD and Qg- 81597 SCMD through Choke 80/64" / Sands within Middle Miocene age.	RE-6 pool is a combination structural/ stratigraphic trap within an erosional remnant of Middle Miocene sands eroded by the Lower late Miocene sequence boundary and sealed by Lower Late Miocene Shale. Discovered new pool within RE North fault block.



Structure depth map of Sub M20 pay sand



Arbitrary seismic section through RE-6, R-12, RF-2ST, RF-7 and RF-5ST

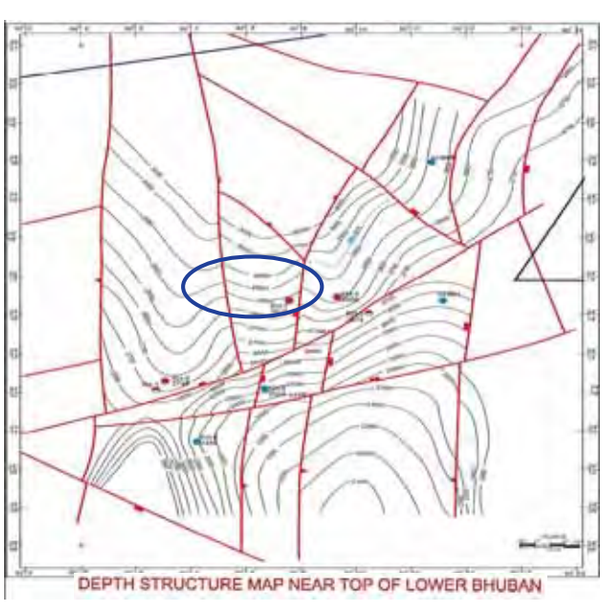


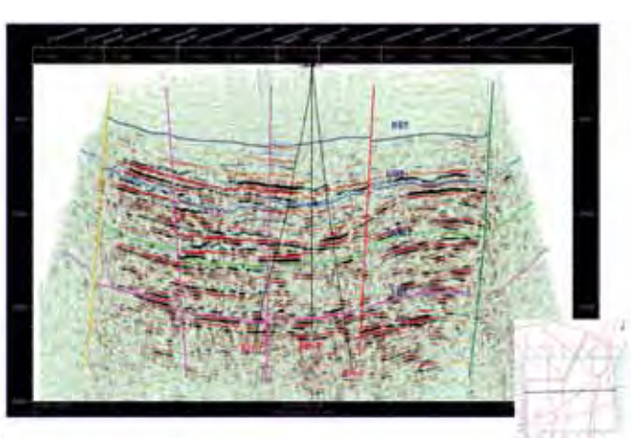
ASSAM ARAKAN FOLD BASIN

01 Discovery in FY 2014-15

KHBJ (AA-ONN-2001/1) **OPERATOR: CAIRN**

Structure/ Location & Well No.	Testing Results	Leads/ Expl. Efficacy
KHBJ/KH-7(Khubal-7)	Object-I (3111-3116m) : Flowed gas @ 30,000 SCMD through 8mm bean. Object- II (3085-3094m): Flowed gas @ 100,800 SCMD from Barail Pay of Oligocene age.	Established potential of Barail pay sand of Oligocene age.


DEPTH STRUCTURE MAP NEAR TOP OF LOWER BHUBAN


Interpreted In line (1163) passing through Well KH-7

4.3. Development Activities

4.3.1 Development Activities in FY 2014-15:

In the FY 2014-15, a total of 430 development wells were drilled by NOCs (ONGC & OIL) and Private/JVs which accounts for a development meterage of 83,076,336-m.

Table 4.9 : Development activities in FY 2014-15:

Subject	Parameter	ONGC (Nomination)	Oil (Nomination)	Pvt/JVs	Total
Development wells drilled	Onland	214	24	130	368
	Offshore	54	0	8	62
	TOTAL	**268**	**24**	**138**	**430**
Development meterage drilled	Onland ('000 M)	386.13	82349	186.04	82921.17
	Offshore ('000 M)	140.91	0	14.25	155.16
	TOTAL	**527.04**	**82349**	**200.30**	**83076.34**

4.3.2. Major Discoveries in Development phase in FY 2014-15

There are seven major discoveries which have entered development phase. The details of these discoveries and its development plan is as under:

4.3.2.1. D-34 Discovery

The Dhirubhai-34 (D-34) gas discovery is in the southern part of block KG-DWN-98/3 (KGD-6) in the Krishna-Godavari basin. RIL is the operator of this block.D-34 discovery was notified in well D6-R1 which struck two gas reservoirs i.e. Middle and late Miocene sequences. There are six gas reservoirs in Late Miocene and Late Pliocene sequences in addition to the appraisal of the Mid Miocene reservoir in the area adjoining the discovery well D6-R1. In total, there are eight reservoirs in this area which are referred together as "R-cluster".

Block:	KG-DWN-98/3
Location:	KG Basin (Offshore)
Round:	NELP-I
Development Area:	530 sq. km (ML area)
Consortium	RIL (60%), BP (30%), NIKO/NECO(10%)
Operator	RIL
Expected commencement of gas production	August 2017

4.3.2.2. Five Satellite Gas Fields (D-2, D-6, D-19 and D-22)

Four satellite Gas Fields Dhirubhai-2, D-6, D-19 and D-22 have entered development phase in the block KG-DWN-98/3. The D-2 field was discovered as a result of drilling the exploratory well DD-6-C1-ST1 in July 2002 at a water depth of 1332-m which subsequently led to discoveries of D-6, D-19 and D-22. These isolated discoveries are collectively referred as Dhirubhai four satellite gas fields. Hydrocarbons found in these fields are of Late Miocene to Pliocene age.

The major reservoir systems identified are submarine channel-fan complexes, mostly sinuous with Multiple channels stacked together resulting in both vertical and lateral aggradations. A number of Facies sequence viz. Channel/Levee, muddy turbidite, debris flows have been identified in the wells drilled indicating excellent to moderate reservoir potential and good reservoir quality in terms of net pay, effective porosity, permeability and shale volume.

Block:	KG-DWN-98/3
Location:	KG Basin (Offshore)
Round:	NELP-I
Development Area:	229 sq. km (ML area)
Consortium	RIL (60%), BP (30%), NIKO/NECO(10%)
Operator	RIL
Expected commencement of gas production	Mid 2016

4.3.2.3. Gulf-A

Block:	CB-OS-1
Location:	Cambay Onshore
Round:	Pre-NELP
Development Area:	60 sq. km.
Consortium	ONGC (55.26%)-HOEC (38.04%)-TPL (6.7%)
Operator	ONGC
Expected commencement of gas production	Yet to be firmed up (2 Producers and 1 injector to be drilled)

4.4. Oil & Gas Production

The targeted crude oil production for Oil and Natural Gas Corporation Limited (ONGC), Oil India Limited (Oil) and PSC-regime for the year 2014-15 was at 38.763 million metric tonnes (MMT) and the actual production achieved was 37.461 MMT. The crude Oil production in 2014-15 was 97% of the target production and showed a decrease of 1% when compared to production of 37.790 MMT during 2013-14. The production of natural gas during 2014-15, was targeted at 36.62 Billion Cubic Meters (BCM), whereas the actual production was 33.657 BCM. The natural gas production in 2014-15 was 92% of the target production and showed a decrease of 5% when compared to production of 35.407 BCM during 2013-14.

In the upstream sector, the two Upstream National Oil Companies (NOCs) viz., ONGC and OIL play a dominant role with a total share of about 71% in Oil and Oil Equivalent gas (O+OEG) production in the country. In 2014-15, ONGC produced nearly 59% of indigenous crude oil and 65% of the country's gas production, while OIL's share was 9% of indigenous crude oil and 8% of gas production. The share of Private/Joint Venture (JV) companies in oil and gas production was about 32% and 27% respectively. Crude Oil and Natural Gas production basin-wise by ONGC, OIL and Private/JV companies during 2014-15 is as given in Table 4.10.

4.4.1. Oil and Gas Production in PSC Regime in 2014-15:

Under the PSC regime, in 2014-15, 35 oil & gas blocks and 5 CBM blocks were under production. A total of 16 companies were operating in these producing fields/ blocks in 2014-15. Currently, Crude Oil and Natural Gas production is from seven sedimentary basins of the country which are - Rajasthan, Assam-Arakan, Assam Shelf Basin, Cambay, Cauvery, Krishna-Godavari and Mumbai.

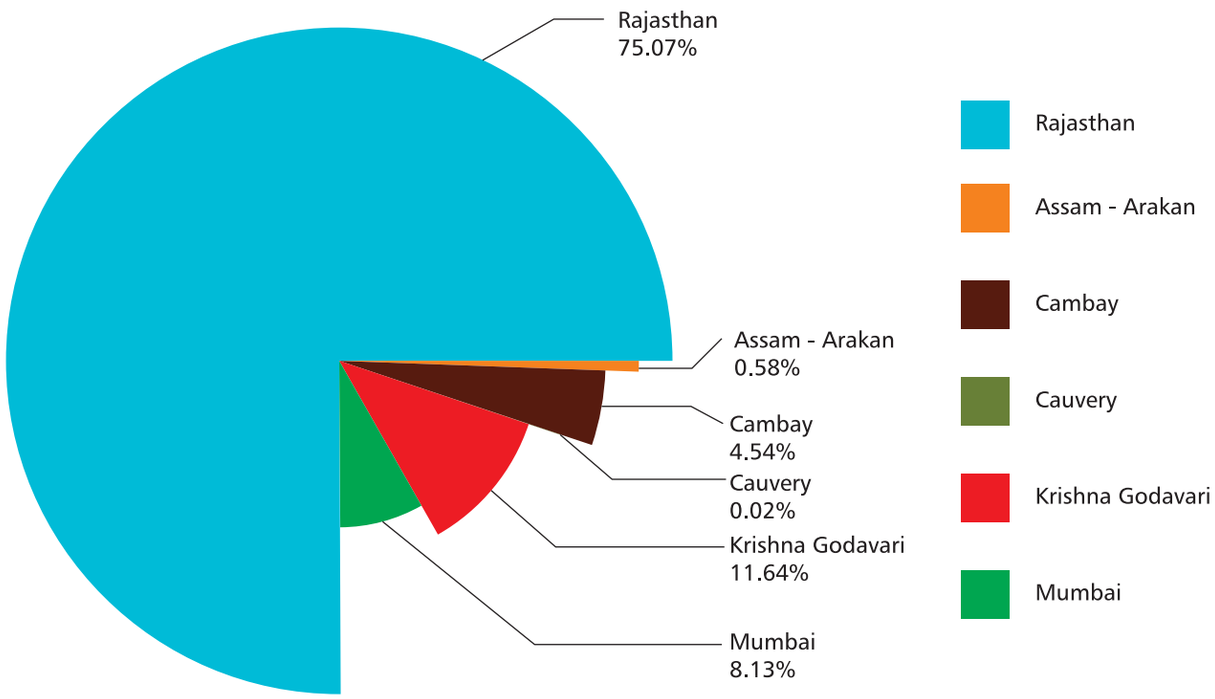
Crude Oil production during 2014–15 was 11,785 TMT as against the target of 11,654 TMT. Achievement with respect to target was 101.1 % and w.r.t 2013-14 it was 97.6 %. Majority of the oil produced was from the Rajasthan basin (75%), followed by Krishna Godavari Basin (11.64%). In 2014-15, the share of offshore crude oil production was about 23% and the remaining crude oil production was from 3 States viz., Rajasthan, Gujarat and Arunachal Pradesh. In RJ-ON-90/1 block of Rajasthan Basin, newly discovered fields of NI and NE were put on production in September 2014 and in December 2014, respectively. Beside that oil production also started in March 2015 from 3 NELP Blocks operated by ONGC, namely CB-ONN-2004/1 (Karan Nagar), CB-ONN-2004/2 (Vadatal-1) and CB-ONN-2002/1 (West Patan-3).

Gas production under PSC Regime during 2014 -15 is 8,912 MMSCM as against the target of 9,782 MMSCM. Achievement w.r.t. target is 91 % and that of w.r.t. 2013–14 is 93.8 %. In CBM blocks, the gas production during FY 2014-2015 was 228 MMSCM. Majority of the gas is coming from Krishna Godavari basin (55%), followed by Mumbai basin (28.6%). In 2014-15, the share of offshore natural gas production was about 85%. The remaining natural gas production including CBM was from 6 States viz., Rajasthan (10.9%), Gujarat (1.15%), West Bengal (2.51%), Arunachal Pradesh (0.24%), Jharkhand (0.03%) and Madhya Pradesh (0.02%).

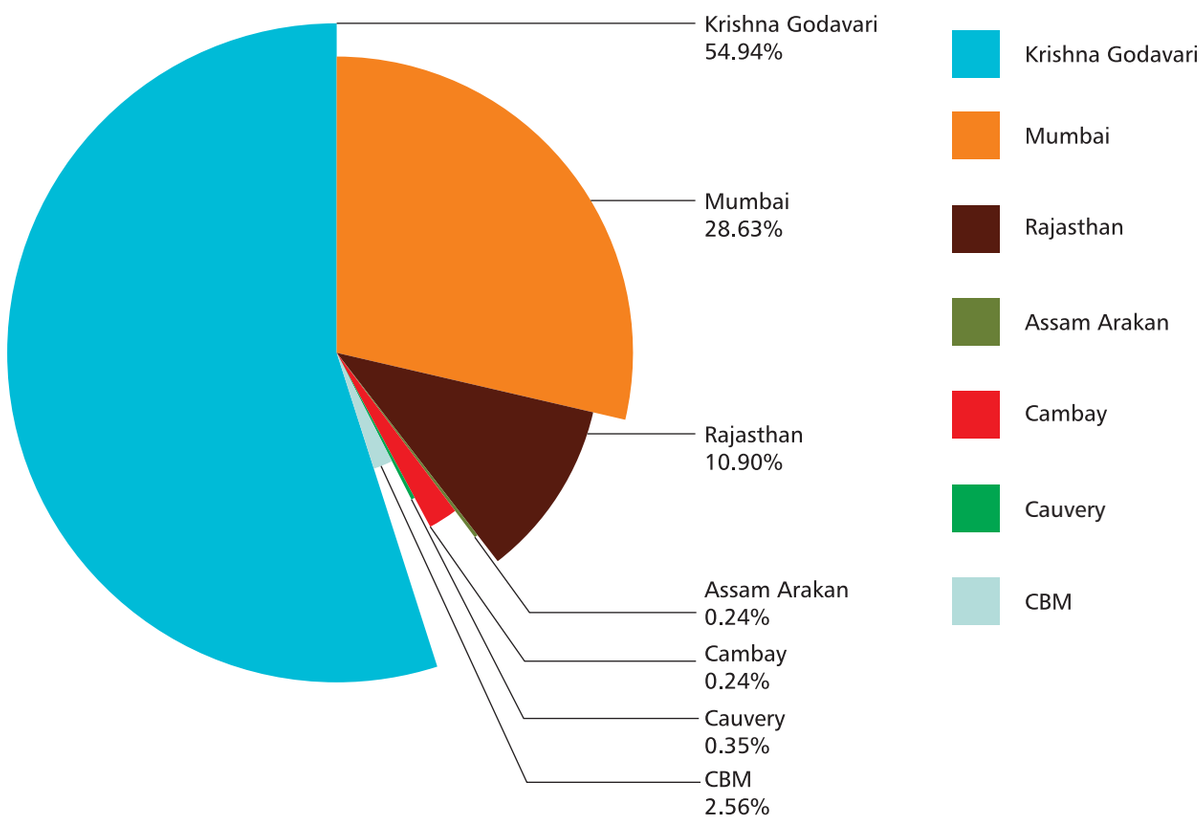
Table: 4.10 : Basin wise and Operator wise Production of country in FY 2014-15

Sl. No.	COMPANY/ OPERATOR	BASIN	OIL (MMT)*	GAS (MMSCM)	O+OEG (MMT)
NATIONAL OIL COMPANIES (NOC)					
1	ONGC	Rajasthan		6.08	0.01
2		Cambay	4.51	1424.34	5.94
3		Cauvery Onland	0.24	1192	1.43
4		KG(Onland & Offshore)	0.27	660	0.93
5		Assam-Arakan	1.061	1589.07	2.66
6		Mumbai Offshore	16.18	17152	33.33
TOTAL ONGC			**22.26**	**22023.49**	**44.29**
7	OIL		0.20	200.66	0.21
8			5.93	2521.34	5.93
TOTAL OIL			**3.41**	**2722.22**	**6.13**
TOTAL NOCs			**25.68**	**24745.71**	**50.42**
PVT/JV COMPANIES (PSC)					
9	CAIRN	KG Offshore	1.10	324.13	1.43
10		Gulf of Cambay	0.34	109.82	0.51
11		Rajasthan	8.84	605.68	9.45
12	RIL	KG Offshore	0.27	4461.91	4.73
13	BG-RIL-ONGC	Mumbai Offshore	0.96	2551.23	3.51
14	GEO-ENPRO	Assam-Arakan & Assam Shelf	0.07	21.63	0.09
15	HOEC	Cambay	0.01	8.81	0.02
16		Cauvery Offshore	0.002	31.62	0.03
17	JTI	Cambay	0.05	15.41	0.06
18	NIKO	Cambay	0.01	55.35	0.06
19	SELAN	Cambay	0.02	7.3	0.03
20	HERAMAC	Cambay	0.01	6.61	0.02
21	HRDCL - PPCL	Cambay	0	0.07	0
22	GSPCL	Cambay	0.046	8.64	0.06
23		Krishna Godavari	0.004	110.16	0.11
24	OilEX	Cambay	0.001	0	0.001
25	ESSAR	Cambay	0.002	0	0.002
26	FOCUS	Rajasthan	0.003	365.35	0.37
TOTAL PVT/JV			**11.79**	**8683.71**	**20.47**
COAL BED METHANE (CBM)					
1	GEECL	Raniganj South		132.35	0.13
2	ESSAR	Raniganj East		91.33	0.09
3	ONGC	Jharia		2.48	0.002
4	RIL	Sohagpur East / West		2.08	0.002
TOTAL CBM				**228.24**	**0.23**
INDIA GRAND TOTAL			**37.46**	**33657**	**71.12**

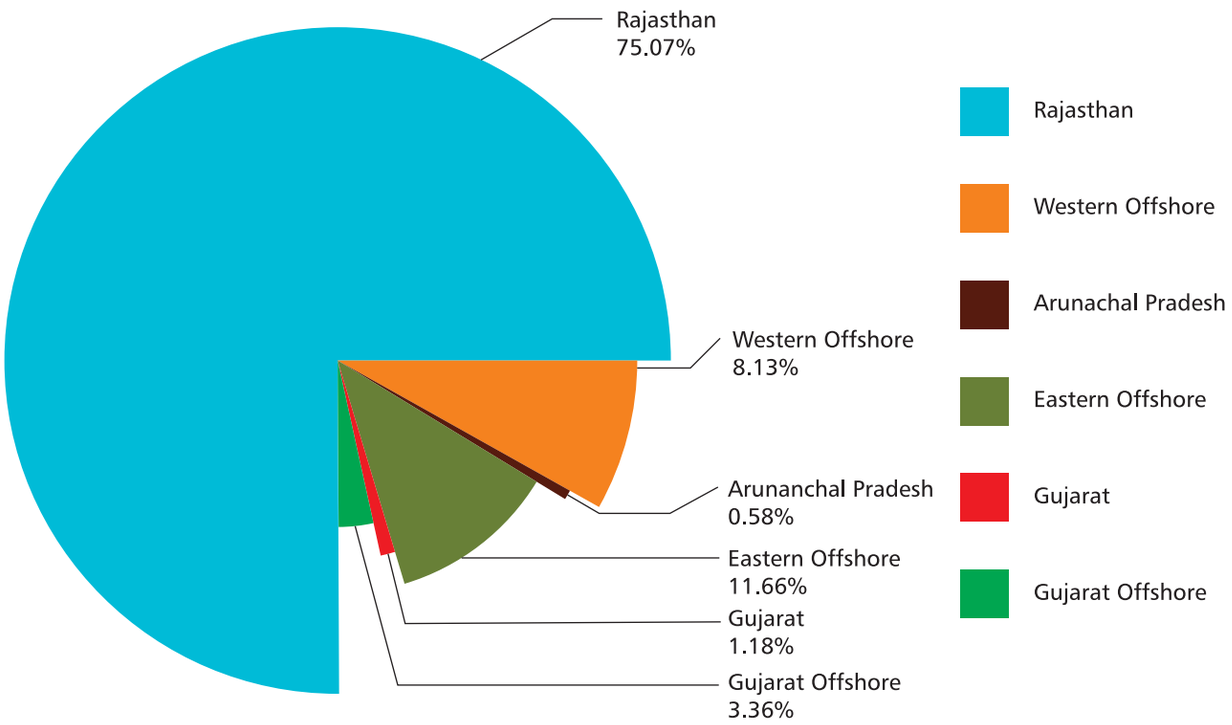
Basin-wise Oil Production in PSC Regime - FY 2014-15



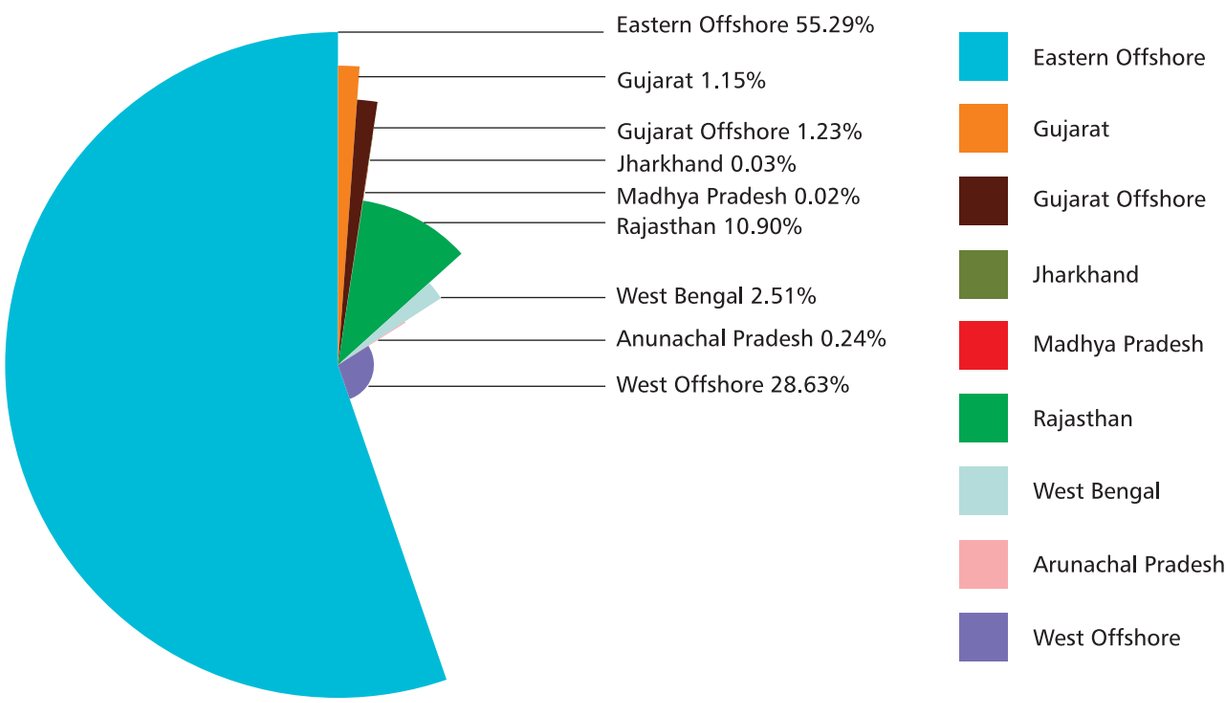
Basin-wise Gas Production in PSC Regime - 2014-15



Location - wise Oil Production in PSC Regime - FY 2014-15



Location - wise Gas Production in PSC Regime - FY 2014-15



4.4.2. Fields which commenced production in FY 2014-15

The major fields that have commenced production during FY 2014-15 are as under: (All data as on 31.03.2015)

A. West Patan

Basin name:	Cambay	**Block name:**	CB-ONN-2002/1
Field	West Patan	**Location (State)**	Gujarat
Round	NELP	**Original Area (SKM)**	135 SKM
Present PEL Area (SKM)	17 SKM	**Present ML Area (SKM)**	17 SKM
Consortium	ONGC	**Operator**	ONGC
Date of commencement of production	31 March, 2015	**Oil/Gas**	Oil

B. Karan Nagar

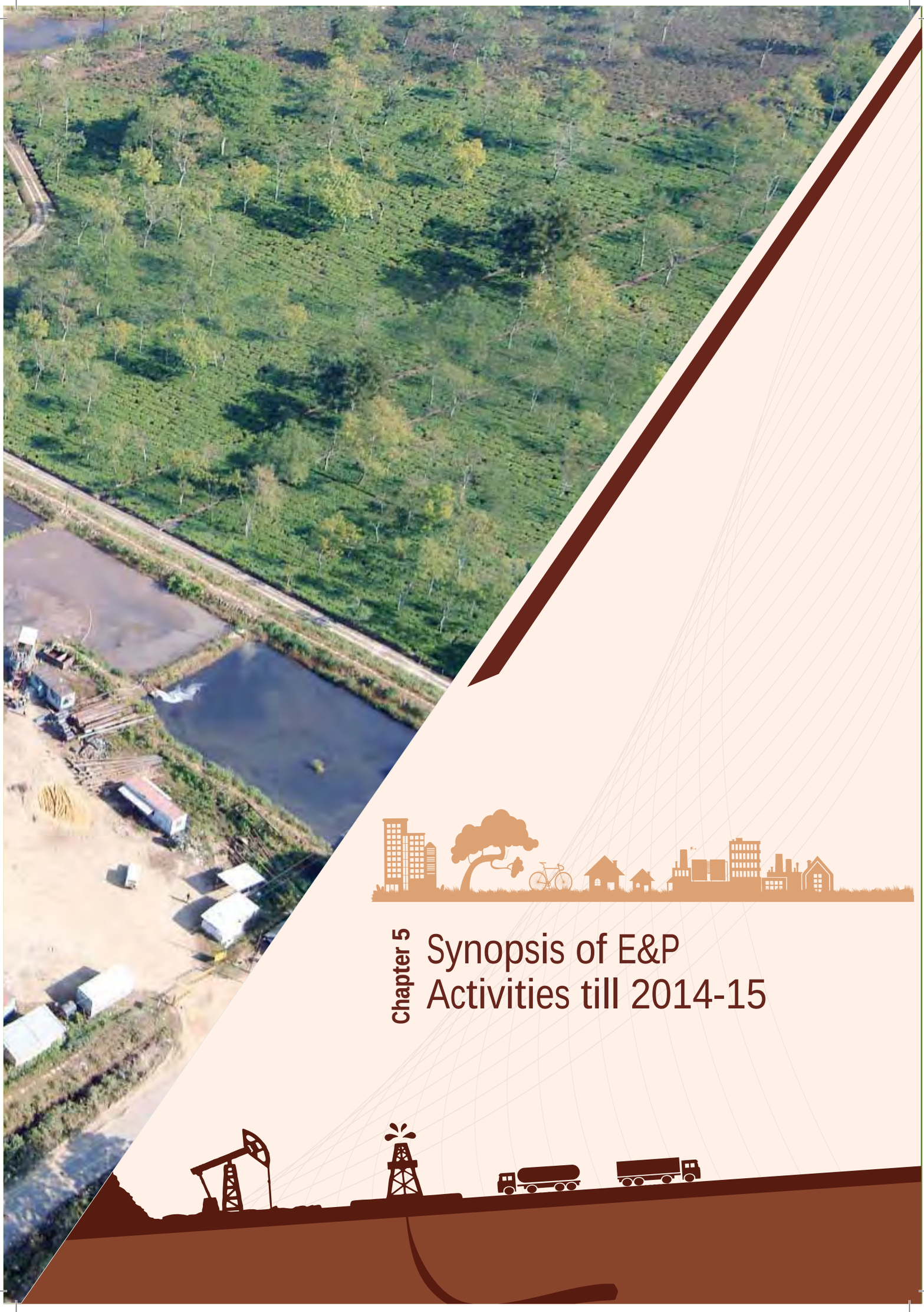
Basin	Cambay	**Block Name**	CB-ONN-2004/1
Field	Karan Nagar	**Location(State)**	Gujarat
Round	VI	**Original Area (SKM)**	32
Present PEL Area (SKM)	9.73	**Present ML Area (SKM)**	9.73
Consortium	ONGC-50, GSPC-40, HERAMEC-10	**Operator**	ONGC
Date of commencement of production	24 March, 2015	**Oil/Gas**	Oil

C. Vadatal

Basin name:	Cambay	**Block name:**	CB-ONN-2004/2
Field	Vadatal	**Location(State)**	Gujarat
Round	VI	**Original Area (SKM)**	423
Present PEL Area (SKM)	423	**Present ML Area (SKM)**	423
Consortium	ONGC-55, GSPC-45	**Operator**	ONGC
Date of commencement of production	26 March, 2015	**Oil/Gas**	Oil

D. Deendayal

Basin name:	Krishna-Godavari	**Block name:**	KG-OSN-2001/3
Field	KG-8, KG-17 and KG-15	**Location(State)**	Eastern Offshore
Round	NELP-III	**Original Area (SKM)**	
Present PEL Area (SKM)	17 (Sq. Km)	**Present ML Area (SKM)**	17
Consortium	GSPC (80%), JODPL (10%) & GGR (10%)	**Operator**	GSPC
Date of commencement of production	Under trial production since Aug/Sept, 2014	**Oil/Gas**	Gas



Chapter 5

Synopsis of E&P Activities till 2014-15

5
Synopsis of E&P Activities till 2014-15

After implementation of New Exploration Licensing Policy (NELP) and Coal Bed Methane (CBM) Policy by Government of India, the requisite thrust was rendered to Exploration and Production sector in India. These policies enabled a level playing field to the Private investors by providing them the same fiscal and contractual terms as was provided to National Oil Companies (NOCs) for the offered exploration acreage.

5.1. Exploration activities in Blocks

The company wise exploratory inputs since inception till 2014-15 are as under:

5.1.1. Exploratory efforts by PSUs

Oil PSUs have carried out 1,160,152.08 Line Kilometers (LKM) of 2D seismic survey, 281,482.96 Sq. Km of 3D seismic survey and drilled 6,384 Exploratory wells since inception as on 31.03.2015. The company-wise details of exploratory efforts in terms of 2D, 3D seismic and Exploratory wells are as under:

Table 5.1 : Exploratory efforts by PSUs since inception (till 2014-15)

Sl.No.	Company (Operator)	2D Seismic (LKM)	3D Seismic (SQ.KM)	Exploratory Wells (Nos.)
1	ONGC-Nomination	882,067.98	107,563.04	5,725
2	Oil India Ltd. -Nomination	73,356.80	12,479.13	351
3	ONGC - PSC regime	196,274.10	141,639.24	205
4	Oil India Ltd. - PSC regime	2,022.20	7,061.00	78
5	Bharat Petro Resources Ltd	10	90.55	-
6	Gujarat State Petroleum Corporation Ltd.	6,421.00	11,371.00	16
7	Indian Oil Corporation Ltd.	-	277	7
8	GAIL (India) Limited.	-	577	-
9	National Thermal Power Corporation	-	425	2
Grand Total		**1,160,152.08**	**281,482.96**	**6,384**

5.1.2. Exploratory efforts by Private Companies

Indian Private Companies have carried out 105,103 Line Kilometer (LKM) of 2D seismic survey,104,723 Sq. Km. of 3D seismic survey and drilled 278 Exploratory wells since inception as on 31.03.2015. The company-wise details are as under:

Table 5.2 : Exploratory efforts by Pvt. Companies since inception (till 2014-15)

Sl.No.	Company (Operator)	2D Seismic (LKM)	3D Seismic (SQ.KM)	Exploratory Wells (Nos.)
1	Adani Welspun Exploration Ltd.	0	3586	0
2	Essar Oil Ltd.	4425	1619	17
3	Cairn India	2128	1995	48
4	Esveegee Steel (Gujarat) Pvt. Ltd.	0	135	0
5	Focus Energy Ltd.	9521	5361	84
6	Geo Enpro	52	114	2
7	Hindustan Oil Exploration Company Ltd.	626	1860	15
8	Interlink Petroleum Ltd.	0	64	2
9	Jay Polychem (India) Ltd.	0	268	2
10	Jubilant Oil & Gas Private Limited.	665	638	14
11	Mercator Petroleum Private Limited.	773	175	2
12	Prize Petroleum Company Ltd.	2050	304	2
13	Reliance Industries Ltd.	86475	90316	134
14	Selan Expl. Tech. Ltd.	166	132	4
15	Omkar Naturals Resources Pvt. Ltd.	350	83	0
16	Sintex Oil & Gas Pvt. Ltd.	0	68	0
Private Total		**107,231.00**	**106,718.00**	**326**

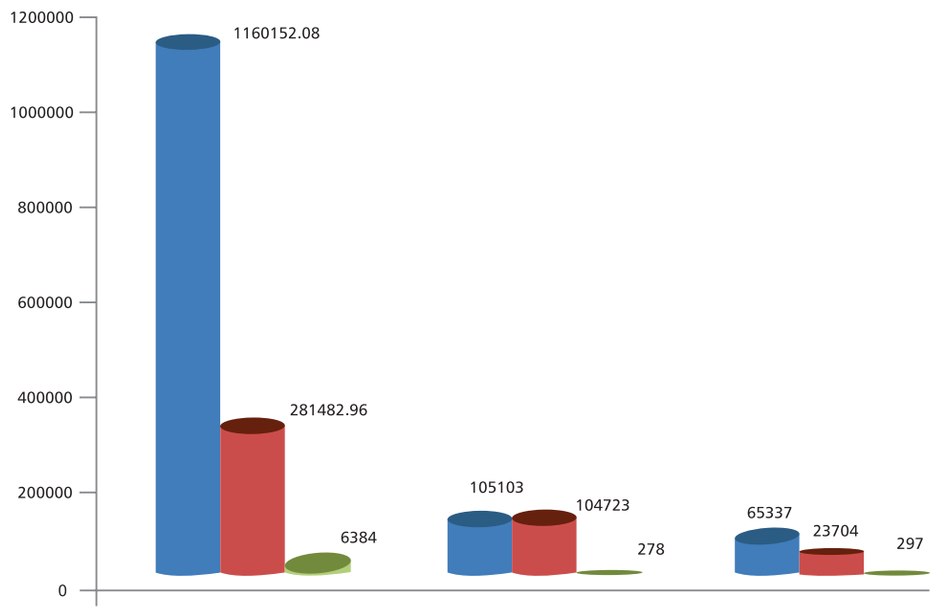
5.1.3. Exploratory efforts by Foreign Companies

Foreign Companies have carried out 63,209 Line Kilometer (LKM) of 2D seismic survey, 21,709 Sq. Km of 3D seismic survey and drilled 249 exploratory wells since inception as on 31.03.2015. The company-wise exploratory efforts are provided in Table 5.3.

Table 5.3 : Exploratory efforts by Foreign Companies since inception (till 2014-15)

Sl. No.	Company (Operator)	2D Seismic (LKM)	3D Seismic (SQ. KM)	Exploratory Wells (Nos.)
1	BHP Billiton Pty. Ltd.	12806	0	0
2	British Gas Exploration and Production (India) Ltd.	2006	5187	15
3	Cairn Energy India Pty Ltd.	18344	6250	180
4	Canoro Resources Ltd.	346	104	4
5	ENI (India) Ltd.	5141	3170	1
6	Geo-Global Resources Inc.	476	0	0
7	Geo-Petrol International Inc.	206	0	0
8	Hardy E&P India Inc.	518	718	4
9	Heramac Ltd.	0	9	2
10	Naftogaz	319	537	8
11	Niko Resources Limited.	161	1304	26
12	OAO Gazprom	4932	530	3
13	Oilex-NL Holdings Ltd	0	178	1
14	Okland Offshore Holdings Ltd.	0	0	1
15	Petrogas	440	1120	3
16	Premier Oil North East India.	261	0	1
17	Santos International Operations Pty. Ltd.	17253	2602	0
Grand Total		**63,209**	**21,709**	**249**

Exploratory Efforts By PSUs/Pvt./Foreign Cos.



	PSU	PVT	FOREIGN
2D (LKM)	1160152.08	105103	65337
3D (SKM)	281482.96	104723	23704
EXPL. WELLS	6384	278	297

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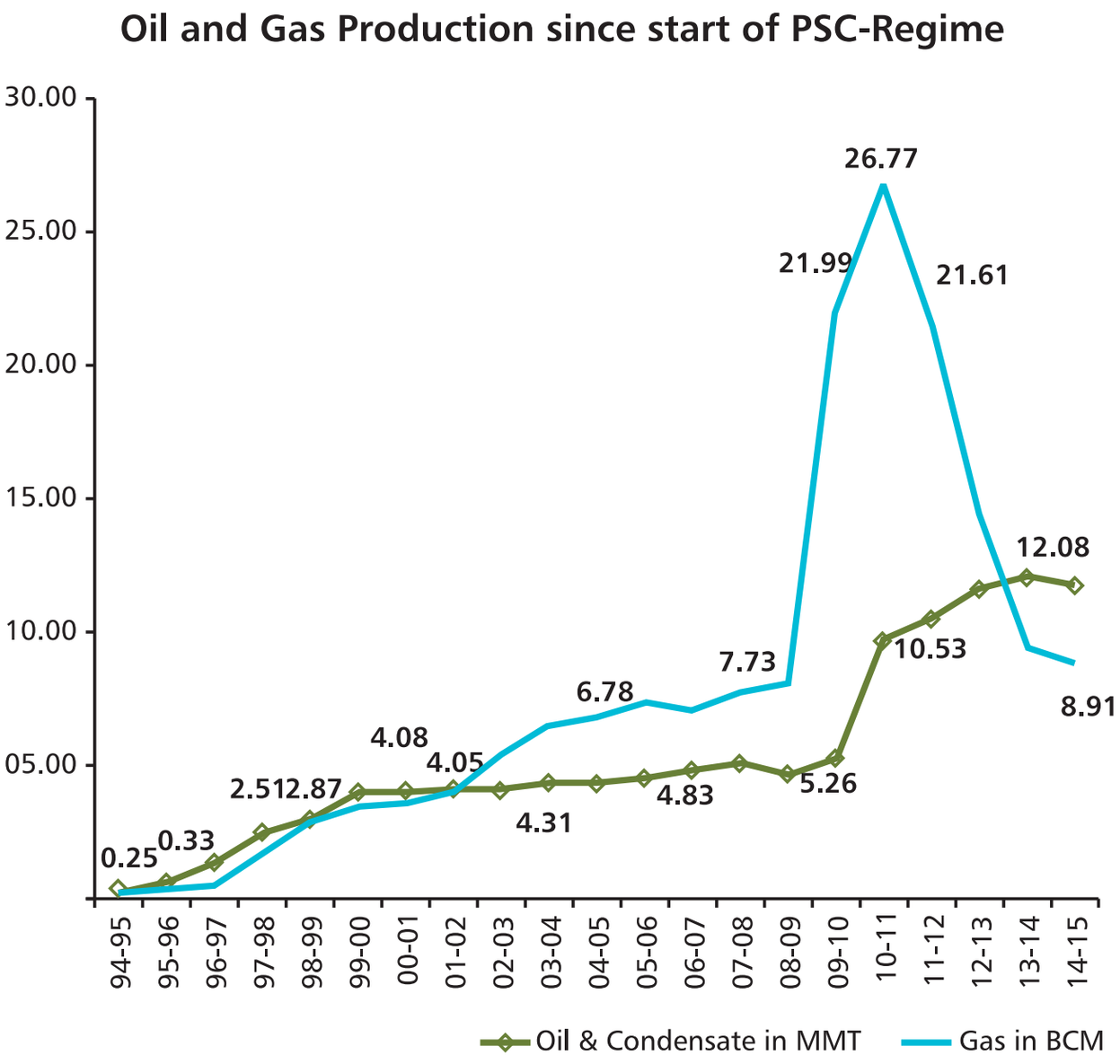
5.2. Oil & Gas production data:

Exploration and Production sector has been opened up after implementation of New Exploration Licensing Policy (NELP) and Coal Bed Methane (CBM) Policy. These policies provide a level playing field to the private investors by giving the same fiscal and contract terms as applicable to National Oil Companies (NOCs) for the offered exploration acreage. Since the implementation of NELP, the Oil and natural gas production till 2014-15 in blocks under PSC regime is given in table below:

Table 5.4 : Year-Wise Production in PSC Regime

Year	OIL ('000 MT)	GAS (MMSCM)
1994-95	254.72	88.01
1995-96	650.41	334.06
1996-97	1345.28	509.99
1997-98	2514.56	1680.75
1998-99	3041.91	2874.07
1999-00	4017.66	3464.64
2000-01	4082.97	3596.00
2001-02	4140.28	4053.80
2002-03	4088.34	5407.01
2003-04	4314.41	6491.46
2004-05	4300.48	6783.80
2005-06	4552.24	7357.63
2006-07	4829.91	7039.70
2007-08	5086.92	7727.39
2008-09	4674.29	8090.04
2009-10	5262.52	21985.12
2010-11	9681.99	26774.49
2011-12	10526.96	21608.96
2012-13	11640.05	14490.88
2013-14	12076.41	9497.09
2014-15	11785.22	8911.95

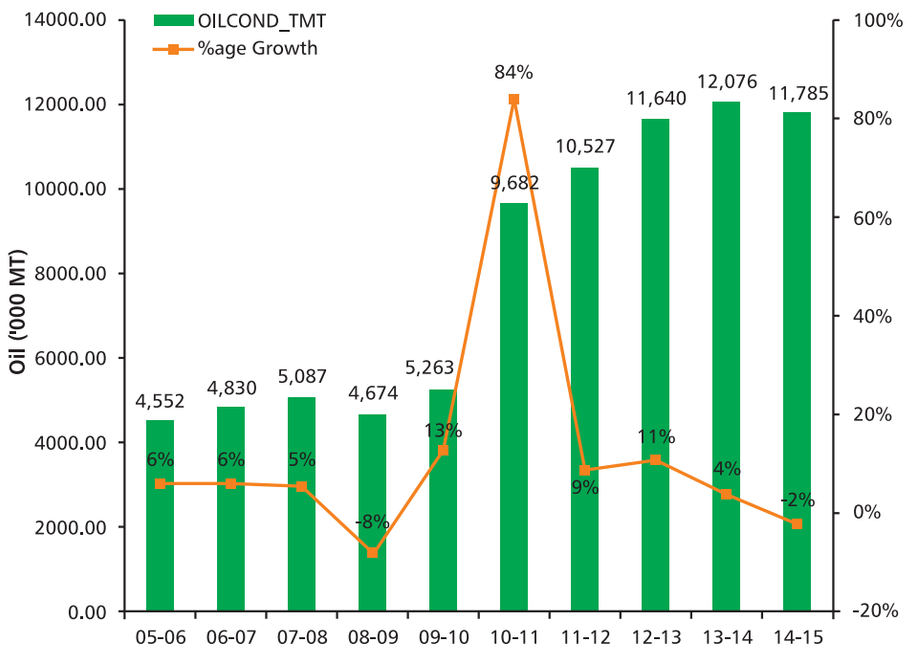
The Oil and gas production trend in blocks and fields operating under PSC regime in the country since inception till 2014-15 is given in graph below:



The crude oil and natural gas production is from seven sedimentary basins of the country which are - Rajasthan, Assam-Arakan, Assam Shelf Basin, Cambay, Cauvery, Krishna-Godavari and Mumbai. The trend in production of crude oil during the period 2005-06 to 2014-15 along with the growth over the previous year is highlighted in the graph below. Over the years, the contribution of oil coming from onshore has increased from 101 TMT in 2005-06 to 9056 TMT in 2014-15 which is mainly attributed to production from Rajasthan Basin.

The trend in production of natural gas during the period 2005-06 to 2014-15 along with the growth over the previous year is highlighted in the graph below. In 2005-06, gas production was 7,358 MMSCM which by 2014-15 reached to 8,912 MMSCM and major chunk of gas production is coming from offshore blocks. However, there was major growth in gas production (172%) in 2009-10 which is mainly attributed to the production coming from offshore block in Krishna Godavari Basin. Also, the incidental gas production from CBM blocks started in 2008-09.

Trend in Crude Oil production in PSC regime during the period 2005-06 to 2014-15 along with the growth over the previous year



Trend in Gas production in PSC regime during the period 2005-06 to 2014-15 along with the growth over the previous year

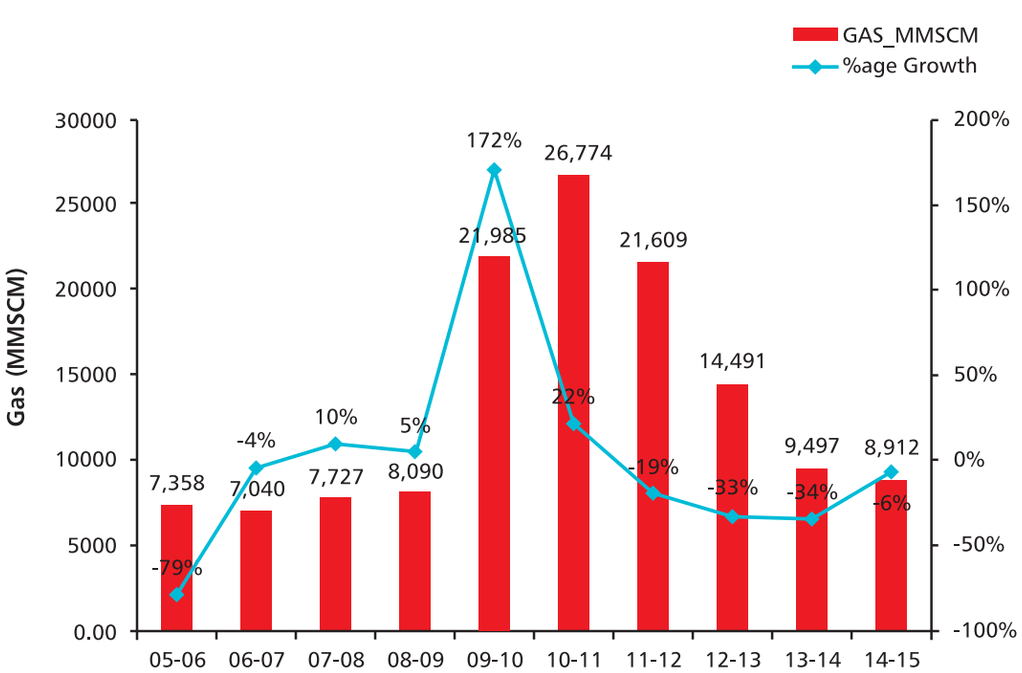
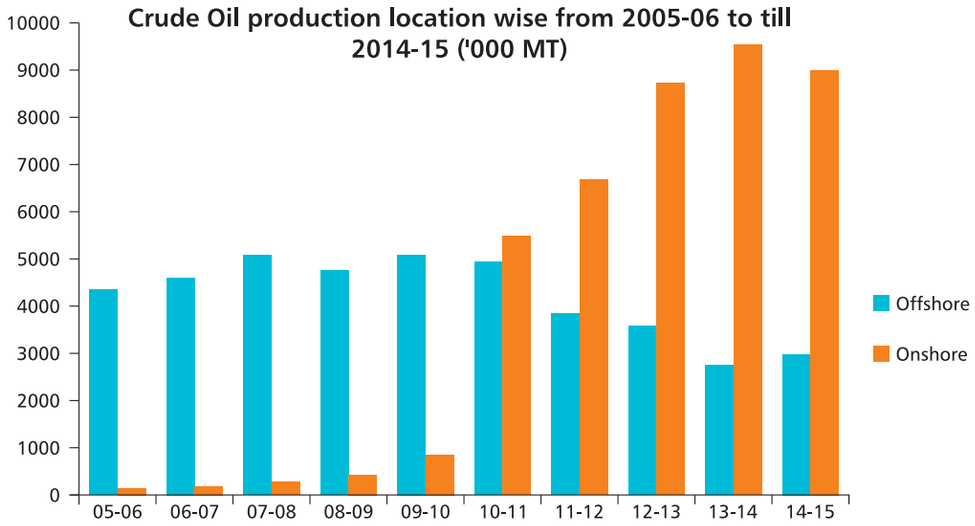
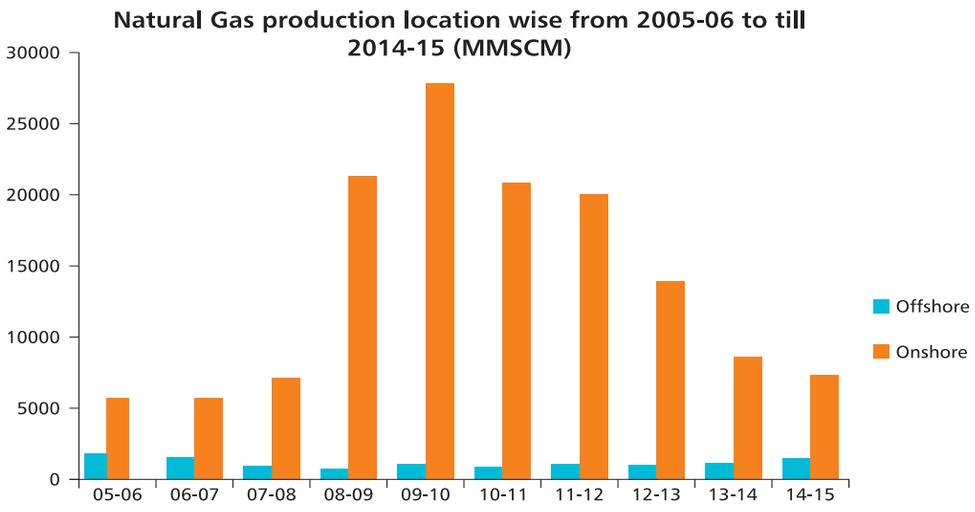


Table 5.5: Location-wise Crude Oil and Natural Gas production in PSC regime from 2005-06 to 2014-15

	OIL ('000 MT)		GAS (MMSCM)		
Year	OFFSHORE	ONSHORE	CBM	ONSHORE	OFFSHORE
05-06	4451.060	101.184	-	1556.708	5800.922
06-07	4669.261	160.644	-	1131.208	5908.489
07-08	4894.930	191.990	-	866.5398	6860.848
08-09	4431.313	242.974	19.786	722.171	7348.088
09-10	4528.776	733.752	38.402	596.958	21349.764
10-11	4281.976	5400.015	41.362	678.672	26054.456
11-12	3733.159	6793.803	84.191	614.936	20909.837
12-13	2803.950	8836.098	107.237	683.716	13699.927
13-14	2662.565	9413.849	165.518	903.907	8427.663
14-15	2729.459	9055.762	228.239	1094.834	7588.877





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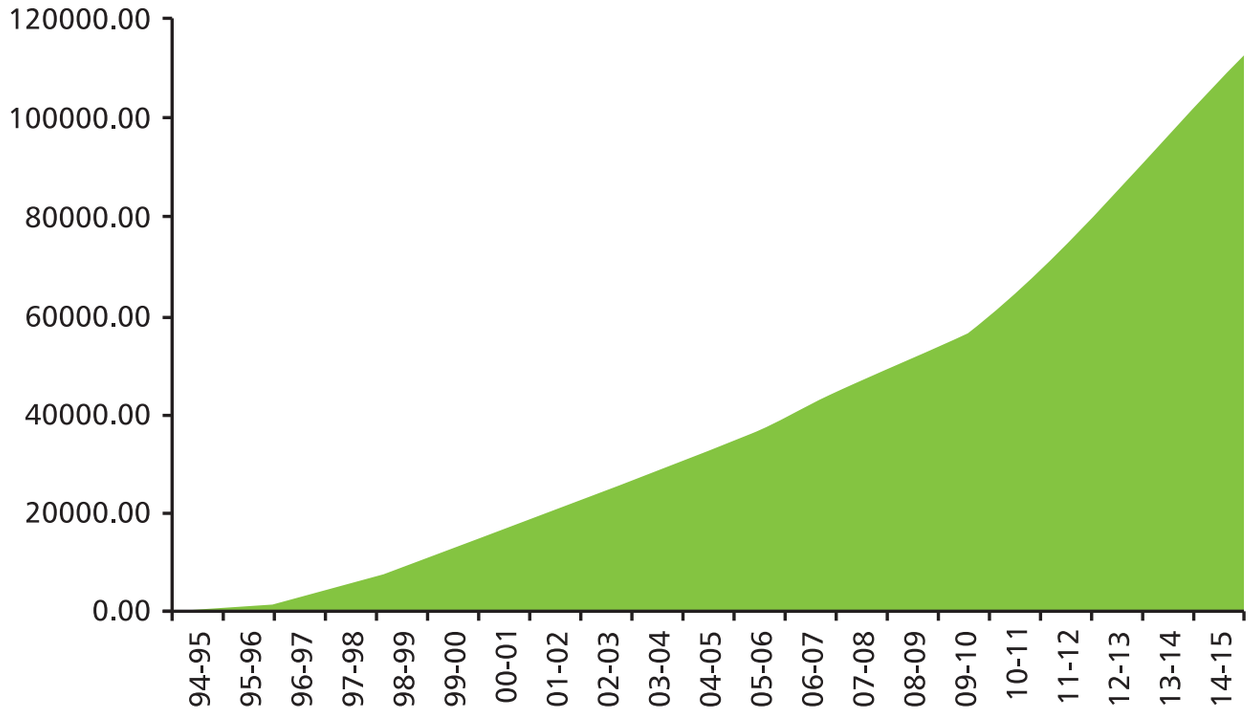
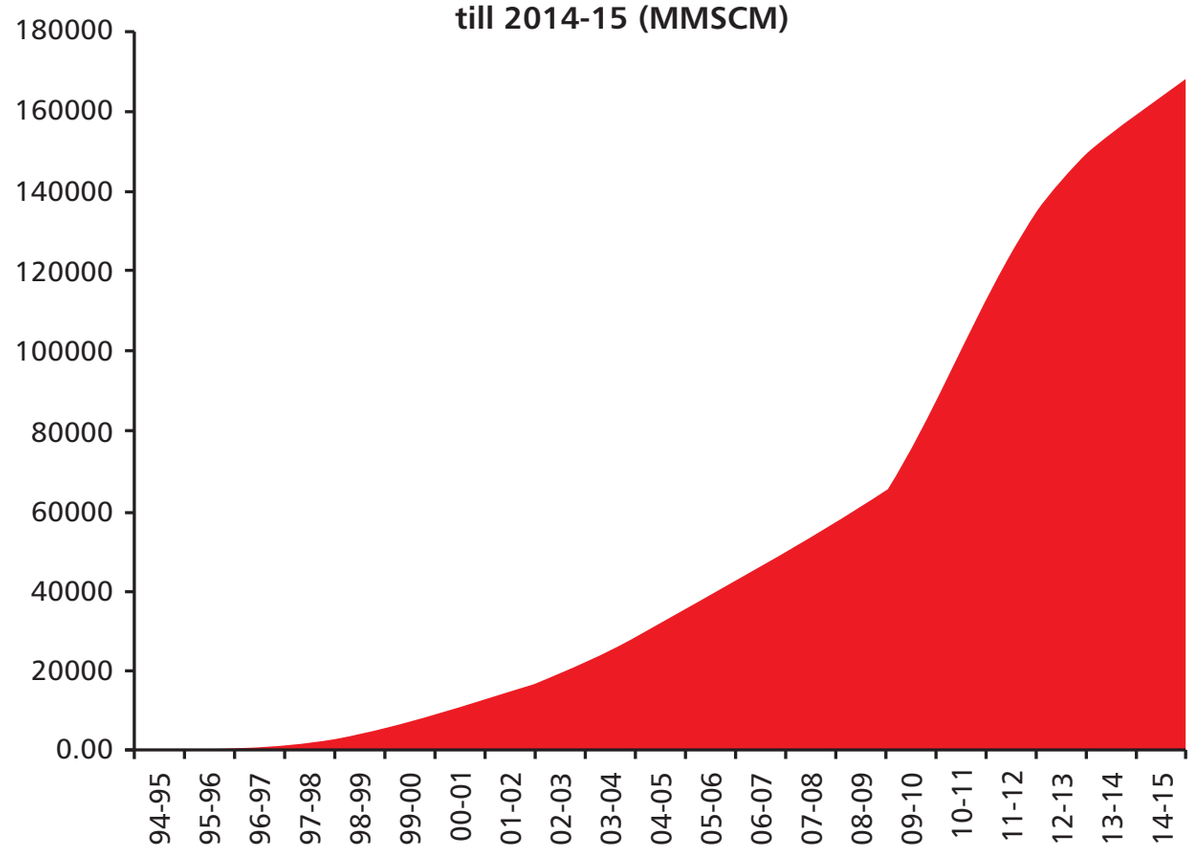
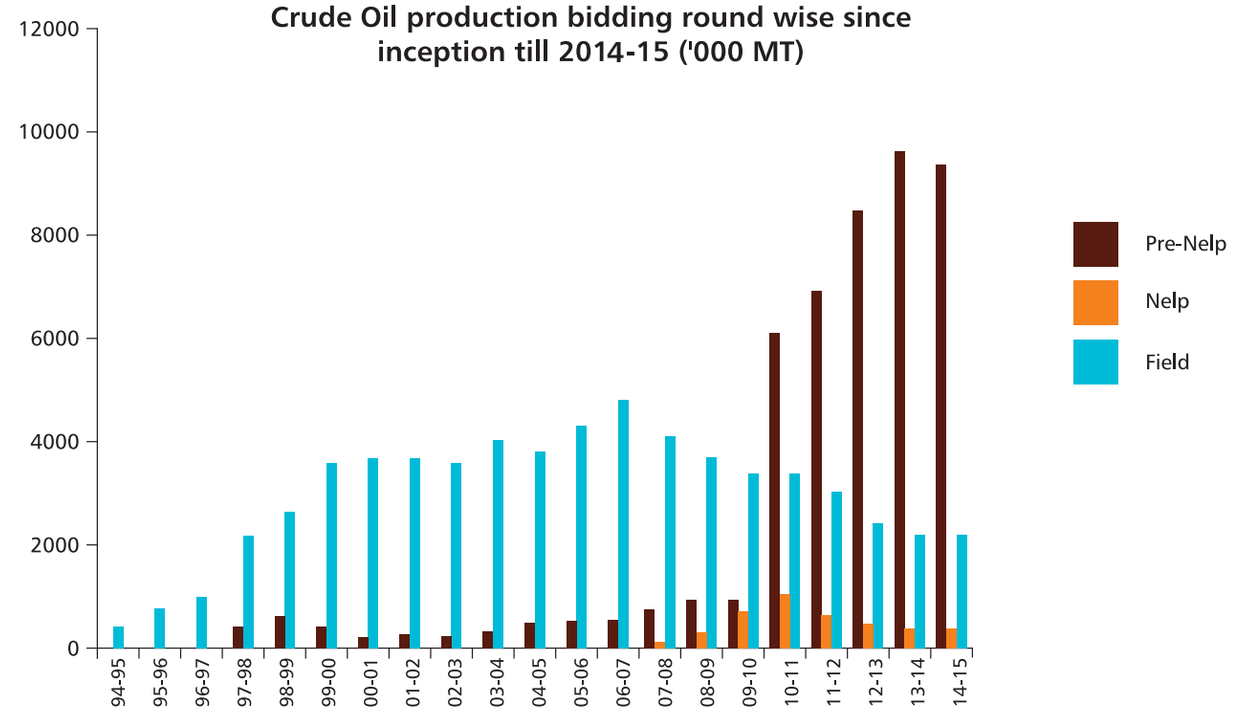
Cumulative Crude Oil production since inception till 2014-15 ('000 MT)



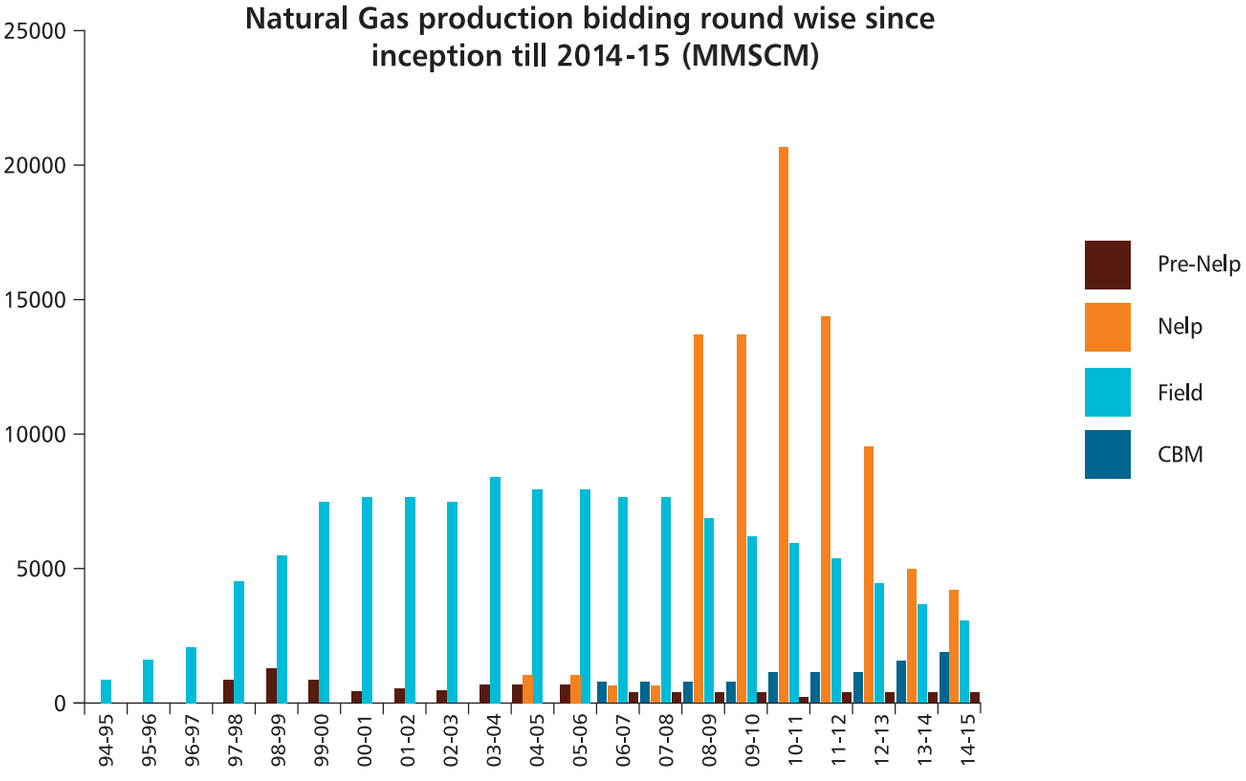
Cumulative Natural Gas production since inception till 2014-15 (MMSCM)



Crude Oil production bidding round wise since inception till 2014-15 ('000 MT)



Natural Gas production bidding round wise since inception till 2014-15 (MMSCM)



5.3 Hydrocarbon Discoveries

Table 5.6 : Basin wise discoveries- Under various regimes as on 31.03.2015

Basin	ONGC (Nomination regime)			OIL (Nomination regime)			PSC Regime			Grand Total	
	Oil	Gas	Total	Oil	Gas	Total	Oil	Gas	Total	Oil	Gas
Andaman-Nicobar	0	1	1	0	0	0	0	1	1	0	2
Assam Arakan	43	17	60	94	12	106	0	7	7	137	36
Cambay	188	13	201	0	0	0	58	12	70	246	25
Cauvery	24	10	34	0	0	0	3	7	10	27	17
Cauvery-Palar	0		0	0	0	0	0	0		0	0
Kutch	2	8	10	0	0	0	0	5	5	2	13
Krishna Godavari	28	59	87	0	0	0	15	52	67	43	111
Mahanadi	0	0	0	0	0	0	0	4	4	0	4
Mumbai	71	27	98	0	0	0	1	2	3	72	29
North East Coast	0	0	0	0	0	0	0	9	9	0	9
Rajasthan	0	11	11	0	0	0	34	8	42	34	19
Satpura-S.Rewa-Damodar							0	1	1	0	1
Saurashtra	0	0	0	0	0	0	0	0	0	0	0
Vindhyan	0	2	2	0	0	0	0	0	0	0	2
Total	**356**	**148**	**504**	**94**	**12**	**106**	**111**	**108**	**219**	**561**	**268**

* Discoveries in Nomination regime is as per FY 2013-14. Discoveries in PSC regime is as per FY 2014-15

Table 5.7 : Region wise discoveries- Under various regimes as on 31.03.2015

Region	Oil			Gas			Total
	Pre-NELP Exp.	Pre-NELP field	NELP	Pre-NELP Exp.	Pre-NELP field	NELP	
Deep Water	-	-	6	-	-	40	46
On Land	51	2	41	11	-	14	119
Shallow water	3	6	2	5	1	37	54
Grand Total	**54**	**8**	**49**	**16**	**1**	**91**	**219**

Table 5.8. : Details of Oil and Gas discoveries under Pre-NELP regime as on 31.03.2015

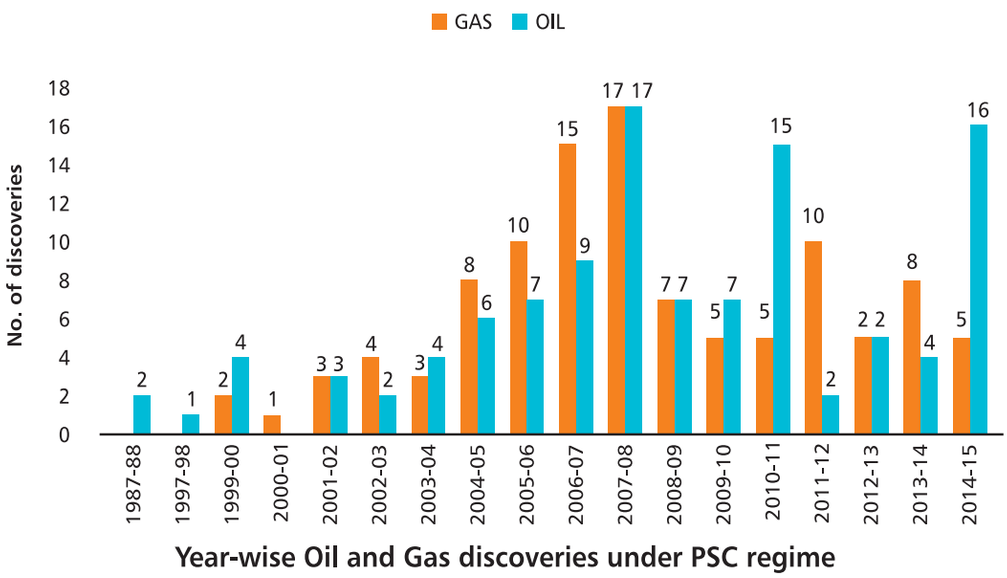
Sl. No.	Operator	Block	PSC Round	Oil	Gas	Total
1	**BGEPIL**	Panna-Mukta	Pre-NELP Field	1		1
2	**Cairn**	CB-OS/2	Pre-NELP	2	3	5
3		Ravva	Pre-NELP Field	5	1	6
4		RJ-ON-90/1	Pre-NELP	33	4	37
5	**ESSAR**	CB-ON/3	Pre-NELP	5		5
6	**Focus**	GK-ON/4	Pre-NELP		1	1
7		RJ-ON/6	Pre-NELP		4	4
8	**GSPC**	CB-ON/2	Pre-NELP	11	1	12
9	**HARDY**	CY-OS-2	Pre-NELP		1	1
10	**HOEC**	AAP-ON-94/1	Pre-NELP		1	1
11		CB-ON/7	Pre-NELP	2		2
12	**Interlink Petroleum**	Baola	Pre-NELP Field	1		1
13	**ONGC**	CB-OS/1	Pre-NELP	1		1
14	**RIL**	SR-OS-94/1	Pre-NELP		1	1
15	**Selan Exploration Technology Ltd.**	Karjisan	Pre-NELP Field	1		1
Pre-NELP Total				**62**	**17**	**79**

Table 5.9.: Details of Oil and Gas discoveries under NELP regime as on 31.03.2015

Sl. No.	Operator	Block	PSC Round	Oil	Gas	Total
1	**Focus**	CB-OSN-2004/1	NELP-VI		1	1
2	**GSPC**	CB-ONN-2000/1	NELP-II	4		4
3		CB-ONN-2002/3	NELP-IV	8		8
4		CB-ONN-2003/2	NELP-V	2	1	3
5		KG-OSN-2001/3	NELP-III		9	9
6	**Jay polychem(India) Pvt. Ltd.**	CB-ONN-2009/8	NELP-VIII	1		1
7	**JOGPL**	AA-ONN-2002/1	NELP-IV		3	3
8		CB-ONN-2002/2	NELP-IV	2		2
9		CY-ONN-2002/1	NELP-IV		1	1
10	**NAFTO GAZ**	CB-ONN-2004/5	NELP-VI	1		1
11	**NIKO**	CB-ONN-2000/2	NELP-II		2	2
12	**OIL**	KG-ONN-2004/1	NELP-VI		1	1
13		RJ-ONN-2004/2	NELP-VI	1		1
14	**ONGC**	AA-ONN-2001/1	NELP-III		2	2
15		AA-ONN-2001/2	NELP-III		1	1
16		AN-DWN-2002/1	NELP-IV		1	1
17		CB-ONN-2001/1	NELP-III	1		1
18		CB-ONN-2002/1	NELP-IV	1		1
19		CB-ONN-2004/1	NELP-VI	1		1
20		CB-ONN-2004/2	NELP-VI	5		5
21		CB-ONN-2004/3	NELP-VI		1	1
22		CB-ONN-2005/4	NELP-VII	1		1
23		CB-OSN-2003/1	NELP-V		3	3
24		CY-ONN-2002/2	NELP-IV	2	1	3
25		CY-ONN-2004/2	NELP-VI	1	1	2
26		GK-OSN-2009/1	NELP-VIII		1	1
27		GK-OSN-2009/2	NELP-VII		1	1
28		GS-OSN-2004/1	NELP-VI		1	1
29		KG-DWN-2005/1	NELP-VII		1	1
30		KG-DWN-98/2	NELP-I	4	8	12
31		KG-ONN-2003/1	NELP-V	2		2
32		KG-OSN-2004/1	NELP-VI		5	5
33		MB-OSN-2005/1	NELP-VII		2	2
34		MN-DWN-98/3	NELP-I		2	2
35		MN-OSN-2000/2	NELP-II		2	2
36		NEC-DWN-2002/2	NELP-IV		1	1
37	**RIL**	CB-ONN-2003/1	NELP-V	8		8
38		CY-DWN-2001/2	NELP-III		2	2
39		CY-PR-DWN-2001/3	NELP-III		1	1
40		GS-OSN-2000/1	NELP-II		1	1
41		KG-DWN-2001/1	NELP-III		1	1
42		KG-DWN-2003/1	NELP-V		4	4
43		KG-DWN-98/1	NELP-I	1		1
44		KG-DWN-98/3	NELP-I	1	19	20
45		KG-OSN-2001/1	NELP-III		3	3
46		KG-OSN-2001/2	NELP-III	2		2
47		NEC-OSN-97/2	NELP-I		8	8
NELP Total				**49**	**91**	**140**

Table 5.10. : Year-wise Oil and Gas discoveries under PSC regime

FY	Oil	Gas
1987-88	2	
1997-98	1	
1999-00	4	2
2000-01		1
2001-02	3	3
2002-03	2	4
2003-04	4	3
2004-05	6	8
2005-06	7	10
2006-07	9	15
2007-08	17	17
2008-09	7	7
2009-10	7	5
2010-11	15	5
2011-12	2	10
2012-13	5	5
2013-14	4	8
2014-15	16	5

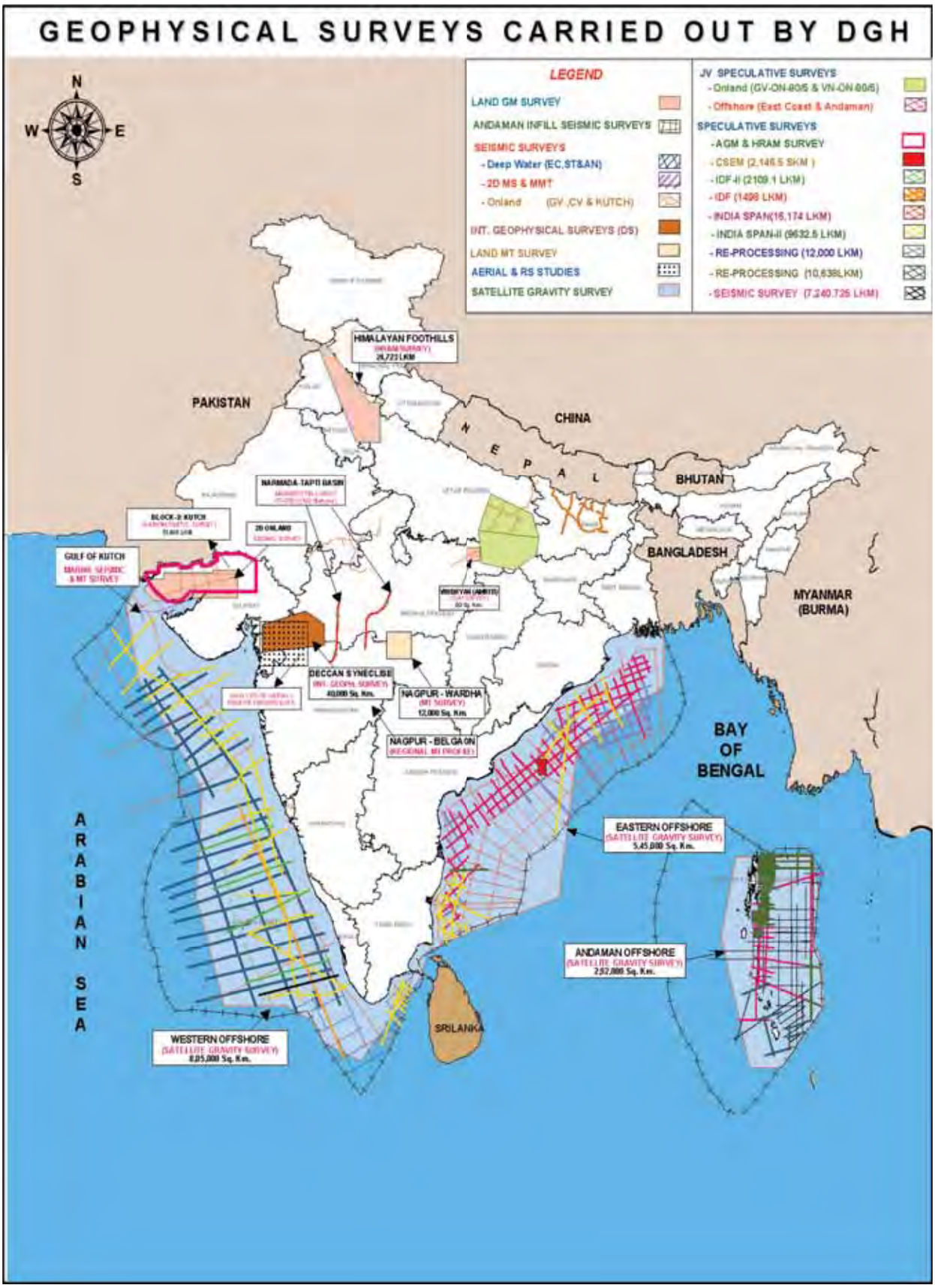


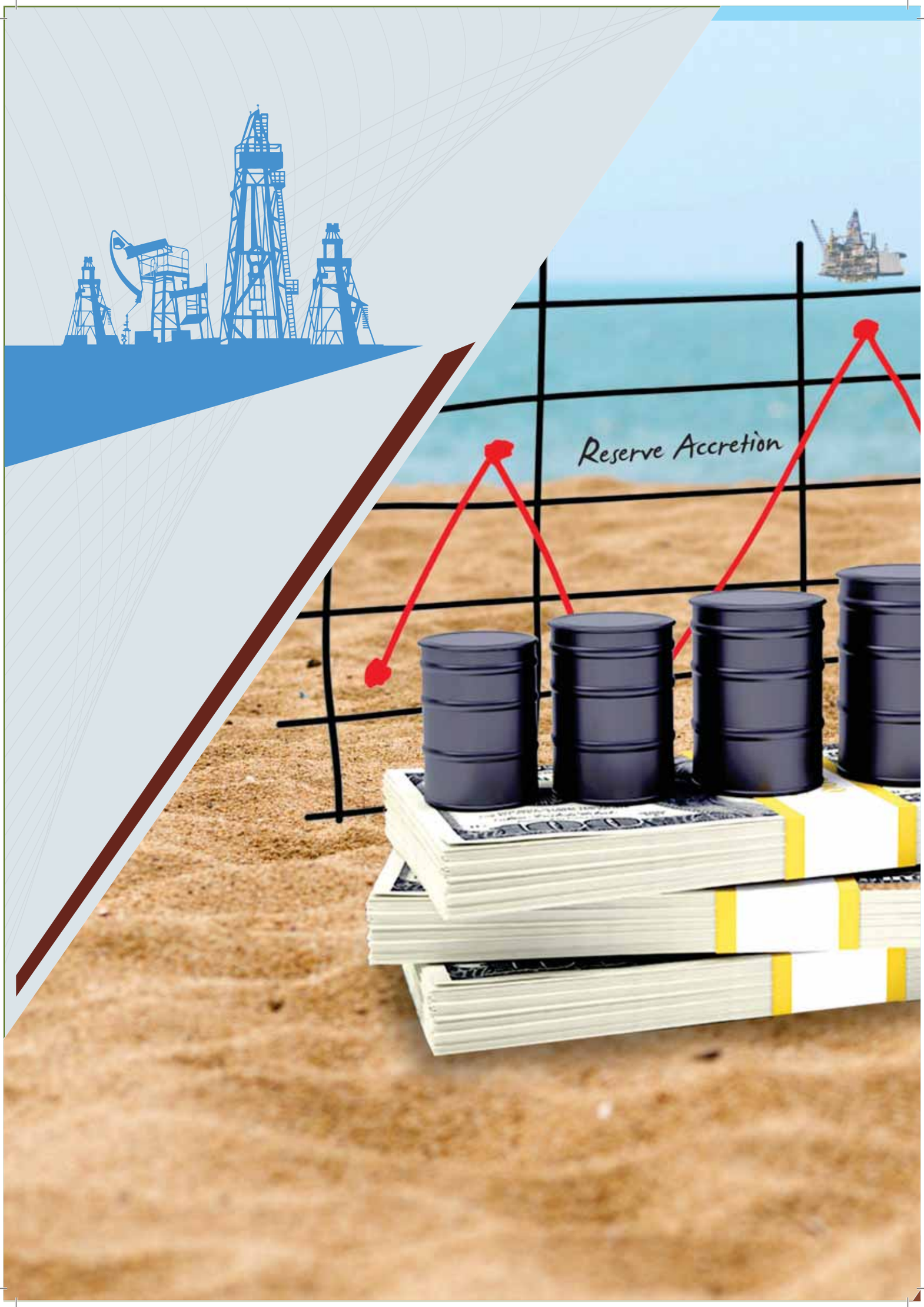
5.4. Geoscientific Studies carried out by DGH

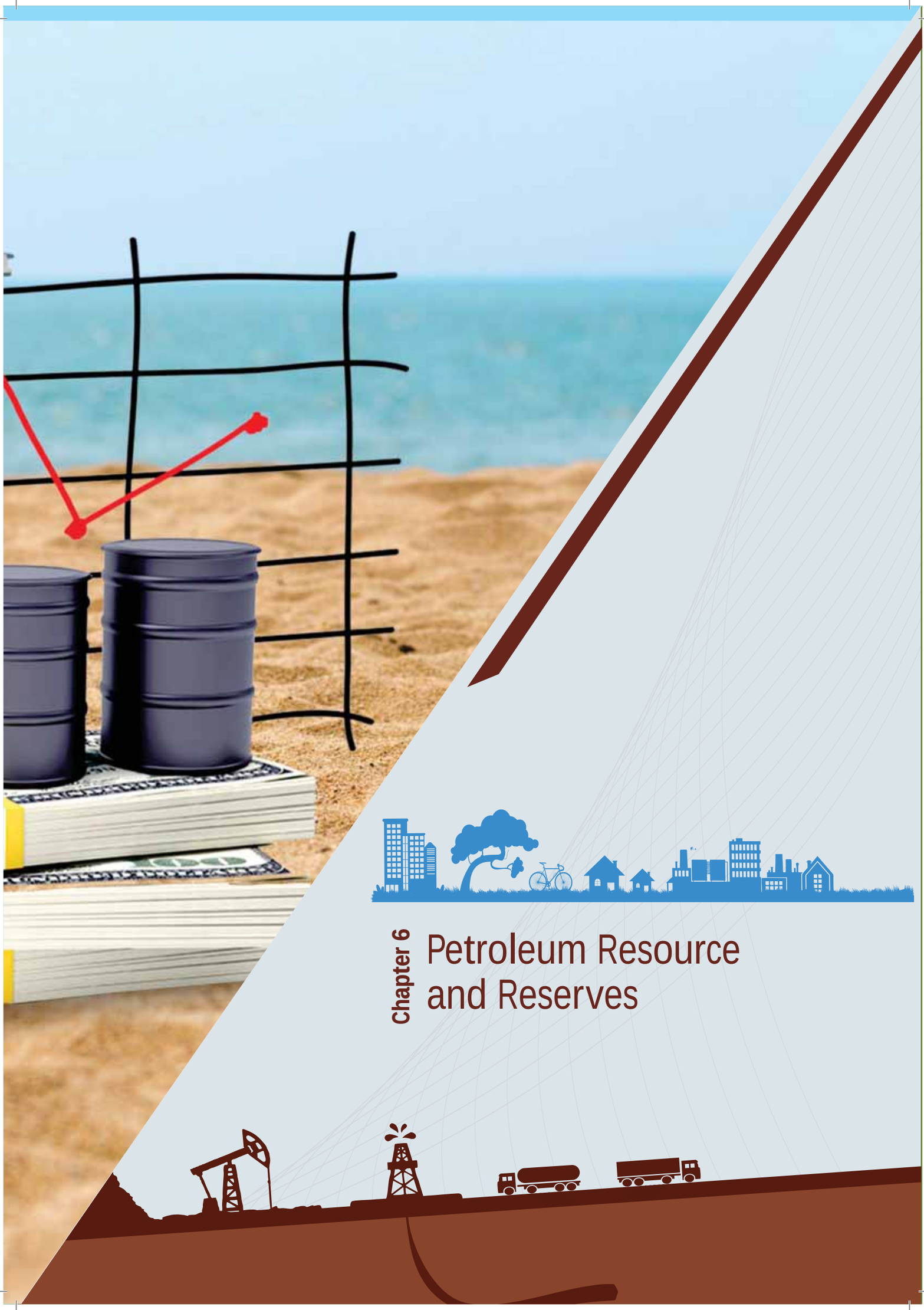
Table 5.11: Summary of Geoscientific studies carried out by DGH

Sl. No.	Area/Block	Survey Type	Area	Achievement (API)	Year	Agreement/ MoU signed with
I. RECONNAISSANCE SURVEYS						
1	**Western & Eastern Offshore**	Satellite Gravity	Offshore	1.642 Million Sq. Km.	1995-98	Petroscan, Sweden
2	**Kutch Offshore & Onland**	Aero-Magnetic	Onland	23,730 LKM	1995-96	NRSA, Hyderabad
3	**Nagpur-Wardha-Belgaum**	MT	Onland	352 Stations	1996-98	NGRI, Hyderabad
4	**Himalayan Foreland**	Aero-Magnetic	Onland	11,958 LKM	2003-05	NRSA, Hyderabad
5	**Punjab and Foot Hills of Himalayas**	Aero-Magnetic	Onland	12,765 LKM	2005-06	NRSA, Hyderabad
II. JOINT VENTURE SPECULATIVE SURVEYS						
OFFSHORE						
6	**East Coast**	2D seismic & GM	Offshore	7428.685 LKM & RI of 4625 LKM of old data	1996-97	Western Geophysical, USA
7	**Andaman-Nicobar**	2D seismic & GM	Offshore	3606.375 LKM & RI of 695 LKM of old data	1996-97	Western Geophysical, USA
ONLAND						
8	**Ganga Valley (GV-ON-90/5)**	2D seismic	Onland	634 GLK	1997-98	Alpha Geo, Hyderabad
9	**Vindhyan (VN-ON-90/5)**	2D seismic	Onland	566 GLK	1997-98	Alpha Geo, Hyderabad

III. SPECULATIVE SURVEYS						
10	**Western & Eastern Offshore**	2D seismic	Offshore	16,174 LKM	2005-07	GXT, USA
11	**Western Offshore**	2D seismic (Reprocessing)	Offshore	Reprocessing (12,000 LKM)	2007-08	GGS Spectrum, Norway
12	**Andaman Offshore**	2D seismic	Offshore	7240.725 LKM	2007-09	PGS, Singapore
13	**Eastern Offshore**	CSEM	Offshore	2146.5 sq. km.	2007-08	EMGS, Norway
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, USA
17	**Andaman Islands of India**	2D seismic (Reprocessing)	Offshore	Reprocessing (10,638 LKM)	2009-10	Spectrum Geo Ltd., UK
18	**Kutch**	Airborne HRAM Airborne GM	Onland Onland	55,668.3 LKM 13,994.64 LKM	2007-09 2009-10	Mcphar, Canada Mcphar, Canada
IV. SEISMIC SURVEYS						
OFFSHORE						
19	**Andaman Infill**	2D Seismic	Offshore	1484.75 LKM	1999	Western Geophysical, USA
20	**Southern Tip (ST)**	2D Seismic	Offshore	2835.925 LKM	2001-02	Large, Russia
21	**East Coast (EC)**	2D Seismic	Offshore	4319.45 LKM	2001-02	Large, Russia
22	**Andaman-Nicobar (AN)**	2D Seismic	Offshore	4307.275 LKM	2001-02	Large, Russia
23	**West Coast (WC)**	2D Seismic	Offshore	12,000.65 LKM	2002-03	Large, Russia
ONLAND						
24	**Ganga Valley (GV)**	2D Seismic	Onland	1135.05 LKM	2002-03	Alpha Geo, Hyderabad
25	**Chambal Valley (CV)**	2D Seismic	Onland	805.00 GLK	2003-04	Alpha Geo, Hyderabad
26	**Kutch**	2D Seismic (Acq.)	Onland	690.6 GLK	2006-09	NGRI, Hyderabad
27	**Kutch**	2D Seismic (P&I)	Onland	690.6 GLK	2010-12	GEOPIC, ONGC, Dehradun
V. INTEGRATED GEOPHYSICAL SURVEYS						
28	**Deccan Syneclise (DS) Narmada-Tapti Area**	Gravity, MT, DRS, 2D seismic	Onland	6000 Stations, 600 & 50 stations, 700 LKM	2003-04	NGRI, Hyderabad
VI. GRAVITY -MAGNETIC SURVEYS & OTHER GEOPHYSICAL SURVEYS						
29	**Vindhyan (Amriti)**	GM	Onland	303 Stations (80 sq.km.)	2003-04	NGRI, Hyderabad
30	**Gulf of Kutch**	MS & MMT	Offshore	133.984 LKM &13Stn.	2006-08	NGRI
31	**Central India**	Land MT	Onland	102 Stations	2006-09	NGRI
32	**Narmada-Cambay Deccan Syneclise**	Analysis of Aerial Images/ Remote sensing data	Onland	302,500 sq. km	2006-08	NGRI


GEOPHYSICAL SURVEYS CARRIED OUT BY DGH
LEGEND
LAND GM SURVEY
ANDAMAN INFILL SEISMIC SURVEYS
SEISMIC SURVEYS
- Deep Water (EC,ST&AN)
- 2D MS & MM†
- Onland (GV ,CV & KUTCH)
INT. GEOPHYSICAL SURVEYS (DS)
LAND MT SURVEY
AERIAL & RS STUDIES
SATELLITE GRAVITY SURVEY
JV SPECULATIVE SURVEYS
- Onland (GV-ON-80/5 & VN-ON-90/5)
- Offshore (East Coast & Andaman)
SPECULATIVE SURVEYS
- AGM & HRAM SURVEY
- CSEM (2,146.5 SKM)
- IDF-II (2109.1 LKM)
- IDF (1499 LKM)
- INDIA SPAN(16,174 LKM)
- INDIA SPAN-II (9632.5 LKM)
- RE-PROCESSING (12,000 LKM)
- RE-PROCESSING (10,638LKM)
- SEISMIC SURVEY (7,240.725 LKM)
N
W
E
S
HIMALAYAN FOOTHILLS
PAKISTAN
CHINA
NEPAL
BHUTAN
BANGLADESH
MYANMAR (BURMA)
NARMADA-TAPTI BASIN
BLOCK-2 KUTCH
2D ONLAND
GULF OF KUTCH
DECCAN SYNECLISE
NAGPUR - WARDHA
NAGPUR - BELGAON
BAY OF BENGAL
ARABIAN SEA
EASTERN OFFSHORE
(SATELLITE GRAVITY SURVEY)
5,45,000 Sq. Km.
ANDAMAN OFFSHORE
(SATELLITE GRAVITY SURVEY)
2,52,000 Sq. Km.
WESTERN OFFSHORE
(SATELLITE GRAVITY SURVEY)
8,25,000 Sq. Km.
SRILANKA


Reserve Accretion



Chapter 6

Petroleum Resource and Reserves

6
Petroleum Resource and Reserves

6.1 Conventional Hydrocarbon Resources

The conventional hydrocarbon prognosticated resources in 15 sedimentary basins along with the deepwater areas of the country are of the order of 28.1 Billion Tonnes of Oil and Oil-equivalent Gas (O+OEG). The resources in the offshore are 18.82 Billion Tonnes of O+OEG out of which deepwater areas account for 7 Billion Tonnes. The contribution of onshore part of basins is 9.27 Billion Tonnes of O+OEG. The Minister of Petroleum & Natural Gas (MoPNG) has issued an office order in January, 2014 to carry out re-assessment of Hydrocarbon Resources for Sedimentary Basins of India including Deepwater Areas.

The work of hydrocarbon resource assessment will be carried out under the leadership of ONGC's Institute KDMIPE (Keshava Deva Malaviya Institute of Petroleum Exploration) at Dehradun. Multiple work execution teams will be established for the purpose, as required. An ICB (International Competitive Bidding) tender has been floated to hire a reputed agency / domain expert for re-assessment of Hydrocarbon Resources in Indian sedimentary basins and as on 31st March 2015, the tendering is under process.

Tabel 6.1 :Basin-wise details of prognosticated hydrocarbon resources in the country (as on 01.04.2015)

Sl. No.	Basin	Offshore Part of Basin	Onland Part of Basin	Total
1	Mumbai	9190	-	9190
2	Assam-Arakan Fold Belt	-	1860	1860
3	Cambay	-	2050	2050
4	Upper Assam	-	3180	3180
5	Krishna-Godavari	555	575	1130
6	Cauvery	270	430	700
7	Rajasthan	-	380	380
8	Kutch	550	210	760
9	Andaman-Nicobar	180	-	180
10	Kerala-Konkan	660	-	660
11	Saurashtra Offshore	280	-	280
12	Ganga Valley	-	230	230
13	Bengal	30	160	190
14	Himalayan Foreland	-	150	150
15	Mahanadi	100	45	145
	Total	**11,815**	**9,270**	**21,085**
	Deepwater	**7,000**	**-**	**7,000**
	Grand Total	**18,815**	**9,270**	**28,085**

6.1.2 Hydrocarbon Reserves of India

As on 01.04.2015, In-place hydrocarbon volume of 11,253 million metric tonnes (MMT) of Oil and Oil equivalent gas could be established through exploration by ONGC, Oil and Private/JV companies. Out of 11,253 MMT of O+OEG of in-place volumes, the ultimate reserves are about 3,900 MMT of O+OEG. The break-up of hydrocarbon reserves established by ONGC, Oil and Companies under the PSC regime in the country as on 01.04.2015 are as under:

Table 6.2 : Reserves Status During the year 2014-15 (as on 01.04.2015)

Sl. No.	Subject	Parameter	ONGC (Nomination)*	OIL (Nomination)*	PSC regime	Total
1	Initial In-place volume	Gas (BCM) Oil (MMT) O+OEG (MMT)	2415.05 5229.32 7644.37	356.84 798.49 1107.85	1460.18 975.35 2435.54	4232.07 7003.16 11187.76
2	Accretion of In-place volume	Gas (BCM) Oil (MMT) O+OEG (MMT)	90.58 43.94 134.52	12.55 -2.88 8.20	142.37 2.99 145.36	245.50 44.05 288.08
3	Ultimate Reserves	Gas (BCM) Oil (MMT) O+OEG (MMT)	1297.15 1492.98 2790.13	197.61 246.62 444.23	767.28 215.38 982.66	2262.04 1954.98 4217.02
4	Accretion of Ultimate Reserves	Gas (BCM) Oil (MMT) O+OEG (MMT)	26.91 31.30 58.21	8.05 0.72 7.83	51.71 0.80 52.51	86.67 32.82 118.55
5	Balance Recoverable Reserves	Gas (BCM) Oil (MMT) O+OEG (MMT)	540.57 453.97 994.54	114.51 83.41 181.75	596.78 98.40 695.19	1251.86 635.78 1871.48

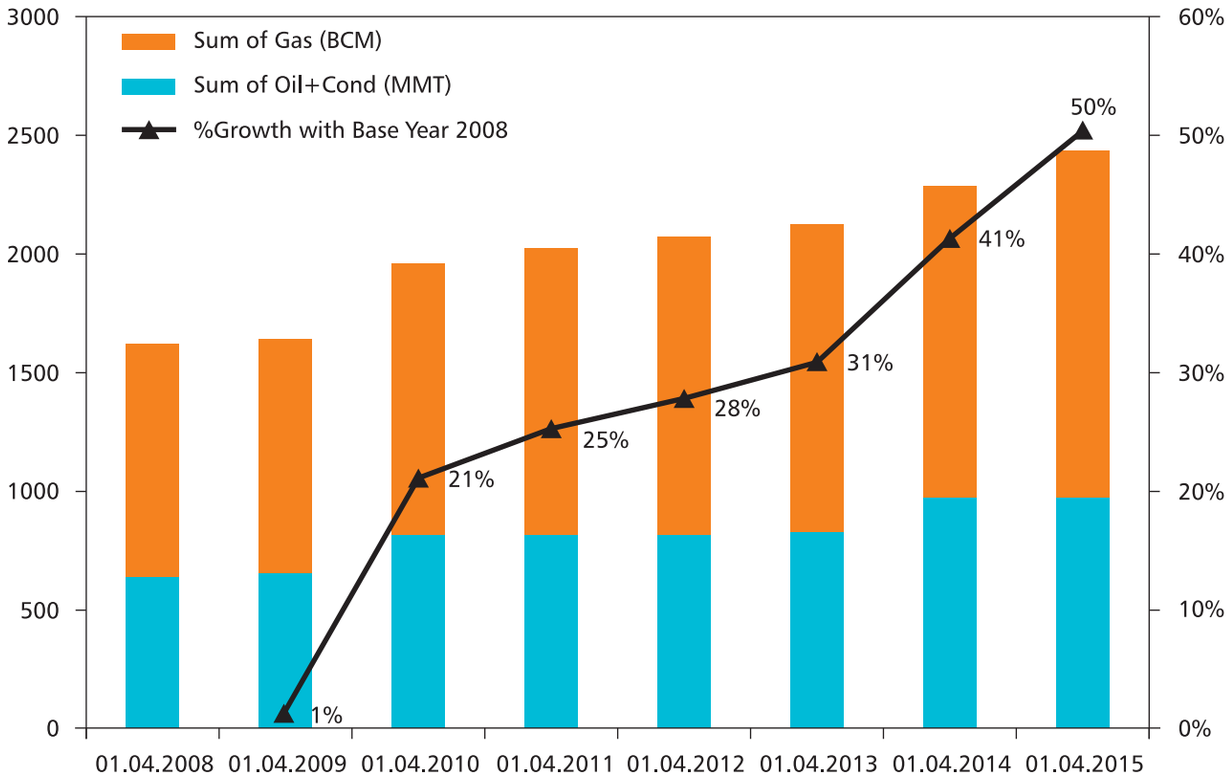
O+OEG – Oil and Oil Equivalent of Gas, Conversion factor: 1 BCM = 1 MMT and for OIL (Nomination blocks), 1 BCM = 0.8828 MMTOE

*As Provided by ONGC,Oil, Pvt./JV

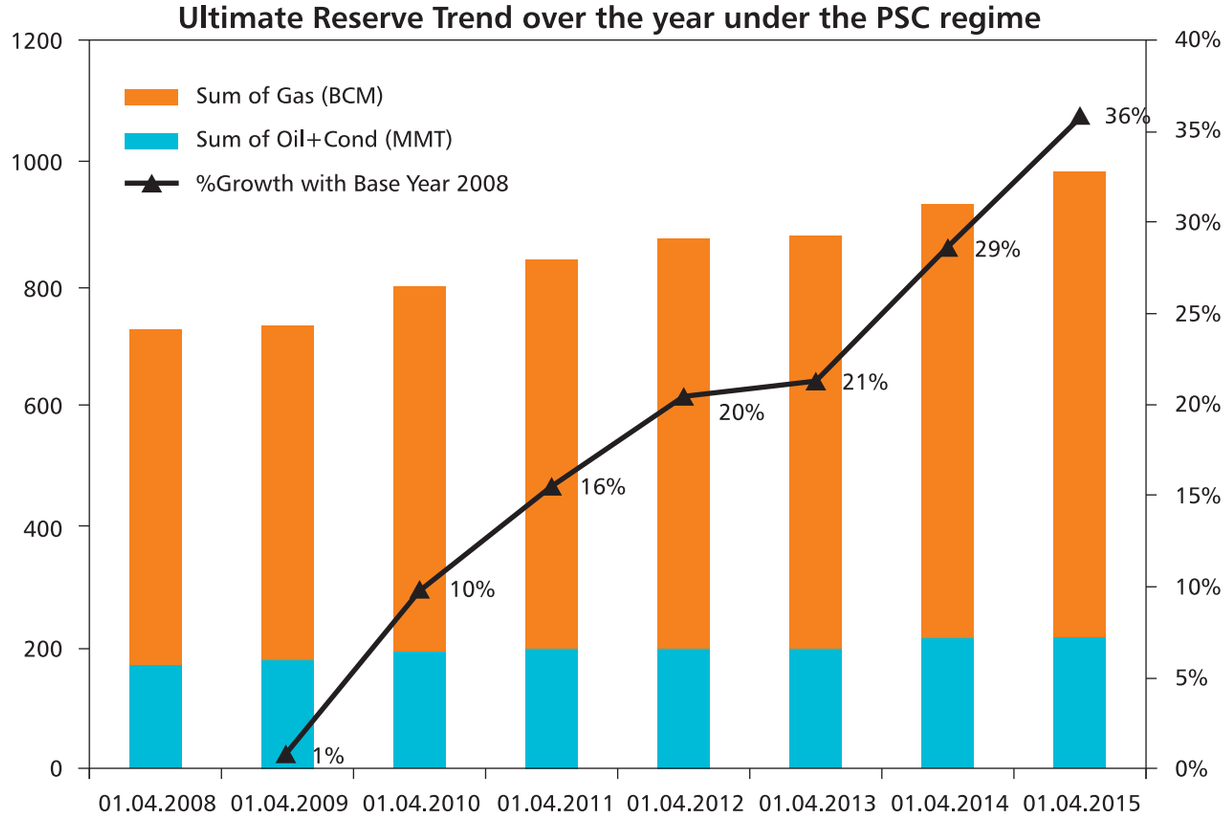
6.1.3. Reserves established under PSC regime

Exploration and Production sector has been opened up after implementation of New Exploration Licensing Policy (NELP) and Coal Bed Methane (CBM) Policy. These policies provide a level playing field to the private investors by giving the same fiscal and contract terms as applicable to National Oil Companies (NOCs) for the offered exploration acreage. Hydrocarbon exploration in Indian Basins has picked up pace after the implementation of NELP and eventually more reserves have been established. The trend of In-place volume and Ultimate reserves of crude oil and natural gas under the PSC regime during the period 2008-09 to 2014-15 along with the growth with base year as 2008-09 is highlighted in the graph on the next page. Over the years, the In-place volume has increased by 50 % and Ultimate reserves have increased by 36 % when compared to figures as on 01.04.2008.

In-Place Volume Trend over the year under the PSC regime

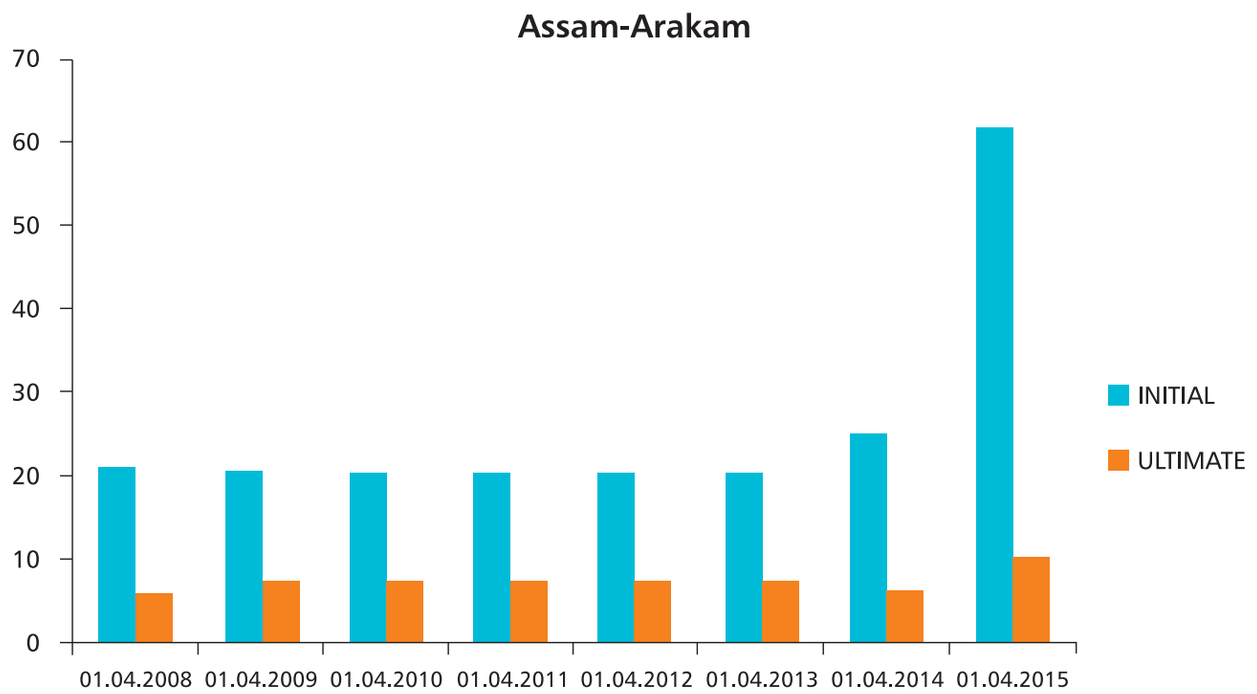


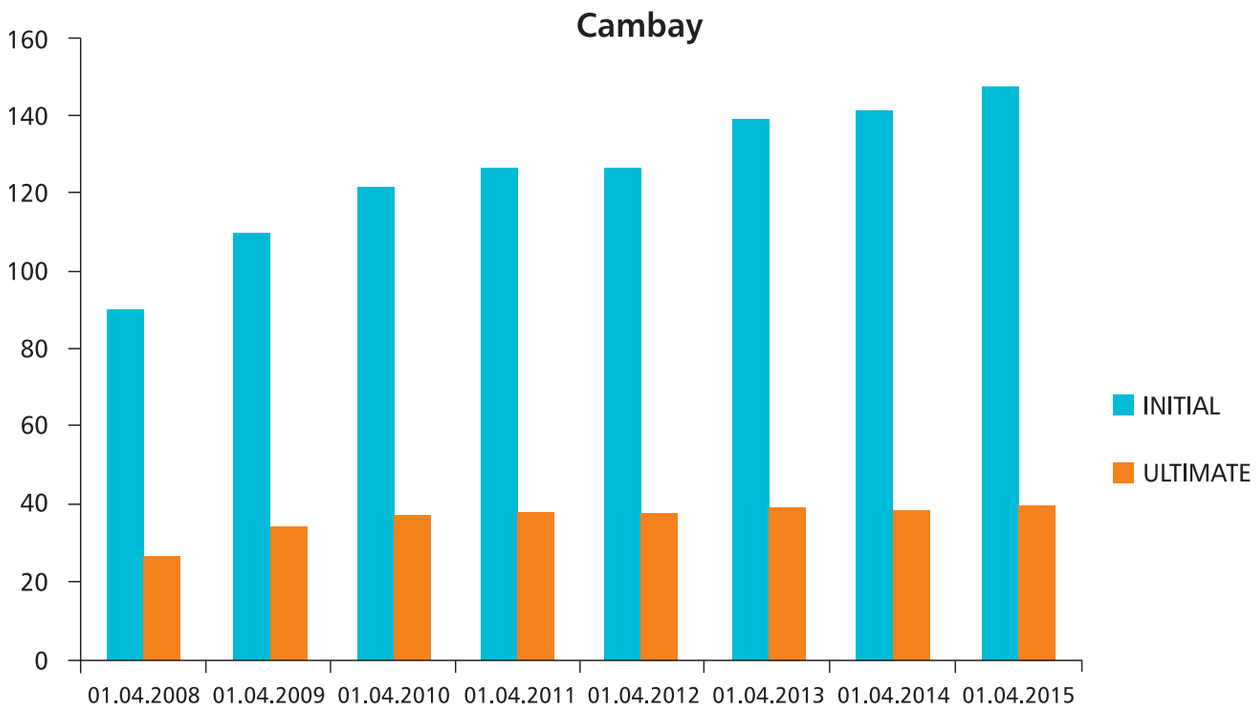
Ultimate Reserve Trend over the year under the PSC regime

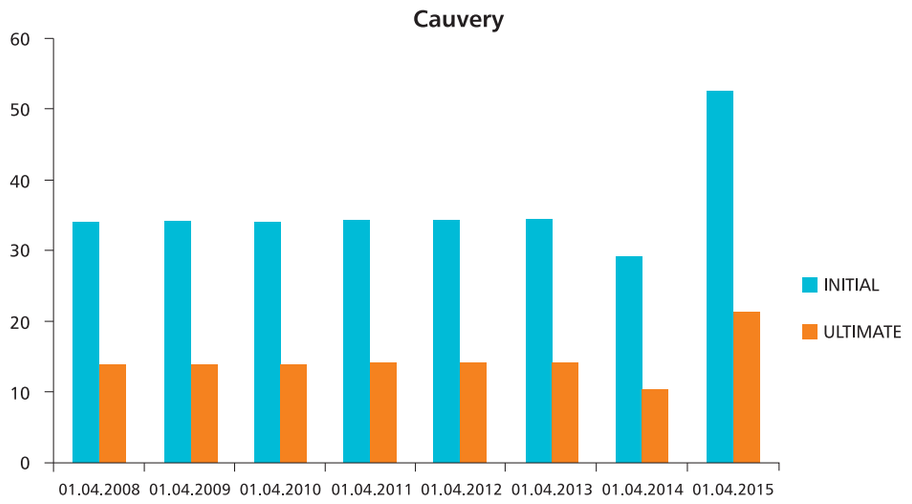


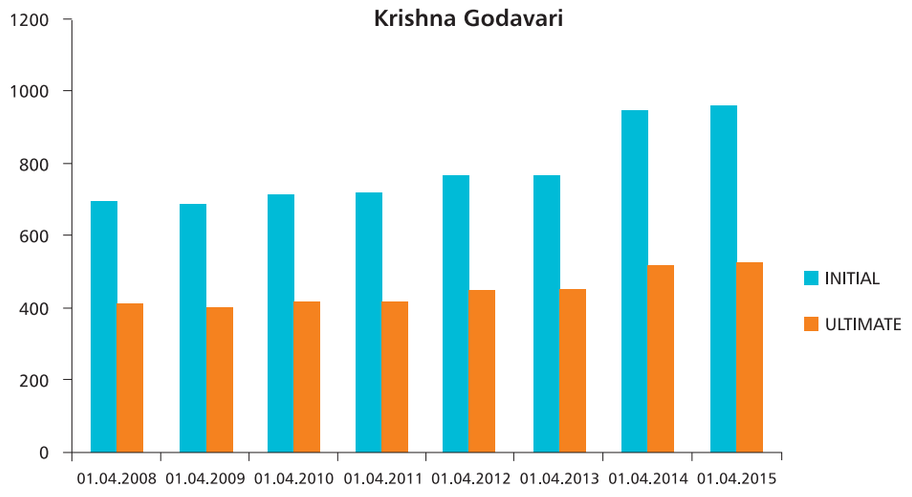
India has 26 sedimentary basins covering an area of 3.14 million square kilometres. The sedimentary basins of India, onland and offshore up to the 400-m isobath, have an areal extent of about 1.84 million Sq. Km. In the deepwater, beyond the 400-m isobath, the sedimentary area has been estimated to be about 1.30 million Sq. Km. Thus, the total works out to 3.14 million sq. km. Major sedimentary basins where hydrocarbon potential has been established under the PSC regime are Assam-Arakan, Cambay, Cauvery, Krishna Godavari, Mahanadi, Mahanadi-NEC, Mumbai, and Rajasthan. The trend of In-place volumes and Ultimate Reserve of Crude Oil and Natural Gas (O+OEG) under the PSC regime in major sedimentary basins from 01.04.2008 to 01.04.2015 is highlighted in the graphs below.

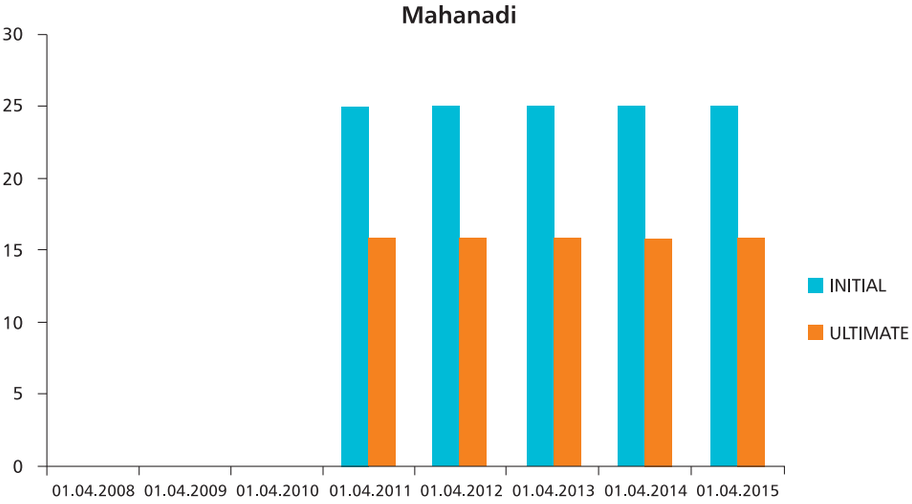
Basin-wise In-Place volume and Ultimate Reserve trend (O+OEG IN MMT) under PSC regime











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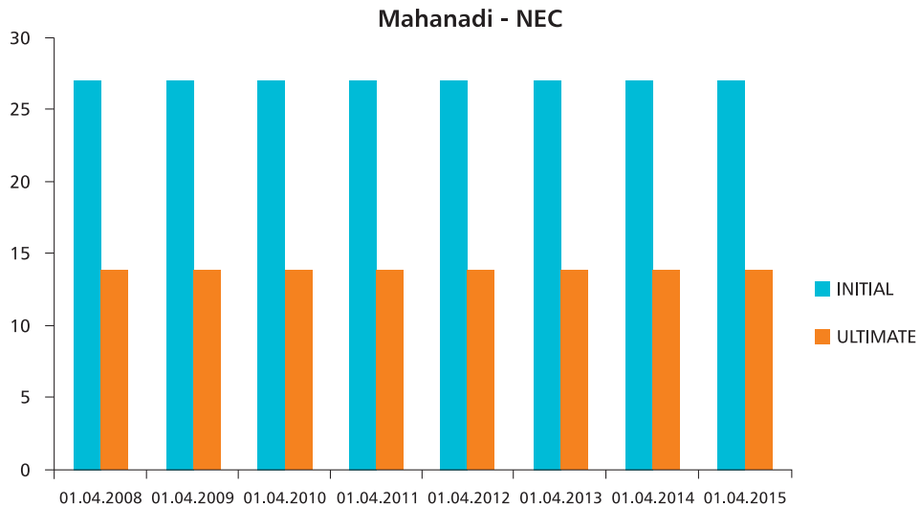
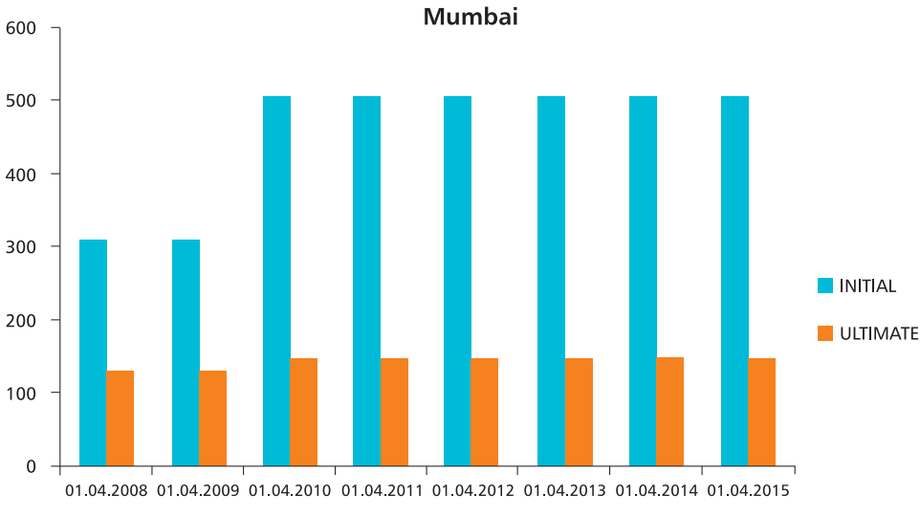
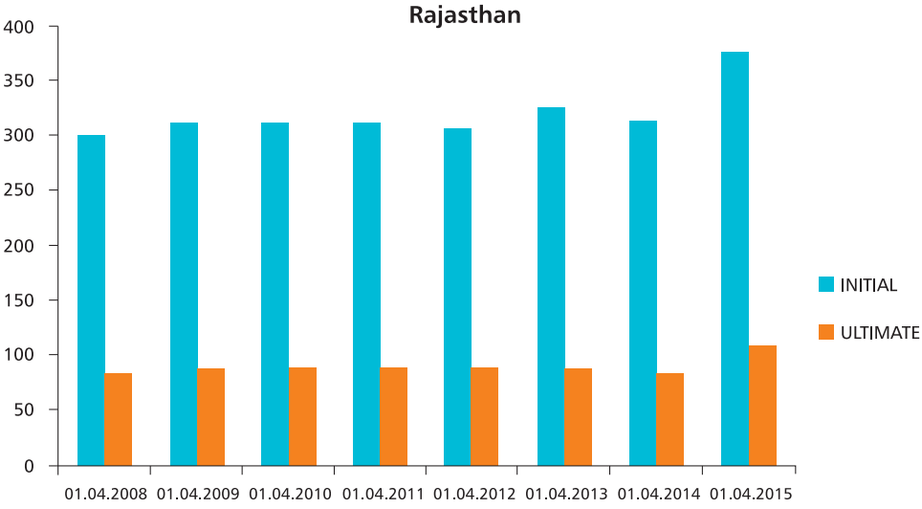

Mahanadi - NEC
30
25
20
15
10
5
0
01.04.2008
01.04.2009
01.04.2010
01.04.2011
01.04.2012
01.04.2013
01.04.2014
01.04.2015
INITIAL
ULTIMATE


Mumbai
600
500
400
300
200
100
0
01.04.2008
01.04.2009
01.04.2010
01.04.2011
01.04.2012
01.04.2013
01.04.2014
01.04.2015
INITIAL
ULTIMATE

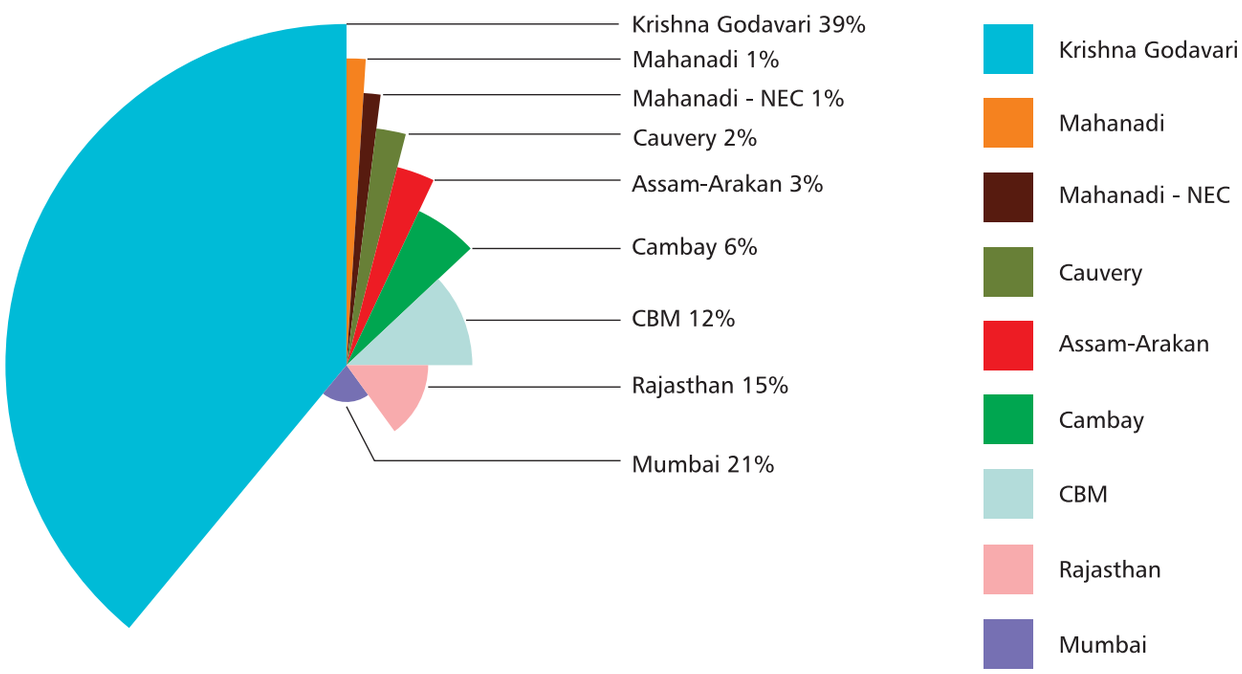

Rajasthan
400
350
300
250
200
150
100
50
0
01.04.2008
01.04.2009
01.04.2010
01.04.2011
01.04.2012
01.04.2013
01.04.2014
01.04.2015
INITIAL
ULTIMATE

Out of all total In-place volumes as on 01.04.2015, Krishna-Godavari Basin has 39% reserves followed by Mumbai (21%) and Rajasthan (15%). Also, 65 % of In-place reserves established is in offshore areas. In FY 2014-15, major contribution to accretion of In-place reserves was from following blocks:

Table 6.3: Major contribution to accretion of In-place reserves in FY 2014-15

Block Name	Basin Name	Discovery Details
CB-OSN-2003/1	Cambay	DoC of ALIABET-2, 3 & 4
CB-ONN-2003/1	Cambay	DoC of D-43, 45, 46, 47, 48, 49, 50 & 51
CY-DWN-2001/2	Cauvery	DoC of D-35
CY-ONN-2002/2	Cauvery	DoC of MADNAM-3, 5, 6S
KG-OSN-2004/1	Krishna Godavari	DoC of ALANKARI-1, CHANDRIKA SOUTH-1, SAVERI-1, KGOSN041NANL-1 & KGOSN041NANL-2
AAP-ON-94/1	Assam-Arakan	FDP of DIROK-1
AA-ONN-2002/1	Assam-Arakan	DoC of KATHALCHARI-1
RJ-ON/6	Rajasthan	Integrated Declaration of Commerciality of SSF-2 and SSG-1 gas discoveries has been approved by MC.
RJ-ON-90/1	Rajasthan	FDP of NI, NE & revised FDP of RDG

Basin-wise In-place volume (O + OEG (MMT)) distribution under PSC regime As on 01.04.2015



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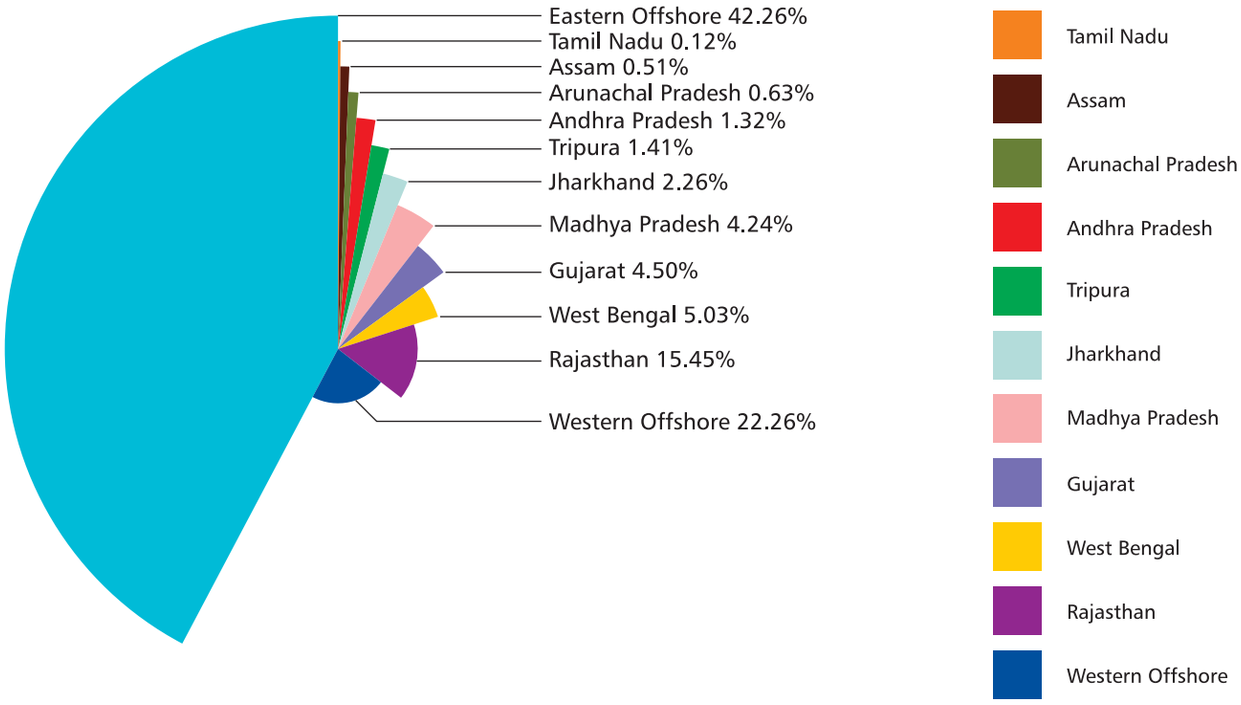
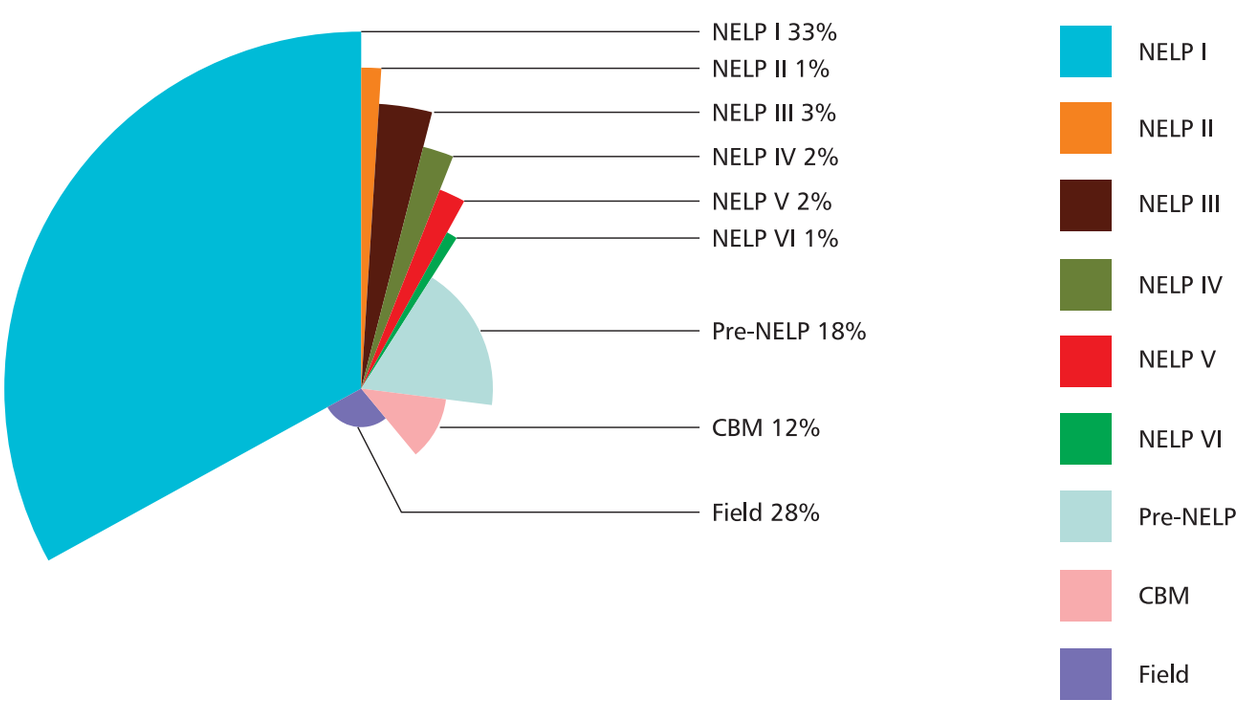
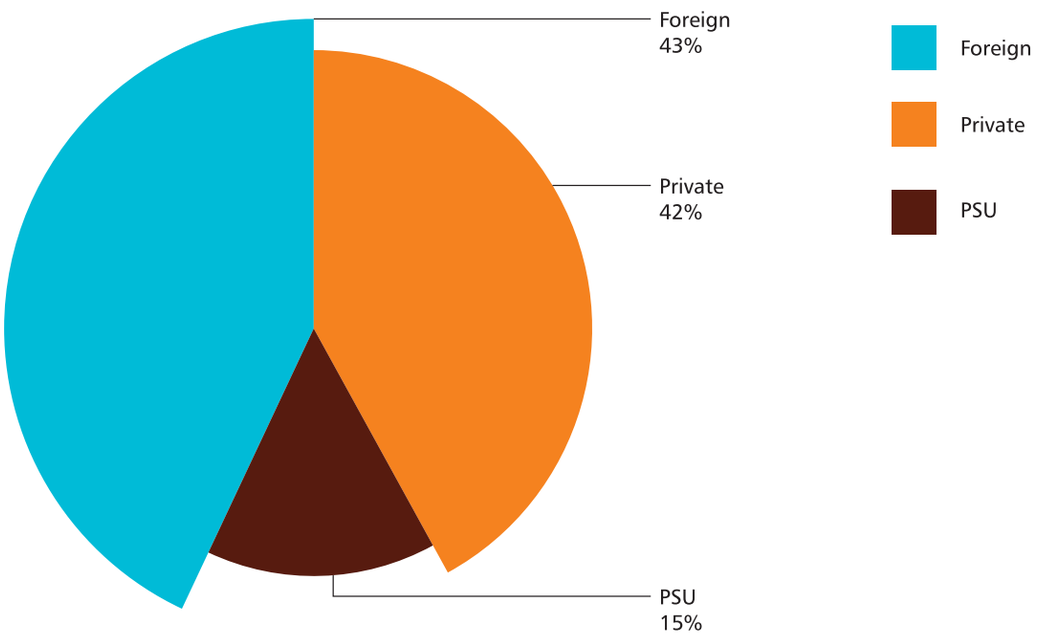
State-wise In-place volume [O + OEG (MMT)] distribution under PSC regime As on 01.04.2015



Bidding Round-wise In-place volume [(O + OEG(MMT)] distribution under PSC regime As on 01.04.2015



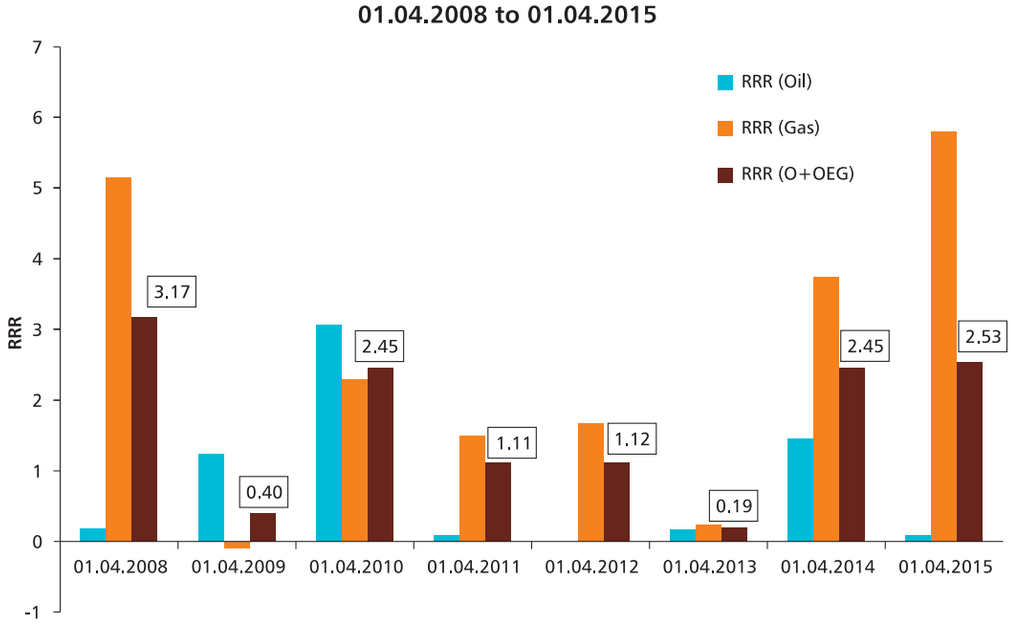
Company-wise In-place volume distribution under PSC regime as on 01.04.2015



Reserve Replacement Ratio (RRR)

It is a parameter to judge the operating performance of an Oil and Gas Exploration and Production company. The reserve-replacement ratio provides an estimate of the amount of reserves added to a company's reserve base during the year relative to the amount of oil and gas produced. A RRR if greater than 1 indicates stable demand condition environments and suggest that reserves are added up along with simultaneous draining out of reserves through continued production. The trend of Reserve Replacement Ratio (RRR) of crude oil and natural gas under the PSC regime during the period as on 01.04.2008 to 01.04.2015 is shown in the graph below.

Reserve Replacement Ratio (RRR) of Oil, Gas and O+OEG 01.04.2008 to 01.04.2015



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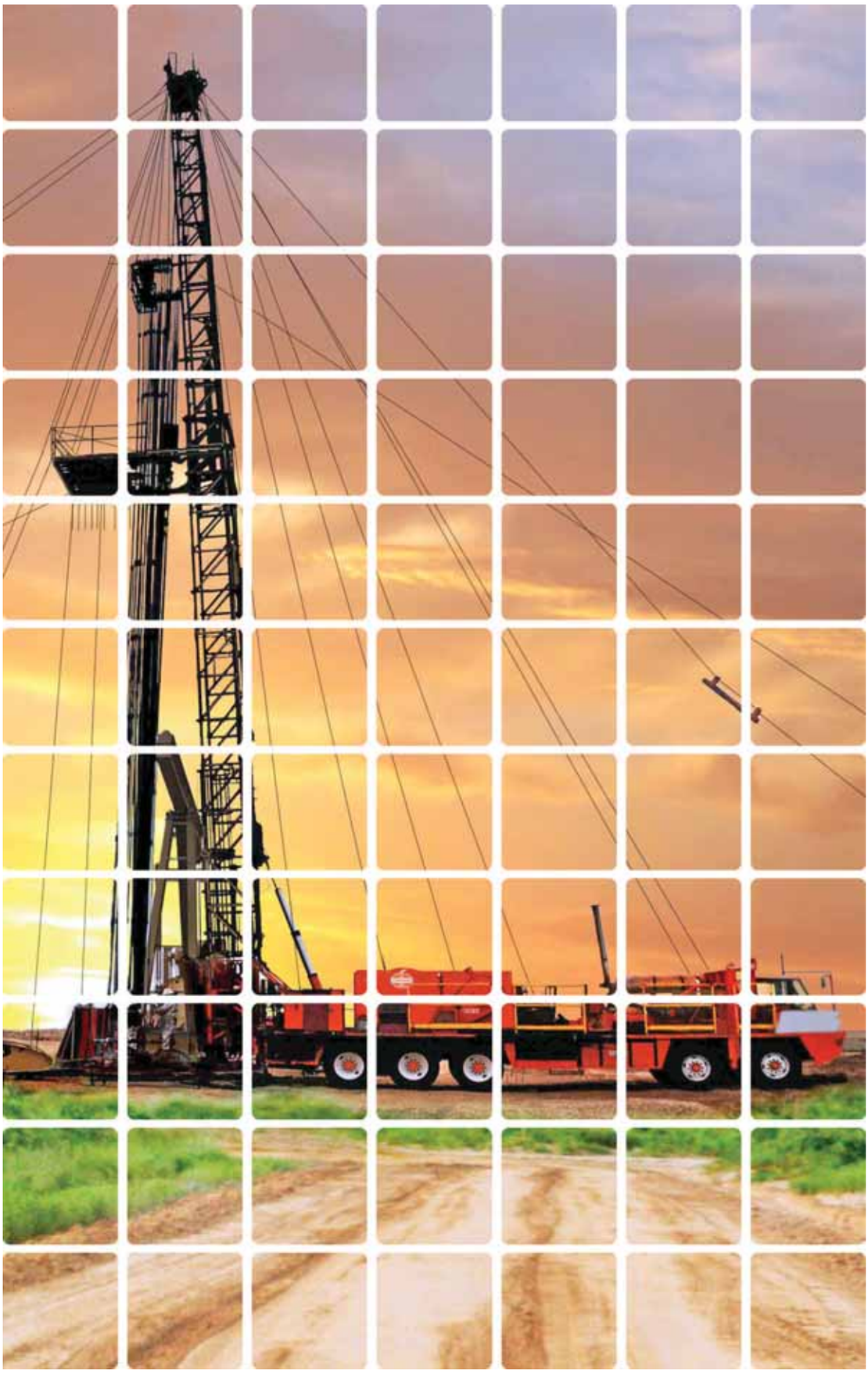
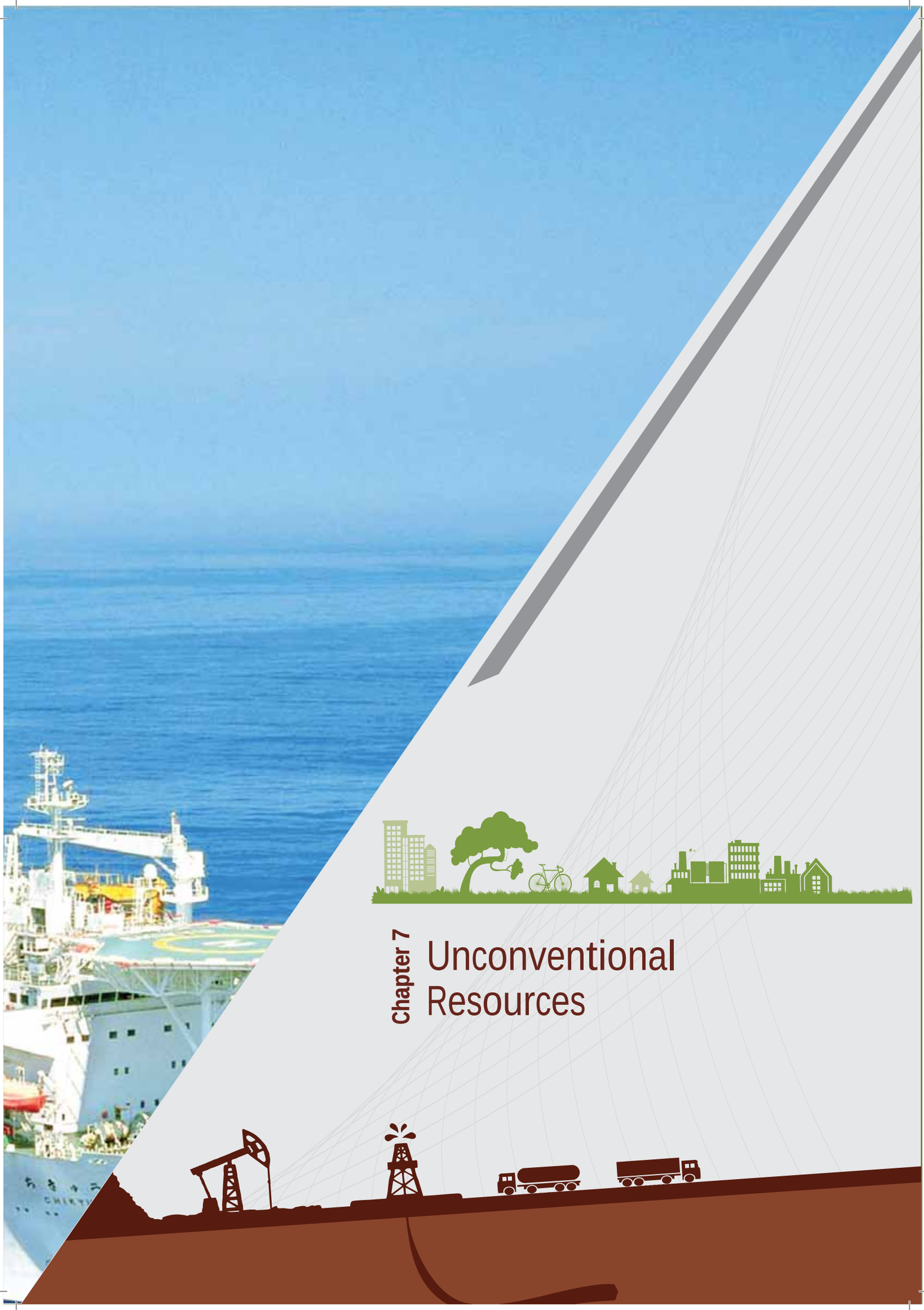




Chapter 7

Unconventional Resources

7

Unconventional Resources

7.1. Coal Bed Methane (CBM)

Coal Bed Methane (CBM), an unconventional source of natural gas is now considered as an alternative source for augmenting India's energy resource. India has the fifth largest proven coal reserves in the world and thus holds significant prospects for exploration and exploitation of CBM. The prognosticated CBM resources in the country are about 92 TCF (2600 BCM) in 12 states of India. 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 Ministry of Coal (MoC) & Central Mine Planning and Design Institute (CMPDI), Ranchi. Under the CBM policy, till date, four rounds of CBM bidding rounds have been implemented by MoP&NG, resulting in award of 33 CBM blocks [including 2 blocks on Nomination and 1 block through Foreign Investment Promotion Board (FIPB) route] which covers 16,613 sq.km out of the total available coal bearing areas for CBM exploration of 26,000 sq.km. Till date, most CBM exploration and production activities in India is pursued by domestic Indian companies. Total prognosticated CBM resource for awarded 33 CBM blocks, is about 62.4 TCF (1767 BCM), of which, so far, 9.9 TCF (280.34 BCM) has been established as Gas in Place (GIP).

The Gondwana sediments of eastern India host the bulk of India's coal reserves and all the current CBM producing blocks. The vast majority of the best prospective areas for CBM development are in eastern India, situated in Damodar Koel valley and Son valley. CBM projects exist in Raniganj South, Raniganj East and Raniganj North areas in the Raniganj coalfield, the Parbatpur block in Jharia coalfield and the East and West Bokaro coalfields. Son valley includes the Sonhat North and Sohagpur East and West blocks. Currently, commercial production has commenced from Raniganj South CBM block operated by M/s. GEECL since July 2007.

Current CBM production (March 2015) is around 0.77 MMSCMD from 5 CBM blocks which includes test gas production from 4 CBM blocks and commercial production from 1 CBM block. 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.

Table 7.1: State-wise distribution of CBM Resources in India

Sl. No.	State	Prognosticated CBM Resources (in BCM)	Prognosticated CBM Resources (in TCF)
1	Jharkhand	722.08	25.5
2	Rajasthan	359.62	12.7
3	Gujarat	351.13	12.4
4	Odisha	243.52	8.6
5	Chattisgarh	240.69	8.5
6	Madhya Pradesh	218.04	7.7
7	West Bengal	218.04	7.7
8	Tamil Nadu	104.77	3.7
9,10	Telangana / AP	99.11	3.5
11	Maharashtra	33.98	1.2
12	North East	8.50	0.3
Total CBM Resource		**2599.48**	**91.8**

Conversion factor: 1 Cubic Meter = 35.3147 Cubic Feet BCM: Billion Cubic Meter; TCF: Trillion Cubic Feet.

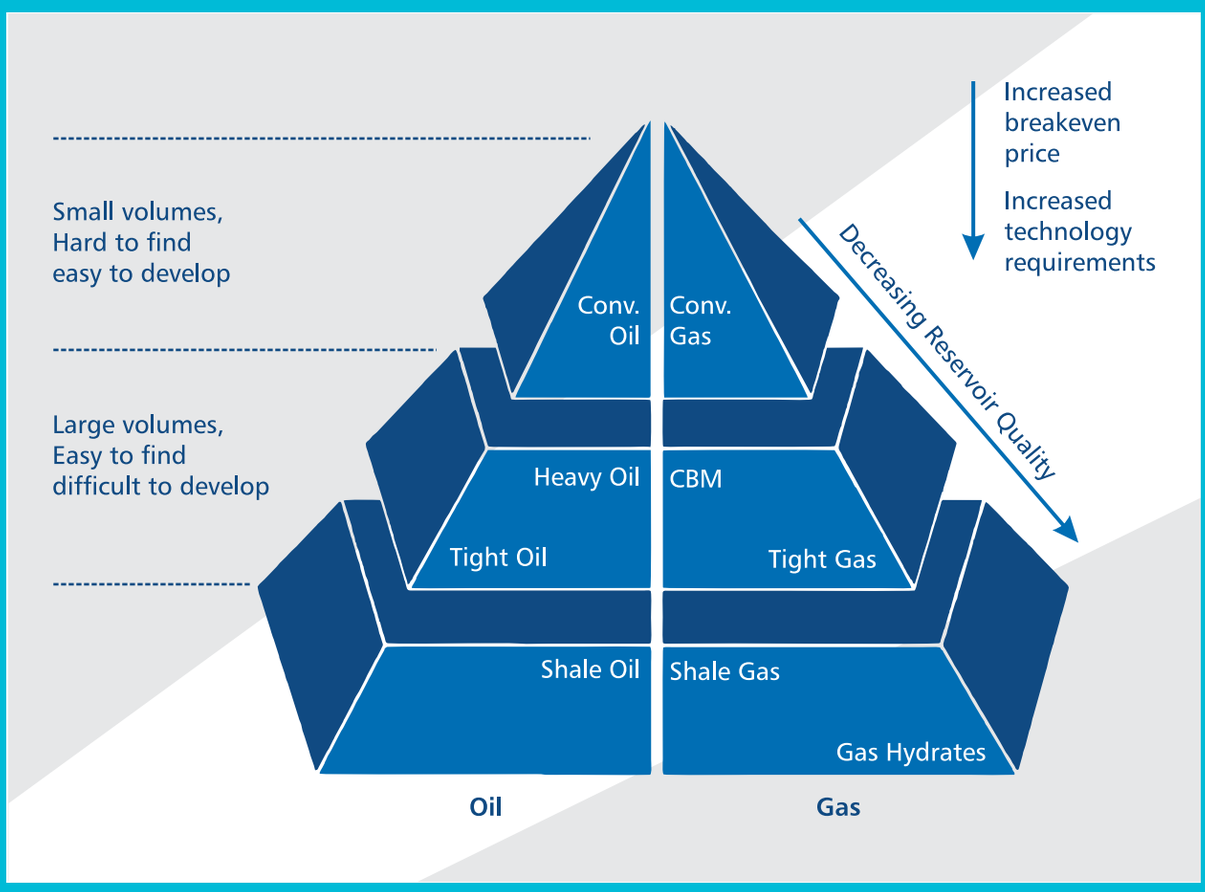


Table 7.2.: In Place CBM Resources

Sl. No.	State	Block name	Operator	Area (sq. km.)	GIIP (BCM)	GIIP (TCF)	Recoverable Reserves (BCM)	Recoverable Reserves (TCF)
1	West Bengal	RG(East)-CBM-2001/1	EOL	500	60.881	2.15	28.12	0.993
2	Jharkhand	BK-CBM-2001/1	ONGC	95	30.182	1.06	3.68	0.130
3	Jharkhand	NK-CBM-2001/1	ONGC	340	9.529	0.34	1.46	0.052
4	Madhya Pradesh	SP(East)-CBM-2001/1	RIL	495	47.855	1.69	17.56	0.620
5		SP(West)-CBM-2001/1	RIL	500	55.501	1.96	18.97	0.670
6	West Bengal	RANIGANJ NORTH	ONGC	350	7.430	0.26	1.86	0.066
7	Jharkhand	JHARIA	ONGC	85	14.610	0.52	3.04	0.107
8	West Bengal	RANIGANJ SOUTH	GEECL	210	54.368	1.92	37.94	1.340
Total				**2575**	**280.357**	**9.9**	**112.63**	**3.978**

Table 7.3: Status of awarded CBM blocks as on 31.03.2015

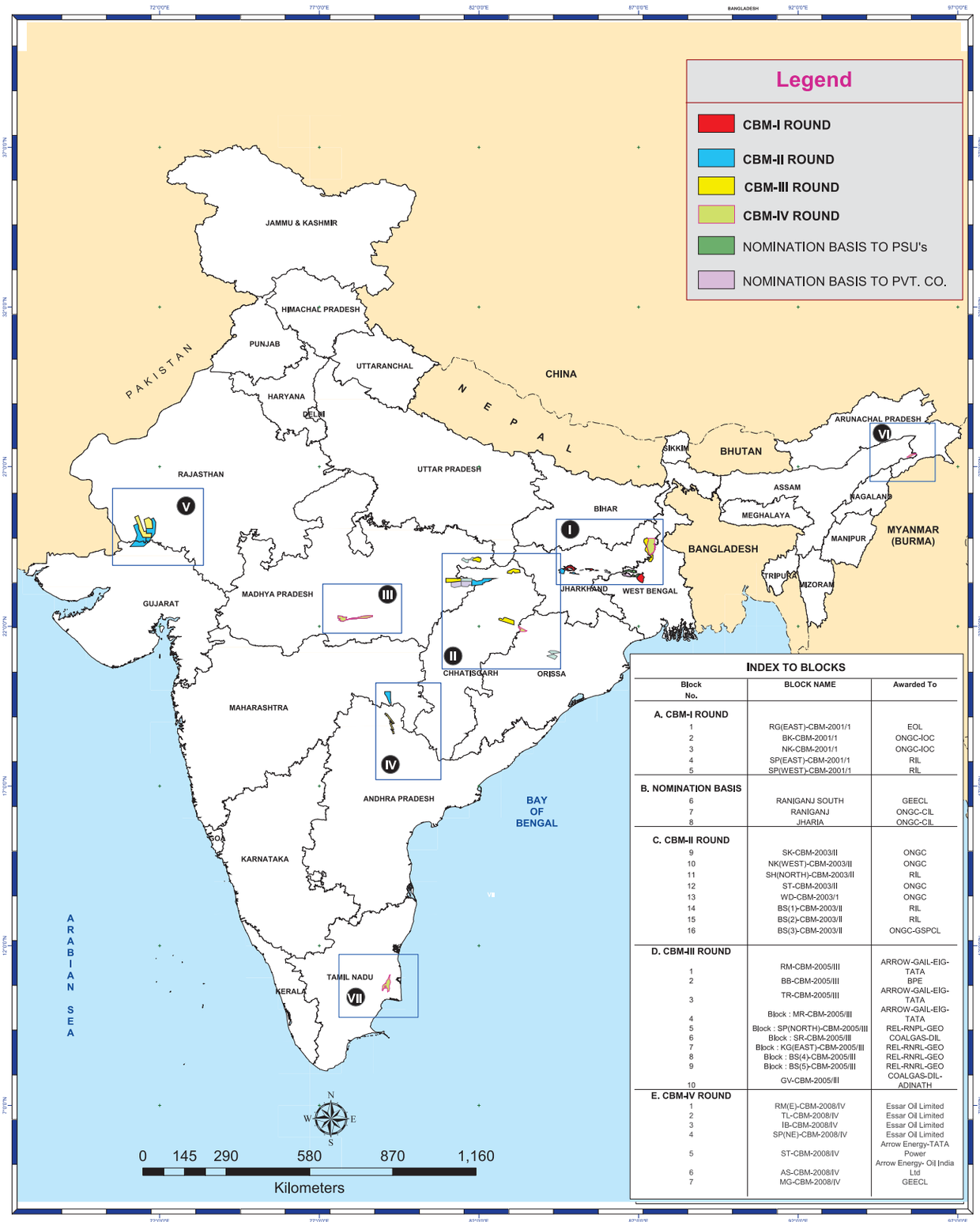
SI. NO.	BLOCK NAME	COAL FIELD / STATE	CONSORTIUM (PARTICIPATING INTEREST)	DATE OF SIGNING CONTRACT	PRESENT AREA (SQ. KM.)	CURRENT STATUS
			CBM ROUND-I			
1	RG(EAST)-CBM-200I/1	RANIGANJ EAST / WEST BENGAL	**EOL** (100)	26.07.2002	500	DEVELOPMENT PHASE
2	BK-CBM-200I/1	BOKARO / JHARKHAND **	**ONGC** (80) & IOC (20)	26.07.2002	74.1	DEVELOPMENT PHASE
3	NK-CBM-200I/1	N. KARANPURA / JHARKHAND **	**ONGC** (80) & IOC (20)	26.07.2002	271.5	DEVELOPMENT PHASE
4	SP(EAST)-CBM-200I/1	SOHAGPUR EAST / M.P	**RIL** (100)	26.07.2002	495	DEVELOPMENT PHASE
5	SP(WEST)-CBM-200I/1	SOHAGPUR WEST / M.P	**RIL** (100)	26.07.2002	500	DEVELOPMENT PHASE
TOTAL AREA :					**1841**	
CBM BLOCKS OFFERED ON NOMINATION BASIS/FIPB ROUTE						
6	RANIGANJ NORTH	RANIGANJ/ WEST BENGAL**	**ONGC** (74) & CIL (26)	06.02.2003	311.8	DEVELOPMENT PHASE
7	JHARIA	JHARIA / JHARKHAND **	**ONGC** (90) & CIL (10)	06.02.2003	65.1	DEVELOPMENT PHASE
8	RANIGANJ SOUTH	RANIGANJ/ WEST BENGAL	**GEECL** (100)	31.05.2001	210	PRODUCTION PHASE
TOTAL AREA :					**586.9**	
CBM ROUND-II						
9	SK-CBM-2003/II*	SOUTH KARANPURA / JHARKHAND	**ONGC** (100)	06.02.2004	70	UNDER RELINQUISHMENT
10	NK(WEST)-CBM-2003/II*	NORTH KARANPURA / JHARKHAND	**ONGC** (100)	06.02.2004	267	UNDER RELINQUISHMENT
11	SH(NORTH)-CBM-2003/II*	SONHAT/ CHATTISGARH & M.P.	**RIL** (100)	06.02.2004	825	UNDER RELINQUISHMENT
12	BS(1)-CBM-2003/II*	BARMER SANCHOR/ RAJASTHAN	**RIL** (100)	06.02.2004	1045	UNDER RELINQUISHMENT
13	BS(2)-CBM-2003/II*	BARMER SANCHOR/ RAJASTHAN	**RIL** (100)	06.02.2004	1020	UNDER RELINQUISHMENT
14	BS(3)-CBM-2003/II	BARMER-SANCHOR / GUJARAT	**ONGC** (70)-GSPCL (30)	06.02.2004	790	RELINQUISHED
15	WD-CBM-2003/II	WARDHA / MAHARASHTRA	**ONGC** (100)	06.02.2004	503	RELINQUISHED
16	ST-CBM-2003/II	SATPURA / M.P.	**ONGC** (100)	06.02.2004	714	RELINQUISHED
TOTAL AREA :					**3227**	
CBM ROUND-III						
14	RM CBM-2005/III*	RAJMAHAL / JHARKHAND	**DART** (40)-GAIL (40)-EIG (10)-TATA (10)	07.11.2006	469	UNDER RELINQUISHMENT

15	BB-CBM-2005/III*	BIRBHUM / WEST BENGAL	**BPE**(100)	16.11.2006	248	UNDER RELINQUISHMENT
16	TR-CBM-2005/III*	TATAPANI RAMKOLA / CHATTISGARH	**DART**(35)-GAIL(35)-EIG(15)-TATA(15)	07.11.2006	458	UNDER RELINQUISHMENT
17	MR CBM-2005/III*	MAND RAIGARH / CHATTISGARH	**DART**(40)-GAIL(45)-EIG(15)	07.11.2006	634	UNDER RELINQUISHMENT
18	SP(N) CBM-2005/III	SOHAGPUR NORTH/ M.P.	**GEOPETROL** (10)-REL(45)-RNPL(45)	07.11.2006	609	EXPLORATION PHASE
19	SR-CBM-2005/III	SINGRAULI / M.P.	COALGAS(10)-**DIL**(90)	07.11.2006	330	EXPLORATION PHASE
20	KG(E)-CBM-2005/III*	KOTHAGUDEM / ANDHRA PRADESH	**GEOPETROL** (10)-REL(45)-RNPL(45)	07.11.2006	750	UNDER RELINQUISHMENT
21	BS(4)-CBM-2005/III*	BARMER SANCHOR / RAJASTHAN	**GEOPETROL** (10)-REL(45)-RNPL(45)	07.11.2006	1168	-
22	BS(5)-CBM-2005/III*	BARMER SANCHOR / RAJASTHAN	**GEOPETROL** (10)-REL(45)-RNPL(45)	07.11.2006	739	-
23	GV(N)-CBM-2005/III	GODAVARI NORTH/ ANDHRA PRADESH	COALGAS(10)-**DIL**(40)-ADINATH(50)	07.11.2006	386	PEL AWAITED
TOTAL AREA :					**5791**	
CBM ROUND-IV						
24	RM(E)-CBM-2008/IV	RAJ MAHAL EAST / JHARKHAND	**EOL** (100)	29.07.2010	1128	EXPLORATION PHASE
25	TL-CBM-2008/IV	TALCHIR / ORISSA	**EOL** (100)	29.07.2010	557	PEL AWAITED
26	IB-CBM-2008/IV	IB VALLEY / ORISSA	**EOL** (100)	29.07.2010	209	PEL AWAITED
27	SP(NE)-CBM-2008/IV	SOHAGPUR NORTH EAST/ MP & CHHATTISGARH	**EOL** (100)	29.07.2010	339	EXPLORATION PHASE
28	AS-CBM-2008/IV	NORTH EAST / ASSAM	**DART ENERGY** (60)–Oil INDIA (40)	29.07.2010	113	EXPLORATION PHASE
29	MG-CBM-2008/IV	MANNARGUDI / TAMIL NADU	**GEECL** (100)	29.07.2010	667	EXPLORATION PHASE
33	ST-CBM-2008/IV	SATPURA / MADHYA PRADESH	**DART ENERGY** (80)–TATAPOWER (20)	29.07.2010	714	RELINQUISHED
TOTAL AREA :					**3727**	

* Contractor has exercised exit option, under relinquishment process
** Part Relinquishment in Development Phase

- Exit option exercised by Contractor & approved by GoI
- Operator has been marked bold.
- Name of Arrow energy has been changed to Dart Energy

CBM BLOCKS AWARDED UNDER CBM ROUND-I, II, III , IV AND ON NOMINATION BASIS



INDEX TO BLOCKS

Block No.	BLOCK NAME	Awarded To
A. CBM-I ROUND		
1	RG(EAST)-CBM-2001/1	EOL
2	BK-CBM-2001/1	ONGC-IOC
3	NK-CBM-2001/1	ONGC-IOC
4	SP(EAST)-CBM-2001/1	RIL
5	SP(WEST)-CBM-2001/1	RIL
B. NOMINATION BASIS		
6	RANIGANJ SOUTH	GEECL
7	RANIGANJ	ONGC-CIL
8	JHARIA	ONGC-CIL
C. CBM-II ROUND		
9	SK-CBM-2003/II	ONGC
10	NK(WEST)-CBM-2003/II	ONGC
11	SH(NORTH)-CBM-2003/II	RIL
12	ST-CBM-2003/II	ONGC
13	WD-CBM-2003/1	ONGC
14	BS(1)-CBM-2003/II	RIL
15	BS(2)-CBM-2003/II	RIL
16	BS(3)-CBM-2003/II	ONGC-GSPCL
D. CBM-III ROUND		
1	RM-CBM-2005/III	ARROW-GAIL-EIG-TATA
2	BB-CBM-2005/III	BPE
3	TR-CBM-2005/III	ARROW-GAIL-EIG-TATA
4	Block : MR-CBM-2005/III	ARROW-GAIL-EIG-TATA
5	Block : SP(NORTH)-CBM-2005/III	REL-RNPL-GEO
6	Block : SR-CBM-2005/III	COALGAS-DIL
7	Block : KG(EAST)-CBM-2005/III	REL-RNRL-GEO
8	Block : BS(4)-CBM-2005/III	REL-RNRL-GEO
9	Block : BS(5)-CBM-2005/III	REL-RNRL-GEO
10	GV-CBM-2005/III	COALGAS-DIL-ADINATH
E. CBM-IV ROUND		
1	RM(E)-CBM-2008/IV	Essar Oil Limited
2	TL-CBM-2008/IV	Essar Oil Limited
3	IB-CBM-2008/IV	Essar Oil Limited
4	SP(NE)-CBM-2008/IV	Essar Oil Limited
5	ST-CBM-2008/IV	Arrow Energy-TATA Power
6	AS-CBM-2008/IV	Arrow Energy- Oil India Ltd
7	MG-CBM-2008/IV	GEECL

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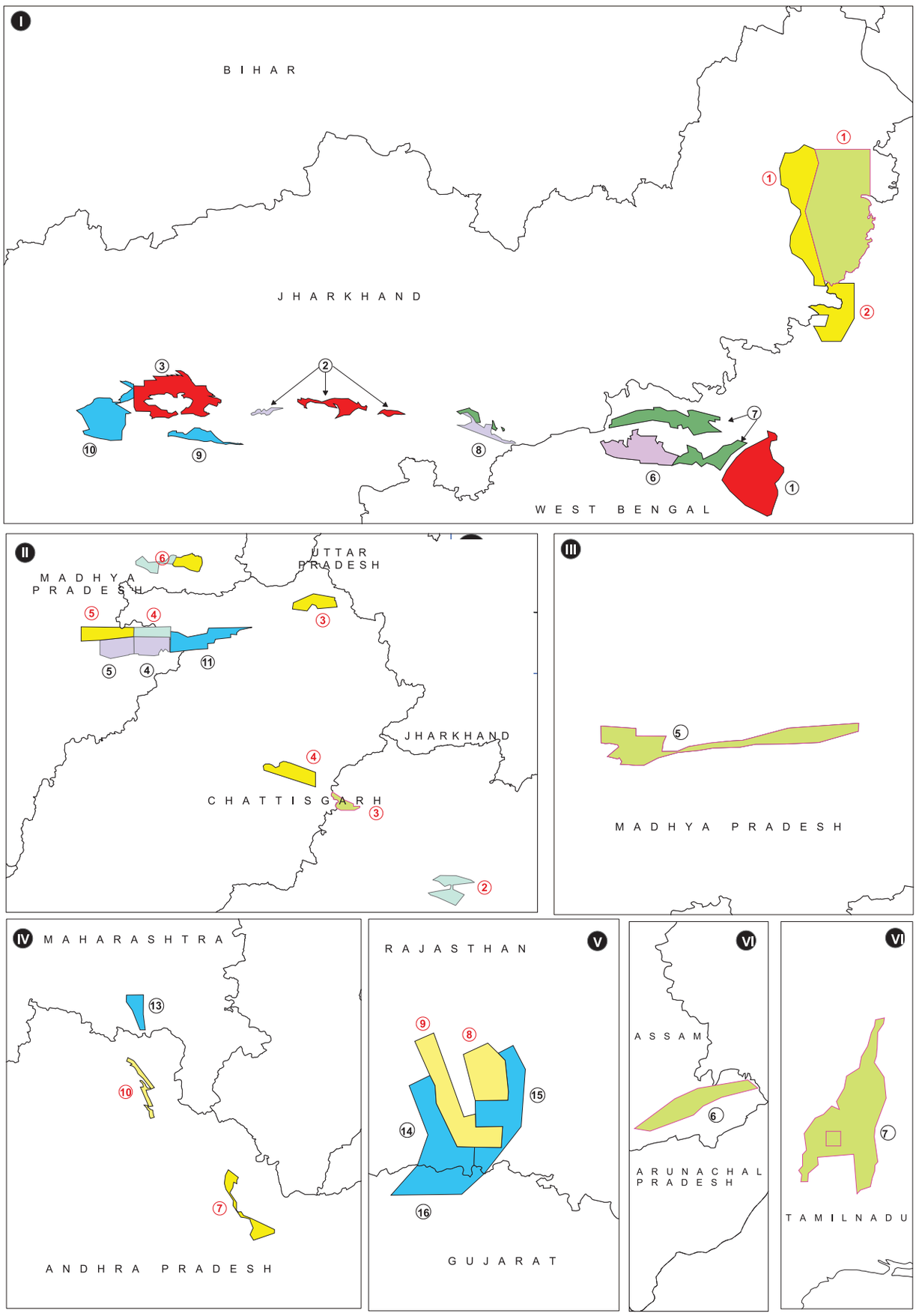

I
BIHAR
JHARKHAND
WEST BENGAL
II
MADHYA PRADESH
UTTAR PRADESH
JHARKHAND
CHATTISGARH
III
MADHYA PRADESH
IV
MAHARASHTRA
ANDHRA PRADESH
V
RAJASTHAN
GUJARAT
VI
ASSAM
ARUNACHAL PRADESH
VI
TAMILNADU

7.2. Shale Gas

Cambay Basin:

- Five exclusive Shale Gas and Oil locations were released in the year 2014-15.
- Proposal for submission of more exclusive locations in Broach Depression are at the final stage.
- Drilling of exclusive shale gas well GNSGA (Gandhar Ext-II) in Gandhar area completed, carried out shale gas specific log studies of Cambay shale section.
- Drilling of two dual objective wells GGAH (Gandhar Ext. VI) & KLXF (kadi ML) has been completed and cores have been collected.
- Two locations (GNSGB (Gandhar Ext.I) & GNSGC (Gandhar Ext.III) in Gandhar area of Cambay basin are under drilling.
- LAQ and Site preparation for released locations are in progress.
- Laboratory studies of Cambay shale for exclusive shale gas/ Oil well (IMSGA) and other dual objective wells (SKBH, GGAF & GGAH) are completed.

KG Basin:

- Source rock logging & evaluation study and field and Laboratory investigation study for Raghavapuram Shale (HG-HR) were completed on core samples of Wells MSAC and SUWAA in Malleswaram Block.
- Two exclusive Shale Gas/Oil locations WGSGA in West Godavari Block and MASGA in Mahadevpatanam Block were released and are under Land acquisition.
- Proposal for submission of third exclusive location MD-SG-1 in Mandapeta Block is in final stage.
- One conventional well WPGAA in Godavari Block is under drilling, extensive coring and laboratory studies and shale gas specific logging are planned.
- Drill sites for three conventional wells NGSAA in West Godavari Block, GMTAA in Kavitam Additional Area Block and SPM-AA in South Penumadam Area in Godavari Block are completed.

Cauvery Basin:

- Two exclusive locations for shale gas/oil assessment, KUSGA in Kuthalam ML and TKDSGA in L-I PML were released.
- A dual objective well PDAB in the L-II block was drilled. Two conventional cores were cut in the well for Shale Gas assessment.
- Special logs like NGS, DSI and ECS were recorded in the target formation Andimadam.
- Lab studies of the cores & cutting of well PDAB, such as sedimentological, biostratigraphic , petrophysical and source rock studies were carried out.
- The desorption studies of the two cores of well PDAB as well as the two cores cut in the well ASAE (drilled in 2013-14) were completed.

Assam & Assam Arakan Basin:

- Lab studies were carried out for evaluation of shale gas/oil potential of Kopili formation on core sample collected in two conventional exploratory wells: # Geleki-373 (GKBO) in Namti PML block and # Lakwa-578 (LDG) in Lakwa PML block.

7.3. Gas Hydrate

Gas Hydrate is a crystalline solid, its building blocks consists of a gas molecule surrounded by a cage of water molecules. Each molecule of Gas hydrate contains upto 164 m^3 of Methane (CH_4). Initial work in India on Gas Hydrates as an energy resource, was done by GAIL and NIO. In 1995, an expert committee realized the potential of Gas Hydrates in India.

Gas Hydrate exploratory activities/ research in India is being steered by the Ministry of Petroleum & Natural Gas under National Gas Hydrate Program (NGHP) which was initiated in 1997 with participation from Directorate General of Hydrocarbons (DGH), National E&P companies (Oil and Natural Gas Corporation Ltd., GAIL India Ltd., Indian Oil Corporation & Oil India Ltd.) and National Research Institutions (National Institute of Oceanography, National Geophysical Research Institute and National Institute of Ocean Technology). Steering Committee is headed by Secretary, P&NG with Joint Secretary (Exploration) as convener. The Technical Committee is chaired by DG, DGH and has participation from all National Oil Companies (NOC) like OIL, ONGC, GAIL, IOCL, and National Institutes like the NGRI, NIO & NIOT. The NGHP was restructured in the year 2000.

To meet the challenges of exploring Gas Hydrate, which is at a research stage the world over, MoPNG / DGH have signed MoUs with various agencies for sharing of knowledge and scientific data, as below;

- MoU with USGS,
- MoU with US-DOE (under renewal),
- MoU with US-MMS (now called US-BOEM, under renewal)

- MoU with JOGMEC, Japan
- MoU with GFZ-POTSDAM, Germany
- MoU with IFM-GEOMAR, Germany Current Status

NGHP carried out the Expedition-01 in 2006. The presence of significant quantities of Gas Hydrate has been estalished in the KG, Mahanadi and Andaman basins.

NGHP Expedition-02 aims at identifying sites which would ideally have:

- Sand dominated gas hydrate occurrence
- Reasonably compacted sediments
- Occurrence of free gas below the gas hydrate stability zone

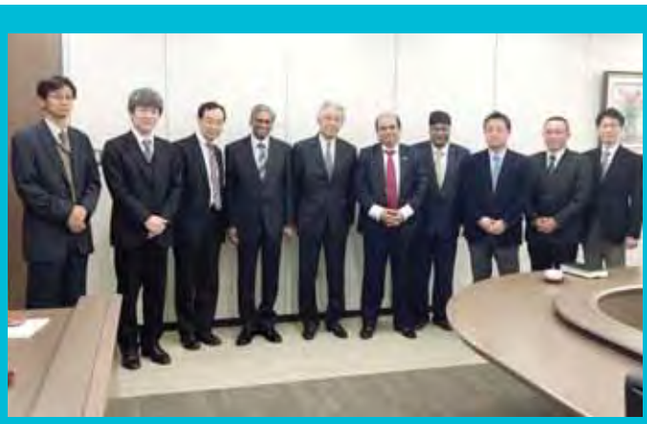
NGHP Expedition-02 has been approved by the Steering Committee of NGHP. NGHP Expedition-02 consists of LWD (Logging while drilling), Coring and wireline logging program at about 20 sites (40 wells) in the deepwater KG & Mahanadi basins. The cost of NGHP Expedition-02 shall be shared by OIDB (50%), ONGC (20%), OIL (10%), GAIL (10%) and IOCL (10%).

The drill ship CHIKYU has commenced operations under the NGHP Exp-02 on 4th March 2015. Till 31st March 2015, Logging While Drilling (LWD) was completed at 13 wells. The NGHP Expediton-02, including the coring leg, is expected to be completed by the 31st July 2015.

Expedition-03 aims at carrying out pilot production testing of at least one site in the Indian deepwater environment. However, the execution of Expedition-03 depends on the success of NGHP Expedition-02.

7.4. Oil Shale

A brainstorming session on 'Exploration of Oil Shale in Indian basins' was held on 23.04.2015 at DGH, Noida and attended by representatives of DGH, CMPDIL, OIL, ONGCL, IOCL and GSI. In the session, a Core Committee was formulated comprising members of DGH, IOCL, ONGC, CMPDIL and OIL.

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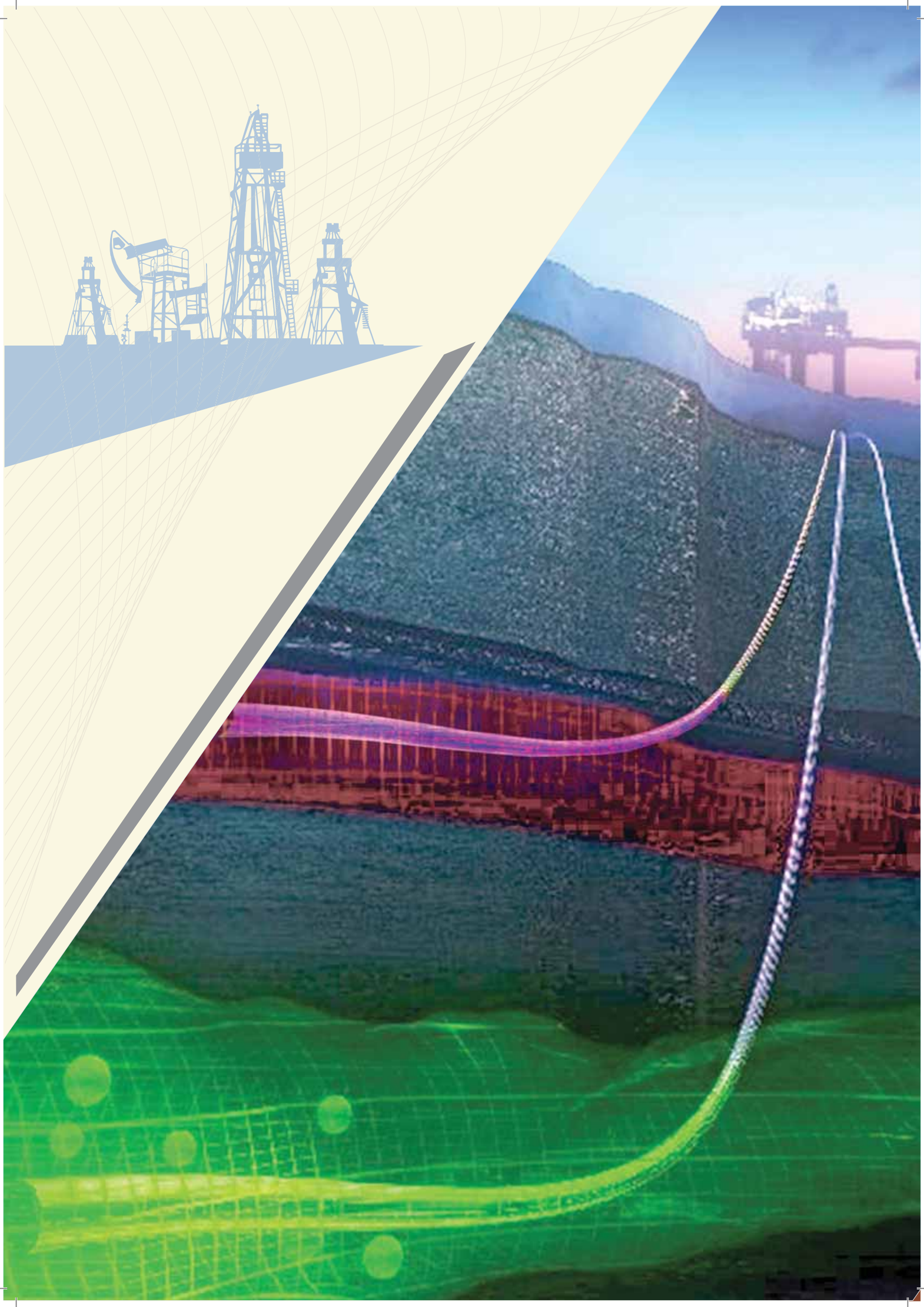
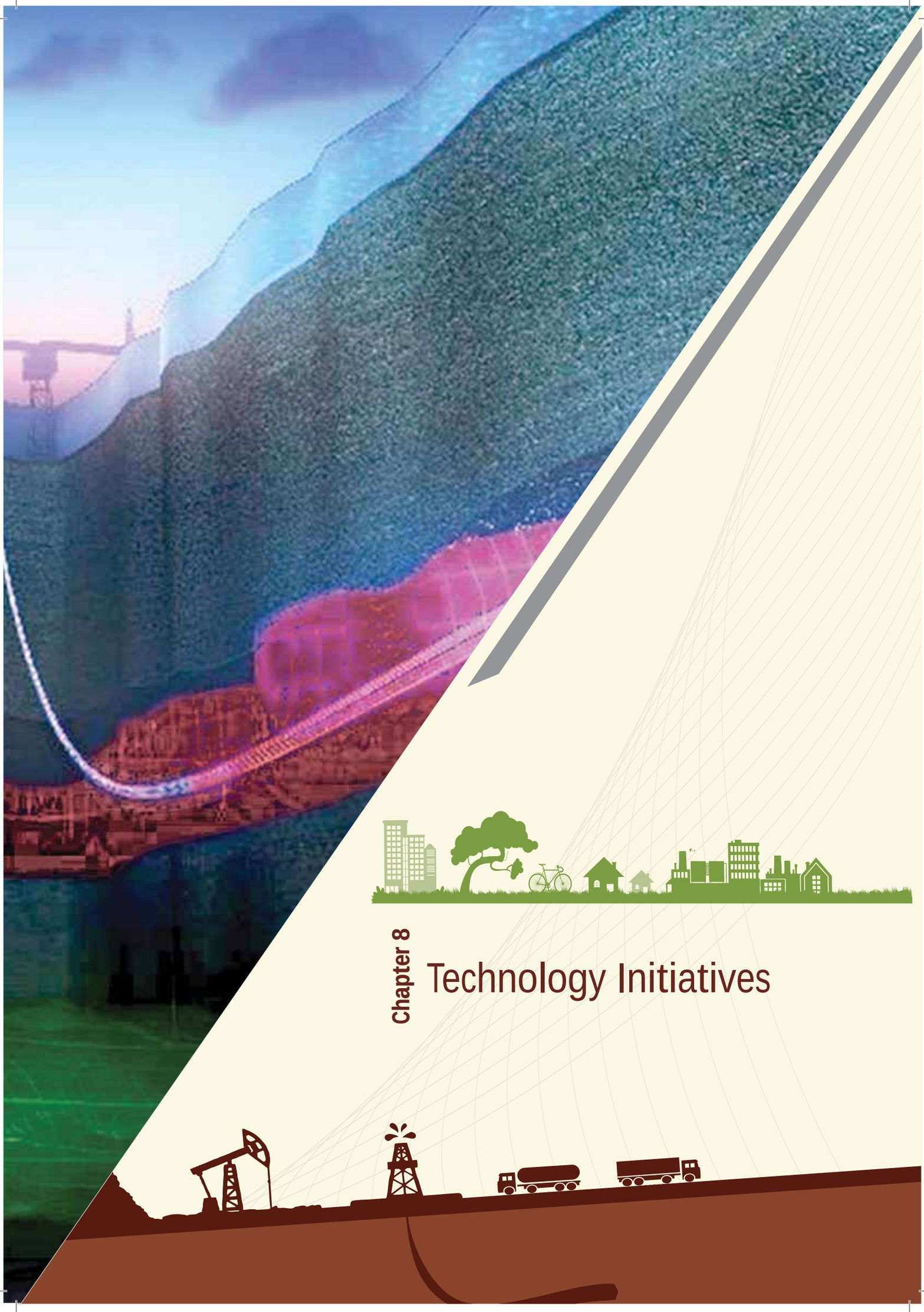
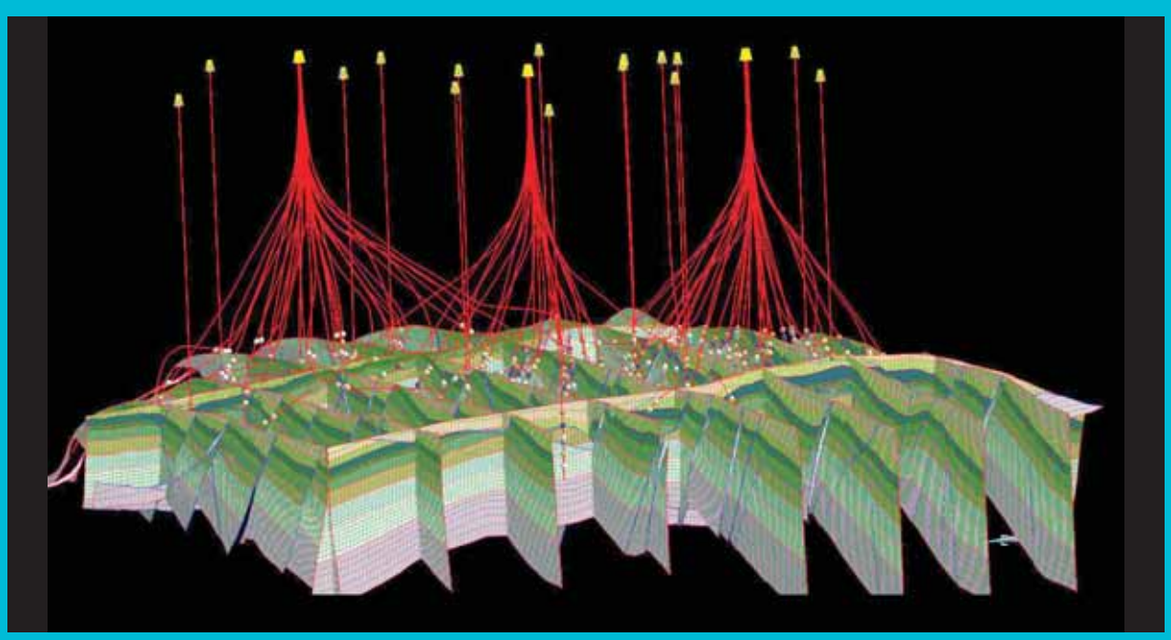




Chapter 8

Technology Initiatives

8
Technology Initiatives



CAIRN*

Any new technology used/or being adopted for exploration/development with their benefits :

- Pad drilling concept: 24 wells per pad with deep cellars for development drilling, leading to saving 85% land requirements, faster drilling of wells with minimal rig moves times, improved rig efficiencies and early delivery of wells for final completion and hook up for production.
- Rapid Rig: Use of state of the art custom designed fast moving self-deploying super single cyber design highly efficient rigs with fully automated pipe handler enabling drilling +/- 1230 meter wells in approximately 7 days.
- Drilling BITS: Cairn adopted PDC bit over Tri Cone bit technology for more than a decade, and with constant technical collaboration with bit companies Cairn has reduced the drilling times significantly; particularly in deeper and harder weathered volcanics. High durability New hybrid PDC-Impreg bits were recently used in very hard & abrasive and volcanic formations in RJ exploration wells resulting in saving long bit trip hours and cost.
- Synthetic Oil Based Mud (SBM) system: Cairn introduced the environment friendly, infinitely recyclable SBM first time in India. SBM provides a superior borehole with less associated drilling problems compared to Water Based Mud saving considerable hidden costs.
- Centrifugal Cutting Driers (CCD): Cairn extensively employed CCD units which reduced the volume of drilling waste and also recovered a percentage SBM from cuttings for re-cycling which would normally be disposed. Recently a centralized processing station has been initiated leading to increased processing efficiency and reduction in number of CCD units.
- WARP - HPHT mud application: Micronized particle drilling fluid (WARP mud - SBM) was used to drill the HPHT (extreme high temperature environment) well in Rawa field and it proved highly successful in reducing the ECDs as well as in providing good hole cleaning (at low flow rates) with minimal maintenance, which enabled to drill through the narrow pressure margin sections of the well. WARP is also beneficial so that solids do not settle in such high temperature environment as against normal barite.

** As provided by M/s. Cairn*

- MPD (Managed Pressure Drilling): MPD was recently used for drilling the HPHT well in Rawa, this is a very efficient technology in industry for drilling wells with very narrow drilling margin between Pore pressure and Fracture pressure.

- Unitized Wellhead: Cairn is using unitized wellhead across all its development and exploration wells. This reduced total well times up to 16% for specific well designs and helps comply with the well safety barrier policy by preventing lifting of BOP to install the casing hanger.

- Cairn introduced Drilling with Casing in its fields.

- Use of Bicentre bit: In a high cost HTHP well with Multiple casing string, Bi-center bits were used to reduce flat time thus increasing drilling efficiency by simultaneous hole opening (traditional hole openers results in longer rat hole and thereby results in additional trip to open rat hole)

- Use of Chemical sealant to rectify casing leak: Cairn successfully used sealtite chemical to rectify casing leak problem. This chemical if successfully applied re-establishes casing integrity (and maintains gas tight property for gas injection wells).

- Digital Oil field: It is deployed for monitoring the well & surface facilities parameters. This enables monitoring & evaluation of well performance and artificial lift parameters remotely for better decision making.

- ATCS : Automatic Tube Cleaning System (ATCS) is installed in Injection water heaters to reduce tube fouling. This unit throws small silicon balls in the heater tubes periodically which help removes Oily sludge & deposits that tend to stick to heater tubes thus prolonging time between heater openings for mechanical tube cleaning.

- Time-Lapse (4D) Seismic Technology: 4D seismic technology was applied as part of a field development strategy to arrest the production decline at Rawa field, and to add incremental reserves. 4D seismic is an advanced method of acquiring, processing and interpreting repeated 3D seismic surveys at intervals of time. The fourth dimension (time) provides an understanding of changes in the reservoir related to production. The 4D (OBC) seismic survey over Rawa that was carefully planned, executed, and interpreted, was the first of its kind in India. The observed 4D response in Rawa field has been interpreted to be the result of a combination of changes in both fluid saturation and pore pressure. Hence, discrete separation of the saturation and pressure components of the 4D effect is thus required for quantitative interpretation. Subsequently, advanced 4D simultaneous AVO inversion was carried out using base and monitor 4D datasets to derive the quantifiable saturation and pressure changes in the reservoir. Comparison of estimated absolute saturation volumes from base and monitor surveys clearly shows indications of water flooding at the flank of the structure and undrained areas at the crest. Infill drilling results along with dynamic reservoir surveillance data have validated the 4D interpretation. Three wells, recently drilled based on 4D seismic results are adding additional Oil to the field's production.

- Reservoir characterization using AVO analysis and Inversion: Rawa Middle Miocene (MM) reservoirs are AVO/seismic friendly and exhibit Class II AVO response with fluid effects more pronounced at far angles. A deterministic AVO inversion study conducted in 2003 enabled volumetric assessment to quantify hydrocarbon-related anomalies using lithology and fluid discriminators and aided in identification and efficient exploitation of development drilling opportunities. Producing areas and prospective hydrocarbon areas were clearly illuminated in the Fluid Factor (FF) map and are separated from water bearing areas that are not illuminated. The FF attribute along with other AVO inversion attributes were extensively used for identifying near field hydrocarbon opportunities and identifying better reservoir areas for optimizing well locations in the subsequent infill drilling campaigns.

- Advanced Spectral Decomposition (CWT) Technology: Rawa main reservoirs Middle Miocene (MM) are overlaid by thin Late Miocene (LM) reservoirs. These reservoirs are thin and isolated and are difficult to map using conventional seismic interpretation methods. Spectral decomposition is an invaluable tool for imaging and mapping thin bed reservoirs and revealing seismic geomorphology. An advanced spectral decomposition technique, Continuous Wavelet Transform (CWT), is applied in Rawa as this technique has several advantages over the conventional FFT methods. CWT possesses the ability to construct a time-frequency representation of a signal that offers very good time and frequency localization. CWT attributes at different frequencies were computed, co-blended and visualized using advanced 3D visualization environment to highlight the thin channels and their geometries. These hydrocarbon filled channels were drilled as secondary targets in the subsequent infill drilling campaigns and produced in some wells

- Delayed Mud Cake Breaker solution was employed. This system dissolves mud cake after well is drilled and completed. This was done to avoid any additional intervention which is required to

dislodge the mud cake from well bore area and also prevented possibility of downhole damage and ensured minimization of rig hours. This technology was used in most of the wells drilled in the recently concluded drilling campaign (2014-15).

- Downhole Robotics: Well tractor & stroker was introduced in high deviation wells (RF-1 and RE-4) where heavy duty work is required. This technique provided opportunity to save cost by averting costly coil tubing or rig dependent workover rig operation
- Downhole Camera: High definition downhole camera used in wells RE-2 and RF-7 to visually inspect well condition and downhole obstruction. This facilitated to design the correct remedial operations.
- Fluid Based Diverters: Acid Stimulation was envisaged through Fluid Based Diverters in Oil wells to restore well productivity where acid is diverted preferentially towards the Oil zone. This ensured that the formation in the Oil zone is stimulated more effectively to obtain better results by reducing water cut and thereby obtaining incremental Oil production. Fluid based diverters technique has been used in RE-1 and RE-4.
- Fluid Based Sealants: Fluid based technology to seal off leaks in tubing / casing in RC-10 well. This technique remediated costly Work over operations.
- Formation Isolation Valves: Use of formation isolation valves in well completion ensured that there is no fluid loss into the reservoir during workover and hence avoiding formation damage. Formation Isolation Valves (FIVs) are closed before killing the well. This isolates the reservoir section from all the work-over fluid and rest of the activities. The same can be opened later using pressure cycles prior to production. All the wells drilled in the recent campaign have FIVs.
- Water Separation Unit Platform: This system was installed in RC platform. This system uses phase separation technique to reduce the total quantity of fluid to be handled in the pipeline which diminishes the backpressure to the connected wells. This in turn results in better deliverability of the wells.
- Separation, treatment and disposal of produced water at the platform itself thus reducing total quantity of water to be treated at terminal.
- Harnessing usable energy from high pressure injection water to the rotary equipment thus conserving energy for the entire system.
- Froth Treatment Vessel: This system handles the recovered Oily water from the Induced Gas Floatation Unit for micro separation of Oil and water such that the separated water can be recirculated or reused. Froth Treatment vessel has reduced the hydraulic load to the existing Effluent Treatment plant to an extent of -50 m^3/hr by recycling the separated water from the system to the existing surge tank which is then used for reinjection via the Induced Gas Floatation unit. This has also reduced the usage of borewell water thereby reducing ground water extraction.

IOR-EOR

Mangala:

Mangala field is the biggest Oilfield in Rajasthan and is the current "jewel in the crown" for the Rajasthan Joint Venture of Cairn and ONGC. This field has exceeded the initial FDP expectations.

The original FDP had an approved off take of 100,000 BOPD, which was further increased to 125,000 BOPD via FDP revision in 2008. This increase in off take was based on the latest petrophysical studies carried out by the JV resulting in increased STOIIP. The field started commercial production in August 2009 and was ramped up to the approved off take rate of 125,000 BOPD in August 2010. The field was producing at 125,000 BOPD till March 2012.

Based on drilling results of phase-1 wells and production performance of the field, subsurface

studies indicated the possibility of enhancing the field off take further to 150,000 BOPD and it was proposed to ramp up the field off take. In order to further substantiate the recommendations, detailed and rigorous third party studies were also carried out. Post ramp up, opportunities were identified in terms of stimulation and artificial lift candidates to keep adding well head capacity to maintain 150,000 Bbls production from the field.

In addition to this, the opportunities were looked into appropriate well locations to be targeted to drill 14 FDP wells to maintain the plateau further. The locations were optimized based on production data and subsurface studies. The placements of these wells were very crucial as there were numerous challenges in drilling and completing the wells in the right place. It was ensured that each and every well was monitored real-time, especially the crestal FM4 horizontal well. Drilling of these wells added substantial well head capacity, which was very critical in maintaining Mangala plateau.

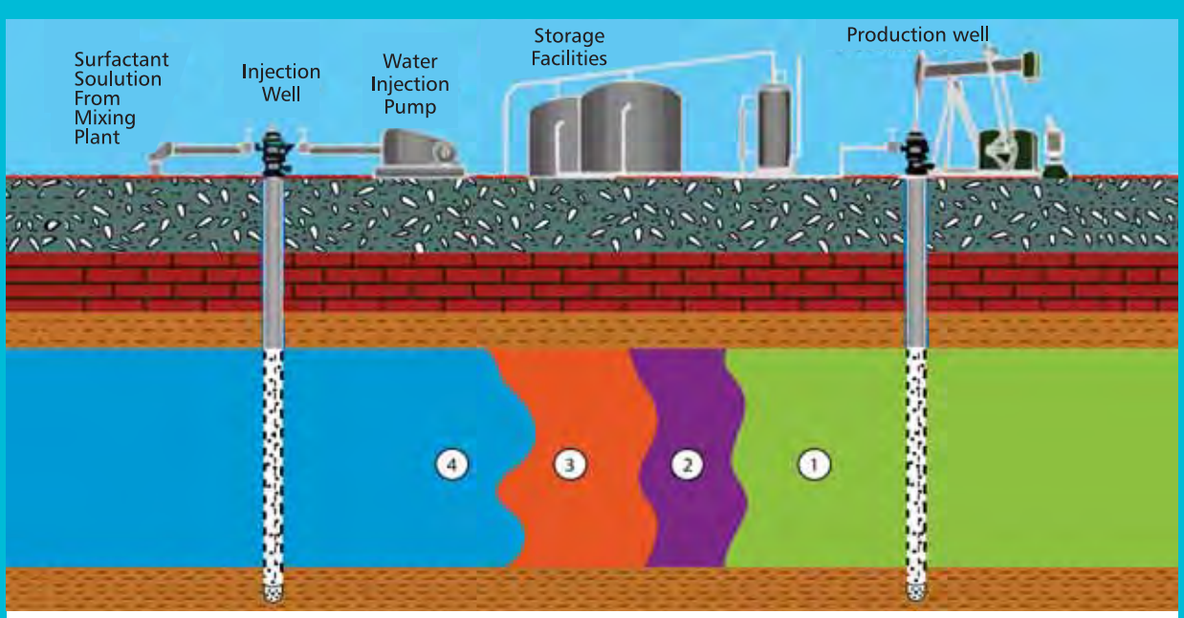
The JV also carried out various technical third party studies like reservoir characterization, RCA, SCAL, VSP, PVT and special reservoir engineering, geological and geophysical studies as a part of the WP&B to ensure optimized reservoir management and production maintenance.

The JV identified the potential challenges to maintain the plateau with FDP approved wells, and recommended to pre-pone the drilling/completion of EOR injectors as infill producers to maintain and possibly extend the plateau. These wells are in complete synergy with the EOR project, a polymer flood, which is one of the world's largest chemical enhanced Oil recovery projects. The JV also came out with the proposal of 3 horizontal infill wells in the challenging FM-5 sands. The infill programs (48FM1, 28FM2 and 3FM5 wells) have been huge success and it has helped in maintaining higher production levels in Mangala. More infill well opportunities and successful execution of chemical EOR will be key to arrest the natural decline of the field. Currently, the Mangala Polymer EOR project implementation is in the final stages of execution and initial polymer injection has started.

ONGC*

A number of new technologies have been inducted in recent past for better subsurface imaging, enhancing in-house processing capacity software and hardware up gradation to fulfil intensive data processing requirements, induction of new interactive work stations for data integration and interpretation with latest volume visualization software and skill improvement of its G&G personnel.

**** As provided by M/s. ONGC***



The new technology adopted during the year and its usefulness is given below:

- Broadband seismic technology has been used in Mumbai High Field identification of porosity sweet spots in carbonate reservoirs and thin bed identification within the clastic reservoirs. The broadband data is also expected to help in Basement imaging for prospectivity within locales of intense fracture development.
- Micro-seismics surveys are performed to monitor hydraulic fracturing. Initiative has been taken with in-house efforts for acquiring data. Feasibility study for monitoring the progress of hydro-fracturing using Micro-seismics is under progress in Cambay Basin.
- Drill bit Seismics technique uses the vibrations produced by a drill bit while drilling as a down hole seismic energy source.The seismic data has been acquired around a well in Gandhar area of Cambay Basin using 3C sensors and drill bit as a source.
- Advance NGS system: It allows simultaneous display and management of different spectra for desired presentation and effective management of data file. It has latest digital signal processor (Orion) and MCA (Multi Channel Analyser) which will improve the data acquisition, analysis process and enrich the interpretation capabilities.
- New Modules in MOVE suite (Geomechanical Modeling (GM), Fracture Modeling (FM) and Stress Analysis tools have been added. GM creates 3D restoration models and affords advanced structural systems analysis capabilities. Data generated will be used in fracture modeling and generation of Discrete Fracture Networks (DFN) whereas FM generates non deterministic 3D Discrete Fracture Network (DFN) models that allows the characterization of fracture networks and generates direct outputs for reservoir simulation. The stress analysis tool uses graphical method for analyzing fault and fracture systems under a user defined 3D stress state. The tool computes stress attributes for Slip Tendency, Dilation Tendency, Fracture Stability and Slip Stability of planes.
- 2D long-offset seismic data reprocessing tool using TGS software: This tool will improve the image by using linear transform (SMELT) module and proprietary software CLARI-FI. This tool has helped in understanding the Basin architecture, Sedimentation History and in identifying prospective locales for Mesozoic exploration of Kutch and Kerala-Konkan Basin.
- Scale-Out NAS 378 TB storage, 40 TB SAN storage and 10G OM3 Fibre based direct Workstation connectivity through IPV6 ready CORE Switch.
- Server virtualization through Rack server & associated Software and induction of Work Stations and Thin Clients.
- Network connectivity has been upgraded from existing 1G to 10G on Fiber Net work.

Technology developed in house and absorbed during the year for IOR / EOR processes:

Technology developed in house and absorbed in R&D Projects on Field development based on Reservoir simulation studies, Performance monitoring, EOR processes – Lab design and simulation, Reservoir characterization, productivity enhancement projects and basic laboratory data generation for various fields of ONGC during the year are as follows:

- 1-D Simulation of air injection combustion tube experiment of Malleswaram field has been successfully carried out by constructing a model to predict parameters of combustion tube experiment.
- Revisit/ Updation of L-II Reservoir model of MHN incorporating structural changes near N-12 area indicated higher ultimate reserves by ~3.0 MMT (by 2030) for L-II.
- For the first time in ONGC, a conscious decision has been taken to exploit gas cap gas post Oil production (GS-4 sand (Central Block), Gandhar field). Several variants were studied for blow down of gas cap gas at plateau rate of 10-15 LCMD for 5-7 years.
- Chemical EOR (Polymer, ASP) simulation study for Bechraji field: Injection of 1.0 PV of 2000 ppm polymer followed by chase water gave 23.4% recovery and with Injection of 0.4 PV of ASP slug followed by chase water gave 29.3% recovery. The pilot OIIP is 0.3 MMT.
- Laboratory Evaluation for hydrocarbon gas injection as WAG mode for K-IX sand of Nardipur area of Kalol Field. 3-Cycle WAG Process with HC Gas gave recovery 65% of HCPV which is 9.4% incremental recovery over water-flood and 3-Cycle WAG Process with N_2 gave incremental recovery of 6% of HCPV over water-flood.
- Application of MEOR processes viz. MEOR in huff-n-puff mode, PDB jobs for paraffin degradation in tubulars in Mehsana & Ankleshwar Assets. Scrapping free period improved by application of PDB jobs in Mehsana and Ankleshwar Assets.
- An incremental Oil gain of about 13000m^3 from WSO achieved through jobs carried out during the

** As provided by M/s. ONGC*

year 2014-15 using in house chemical formulations in fields of ONGC.

Production

The induction of advanced technologies is a continuous process and ONGC has been employing the best in class technologies for pursuing its objective of improving production from its Oil fields/wells. Some of the major technologies recently inducted in offshore are as under:

- Float over method installation: HRD process platform has been installed in Jan'2015 by using state-of-the-art "Float-Over Technology" resulting in saving of offshore construction time for installation.Earlier the successful installation of B-193 AP Deck of B&S Asset, in Dec'12 using the Float Over method was the first endeavour of ONGC in this direction
- Floating Production, Storage and Offloading (FPSO): FPSO (Armada Sterling-II) a floating Oil production system successfully commissioned in Mar'15 in western offshore to produce Oil and gas from Cluster-7 fields. It is to mention that ONGC earlier for the first time has deployed FPSO in April'13 to produce Oil from NBP field of Western offshore
- Gas Sweeting Facilities at Offshore: B193 Process Platform commissioned in Nov'14 under Development of B193 Cluster fields having high H_2S gas concentrations. It is for the first time that sour gas processing & sweetening facilities have been installed and being operated at Offshore installation.
- Proppant Hydro-fracturing of Basal Clastics and Basement: Hydro-fracturing of Basal Clastics and Basement pay zones carried out in one of the low producing wells in Mumbai High field has resulted in substantial Oil gain. This will pave way to carry out similar jobs for other wells with Basal clastics layer to enhance production
- Auto gas lift with surface control has been effectively utilized in wells where a gas pool/zone is present above Oil bearing formation. In this system in-situ gas is utilized as lifting gas for hydrocarbon without depending on external infrastructure/source.
- CO_2 tracer survey: New technologies for Gas lift surveillance "CO_2 tracer survey" from M/s. Weatherford introduced in Mumbai Offshore. This technology provides a simple, more efficient, non-intervening method for trouble shooting a gas lift well system
- Hollow glass sphere mud for drilling through sub-hydrostatic sections.
- Periscope for proper placement of horizontal drain hole in thin sub-layers of the reservoir.
- Multi-lateral level-II completion technology has been successfully implemented in the wells for different sub layers of Heera field.
- Nitrified emulsified matrix acid jobs (NEMAJ) using foam diverter for effective acidization jobs in Mumbai high field.
- Enzyme breakers and especially in-house developed chemical formulation for clean-up of drain holes for improving wellbore productivity in offshore.

Drilling:

- 5 New Generation AC-VFD rigs in Onshore have been commissioned in 2014-15 and 1 more rig is under commissioning/transportation. These rigs shall enhance our ability to drill ERD/ deeper exploratory wells with improved drilling performance.
- 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. Usage of PBL tool has resulted in downward trend in time lost due to Mud loss.
- 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.
- Air Hammer Drilling and Turbo Drilling with IMPREG Bits have been successfully introduced in the Frontier basin, resulting in improvement in drilling performance by facilitating drilling very hard formations. Earlier these formations were drilled by conventional drilling at very slow ROP with frequent tripping for Bit change.

Drilling Fluid Technologies:

- Loss Control Material: Mud loss is one of the major factors contributing to the NPT in offshore operation. In view of controlling losses in highly pressure depleted formations, Stoploss (For Non-reservoir formation) and Fracseal (For reservoir formation) have been introduced. The success rate obtained during field operations was higher at about 85-95% and resulting in considerable reduction in NPT due to Mud loss System.
- Introduction of Hollow Glass Sphere Mud System

(HGS Mud System): The re-development of Mumbai High field requires induction of new technologies in order to attain the objective of reaching the targeted 40% recovery factor from the field. The use of HGS based Sub-Hydrostatic Drilling Fluid in Mumbai Offshore is aimed to formulate sub-hydrostatic fluid to conduct balanced drilling and work-over in pay zones to minimize formation damage and prevent fluid loss due to depletion.

- Micro bubble based Drilling Fluid: Most of the ONGC fields are depleted and reservoir pressures are less than hydrostatic. Drilling through these reservoirs without any complication is the most challenging task being faced today. This unique stabilized micro bubble system designed is expected to be a perfect fluid for drilling depleted reservoirs and simultaneously curing mud loss problem. The field trial of this drilling fluid has been done in the well HSD # 8H (Rig- Trident-II) of South Heera field for drilling 8 ½" section during the period 24th to 27-03-2015.

- Choline Chloride as a substitute of KCl in drilling Fluids: KCl-PHPA-Glycol non dispersed drilling fluid system is widely used in ONGC to drill clay section. Although KCl in concentration of 5 to 15 % provides effective inhibition of shales along with PHPA and Glycols yet discharge of saline drilling wastes poses environmental problems due of contamination of ground water and soil Choline Chloride – PHPA –Glycol system provides an effective substitute of KCl-PHPA-Glycol system. Choline chloride works on one third the dose of KCl and it has been field implemented in wells of Ankleshwar, Ahmedabad and Mehsana Asset successfully.

- High Density Clean Brine for testing and completion in HTHP wells in Western & Eastern Offshore areas: The extreme condition encountered in HTHP wells exposes the functional inadequacies of conventional drilling & completion fluid. High temperature accelerates the break-down of water base drilling fluid and degrades the fluid rheology. This can lead to dynamic and static barite sag, increasing risk of loss of well control in high angle wells. Turning to Oil base mud as an alternative does not entirely solve the problem.

- Formate brine reduces deep gas field development cost by cutting the time taken to drill, completes & evaluates the reservoir section. It helps efficient delivery of recoverable reserves by improving the reservoir connectivity, providing precise reservoir definition & visualization, providing ideal fluid medium for supporting acoustics and electrical image log. Present status: implemented in the well YF#8. Cesium formate has been successfully used in two wells YS#8-1 and C-39#P1.

- Advanced Mud Systems: In addition to hollow glass sphere mud system & environment friendly SOBM (Synthetic Oil Base Mud systems), Proprietary mud systems like KCl-PHPA-Glycol Mud system, Non-damaging Drilling Fluids, are being used to minimize the down hole complications in wells, especially in Mumbai Offshore, KG & Assam Asset wells. (SOBM) has been trial tested in Rajahmundry (Onshore) for better hole stability and minimize down-hole complications.

- Non-Invasive Fluid (NIF) has been used for bore-hole stability in Deep-water wells and in Assam, where there is less margin between Fracture Gradient and Pore Pressure.

- Loss control solution during drilling and cementation: Rapid Setting Fluid (RSF pill)/ Acid soluble loss control material used in well N_12#3Z & HG# 6H of Mumbai offshore with encouraging results. Fiber- cement used in Well# TISUA (Frontier. Basin). Chemically activated polymer gel formulations used in Cauvery asset. Micro-bubble based light wt cement slurry used in severe seepage loss at shallow depth at Cauvery asset.

Cementation Technologies:

- Development of Light / ultra-light weight slurries: Wells having low fracture gradient and depleted reservoirs demands Light / ultra-light weight slurries for desired cement rise. Being used regularly for cementation of CBM wells and many onshore & offshore wells.

- In-house development of weighted spacer: Weighted spacer for cementation of high pressure wells has been developed In-house wherein density achieved upto 2.15 SG & applicable upto 165^{0}C.

1. Slurry formulation for HPHT wells: Being regularly used in Rajahmundry Asset & Mumbai Region (140^0-200^0 C)

Well Services:

1. Radial Drilling technology is a cost effective technology to address problems of marginal and brown fields and providing the production enhancement. This technology is being implemented in Ahmedabad and action is in progress to implement in other work centres including Assam.Radial Unit deployed and Work Over rig CW 50-V deployed to assist radial job.

2. Designed and implemented mechanism for Recovery of trapped Oil from Brine tank as a step towards environmental protection:

3. Fabricated unit (Floating Oil Recovery Unit) has been tested at rig ROM-50-IV and units in other Rigs are being installed.

4. Details of New discoveries and new resources in WSS Ahmedabad:

- Provisional patent has been applied for development of formulation of Frac. Slurry using sea Water.
- Provisional patent has been applied for design of 9-5/8" Over the Top assembly.
- Agency is being finalized for roping in new tools, techniques and chemicals such as Ultra Low Temperature Breaker for hydro-fracturing, Universal X-Over tool for GP and alternate GP packer

5. Special studies for productivity improvement

- Undertaken special study for developing Fast Hydrating Guar Gum (FHGG) for use in hydraulic fracturing jobs in ONGC fields

6. Initiatives and development in the field of Information Technology:

- Acquired CTU software (Cerberus) and up-graded Field Pro software for Hydro fracturing.

7. Specific areas where R&D was carried out/ Innovations:

- Design & development of 9-5/8" Over The Top assembly for Gravel pack jobs.
- Design & development of Universal X-over tool for GP jobs.
- Alternate GP packer with improved design for better efficiency.
- Frac. Fluid Formulation using sea water.
- Development of Fast Hydrating Guar Gum for fracturing jobs.
- Development of ultra low temperature Frac. fluid upto 25^0C.
- Development of High temperature Frac. fluid upto 165^0C

These have brought down cost drastically, as acquisition cost of these technologies from International service provide is very high. Apart from technological advancement, these also have resulted into ease in operations.

8. Hydraulic Fracturing in HPHT wells (BHT $>150^0$ C)

Successfully implemented Hydraulic fracturing technology in 3 wells in Rajahmundry and Cauvery fields. This technology is capable of enhancing productivity from wells with High Pressure High Temperature.

9. Oil Emulsified Acid Treatment

Successfully implemented Oil Emulsified Acid Treatment technology in wells of Ahmedabad fields which is suitable for water sensitive formations and deep penetration of live acid for removal of damage.

10. Enhancement of Productivity by increasing hole size (under reaming) and Gravel packing

Well Stimulation team for the first time completed 3 wells with Gravel Pack, having 9-5/8'' casing and 12-1/4'' under-reamed holes, using 9-5/8" Over The top assembly. This technology has been developed in-house and will be suitable for exploiting sub-hydrostatic wells having heavy Oils.

11. Expandable Sand Screen Technology for sand control

Gas wells with potential sand production due to unconsolidated sand reservoir have been successfully completed with Expandable Sand Screen technology (ESS) and have yielded very good results. This technology is an alternative to hitherto practiced gravel packing technology and has potential to be used in high producers.

12. New technology implementation in Eastern offshore Kakinada: Testing & HF of deepest and hottest offshore reservoir - well no. YS-8-1

New Technology induction with stimulation driven exploratory well testing through successful hydro-fracturing in globally the deepest & hottest tight HP-HT Golapalli gas reservoir at Yanam Offshore block in Eastern Offshore at a depth of 5231-5250m at a temperature of 450 deg F. Anticipating very high pressure and temperatures, tools were rated for 15000 psi & 450^0 F for which Well Services, ONGC made meticulous plans along with best in class service providers Schlumberger and Halliburton.

The fracturing executions in two objects were pumped through DP-II Modular Stimulation Vessel braving the most volatile & challenging weather conditions, utilizing 1100 bbl of specialized high temperature frac. fluid SAPPHIRE XF with 98 tons of high strength proppant at maximum pressure of 12400 psi and pumping rate of 16 bpm. The job execution was performed commensurate

with the design plan to create the fracture geometry and successfully place the proppant.

All operations related to Drill Stem Testing, Pre-frac testing, mini frac, Main frac and post frac testing were successfully carried out with single string run and the string was pulled out after 47 days. The Bottom Hole temperature encountered during frac job was 388° which is highest in the world for frac jobs. The effort has provided valuable BHP & BHT data to understand reservoir characteristics, pre-frac and post frac behaviour and its potential.

13. Multicycle DST Tool of 15K Rating for safe HPHT well testing -onland

A new technology "Multicycle DST Tool of 15K Rating" was used for the first time during testing of deepest onshore HPHT well KL#2A, Rajahmundry Well Services. The well was drilled upto 5450 metres with maximum mud weight of 2.05 g.cc and reservoir temperature was more than 450^{0}F.

Due care was taken to ensure safe operations and safety of the well. Clear fluid comprising Calcium Bromide and Zinc bromide was used during testing for desired pressure transmission for DST operation of different downhole valves. This technology enabled us to give stage wise cycling of the recirculation valves in the DST string thus different predetermined drawdown could be given for activation. This also eliminated the use of CTU in 15 K well for repeated activation. Valuable Bottom hole data was generated with this efforts for analysis and guidance for future.

IOR / EOR efforts in ONGC:

ONGC puts efforts on continual basis for performance analysis of fields and suitable technology & corrective measures are taken for improvement in crude Oil production. Improved Oil Recovery (IOR) / Enhanced Oil Recovery (EOR) schemes were formulated by ONGC for improvement in production in its 15 major fields viz. Mumbai High, Heera, Neelam, Gandhar, Kalal, North Kadi Sanand, Santhal, Balol, Sobhasan, Jotana, Lanwa in Gujarat; Lakwa-Lakhmani, Geleki, Rudrasagar in Assam. These I0R/EOR schemes not only helped in arresting the decline trend of Oil production, but also led to augmentation in Oil production and its effects are also seen in concluded fiscal year 2014-15. 21 Nos. of IOR/EOR schemes have already been completed and have contributed significantly in arresting the decline on production from aged/mature fields. IOR/EOR schemes of ONGC are proven, customized and cost effective technologies which have resulted positive results. The major fields undergoing IOR/EOR programs have also witnessed continuous growth in In-Place Volumes and all efforts are made to translate the same to reserves through model re-visits and technology interventions.

IOR Schemes: Mumbai High field has been covered through rolling development plans of IOR. Two phases of IOR schemes in Mumbai High North and Mumbai High South fields have been successfully implemented. The third Phase of Redevelopment Plan (IOR) Phase three has been prepared and approved for both MHN and MHS fields. Similarly, redevelopment scheme Phase-I for Heera field has been implemented and resulting in enhancement in Oil production level. Subsequently, redevelopment Phase-II including Panna Pay was formulated for Heera field and is under implementation. IOR scheme was also formulated for Neelam field is also under implementation. The Redevelopment plan of Neelam field is being formulated. The status of current IOR/EOR projects is tabulated as under:

Sl. No.	Field	Scheme	Status of IOR/ EOR Project
1	Balol	EOR - (Insitu Combustion)	On stream
2	Santhal	EOR - (Insitu Combustion)	On stream
3	Sanand	EOR – (Polymer Flood)	On stream
4	Gandhar (GS-11)	EOR – (WAG)	Under implementation
5	Heera	IOR – Redevelopment Phase-II	Under implementation
6	Mumbai High North	IOR – Redevelopment Phase-III	FR is approved. Under implementation
7	Mumbai High South	IOR – Redevelopment Phase-III	FR is approved. Under implementation
8	Jhalora	EOR – ASP (Field expansion)	FR under approval
9	Viraj	EOR – ASP (Field expansion)	FR under approval

EOR application:

Various Enhanced Oil Recovery (EOR) technologies applied in fields of ONGC for enhancing production are:

- In-situ combustion in heavy Oil fields of Balol,

Sonthol, Lanwa in Mehsana.

- Polymer flooding in Sanand field of Ahmedabad.
- Alkali Surfactant Polymer (ASP) pilots expansion in Viroj. Jhalora and Kalol fields.
- Development of South Lanwa and North Balol field with Hybrid EOR i.e. CSS followed by ISC in combination with infill wells
- Miscible hydrocarbon gas injection in Gandhar field of Ankleshwar Asset.
- Field scale implementation of immiscible hydrocarbon WAG in Gandhar field (GS-11) of Ankleshwar Asset after successful pilot implementation.
- Pilot scale SWAG process as on EOR effort has been formulated in Heera and Mumbai High South fields which is under implementation.

Microbial EOR (MEOR):

ONGC has also applied its indigenously developed technology of Microbial EOR process to increase production from sub-optimally flowing wells in fields of Ahmedabad, Mehsana and Assam. By application of microbial paraffin control technology, another MEOR process, field jobs have been carried out for improving well productivity by reducing frequency of scrapping to avoid wax deposition in wells of Ahmedabad, Mehsana and Ankleshwar fields. Indigenously developed MEOR formulations have been successfully applied for improving flow efficiency of surface flow lines.

Introduction of new state-of-art technologies for IOR/EOR on existing field to activate less permeable parts of the reservoir and catch the by-passed Oil by IOR/EOR processes is one of the major efforts of ONGC to enhance the production. These are:

- Thermal EOR: ONGC has approved implementation of Cyclic Steam Stimulation (CSS) as a pilot project in Lanwa field. IRS is working on the modalities for implementation of the project. Success of this project will help in increasing production and recovery from other heavy Oil fields in Mehsana Asset.
- Chemical EOR: Alkaline Surfactant Polymer (ASP) pilot in Kalol field (sand XII) was commissioned in January 2014. Similarly other chemical EOR schemes like ASP for K-IV sand of Jhalora field, chemical flood in Bechrajee, CSS in in Balol field are also being considered.
- Preparation of Integrated Geo-celluar Models (GCM): As an important initiative to move from conventional map-based Geological model to fine scale Geocelluar Model (GCM), IRS has taken lead in preparing GCMs of major fields in recent past in order to address issues of brownfield development by capturing reservoir heterogeneity, improved water flooding efficiency, optimizing infill drilling etc. During FY 2014-15 GCM of another 7 fields namely Jotana, Sanand, Langnaj, Kanjirangudi, KSP-W, Lingala-Kaikalur, Mandapeta were taken up in, besides the same for Geleki and Nandasan fields taken up in 2013-14, continued in current year. GCM Model will help in better understanding of the reservoir, balance reserves, by passed Oil, saturations etc. and will facilitate firming up of comprehensive redevelopment/IOR scheme.

Steps taken for revitalization/redevelopment of old fields, if any.

ONGC has implemented a number of IOR/Redevelopment Schemes to arrest the decline, sustain production levels and improve recovery factor from mature fields. Several IOR schemes have been successfully implemented in offshore to augment Oil & gas production from major offshore producing fields - Mumbai High, Heera & Neelam since 2000-01.

The major projects already implemented include redevelopment projects for Mumbai High North and South Phase-I & II, Additional development of Heera Part-I & II with exploitation of free gas from Bandra formation , IOR scheme for Neelam and Redevelopment of Heera & South Heera Phase-I.

To further improve the recovery factor, Development of Western Periphery of Mumbai High South field and Redevelopment of Heera and South Heera Part-II are under implementation.

The successful implementation of various IOR schemes in offshore since 2000-01 have resulted in an incremental gain of over 72 MMT of Oil and 23 BCM of gas till FY 2014-15.

In continuation to efforts being made to further improve the recovery factor and as a part of rolling development plan, ONGC Board has approved the following three major Projects during the FY (14-15).

Mumbai High North Redevelopment Project Phase-III: Project has been approved in June'14. The scheme envisages an incremental Oil & gas production of 6.997 MMT and 5.253 BCM by the year 2029-2030.

Mumbai High South Redevelopment Project Phase-III:

Project has been approved in Nov'14. The scheme envisages an incremental Oil & gas production of 7.547 MMT and 3.864 BCM by the year 2029-2030.

Enhanced recovery from Bassein field through Integrated Development of Mukta, Bassein and Panna Formations: Project has been approved in Nov'14. The scheme envisages an incremental production of 18.83 BCM of gas, 1.97 MM m3 of condensate and 0.183 MMT of Oil by the year 2027-2028

Lanwa Field: Development of Lanwa field by application of Cyclic Steam Stimulation (CSS) under current reservoir conditions was studied. Also, development of South Lanwa and North Balol field with Hybrid EOR i.e. CSS followed by ISC in combination with infill wells was studied and the combination of both CSS (between 5-7 cycles) along with Air-injection shows recovery in the range of 15-30%.

Bechraji Field: In view of up-gradation of liquid handling capacity of Bechraji field to a level of 3500 m3/d, simulation study was carried out to ascertain the impact of recovery and enhancement of production from the field. As way forward, Laboratory studies have been carried out for feasibility of Polymer Flood in for increasing recovery in Bechraji field which indicates encouraging results.

GS-4 sand (Central Block) of Gandhar field:For the first time in ONGC, a conscious decision has been taken to exploit gas cap; gas post Oil production from GS-4 sand (Central Block) of Gandhar field.

Viraj field: Consequent upon the encouraging results of ASP Pilot in Viraj field, the simulation studies for ASP Pilot expansion was carried out.

Similarly, study of Kalol ASP Pilot (K-XII sand) envisaged incremental recovery of ~7.4% of pilot OIIP over water flood with pilot life of 57 months. Pilot was commissioned in January, 2014.

Simulation study of major sands of Assam majors (Geleki, Lakwa and Rudrasagar) has been completed which holds 85% of in place volume of Assam Asset and 80% of total production and have more than 800 Oil wells and 45 years of production history. Study of TS-4B, TS-5A1, TS-5A2 & TS-5B of Geleki field, BMS sand of Rudrasagar field, TS-3, TS-6 sands of Lakwa field, Charali field, development of different sands of Konaban field has been completed during FY 2014-15 based on new/updated geological model.

OIL*

IOR/EOR

OIL is pursuing a Joint Industry Project (JIP) on Improved Oil Recovery from the matured Oil fields of upper Assam Basin by Carbonated Water Injection (CWI) with Heriot-Watt University, UK. The experimental work is aimed at studying the efficacy of carbonated water injection in increasing Oil recovery at secondary and tertiary stage using different rock samples, reservoir conditions, Crude Oils, etc. The methodology adopted for the work includes high pressure-high temperature micro-model visualization experiments, core flood recovery tests, spontaneous imbibition tests, etc. In the present phase of work, the CWI at secondary and

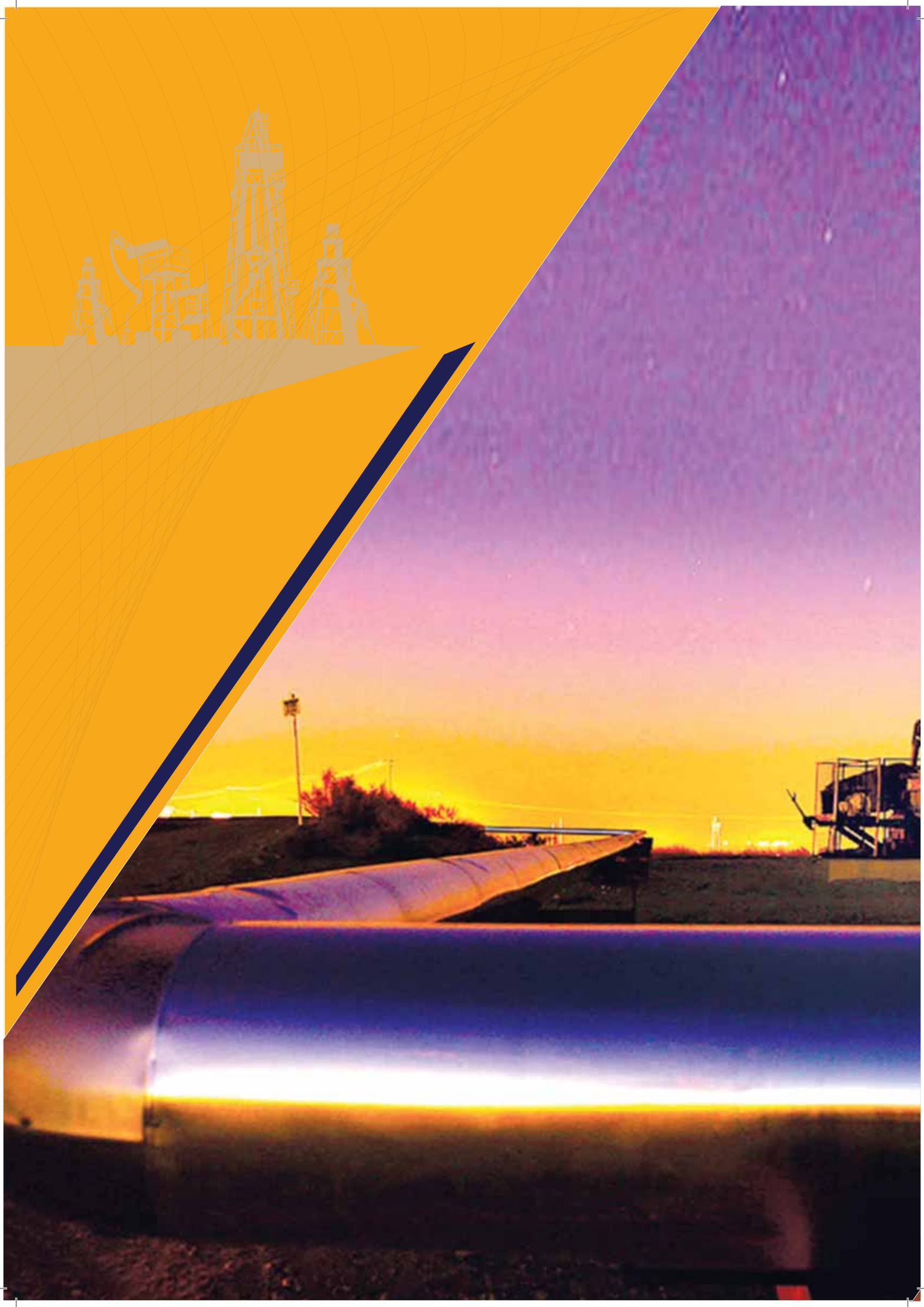
tertiary stage (carbon dioxide and low salinity brine system) was investigated using live, saturated Oils. The mechanism of spontaneous imbibition in providing additional Oil recovery in fractured carbonate rocks was also investigated. The preliminary results have indicated that carbonated water injection provides additional oil recovery through various mechanisms such as viscosity reduction, swelling, diversion, spontaneous imbibition, etc. These results will be used in implementing the CWI process in field.

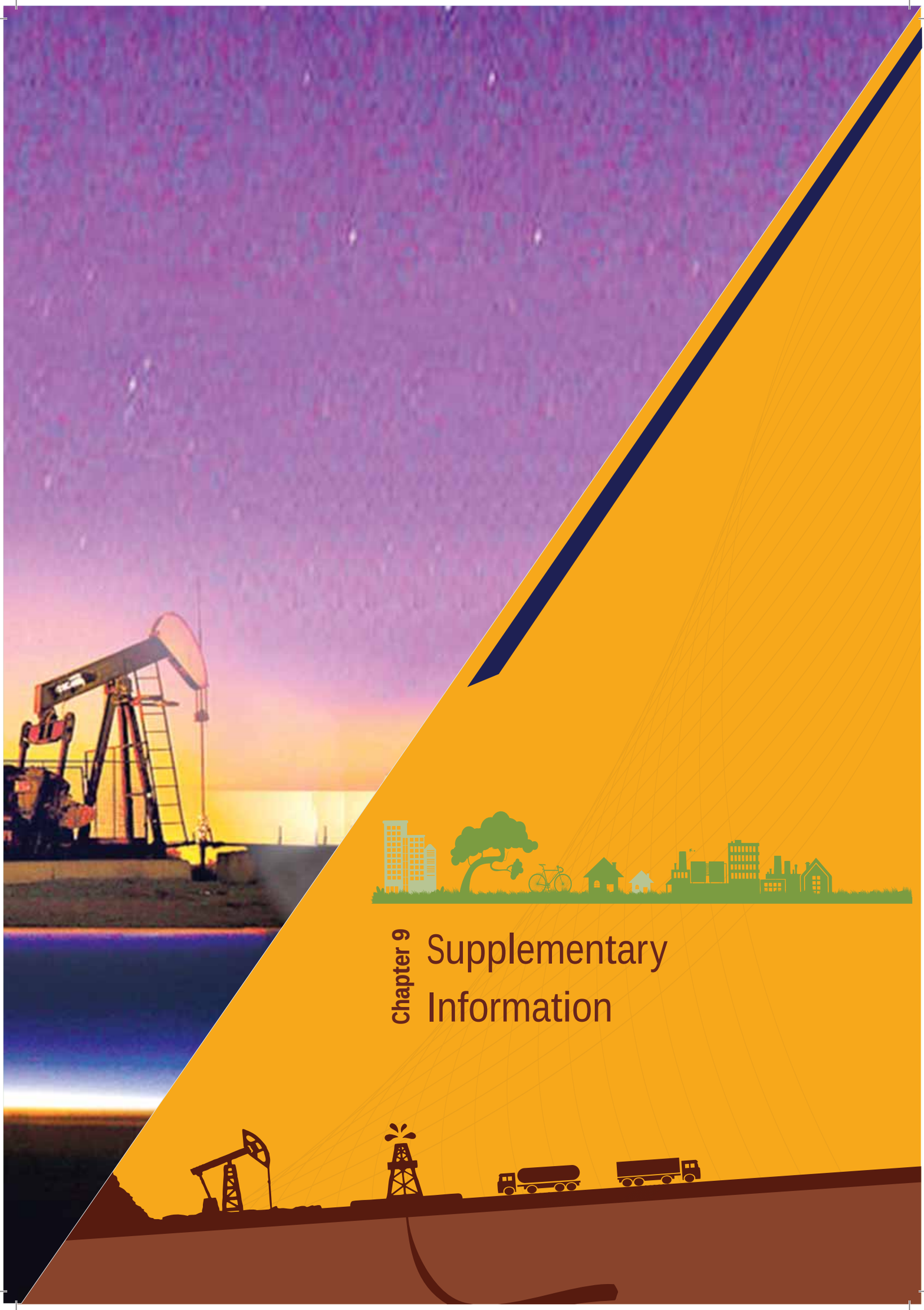
Steps taken for Revitalization I Redevelopment of Old Oilfields, if any

OIL is pursuing a number of systematic geo-scientific study and initiatives towards revitalization of its upper Assam reservoirs by engaging international experts/ service providers for Identification of Prospects and Static Reservoir Modeling (Paleocene-Eocene) in OIL's Operational Areas of Upper Assam Basin. A few of such initiatives are listed below:

- Consultancy study for identification of reservoirs, building Static models, looking into areas for perspective of placement of horizontal/in fill wells through Reservoir Simulation studies as well as techno-economic feasibility analysis for the identified locations.
- Process has been initiated for possible implementation of Alkaline Surfactant Polymer flooding through a service contract for which two reservoirs have been short listed for detailed laboratory analysis and reservoir simulation study.
- Field re-development study has been conducted by M/s FOROIL, France using their new proprietary technology for increasing productivity from the ageing Greater Tengakhat Field through a service contract.
- Engaging M/s Radial Drilling Services, Inc., USA for carrying out Radial Drilling in 04 wells for Oil India Limited as a Pilot R&D Project.
- Study have been initiated to select 10 candidate wells to carry out chemical water shut of job in Upper Assam as a pilot R&D project through a hired service Contract.
- Consultancy Study for assessment of Gas availability & Field Development plan for exploitation of Oil, Gas, condensate in OIL's operational areas of Assam and Arunachal Pradesh

**** As provided by M/s. OIL***





Chapter 9

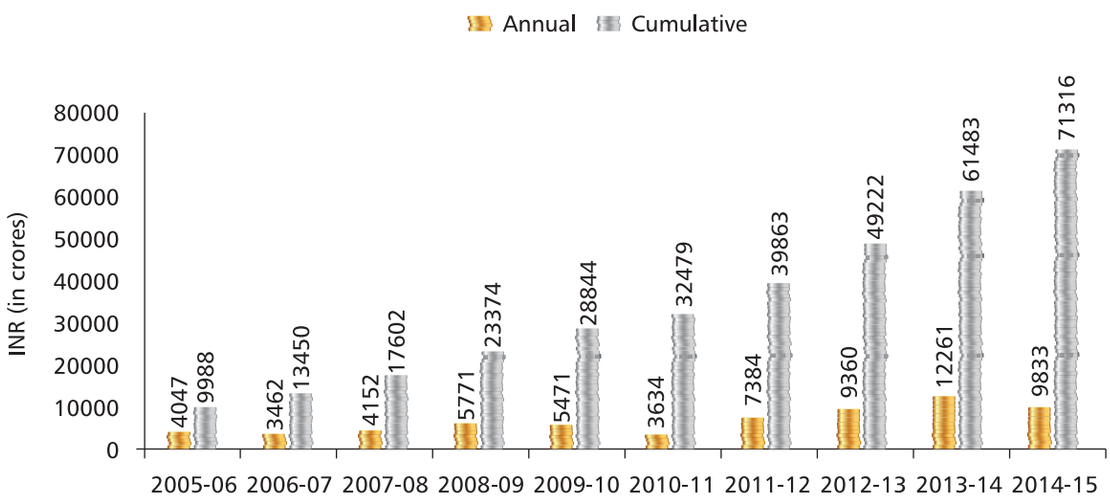
Supplementary Information

9
Supplementary Information

9.1. Contribution to Government Exchequer

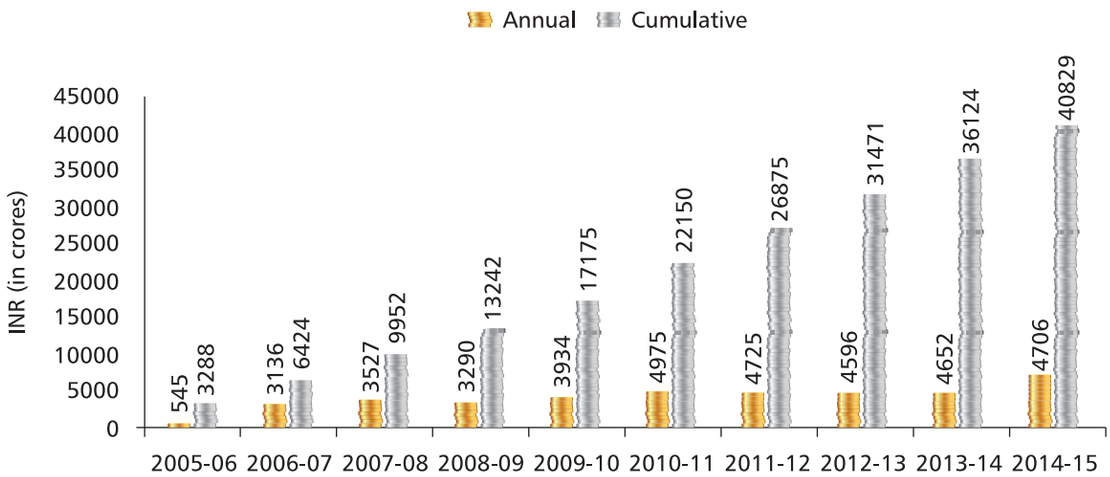
9.1.1. Profit Petroleum

During the Financial Year 2014-15, Profit Petroleum of Rs. 9833 crores was contributed to Govt Exchequer from the E & P operations under PSC regime.The cumulative Profit Petroleum earned upto 31st March 2015 was of the order of Rs. 71316 crores.



9.1.2. Royalty

During the Financial Year 2014-15, Royalty received by the Central Exchequer was of the order of Rs. 4706 crores. The cumulative Royalty contributing to the Central exchequer till 31st March 2015 amounted to Rs. 40829 crores.



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9.2. Memorandum of Understanding (MoU)

Table 9.1: Details of MoU signed

Sl. No	MoU Signed Between	MoU Signed on	Valid upto	Objectives
1	Lebniz Institute of Marine Sciences (LIFM-Geomar)of Germany & DGH	30th August 2010	29th August 2015	Joint Research in Marine Gas Hydrates, Research and Development
2	GFZ German Research Centre for Geosciences & DGH	17th April 2012	16th April 2017	Collaborative research in Gas Hydrate Laboratory studies
3	Japan Oil, Gas Metals National Corporation (JOGMEC) & DGH	16th February 2007	15th February 2015	Exchanges of technical knowledge and information, workshops, meetings on Gas Hydrates Research and Development
4	U.S Geological Surveys (USGS) of the Department of Interior of the United States of America & DGH	16th December 2008	Open ended	Resource exploration hazards and environmental issues associated with Gas Hydrates; Field studies & research for Gas hydrate
5	Department of Energy of United States of America & MOPNG, India	4th April 2008	3rd April 2013 (Under process of renewal)	Enhance & accelerate Gas Hydrate exploration
6	The Minerals Management Service of the Department of the Interior of the United States of America & DGH	21st August 2009	20th August 2014 (extension of MoU is underway)	Leasing/tendering programs, Resource estimation and Methane Hydrate R&D activities and human resource development.
7	Department of State (DoS), USA & MOPNG, India	6th November 2010	Open ended	Exchange of knowledge and expertise in the areas concerning Shale Gas resource characterization and assessment in India
8	Norwegian Petroleum Directorate & DGH	21st September 2012	20th September 2017	Petroleum Resource Management; Human Resource Development; Petroleum related R&D and technology sharing
9	IOCL & DGH	3rd January 2013	2nd January 2016	Oil Shale related studies

9.3. RTI Annual Return information in the year 2014-15

Table 9.2: Details of RTI in the FY 2014-15

Ministry/ Department/ Organization	Quarter	Opening balance of request (as on start of Quarter)	No. of Request received during Quarter	Total no. of Request (Column 3+4)	No. of Request 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
Directorate General of Hydrocarbons	1st Quarter (Apr 14-Jun 14)	5	26	31	1	0 (0%)	0
	2nd Quarter (July 14-Sept14)	30	12	42	1	0 (0%)	0
	3rd Quarter (Oct 14-Dec 14)	41	9	50	0	0 (0%)	0
	4th Quarter (Jan 15-Mar 15)	50	15	65	0	0 (0%)	0

9.4. Environmental Protection, Initiatives and Clearances: Recent Initiatives: (2014-15)

It has always been a challenge to maintain a good balance between sustainable development and environmental conservation. The hydrocarbon exploration and development activities are not any exception to this challenge. The Ministry of Environment, Forest & Climate Change (MoEF&CC) , therefore , has made the Environmental Clearance (EC) mandatory for various projects , including E&P sector, under the Environmental Impact Assessment notification of 14th September, 2006 and the Forest Clearance (FC) under the Forest (Conservation) Act,1980, if diversion of forest land is involved. However, keeping in view the energy requirements and need to enhance domestic production in the Oil and Gas sector, continuous interaction was maintained with MoEF&CC for simplification of the procedures for environment related clearances without compromising on the environmental integrity.

During recent past following initiatives have been undertaken in this direction

- For ensuring transparency in environmental related clearances, on line submission of application with facilities for tracking of the application for Environmental Clearance (EC) , Forest Clearance (FC) and Coastal Regulation Zone (CRZ) clearance has been introduced since July 2014 by the Ministry of Environment, Forest & Climate Change (MoEF&CC) The portal address is : environmentalclearance.nic.in/forestsclearance.nic.in
- MOEF&CC has finalized and uploaded the standard Terms of Reference (TOR) for various sectors including onshore and offshore Oil and Gas sector. Further, the EC process has been simplified vide notification no. S. O. 996(E) dated 10th April 2015. As per this notification, the standard TOR developed by the Ministry in consultation with sector specific Expert Appraisal Committee (EAC) shall be the deemed TOR. The standardized TORs shall enable the project proponent to commence preparation of Environmental Impact assessment (EIA) Report after successful online submission and registration of application. However, the EAC may stipulate additional TOR , if found necessary , within 30 days of acceptance of application.
- The validity of Environmental Clearance for projects and activities has been enhanced from 5 years to 7 years vide MoEF&CC notification dated 29.04.2015.
- Forest (Conservation) Rules have also been revised in April 2014 to give special considerations for exploration surveys including for Oil and Gas. Further a notification G.S.R. 713 (E) dated 10th October, 2014 has been issued called "the Forest (Conservation) Second Amendment Rules" for consideration of forest diversion cases in various slabs such as up to 5 ha., between 5 and 40 ha., above 100 ha. etc along with timelines and level of consideration. Regional Empowered Committees have also been constituted to deal with forest diversion cases at regional level.

The above steps are expected to boost activities in Oil and Gas sector.

Management of Oil spills in coastal area and marine environment is another area where substantial progress has been made. The National Oil Spill Disaster Contingency Plan (NOS-DCP) is the national plan for dealing with the Oil Spill response. This plan was originally promulgated in 1996 and has been revised in 2015 in view of the improved technologies and international norms. Online Oil Spill Advisory (OOSA) has also been released by Indian National Centre for Ocean Information Services (INCOIS) for prediction of Oil spill trajectory. DGH representative participated in both 19th NOSDCP meeting held at Chennai on 12th May 2014 and 20th NOSDCP and meeting held at Goa on 9th April, 2015. The NOS-DCP delineates responsibilities and preparedness by various resource and Oil handling agencies besides government agencies. It also covers responsibilities of State level agencies, concerned Coastal State Pollution Control Boards, involvement of NGOs, the public information mechanism etc. The Indian Coast Guard (ICG) in the central coordinating authority for enforcing the provisions of the NOSDCP in the maritime zones of India. All the offshore E&P operators are required to maintain on board Tier-1 level Oil spill response facility. In order to be better prepared to respond to contingencies and rehearse response procedures, a large number of personnel of various stakeholders were imparted training by ICG in IMO level I course, apart from IMO level II course. The MOEF&CC is presently mapping the Ecological Sensitive Areas for priority in protection and for preparation of pre-determined strategy plan. A national meeting on Enhancing Regional Cooperation Mechanisms For Marine Pollution Preparedness and Response in South Asia Cooperative Environment Program (SACEP) region was held on 3rd February 2015 at National Institute of Ocean Technology (NIOT), Chennai under the aegis of the

Ministry of Earth Sciences. Representatives of DGH also participated in this exercise. Purpose of this meet was to align our NOSDCP with SACEP regional plan.

Following two important technical studies have been initiated in DGH for adopting best international practices relating to Oil and Gas sector.

1. Study on Good International Petroleum Industry Practices (GIPIP)
2. Study of Site Restoration Guidelines for Petroleum Operations.

To create a data bank on various environment related clearances required prior to undertaking exploration and production activities, a matrix has been developed in DGH and soon would be integrated with MIS of each block/field.

Ecological Restoration and Environmental Remediation in ONGC

Exploration and Production of hydrocarbon involves risk and close interaction with surrounding environment. To safeguard the working and surrounding environment, ONGC has commitment to protect environment and arrest climate change agents in the HSE policy as well as Climate Change and Sustainability Policy. Initiatives taken during the year 2014-15 are as follows:

Conservation of water: To prevent further depletion and to sustain ground water table, ONGC's Institute, KDMIPE, dug six wells to collect the discharge water at different locations of campus.

Recycling of waste: KDMIPE also operates a six-pit Vermi-compost plant where dry leaves and kitchen waste are recycled. As a result, KDMIPE Campus is free from burning of waste papers by recycling the same.

Ringal plantation: To sustain fragile ecosystem of Himalayas, ringal plantation in Upper Himalayan Region is being carried out as an initiative under National Action Plan on Climate Change launched by the Hon'ble Prime Minister. In the FY 2014-15, 3.75 lakhs ringal plants were planted in an area of 150 Ha under Phase-III of the project and over all 10.75 lakhs Ringal plantation in 430 ha of Upper Himalayan region has been done, resulting in 1.97 million tonnes of CO_2 fixation per annum.

Mangrove plantation: ONGC has undertaken massive mangrove plantation drive in operational areas particularly for protection and stabilization of shoreline close to ONGC Assets mangrove plantation is being carried out. So far, 19.95 lakhs mangrove plants have been planted in Gandhar Area and 1.5 lakhs near Hazira Plant. To spread awareness on significance of Mangroves plantation, protection and its continued cultivation programs were arranged among children and local communities in these areas.

Bio-Remediation: To prevent the contamination of soil ONGC entered into a rate contract with ONGC's joint venture company OTBL for Bio-remediation of Oily sludge/Oil contaminated waste. In the FY 2014-15 about 69,152 MT of Oily sludge / Oil contaminated waste has been bio-remediated across various assets of ONGC.

CO_2 Sequestration: In view of the Indian position on the Carbon Capture and Storage and the inherent peculiarities of ONGC`s CO_2 sources, ONGC had taken the benefits of the recent scientific development in the field of Micro algal/ chemical conversions of CO_2 into useful end products like biomass, bio fuel etc. ONGC has undertaken following two projects / programs in the area of CO_2 sequestration:

1. ONGC had undertaken an R&D project for the fixation of vent CO_2 by Microalgae at Hazira Plant with a view to mitigate emission of CO_2 to the environment. The objective of the proposed project is to Biofixation of CO_2 and Greenhouse Gas Abatement with Microalgae which also contribute to the improvement or development of advanced Biofuels technologies that support downstream commercial deployment through enhanced process efficiency, cost-effectiveness and environmental sustainability. The R&D project has been completed and ONGC is looking for scaling up of the project
2. ONGC has also joined an international, multi-sectoral R&D program consortium to study the opportunities for Carbon Capture Storage (CCS) and Carbon Capture and Utilization CCU in the Oil and gas industry. This program, Carbon Capture and Storage Program (CCSP), is managed by CLEEN Ltd. in Finland. The objective of CCSP is to develop CCS-related technologies and concepts, leading to essential pilots and demonstrations by the end of the program. A further objective is to create a strong scientific basis for the development of CCS technology, concepts and frameworks. In the CCSP program, ONGC's main interest lies in research for CO_2 capture solutions for industrial vent gases in the Oil and gas industry. ONGC has been in the process of looking for solutions to capture the CO_2 from the vent gas at one of the natural gas processing plant

Ecological Restoration and Environmental remediation in OIL

Oil India Limited made concerted efforts to ensure ecological balance in OIL's operational areas with various environmental initiatives and measures towards minimizing different types of pollution caused by various Oilfield operations. Finding and producing Oil and Gas is an industrial process that, inevitably, has an impact on the environment. The major thrust during the year was for abatement of tangible pollution threat likely to be caused by production of increasing volume of formation water during drilling operation in field areas. The formation water produced along with Crude Oil is scientifically treated with oil soluble demulsifies to separate oil and water. Settling time in the tanks were increased. The separated formation water is disposed off into selected disposal wells specially drilled for the purpose. Such wells have impermeable layers to prevent any vertical migration of disposed formation water to the surface. The water samples from the monitoring water wells in the vicinity of the disposal wells are regularly monitored.

Oil, in addition, took initiative and is carrying out the Bio-remediation in field's areas in collaboration with TERI with encouraging result.

Ecological restoration/ Environmental remediation in CAIRN

Cairn restores its project sites (including camp sites) as close as possible to the original conditions. This includes restoration of preserved topsOil, removal of all buried and above-ground structures (unless required by the landowner), and restoration of natural drainage channels and topography. In the Barmer-Salaya pipeline project, Cairn has restored water body crossings, which were vulnerable to erosion, with geo-jute and stone pitching.

CO_2 Sequestration: Cairn has planted 3.4 million trees and mangroves till date. At a 90% survival rate, an estimated tree lifespan of 60 years and the sequestration capacity of 1.5 Tons of $C0_2$/tree for its life, it is estimated that the CO_2 sequestration capacity of our plantations is 4.6 million tons of $C0_2$ or 76,500 tons of $C0_2$/year. No other $C0_2$ sequestration activity has been undertaken.

9.5. XII Plan E&P Projections (2012-17):

Extracts from "12th Five Year Plan (2012 - 2017) Economic Sectors - Vol-II" published by Planning Commission, Government of India

Table 9.3: Projection of Crude Oil & Natural Gas production in 12th Plan

(Figs. In MMTPA)

Company	2012-13 (Projected)	2012-13* (Actual)	2012-13 (Projected)	2013-14* (Actual)	2014-15 (Projected)	2014-15* (Actual)	2015-16 (Projected)	2016-17 (Projected)	Total (Projected)	Total (Actual)
ONGC	25.045	22.561	28.270	22.240	28.002	22.260	26.286	25.456	133.059	67.061
Oil	3.920	3.660	4.000	3.460	4.060	3.412	4.160	4.200	20.34	10.532
Pvt./JV	13.340	11.640	13.300	12.080	12.700	11.780	12.100	11.500	62.94	35.500
Total	**42.305**	**37.861**	**45.570**	**37.780**	**44.762**	**37.452**	**42.546**	**41.156**	**216.339**	**113.093**

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

(Figs. In BCM)

Company	2012-13 (Projected)	2012-13* (Actual)	2012-13 Projected	2013-14* Actual	2014-15 Projected	2014-15* Actual	2015-16 Projected	2016-17 Projected	Total Projected	Total Actual
ONGC	25.266	23.550	25.472	23.280	26.669	22.020	28.215	38.676	144.298	68.850
Oil	3.300	2.640	3.800	2.620	4.000	2.720	4.270	4.450	19.820	7.980
Pvt./JV	23.710	14.490	32.380	9.500	39.400	8.910	40.430	41.460	177.380	32.900
Total	52.276	40.680	61.652	35.400	70.069	33.650	72.915	84.586	341.498	109.730
Total	**143.220**	**111.450**	**168.910**	**97.000**	**191.970**	**92.192**	**199.770**	**175.000**	**187.120**	**300.642**

* as per actual

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 4th May, 2012- "Revised Estimates of Domestic Natural Gas Production- 12th Plan"

9.6. Extracts from BP statistical Review (2015)

Tabel 9.4: Oil Proved Reserves

Thousand million barrels	1994	2004	2013	2014	2014 (%Share of Total)	2014 R/P ratio
US	29.6	29.3	48.5	48.5	2.9%	11.4
Canada	48.1	179.6	172.9	172.9	10.2%	*
Mexico	49.8	14.8	11.1	11.1	0.7%	10.9
Total North America	**127.6**	**223.7**	**232.5**	**232.5**	**13.7%**	**34.0**
Argentina	2.3	2.5	2.3	2.3	0.1%	10.1
Brazil	5.4	11.2	15.6	16.2	1.0%	18.9
Colombia	3.1	1.5	2.4	2.4	0.1%	6.8
Ecuador	3.5	5.1	8.2	8.0	0.5%	39.4
Peru	0.8	1.1	1.6	1.6	0.1%	40.2
Trinidad & Tobago	0.6	0.8	0.8	0.8	◊	20.3
Venezuela	64.9	79.7	298.3	298.3	17.5%	*
Other S. & Cent. America	1.0	1.5	0.5	0.5	◊	9.6
Total S. & Cent. America	**81.5**	**103.4**	**329.8**	**330.2**	**19.4%**	*****
Azerbaijan	1.2	7.0	7.0	7.0	0.4%	22.6
Denmark	0.8	1.3	0.7	0.6	◊	10.0
Italy	0.8	0.5	0.6	0.6	◊	14.5
Kazakhstan	5.3	9.0	30.0	30.0	1.8%	48.3
Norway	9.7	9.7	7.0	6.5	0.4%	9.5
Romania	1.0	0.5	0.6	0.6	◊	19.4
Russian Federation	115.1	105.5	105.0	103.2	6.1%	26.1
Turkmenistan	0.5	0.5	0.6	0.6	◊	6.9
United Kingdom	4.3	4.0	3.0	3.0	0.2%	9.8
Uzbekistan	0.3	0.6	0.6	0.6	◊	24.3
Other Europe & Eurasia	2.3	2.2	2.0	2.0	0.1%	14.0
Total Europe & Eurasia	**141.2**	**140.8**	**157.2**	**154.8**	**9.1%**	**24.7**
Iran	94.3	132.7	157.8	157.8	9.3%	*
Iraq	100.0	115.0	150.0	150.0	8.8%	*
Kuwait	96.5	101.5	101.5	101.5	6.0%	89.0
Oman	5.1	5.6	5.0	5.2	0.3%	15.0
Qatar	3.5	26.9	25.1	25.7	1.5%	35.5
Saudi Arabia	261.4	264.3	265.9	267.0	15.7%	63.6
Syria	2.7	3.2	2.5	2.5	0.1%	*
United Arab Emirates	98.1	97.8	97.8	97.8	5.8%	72.2
Yemen	2.0	3.0	3.0	3.0	0.2%	56.7
Other Middle East	0.1	0.1	0.3	0.2	◊	3.1
Total Middle East	**663.6**	**750.1**	**808.7**	**810.7**	**47.7%**	**77.8**
Algeria	10.0	11.8	12.2	12.2	0.7%	21.9

Angola	3.0	9.0	12.7	12.7	0.7%	20.3
Chad	–	0.9	1.5	1.5	0.1%	52.4
Rep. of Congo (Brazzaville)	1.4	1.5	1.6	1.6	0.1%	15.6
Egypt	3.9	3.6	3.9	3.6	0.2%	13.8
Equatorial Guinea	0.3	1.8	1.7	1.1	0.1%	10.7
Gabon	1.4	2.2	2.0	2.0	0.1%	23.2
Libya	22.8	39.1	48.4	48.4	2.8%	*
Nigeria	21.0	35.9	37.1	37.1	2.2%	43.0
South Sudan	–	–	3.5	3.5	0.2%	60.3
Sudan	0.3	0.6	1.5	1.5	0.1%	37.7
Tunisia	0.3	0.7	0.4	0.4	◊	22.1
Other Africa	0.6	0.6	3.7	3.7	0.2%	40.0
Total Africa	**65.0**	**107.6**	**130.1**	**129.2**	**7.6%**	**42.8**
Australia	3.8	3.9	4.0	4.0	0.2%	24.3
Brunei	1.2	1.1	1.1	1.1	0.1%	23.8
China	16.3	15.5	18.5	18.5	1.1%	11.9
India	5.8	5.6	5.7	5.7	0.3%	17.6
Indonesia	5.0	4.3	3.7	3.7	0.2%	11.9
Malaysia	5.2	5.2	3.8	3.8	0.2%	15.4
Thailand	0.2	0.5	0.5	0.5	◊	2.8
Vietnam	0.6	3.1	4.4	4.4	0.3%	33.0
Other Asia Pacific	1.1	1.5	1.1	1.1	0.1%	10.9
Total Asia Pacific	**39.2**	**40.6**	**42.7**	**42.7**	**2.5%**	**14.1**
Total World	**1118.0**	**1366.2**	**1701.0**	**1700.1**	**100.0%**	**52.5**
* More than 100 years.						
† Less than 0.05						
◊ Less than 0.05%						
Reserves include Gas Condensate and Natural Gas Liquids (NGLs) as well as Crude Oil.						

OIL PRODUCTION*

Table 9.5: Oil Production

Thousand barrels daily	2004	2013	2014	2014 share of total
US	7250	10069	11644	12.3%
Canada	3080	3977	4292	5.0%
Mexico	3830	2875	2784	3.2%
Total North America	**14160**	**16921**	**18721**	**20.5%**
Argentina	868	635	629	0.7%
Brazil	1543	2114	2346	2.9%
Colombia	528	1004	990	1.2%
Ecuador	528	527	556	0.7%
Peru	86	104	110	0.1%
Trinidad & Tobago	165	116	112	0.1%

Venezuela	3305	2687	2719	3.3%
Other S. & Cent. America	144	148	149	0.2%
Total S. & Cent. America	**7166**	**7335**	**7613**	**9.3%**
Azerbaijan	309	877	848	1.0%
Denmark	390	178	167	0.2%
Italy	113	116	121	0.1%
Kazakhstan	1248	1720	1701	1.9%
Norway	3180	1838	1895	2.0%
Romania	120	86	85	0.1%
Russian Federation	9335	10777	10838	12.7%
Turkmenistan	194	231	239	0.3%
United Kingdom	2064	867	850	0.9%
Uzbekistan	138	68	67	0.1%
Other Europe & Eurasia	482	398	387	0.5%
Total Europe & Eurasia	**17572**	**17155**	**17198**	**19.8%**
Iran	4201	3525	3614	4.0%
Iraq	2030	3141	3285	3.8%
Kuwait	2523	3135	3123	3.6%
Oman	783	942	943	1.1%
Qatar	1082	1998	1982	2.0%
Saudi Arabia	10458	11393	11505	12.9%
Syria	487	59	33	◊
United Arab Emirates	2836	3648	3712	4.0%
Yemen	424	150	145	0.2%
Other Middle East	48	207	213	0.2%
Total Middle East	**24873**	**28198**	**28555**	**31.7%**
Algeria	1921	1485	1525	1.6%
Angola	1103	1799	1712	2.0%
Chad	168	83	78	0.1%
Rep. of Congo (Brazzaville)	217	281	281	0.3%
Egypt	701	714	717	0.8%
Equatorial Guinea	351	267	281	0.3%
Gabon	273	236	236	0.3%
Libya	1623	988	498	0.6%
Nigeria	2430	2302	2361	2.7%
South Sudan	–	99	159	0.2%
Sudan	291	115	109	0.1%
Tunisia	71	61	53	0.1%
Other Africa	165	254	252	0.3%
Total Africa	**9313**	**8684**	**8263**	**9.3%**
Australia	582	421	448	0.5%
Brunei	210	135	126	0.1%

China	3486	4216	4246	5.0%
India	773	906	895	1.0%
Indonesia	1130	882	852	1.0%
Malaysia	776	645	666	0.7%
Thailand	241	459	453	0.4%
Vietnam	424	350	365	0.4%
Other Asia Pacific	233	272	272	0.3%
Total Asia Pacific	7854	8286	8324	9.4%
Total World	**80938**	**86579**	**88673**	**100.0%**
◊ Less than 0.05%.				

NATURAL GAS : PROVED RESERVES

Table 9.6: Natural Gas - Proved Resources

Trillion Cubic Metres	1994	2004	2013	2014	Share of total	R/P ratio
US	4.6	5.5	9.6	9.8	5.2%	13.4
Canada	1.9	1.6	2.0	2.0	1.1%	12.5
Mexico	1.9	0.4	0.3	0.3	0.2%	6.0
Total North America	8.5	7.5	12.0	12.1	6.5%	12.8
Argentina	0.5	0.5	0.3	0.3	0.2%	9.3
Bolivia	0.1	0.8	0.3	0.3	0.2%	13.9
Brazil	0.1	0.3	0.5	0.5	0.2%	23.1
Colombia	0.2	0.1	0.2	0.2	0.1%	13.7
Peru	0.3	0.3	0.4	0.4	0.2%	33.0
Trinidad & Tobago	0.3	0.5	0.3	0.3	0.2%	8.2
Venezuela	4.0	4.3	5.6	5.6	3.0%	*
Other S. & Cent. America	0.2	0.1	0.1	0.1	◊	21.8
Total S. & Cent. America	**5.7**	**7.0**	**7.7**	**7.7**	**4.1%**	**43.8**
Azerbaijan	n/a	0.9	0.9	1.2	0.6%	68.8
Denmark	0.1	0.1	+	+	◊	7.6
Germany	0.2	0.2	0.1	+	◊	5.6
Italy	0.3	0.1	0.1	+	◊	7.5
Kazakhstan	n/a	1.3	1.5	1.5	0.8%	78.2
Netherlands	1.7	1.3	0.8	0.8	0.4%	14.3
Norway	1.3	2.4	2.0	1.9	1.0%	17.7
Poland	0.1	0.1	0.1	0.1	0.1%	23.6
Romania	0.4	0.3	0.1	0.1	0.1%	9.6
Russian Federation	n/a	31.1	32.3	32.6	17.4%	56.4
Turkmenistan	n/a	2.3	17.5	17.5	9.3%	*
Ukraine	n/a	0.7	0.6	0.6	0.3%	34.3
United Kingdom	0.7	0.5	0.2	0.2	0.1%	6.6
Uzbekistan	n/a	1.2	1.1	1.1	0.6%	19.0

Other Europe & Eurasia	3.9	0.2	0.2	0.2	0.1%	32.7
Total Europe & Eurasia	**40.6**	**42.7**	**57.5**	**58.0**	**31.0%**	**57.9**
Bahrain	0.2	0.1	0.2	0.2	0.1%	10.7
Iran	20.8	27.5	34.0	34.0	18.2%	*
Iraq	3.1	3.2	3.6	3.6	1.9%	*
Israel	†	†	0.2	0.2	0.1%	25.3
Kuwait	1.5	1.6	1.8	1.8	1.0%	*
Oman	0.3	1.0	0.7	0.7	0.4%	24.3
Qatar	7.1	25.4	24.7	24.5	13.1%	*
Saudi Arabia	5.3	6.8	8.2	8.2	4.4%	75.4
Syria	0.2	0.3	0.3	0.3	0.2%	65.5
United Arab Emirates	6.8	6.1	6.1	6.1	3.3%	*
Yemen	0.3	0.3	0.3	0.3	0.1%	28.0
Other Middle East	+	+	+	+	◊	40.4
Total Middle East	**45.5**	**72.2**	**80.0**	**79.8**	**42.7%**	*****
Algeria	3.0	4.5	4.5	4.5	2.4%	54.1
Egypt	0.6	1.9	1.8	1.8	1.0%	37.9
Libya	1.3	1.5	1.5	1.5	0.8%	*
Nigeria	3.5	5.2	5.1	5.1	2.7%	*
Other Africa	0.8	1.1	1.2	1.2	0.6%	60.3
Total Africa	9.1	14.2	14.2	14.2	7.6%	69.8
Australia	1.3	2.3	3.7	3.7	2.0%	67.6
Bangladesh	0.3	0.4	0.3	0.3	0.1%	10.7
Brunei	0.4	0.3	0.3	0.3	0.1%	23.3
China	1.7	1.5	3.5	3.5	1.8%	25.7
India	0.7	0.9	1.4	1.4	0.8%	45.0
Indonesia	1.8	2.8	2.9	2.9	1.5%	39.2
Malaysia	1.9	2.5	1.1	1.1	0.6%	16.2
Myanmar	0.3	0.5	0.3	0.3	0.2%	16.8
Pakistan	0.6	0.8	0.6	0.6	0.3%	13.8
Papua New Guinea	†	†	0.2	0.2	0.1%	31.0
Thailand	0.2	0.4	0.2	0.2	0.1%	5.7
Vietnam	0.1	0.2	0.6	0.6	0.3%	60.4
Other Asia Pacific	0.3	0.4	0.3	0.3	0.2%	15.6
Total Asia Pacific	**9.7**	**13.0**	**15.2**	**15.3**	**8.2%**	**28.7**
Total World	**119.1**	**156.5**	**186.5**	**187.1**	**100.0%**	**54.1**

*** More than 100 years.**

+ Less than 0.05.

◊ Less than 0.05%

Table 9.7: Natural Gas Production

Billion cubic metres	2004	2013	2014	2014 share of total
US	526.4	689.1	728.3	21.4%
Canada	183.7	156.1	162.0	4.7%
Mexico	43.4	58.2	58.1	1.7%
Total North America	**753.5**	**903.3**	**948.4**	**27.7%**
Argentina	44.9	35.5	35.4	1.0%
Bolivia	9.8	20.3	21.4	0.6%
Brazil	11.0	18.7	20.0	0.6%
Colombia	6.4	12.6	11.8	0.3%
Peru	0.9	12.2	12.9	0.4%
Trinidad & Tobago	30.2	42.8	42.1	1.2%
Venezuela	28.4	28.4	28.6	0.8%
Other S. & Cent. America	3.1	2.7	2.7	0.1%
Total S. & Cent. America	**134.7**	**173.3**	**175.0**	**5.0%**
Azerbaijan	4.5	16.2	16.9	0.5%
Denmark	9.4	4.8	4.6	0.1%
Germany	16.4	8.2	7.7	0.2%
Italy	11.9	7.1	6.6	0.2%
Kazakhstan	12.3	18.6	19.3	0.6%
Netherlands	68.5	68.7	55.8	1.6%
Norway	79.2	108.7	108.8	3.1%
Poland	4.4	4.2	4.2	0.1%
Romania	12.8	10.9	11.4	0.3%
Russian Federation	573.3	604.7	578.7	16.7%
Turkmenistan	52.8	62.3	69.3	2.0%
Ukraine	18.4	19.3	18.6	0.5%
United Kingdom	96.4	36.5	36.6	1.1%
Uzbekistan	54.2	56.9	57.3	1.6%
Other Europe & Eurasia	11.0	7.5	6.7	0.2%
Total Europe & Eurasia	**1025.3**	**1034.7**	**1002.4**	**28.8%**
Bahrain	9.8	15.8	16.9	0.5%
Iran	96.4	164.0	172.6	5.0%
Iraq	1.0	1.2	1.3	◊
Kuwait	11.9	16.3	16.4	0.5%
Oman	18.5	30.5	29.0	0.8%

Qatar	39.2	176.5	177.2	5.1%
Saudi Arabia	65.7	100.0	108.2	3.1%
Syria	6.4	4.7	4.4	0.1%
United Arab Emirates	46.3	54.6	57.8	1.7%
Yemen	–	10.3	9.6	0.3%
Other Middle East	1.5	6.5	7.7	0.2%
Total Middle East	**296.6**	**580.5**	**601.0**	**17.3%**
Algeria	82.0	81.5	83.3	2.4%
Egypt	33.0	56.1	48.7	1.4%
Libya	8.1	11.0	12.2	0.4%
Nigeria	24.4	36.2	38.6	1.1%
Other Africa	8.9	19.9	19.8	0.6%
Total Africa	156.4	204.7	202.6	5.8%
Australia	35.3	53.4	55.3	1.6%
Bangladesh	12.8	22.7	23.6	0.7%
Brunei	12.2	12.2	11.9	0.3%
China	42.8	124.9	134.5	3.9%
India	**29.2**	**33.7**	**31.7**	**0.9%**
Indonesia	74.6	72.1	73.4	2.1%
Malaysia	56.7	67.2	66.4	1.9%
Myanmar	10.2	13.1	16.8	0.5%
Pakistan	34.5	42.7	42.0	1.2%
Thailand	22.4	41.8	42.1	1.2%
Vietnam	4.2	9.8	10.2	0.3%
Other Asia Pacific	10.0	18.8	23.3	0.7%
Total Asia Pacific	344.8	512.3	531.2	15.3%
Total World	**2711.3**	**3408.8**	**3460.6**	**100.0%**
◊ Less than 0.05%.				

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9.7. DGH Corporate Social Responsibility

With the aim to reach society and to promote social and community welfare DG, DGH motioned the formation of a welfare association in the 21st DGH foundation day. The concept was deliberated and it was decided to form an association led by women comprising of all spouses of DGH officers and lady officers of DGH. The association came into being on 26th May 2014 with the name "Hydrocarbon Ladies Welfare Association." The Hydrocarbon Ladies Welfare Association is oriented towards the following aims and objectives:

a. To encourage participation of women in social and community work.

b. To promote social, cultural, educational and welfare activities in the community.

c. To organize awareness camps on health, education and welfare

d. To organize social and cultural programs for unity and togetherness.

e. To encourage humanitarian deeds through voluntary services.

f. To receive any grant, donation, fee, support and assistance in any form for the furtherance of the objectives of the Association.

The Association is registered under Societies Registration Act XXI of 1860 having its own governing body with its own set of rules and regulations.

The Association with its basic aims and objectives took up two projects "Anubhav" and "Sparsh". Under project "Anubhav" the association identified Old Age Home named Jan Kalyan Trust- Anand Niketan Old Age Home and school named Tapovan Vidya Mandir serving 300 children belonging to weaker economic sections. Under project "Sparsh", the association intended to extend support to15 blind girls pursuing their higher studies under Association for Blind Persons.

Under project named 'Anubhav', the association visited Jan Kalyan Trust-Anand Niketan Old Age Home on 07th August 2014 and on 26th May 2015 with intention to spend a day with senior citizens and sponsored a communion lunch with the senior citizen residing at Old Age Home. Further under project 'Anubhav' association visited Tapovan Vidya Mandir providing education to slum children. The association is working towards extending assistance in the form of uniforms and other basic amenities to the students studying in the school.

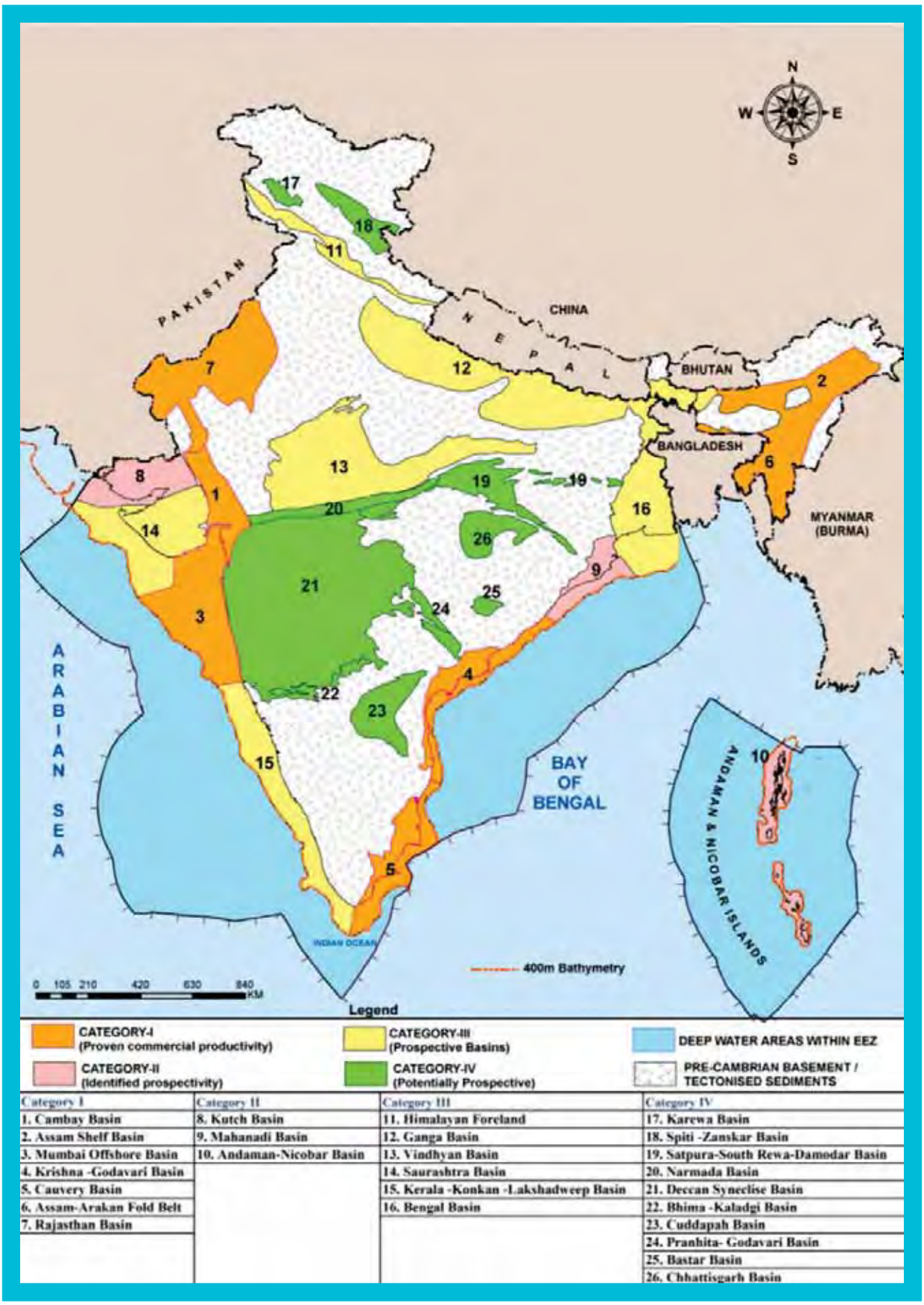
Under project 'Sparsh', the association visited blind girls on two occasions i.e. on 22nd August 2014 and 13th February 2015 to interact with ambitious girls staying together who are pursuing their further studies from different colleges. The members of the association decided to support the girls not only in pursuing their higher education but also helping them to have a fit and healthy life.

In the past one year, the association has strived to reach the society and meet their needs with whatever available resources it had and definitely it's just a beginning and there is long way to go.

9.7.1. Swachh Bharat Abhiyan

Directorate General of Hydrocarbons communicated a quintessential message to the nation of cleanliness around the surrounding by showing its participation in Swachh Bharat Abhiyan (Clean India Mission), a national campaign by the Government of India with an aim to accomplish the vision of a 'Clean India' by 2nd October 2019, the 150th birthday of Mahatma Gandhi. A team of 12 members, full of enthusiasm and zeal, participated in Swachh Bharat Run, organized at the Rashtrapati Bhavan on 2nd October 2014.

DGH officers also took the noble steps of planting saplings around the premises of DGH and cleaning the surrounding areas on the birth anniversary of Mahatma Gandhi for cleaner and greener India.



Category I	Category II	Category III	Category IV
1. Cambay Basin	8. Kutch Basin	11. Himalayan Foreland	17. Karewa Basin
2. Assam Shelf Basin	9. Mahanadi Basin	12. Ganga Basin	18. Spiti -Zanskar Basin
3. Mumbai Offshore Basin	10. Andaman-Nicobar Basin	13. Vindhyan Basin	19. Satpura-South Rewa-Damodar Basin
4. Krishna -Godavari Basin		14. Saurashtra Basin	20. Narmada Basin
5. Cauvery Basin		15. Kerala -Konkan -Lakshadweep Basin	21. Deccan Syneclise Basin
6. Assam-Arakan Fold Belt		16. Bengal Basin	22. Bhima -Kaladgi Basin
7. Rajasthan Basin			23. Cuddapah Basin
			24. Pranhita- Godavari Basin
			25. Bastar Basin
			26. Chhattisgarh Basin

9.8. Sedimentary Basins of India

The existing 26 Sedimentary Basins have an area of approximately 3.14 million Sq. Kms.

The sedimentary basins of the country have been classified into four categories and are as defined below:

Category-I

Basins with established commercial production.

Cambay, Mumbai Offshore, Rajasthan, Krishna Godavari, Cauvery, Assam Shelf and Assam-Arakan Fold Belt

Category-II

Basins with known accumulation of hydrocarbons but no. commercial production achieved so far

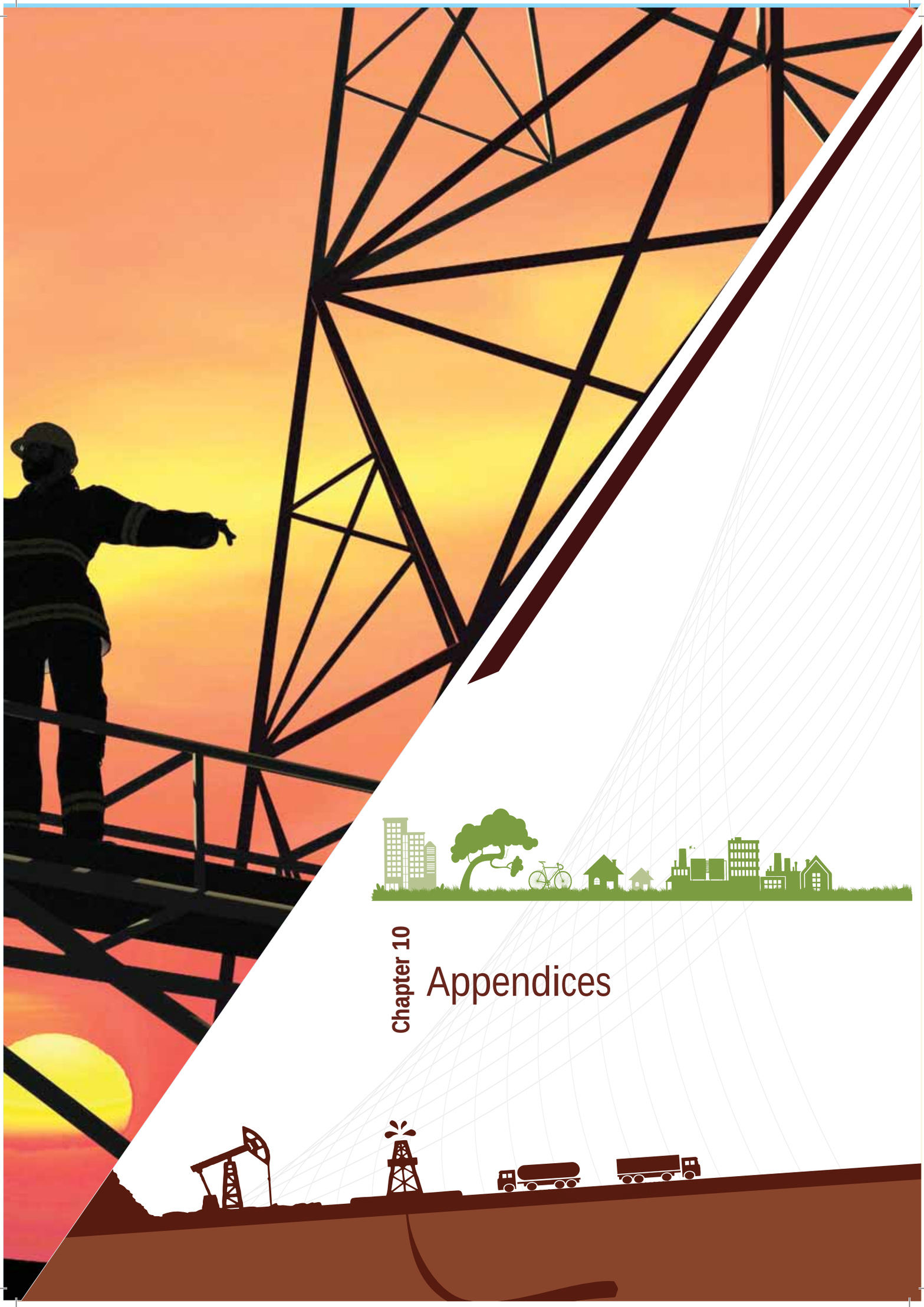
Kutch, Mahanadi-NEC (North East Coast) Basin, Andaman-Nicobar, Kerala-Konkan-Lakshadweep Basin.

Category-III

Basins having hydrocarbon shows that are considered geologically prospective Himalayan Foreland Basin, Ganga Basin, Vindhyan basin, Saurashtra Basin, Kerela Konkan Basin, Bengal Basin

Category-IV

Basins having uncertain potential which may be prospective by analogy with similar basins in the world. Karewa basin, Spiti-Zanskar basin, Satpura–South Rewa–Damodar basin, Chhattisgarh Basin, Narmada basin, Deccan Syneclise, Bhima-Kaladgi, Bastar Basin, Pranhita-Godavari basin, Cuddapah basin.



Chapter 10

Appendices

10
Appendices

Tabel 10.1: Exploration blocks awarded under PRE-NELP (as on 01.04.2015)

SL. NO.	BASIN	BLOCK NAME	REF. NO. ON MAP	CONSORTIUM (PARTICIPATING INTEREST IN %)	DATE OF SIGNING CONTRACT	AWARDED AREA (in sq.km)	RELINQ. AREA (in sq.km)	PRESENT AREA (in sq.km)
CURRENT ACTIVE BLOCKS (11 BLOCKS)								
ONLAND								
1	**RJ**	RJ-ON-90/1	17	**CIL(35)**, CEHL(35) & ONGC (30)	15-05-1995	11108	7996.73	0
2		RJ-ON/6	16	**FEL(10)**,ISIL(65) & NOCL(25)	30-06-1998	5378	3203	2000
3	**CB**	CB-ON/7	22	**HOEC(50)** & GSPCL(50)	-	492	484.36	7.64
4		CB-ON/2	23	**GSPC(80)**, GGR(20)	12-04-2000	1618	408	1210
5		CB-ON/3	19	**ESSAR OIL LTD**.(100)	16-07-1998	574	560.27	13.73
6	**GK**	GK-ON/4	21	**FEL (100)**	30-06-1998	1550	775	775
7	**AA**	AAP-ON-94/1	14	**HOEC (40.32)**, OIL (16.12) & IOC(43.56)	30-06-1998	870	565	305
8		AA-ON-07#	13	**CRL(65)**, ACL(35)	19-02-1999	1934	1615	319
9		AA-ONJ/2	11	**ONGC(100)**	07-11-2003	1595	318	1277
				SUB TOTAL		**25119**	**15925.36**	**5907.37**
SHALLOW WATER								
10	**CB**	CB-OS/1	6	**ONGC**(55.26),HOEC (38.04)&TPL(6.7)	19-11-1996	3290	3230	60
11		CB-OS/2	7	**CIL**(40),ONGC(50) & TPL(10)	-	3315	3110	0
SUB TOTAL SHALLOW WATER						**6605**	**6340**	**60**
SUB TOTAL ACTIVE BLOCKS						**31724**	**22265.36**	**5967.37**
RELINQUISHED BLOCKS/PROPOSED FOR RELINQUISHMENT (17 BLOCKS)								
12	**AA**	AA-ON/3	26	OKLAND(100)	-	3000	3000	0
13	**CR**	CR-ON-90/1	12	PONEI(29),EOL(16), IOC(35)&OIL(20)	-	2570	2570	0
14	**RJ**	RJ-ON-90/5	15	EOL(75)&POGC(25)	-	16030	16030	0
15		RJ-ON-90/4	28	EOL(75), POGC (25)	-	16600	16600	0
16	**GK**	GK-ON-90/2	20	OKLAND(100)	-	11820	11820	0
17		GK-OS/5*	3	RIL(40),TIOL(50) & OKLAND(10)	-	5000	5000	0
18		GK-OSJ/1	1	RIL(50),TIOL(25) & ONGC(25)	-	1275	1275	0
19	**KG**	KG-ON/1	25	RIL(40) & TOil(60)	-	4180	4180	0
20		KG-OS/6	10	CAIRN(50) & VPL(50)	-	8775	8775	0
21		KG-OS-90/1	27	HARDY(30), HOEC (300), NIKO (30), NAGA FERTI (10)	-	3720	3720	0
22	**MB**	BB-OS/5	5	ESSAR(79) & PETROM SA(21)	-	9095	9095	0
23	**CY**	CY-OS/2##	9	HEPI(75) & GAIL(25)	19-11-1996	5010	5010	0
24		CY-OS-90/1(PY3)	-	HARDY(18),ONGC(40),TPL(21) &HOEC(21)	-	81	81	0
25	**GS**	SR-OS-94/1	4	RIL(100)	12-04-2000	9150	9150	0
26	**PG**	GN-ON-90/3	24	HOEC(75) & MIL(25)	29-09-1993	29200	29200	0
27		CB-ON/1*	18	RIL(40),TOil(50) & OOHL(10)	16-07-1998	6133	6133	0
28	**GK**	GK-OSJ/3*	2	RIL(60),ONGC(25) & OIL(15)	06-09-2001	5725	5725	0
SUB TOTAL RELINQUISHED / PFR BLOCKS						**137364**	**137364**	**0**
TOTAL AREA:						**169088**	**159629.36**	**5967.37**

NOTE: #Execution of new PSC after resolution of Nagaland issue
##Arbitral award pronounced in favour of HEPI. Govt. challenged the arbitral award
*PROPOSED FOR RELINQUISHMENT-
Bold indicates Operatorship

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AA	Assam Arakan	MB	Mumbai
AN	Andaman Nicobar	MN	Mahanadi - NEC
PG	Pranhita Godavari	KK	Kerala Konkan
CB	Cambay	SR	South Rewa
RJ	Rajasthan	WB	Bengal
GK	Gujarat Kutch	VN	Vindhyan
GS	Gujarat Saurashtra	DS	Deccan Syneclise
GV	Ganga Valley	PR	Palar
HF	Himalayan Foreland	PA	Purnea
KG	Krishna Godavari	MZ	Mizoram
CY	Cauvery		

Table 10.2: Exploration Blocks Awarded Under NELP-I (as on 01.04.2015)

SL. NO.	BASIN	BLOCK NAME	REF. NO. ON MAP	CONSORTIUM (PARTICIPATING INTEREST IN %)	DATE OF SIGNING CONTRACT	AWARDED AREA (in sq.km)	RELINQ. AREA (in sq.km)	PRESENT AREA (in sq.km)
CURRENT ACTIVE BLOCKS (4 BLOCKS)								
DEEPWATER								
1	**KG**	KG-DWN-98/2	D2	**ONGC(100)**	12-04-2000	9757	2462	7295
2		KG-DWN-98/3#	D3	**RIL(60)**,BPEAL 30) & NIKO(10)	12-04-2000	7645	6198.88	298
3	**MN**	MN-DWN-98/3	D7	**ONGC(100)**	12-04-2000	10005	5017	4988
SUB TOTAL DEEPWATER						**27407**	**13677.88**	**12581**
SHALLOW WATER								
4	**MN**	NEC-OSN-97/2	N-15	**RIL(60)**,BPEAL(30) & NIKO(10)	12-04-2000	14535	9895	4640
SUB TOTAL SHALLOW WATER						**14535**	**9895**	**4640**
SUB TOTAL ACTIVE BLOCKS						**41942**	**23572.88**	**17221**
RELINQUISHED BLOCKS/PROPOSED FOR RELINQUISHMENT(20 BLOCKS)								
5	**MN**	NEC-OSN-97/1	N-16	GAZPROM(100)	12-04-2000	10425	10425	0
6	**MN**	MN-OSN-97/3*	N-14	ONGC(85) & GAIL(15)	12-04-2000	5420	5420	0
7	**KG**	KG-DWN-98/4	D4	ONGC(55), BG(30) & OIL(15)	12-04-2000	9940	9940	0
8		KG-OSN-97/4	N-10	RIL(100)	12-04-2000	4020	4020	0
9		KG-OSN-97/31	N-11	RIL(100)	12-04-2000	2460	2460	0
10		KG-OSN-97/2	N-12	RIL(100)	12-04-2000	4790	4790	0
11		KG-OSN-97/1	N-13	ONGC(100)	12-04-2000	4485	4485	0
12	**CY**	CY-OSN-97/1	N-9	Mosbacher(20)** & HOEC(80)	12-04-2000	4940	4940	0
13	**CY**	CY-OSN-97/2	N-8	OIL(100)	12-04-2000	5215	5215	0
14	**KK**	KK-OSN-97/2	N-6	RIL(100)	12-04-2000	19450	19450	0
15		KK-OSN-97/3	N-7	ONGC(100)	12-04-2000	15910	15910	0
16	**MB**	MB-OSN-97/2	N-3	RIL(100)	12-04-2000	5270	5270	0
17		MB-OSN-97/3	N-4	RIL(100)	12-04-2000	5740	5740	0
18		MB-OSN-97/4	N-5	ONGC(70) &IOC(30)	12-04-2000	18870	18870	0
19	**SR**	SR-OSN-97/1	N-2	RIL(100)	12-04-2000	5040	5040	0
20	**GK**	GK-OSN-97/1	N-1	RIL(100)	12-04-2000	1465	1465	0
21	**GV**	GV-ONN-97/1	N-17	ONGC(40),IOC(30), CEIL(15)&CEEPC(15)	12-04-2000	36750	36750	0
22	**KG**	KG-DWN-98/1	D1	RIL(70) & BPEAL (30)	12-04-2000	10810	10810	0
23		KG-DWN-98/5	D5	ONGC(85) & OIL(15)	12-04-2000	8980	8980	0
24	**MN**	MN-DWN-98/2*	D6	RIL(100)	12-04-2000	9605	9605	0
SUB TOTAL RELINQUISHED/PFR BLOCKS						**189585**	**189585**	**0**
TOTAL AREA:						**231527**	**213157.88**	**17221**

NOTE: #1148.12 SQ.KM Area converted to PML, 298 Sq.Km is tentative PEL area. * PROPOSED FOR RELINQUISHMENT

Table 10.3 : Exploration blocks awarded under NELP-II (as on 01.04.2015)

SL. NO.	BASIN	BLOCK NAME	REF. NO. ON MAP	CONSORTIUM (PARTICIPATING INTEREST IN %)	DATE OF SIGNING CONTRACT	AWARDED AREA (in sq.km)	RELINQ. AREA (in sq.km)	PRESENT AREA (in sq.km)
CURRENT ACTIVE BLOCKS (4 BLOCKS)								
SHALLOW WATER								
1	**GS**	GS-OSN-2000/1	N18	**RIL (90)**, HEPI (10)	17-07-2001	8841	8241	600
2	**MN**	MN-OSN-2000/2	N24	**ONGC (40)**, GAIL (20), **IOC (20)**, OIL (20)	17-07-2001	8330	4269	4061
SUB TOTAL						**17171**	**12510**	**4661**
ONLAND								
3	**CB**	CB-ONN-2000/1	N29	**GSPC (50)**, GAIL (50)	17-07-2001	1424	983.29	440.71
4		CB-ONN-2000/2	N30	**NIKO (100)**	17-07-2001	419	394.75	0
SUB TOTAL						**1424**	**983.29**	**440.71**
SUB TOTAL ACTIVE BLOCKS						**19014**	**13888.04**	**5101.71**
RELINQUISHED BLOCKS/PRPOSED FOR RELINQUISHMENT (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), GAIL (15) 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
SUB TOTAL RELINQUISHED/PFR BLOCKS						**248869**	**248869**	**0**
TOTAL AREA:						**267883**	**262757.04**	**5101.71**

NOTE: *PROPOSED FOR RELINQUISHMENT

Table 10.4: Exploration blocks awarded under NELP-III (as on 01.04.2015)

SL. NO.	BASIN	BLOCK NAME	REF. NO. ON MAP	CONSORTIUM (PARTICIPATING INTEREST IN %)	DATE OF SIGNING CONTRACT	AWARDED AREA (in sq.km)	RELINQ. AREA (in sq.km)	PRESENT AREA (in sq.km)
CURRENT ACTIVE BLOCKS (5 BLOCKS)								
DEEPWATER								
1	**CY**	CY-DWN-2001/2	D20	**RIL (70)**, BPEAL (30)	04-02-2003	14325	7465	6860
SUB TOTAL DEEPWATER						**14325**	**7465**	**6860**
SHALLOW WATER								
2	**KG**	KG-OSN-2001/3	N38	**GSPC** (80), GGR(10), & JOGPL(10)	04-02-2003	1870.5	1340	530.5
SUB TOTAL SHALLOW WATER						**1870.5**	**1340**	**530.5**
ONLAND								
3	**AA**	AA-ONN-2001/1	N39	**ONGC** (100)	04-02-2003	3010	2050	960
4		AA-ONN-2001/2	N40	**ONGC** (80) & IOC (20)	04-02-2003	5340	2680	2660
5	**CB**	CB-ONN-2001/1	N45	**ONGC** (100)	04-02-2003	215	189	26
SUB TOTAL ONLAND						**8565**	**4919**	**3646**
SUB TOTAL ACTIVE BLOCKS						**24760.5**	**13724**	**11036.5**
RELINQUISHED BLOCKS/PROPOSED FOR RELINQUISHMENT (18 BLOCKS)								
6	**KK**	KK-DWN-2001/3	D18	ONGC (100)	04-02-2003	21775	21775	0
7		KK-DWN-2001/2	D17	RIL (70), BPEAL (30)	04-02-2003	31515	31515	0
8		KK-DWN-2001/1	D16	RIL (70), BPEAL (30)	04-02-2003	27315	27315	0
9		KK-OSN-2001/2*	N34	ONGC (100)	04-02-2003	14120	14120	0
10		KK-OSN-2001/3*	N35	ONGC (100)	04-02-2003	8595	8595	0
11	**CY**	CY-DWN-2001/1	D19	ONGC (80), OIL (20)	04-02-2003	12425	12425	0
12		CY-PR-DWN-2001/3	D21	RIL (70), BPEAL (30)	04-02-2003	8600	8600	0
13		CY-PR-DWN-2001/4	D22	RIL (70), BPEAL (30)	04-02-2003	10590	10590	0
14	**KG**	KG-DWN-2001/1	D24	RIL (60), BPEAL (30) & HEPI (10)	04-02-2003	11605	11605	0
15		KG-OSN-2001/1	N36	RIL (100)	04-02-2003	1100	1100	0
16		KG-OSN-2001/2	N37	RIL (100)	04-02-2003	210	210	0
17	**GS**	GS-OSN-2001/1	N33	ONGC (100)	04-02-2003	9468	9468	0
18	**RJ**	RJ-ONN-2001/1	N44	ONGC (30), Oil (40) & SUNTERA (30)	04-02-2003	3425	3425	0
19	**PG**	PG-ONN-2001/1	N46	ONGC (100)	04-02-2003	6920	6920	0
20	**HF**	HF-ONN-2001/1*	N43	ONGC (100)	04-02-2003	3175	3175	0
21	**PR**	PR-DWN-2001/1	D23	RIL (70), BPEAL (30)	04-02-2003	8255	8255	0
22	**AA**	AA-ONN-2001/3*	N41	ONGC (85) & OIL (15%)	04-02-2003	110	110	0
23		AA-ONN-2001/4*	N42	ONGC (100)	04-02-2003	645	645	0
SUB TOTAL RELINQUISHED/PFR BLOCKS						**179848**	**179848**	**0**
TOTAL AREA:						**204608.5**	**193572**	**11036.5**

NOTE: *PROPOSED FOR RELINQUISHMENT

Table 10.5 : Exploration blocks awarded under NELP-IV (as on 01.04.2015)

SL. NO.	BASIN	BLOCK NAME	REF. NO. ON MAP	CONSORTIUM (PARTICIPATING INTEREST IN %)	DATE OF SIGNING CONTRACT	AWARDED AREA (in sq.km)	RELINQ. AREA (in sq.km)	PRESENT AREA (in sq.km)
CURRENT ACTIVE BLOCKS (5 BLOCKS)								
ONLAND								
1	**AA**	AA-ONN-2002/1	N47	**JOGPL (20)** & GAIL (80)	06-02-2004	1680	420	1260
2		AA-ONN-2002/3	N48	**OIL(30)** & ONGC (70)	06-02-2004	1460	365	1095
3	**CB**	CB-ONN-2002/1	N52	**ONGC (100)**	06-02-2004	135	118	17
4		CB-ONN-2002/3	N54	**GSPC(55)**, JEPL (20), PPCL (15) & GGR(10)	06-02-2004	285	263.71	21.29
5	**CY**	CY-ONN-2002/2	N56	**ONGC (60)** & BPRL (40)	06-02-2004	280	140	140
SUB TOTAL ONLAND ACTIVE BLOCKS						**3840**	**1306.71**	**2533.29**
RELINQUISHED BLOCKS/PRPOSED FOR RELINQUISHMENT (15 BLOCKS)								
6	**GV**	GV-ONN-2002/1	N50	CIL(50) & CESL(50)	06-02-2004	15550	15550	0
7	**GS**	GS-DWN-2002/1	D25	ONGC(100)	06-02-2004	21450	21450	0
8	**RJ**	RJ-ONN-2002/1	N51	OIL(60) & ONGC(40)	06-02-2004	9900	9900	0
9	**KK**	KK-DWN-2002/2*	D26	ONGC(80) & HPCL(20)	06-02-2004	22810	22810	0
10		KK-DWN-2002/3	D27	ONGC(80) & HPCL(20)	06-02-2004	20910	20910	0
11	**MN**	MN-DWN-2002/1	D29	ONGC(36), ENI(34), OIL (20) & BPCL-10	06-02-2004	9980	9980	0
12		MN-DWN-2002/2	D30	ONGC(100)	06-02-2004	11390	11390	0
13		NEC-DWN-2002/1	D31	RIL(100)	06-02-2004	25565	25565	0
14		NEC-DWN-2002/2*	D32	ONGC (100)	06-02-2004	15465	15465	0
15	**AN**	AN-DWN-2002/2*	D34	ONGC(100)	06-02-2004	12495	12495	0
16	**AN**	AN-DWN-2002/1	D33	ONGC(100)	06-02-2004	10990	10990	0
17	**KG**	KG-DWN-2002/1*	D28	ONGC(70), OIL(20) & BPCL(10)	06-02-2004	10600	10600	0
18	**CB**	CB-ONN-2002/2	N53	JOGPL(30), GSPC(60) & GGR(10)	06-02-2004	125	125	0
19	**CY**	CY-ONN-2002/1	N55	JOGPL(30), GAIL(50) & GSPC(20)	06-02-2004	680	680	0
20	**AA**	AA-ONN-2002/4*	N49	ONGC (90) & OIL (10)	06-02-2004	1060	1060	0
SUB TOTAL RELINQUISHED/PFR BLOCKS						**188970**	**188970**	**0**
TOTAL AREA:						**192810**	**190276.71**	**2533.29**

NOTE: *PROPOSED FOR RELINQUISHMENT

Table 10.6 : Exploration blocks awarded under NELP-V (as on 01.04.2015)

SL. NO.	BASIN	BLOCK NAME	REF. NO. ON MAP	CONSORTIUM (PARTICIPATING INTEREST IN %)	DATE OF SIGNING CONTRACT	AWARDED AREA (in sq.km)	RELINQ. AREA (in sq.km)	PRESENT AREA (in sq.km)
CURRENT ACTIVE BLOCKS (6 BLOCKS)								
DEEPWATER								
1	**AN**	AN-DWN-2003/2	D40	**ENI (40)**, ONGC(45) & GAIL(15)	23-09-2005	13110	0	13110
SUB TOTAL DEEPWATER						**13110**	**0**	**13110**
SHALLOW WATER								
2	**CB**	CB-OSN-2003/1	N57	**ONGC(100)**	23-09-2005	2394	598.5	1795.5
SUB TOTAL						**2394**	**599**	**1795.5**
ONLAND								
3	**RJ**	RJ-ONN-2003/2	N65	**FEL(10)**, BIL(40) & XOIL(50)	23-09-2005	13195	11031	2164
4	**CB**	CB-ONN-2003/1	N66	**RIL (70)** & BPEAL (30)	23-09-2005	635	159	476
5		CB-ONN-2003/2	N67	**GSPC(50)**, GAIL(20), JSPL(20) & GGR(10)	23-09-2005	448	276	172
6	**KG**	KG-ONN-2003/1	N69	**CIL(49)** & ONGC(51)	23-09-2005	1697	1382	315
SUB TOTAL ONLAND						**15975**	**12848**	**3127**
SUB TOTAL ACTIVE BLOCKS						**31479**	**13447**	**18032.50**
RELINQUISHED BLOCKS/PROPOSED FOR RELINQUISHMENT (14 BLOCKS)								
7	**CY**	CY-ONN-2003/1	N70	NR(V)L(100)	23-09-2005	957	957	0
8	**KK**	KK-DWN-2003/1	D35	RIL(100)	23-09-2005	18245	18245	0
9		KK-DWN-2003/2	D36	RIL(100)	23-09-2005	12285	12285	0
10	**GS**	GS-OSN-2003/1	N58	ONGC(51) & CE7L(49)	23-09-2005	5970	5970	0
11	**AA**	AA-ONN-2003/2 (Arunachal Pradesh)	N60	GPI(30), NTPC(40), CRL(15) & Brownstone (15)	23-09-2005	295	295	0
12		AA-ONN-2003/3	N61	OIL (85) & HPCL(15)	23-09-2005	275	275	0
13	**AA**	AA-ONN-2003/1*	N59	JOGPL(10), JSPL(35), GSPC(20) & GAIL(35)	23-09-2005	81	81	0
14	**GV**	GV-ONN-2003/1	N62	CIL(24), CE1L(25) & ONGC(51)	23-09-2005	7210	7210	0
15	**RJ**	RJ-ONN-2003/1	N64	ENI(34),ONGC(36) & CE2L(30)	23-09-2005	1335	1335	0
16	**DS**	DS-ONN-2003/1	N68	GGR(100)	23-09-2005	3155	3155	0
17	**MN**	MN-DWN-2003/1*	D38	RIL(55) NIKO(15) & BPEAL(30)	23-09-2005	17050	17050	0
18	**AN**	AN-DWN-2003/1*	D39	ONGC(100)	23-09-2005	9970	9970	0
19	**VN**	VN-ONN-2003/1	N63	ONGC(100)	23-09-2005	3585	3585	0
20	**KG**	KG-DWN-2003/1	D37	RIL(60), BPEAL(30) & HEPI(10)	23-09-2005	3288	3288	0
SUB TOTAL RELINQUISHED/PFR BLOCKS						**83701**	**83701**	**0**
TOTAL AREA:						**115180**	**97148**	**18032.5**

NOTE: * PROPOSED FOR RELINQUISHMENT

Table 10.7 : Exploration blocks awarded under NELP-VI (as on 01.04.2015)

SL. NO.	BASIN	BLOCK NAME	REF. NO. ON MAP	CONSORTIUM (PARTICIPATING INTEREST IN %)	DATE OF SIGNING CONTRACT	AWARDED AREA (in sq.km)	RELINQ. AREA (in sq.km)	PRESENT AREA (in sq.km)
CURRENT ACTIVE BLOCKS (14 BLOCKS)								
SHALLOW WATER								
1	**GS**	GS-OSN-2004/1	1	**ONGC (100)**	02-03-2007	6589	1647	4942
2	**CB**	CB-OSN-2004/1	2	**FEL(10)** & NEWBURY (90)	02-03-2007	2616	0	2616
3	**PR**	PR-OSN-2004/1	5	**CIL(35)**, ONGC(35) & TATA(30)	02-03-2007	9417	0	9417
4	**KG**	KG-OSN-2004/1	6	**ONGC (100)**	02-03-2007	1151	20	1131
SUB TOTAL SHALLOW WATER						**19773**	**1667**	**18106**
ONLAND								
5	**MZ**	MZ-ONN-2004/1	7	**OIL(85)** & SHIV-VANI(15)	02-03-2007	3213	0	3213
6	**AA**	AA-ONN-2004/3	11	**ESSAR OIL (10)**, EEHL (90)	02-03-2007	1252	0	1252
7	**VN**	VN-ONN-2004/1	17	**ONGC (100)**	02-03-2007	5801	1470	4331
8		VN-ONN-2004/2	18	**ONGC (100)**	02-03-2007	4466	1120	3346
9	**RJ**	RJ-ONN-2004/2	20	**OIL (75)** & GEOGLOBAL (25)	02-03-2007	2196	2185.76	10.24
10	**CB**	CB-ONN-2004/1	22	**ONGC(50)**, GSPC(40) & HERAMEC (10)	02-03-2007	32	22.27	9.73
11		CB-ONN-2004/2	23	**ONGC(50)**, GSPC(40) & SUNTERA(10)	02-03-2007	423	0	423
12		CB-ONN-2004/3	24	**ONGC(40)**, GSPC(35) & ENSEARCH(25)	02-03-2007	113	0	113
13	**KG**	KG-ONN-2004/1	28	**OIL(90)** & GEOGLOBAL(10)	02-03-2007	549	194.54	354.46
14	**CY**	CY-ONN-2004/2	31	**ONGC (80)** & BRPL(20)	02-03-2007	375	0	375
SUB TOTAL ONLAND						**18420**	**4993**	**13427.43**
SUB TOTAL ACTIVE BLOCKS						**38193**	**6659.57**	**31533.43**
RELINQUISHED BLOCKS/PROPOSED FOR RELINQUISHMENT (38 BLOCKS)								
15	**KK**	KK-DWN-2004/1	D1	ONGC(45), CIL(40) & TATA(15)	02-03-2007	12324	12324	0
16	**KG**	KG-DWN-2004/1	D10	ONGC(70), GSPC(10), HPCL(10) & GAIL(10)	02-03-2007	11951	11951	0
17		KG-DWN-2004/2	D11	ONGC (60),GSPC (10), HPCL (10), GAIL (10) &BPCL(10)	02-03-2007	11851	11851	0
18		KG-DWN-2004/3	D12	ONGC(70), GSPC(10), HPCL(10) & GAIL(10)	02-03-2007	6205	6205	0
19		KG-DWN-2004/4	D13	RIL(70) & BPEAL (30)	02-03-2007	11904	11904	0
20		KG-DWN-2004/5	D14	ONGC(50), GSPC(10), HPCL(10), GAIL(10),OIL(10) & BPCL(10)	02-03-2007	11922	11922	0
21		KG-DWN-2004/6	D15	ONGC(34), GSPC(10), HPCL(10), GAIL(10) Impex Corporation Japan (26) & OIL (10)	02-03-2007	10907	10907	0
22		KG-ONN-2004/2*	29	GSPC (40), GAIL (40) & PETROGAS (20)	02-03-2007	1140	1140	0
23		KG-DWN-2004/7	D16	RIL (70) & BPEAL (30)	02-03-2007	11856	11856	0
24	**MN**	MN-DWN-2004/1*	D17	RIL (70) & BPEAL (30)	02-03-2007	9885	9885	0
25		MN-DWN-2004/2*	D18	RIL (70) & BPEAL (30)	02-03-2007	11813	11813	0
26		MN-DWN-2004/3*	D19	RIL (70) & BPEAL (30)	02-03-2007	11316	11316	0
27		MN-DWN-2004/4*	D20	RIL (70) & BPEAL (30)	02-03-2007	8822	8822	0

28	**MN**	NEC-DWN-2004/1*	D22	SANTOS (100)	02-03-2007	7790	7790	0
29		NEC-DWN-2004/2*	D23	SANTOS (100)	02-03-2007	8706	8706	0
30		MN-DWN-2004/5	D21	RIL (70) & BPEAL (30)	02-03-2007	10454	10454	0
31	**RJ**	RJ-ONN-2004/3	21	OIL(60), GEOGLOBAL(25) & HPCL (15)	02-03-2007	1330	1330	0
32		RJ-ONN-2004/1*	19	GSPC(22.22), GAIL(22.22), HPCL(22.22), HALLWORTHY (PANAMA) (11.11), NITIN FIRE (11.11) & BPCL (11.11)	02-03-2007	4613	4613	0
33	**MZ**	MZ-ONN-2004/2**	8	NAFTOGAZ(10), RNRL(10), GEOPETROL(10) & REL(70)	02-03-2007	3619	3619	0
34	**AA**	AA-ONN-2004/1**	9	OIL(85) & SHIV-VANI (15)	02-03-2007	144	144	0
35		AA-ONN-2004/4**	12	ADANI ENTERPRISES(35), AISPL(20), NAFTOGAZ(10) & WPPL(35)	02-03-2007	95	95	0
36		AA-ONN-2004/2	10	OIL (100)	02-03-2007	218	218	0
37		AA-ONN-2004/5*	13	ESSAR ENERGY(90) & ESSAR Oil (10)	02-03-2007	46	46	0
38	**CB**	CB-ONN-2004/4	25	ONGC(50), GSPC(40) & HERAMEC(10) NAFTOGAZ (10) & WELSPUN (35)	02-03-2007	70	70	0
39		CB-ONN-2004/5**	26	ADANI ENTEREPRISES(35), ADANI PORT(20),	02-03-2007	75	75	0
40	**CY**	CY-DWN-2004/1	D4	ONGC(70), GSPC(10), HPCL(10) & GAIL(10)	02-03-2007	10302	10302	0
41		CY-DWN-2004/2	D5	ONGC(70), GSPC(10), HPCL(10) & GAIL(10)	02-03-2007	12059	12059	0
42		CY-DWN-2004/4	D7	ONGC(70), GSPC(10), HPCL(10) & GAIL(10)	02-03-2007	12025	12025	0
43		CY-PR-DWN-2004/2	D9	ONGC(70), GSPC(10), HPCL(10) & GAIL(10)	02-03-2007	9994	9994	0
44		CY-DWN-2004/3*	D6	ONGC(70), GSPC(10), HPCL(10) & GAIL(10)	02-03-2007	12017	12017	0
45		CY-PR-DWN-2004/1*	D8	ONGC(70), GSPC(10), HPCL(10) & GAIL(10)	02-03-2007	13451	13451	0
46		CY-ONN-2004/1*	30	ONGC (80) & BPCL(20)	02-03-2007	214	214	0
47	**MB**	MB-OSN-2004/1	3	GSPC(20), IOC(20), GAIL(20), HPCL(20) & PETROGAS (20)	02-03-2007	1520	1520	0
48		MB-OSN-2004/2	4	PETROGAS(20), GAIL (20),IOC(20), GSPC(20) & HPCL(20)	02-03-2007	741	741	0
49	**PA**	PA-ONN-2004/1	14	ONGC (100)	02-03-2007	2537	2537	0
50	**GV**	GV-ONN-2004/1	15	ONGC (100)	02-03-2007	8354	8354	0
51	**SR**	SR-ONN-2004/1*	16	PRIZE PETROLEUM (10) & JAIPRAKASH ASSOCIATES LTD. (90)	02-03-2007	13277	13277	0
52	**DS**	DS-ONN-2004/1	27	GEOGLOBAL RESOURCES (BARBADOS) (100)	02-03-2007	2649	2649	0
SUB TOTAL RELINQUISHED/PFR BLOCKS						**268196**	**268196**	**0**
TOTAL AREA:						**306389**	**274855.57**	**31533.43**

NOTE: *PROPOSED FOR RELINQUISHMENT **PSC TERMINATED BY MOP&NG

Table 10.8 : Exploration Blocks Awarded Under NELP-VII (as on 01.04.2015)

SL. NO.	BASIN	BLOCK NAME	REF. NO. ON MAP	CONSORTIUM (PARTICIPATING INTEREST IN %)	DATE OF SIGNING CONTRACT	AWARDED AREA (in sq.km)	RELINQ. AREA (in sq.km)	PRESENT AREA (in sq.km)
CURRENT ACTIVE BLOCKS (18 BLOCKS)								
SHALLOW WATER								
1	**MB**	MB-OSN-2005/1	S-1	**ONGC (80)** & GSPC (20)	22-12-2008	2811	0	2811
2		MB-OSN-2005/2	S-2	**ADANI WELSPUN EXPLORATION LTD. (100)**	22-12-2008	1191	0	1191
3		MB-OSN-2005/3	S-3	**ESSAR EXPLORATION & PRODUCTION LTD. (100)**	22-12-2008	2810	1125	1685
SUB TOTAL SHALLOW WATER						**6812**	**1125**	**5687**
ONLAND								
4	**PA**	PA-ONN-2005/2	3	**ONGC (100)**	22-12-2008	2552	0	2552
5	**WB**	WB-ONN-2005/2	5	**ONGC (100)**	22-12-2008	3792	0	3792
6		WB-ONN-2005/3	6	**ONGC (100)**	22-12-2008	4001	0	4001
7		WB-ONN-2005/4	7	**ONGC (75)** & OIL (25)	22-12-2008	3940	0	3940
8	**SR**	SR-ONN-2005/1##	11	**DEEP ENERGY(10)**,DEEP INDUS(70) KANVEL FINANCE (10) & SAVLA ELECTRONICS (10)	22-12-2008	789	0	789
9	**RJ**	RJ-ONN-2005/1	14	**HOEC (33.34)**, BPRL (33.33) & IMC (33.33)	22-12-2008	1424	273	1151
10		RJ-ONN-2005/2	15	**OIL (60)**, HOEC (20) HPCL & MITTAL ENERGY (20)	22-12-2008	1517	0	1517
11	**CB**	CB-ONN-2005/2	18A&B	**IOCL (100)**	22-12-2008	77.68	0.00	77.68
12		CB-ONN-2005/3	19	**MERCATOR PETROLEUM (100)**	22-12-2008	48	0	48
13		CB-ONN-2005/4	20	**ONGC (51)** & GSPC (49)	22-12-2008	31	0	31
14		CB-ONN-2005/5	21	**OMKAR NATUAL RESOUR. (100)**	22-12-2008	83	0	83
15		CB-ONN-2005/7	23	**IOCL (100)**	22-12-2008	199	0	199
16		CB-ONN-2005/9	25	**MERCATOR PETROLEUM (100)**	22-12-2008	170	37.8	132.20
17		CB-ONN-2005/10	26	**ONGC (51)** & GSPC (49)	22-12-2008	270	0	270
18	**CY**	CY-ONN-2005/1	29	**GAIL (40)**, GSPC (30) & BENGAL ENERGY INTERNATIONAL(30)	22-12-2008	946	0	946
SUB TOTAL						**19840**	**310.8**	**19528.88**
SUB TOTAL ACTIVE BLOCKS						**26652**	**1435.8**	**25215.88**
RELINQUISHED BLOCKS/PROPOSED FOR RELINQUISHMENT (23 BLOCKS)								
19	**KK**	KK-DWN-2005/1	D-14	BHP BILLITON (26) & GVK (74)	22-12-2008	14675	14675	0
20		KK-DWN-2005/2	D-15	ONGC (90) & GSPC (10)	22-12-2008	19234	19234	0
21	**KG**	KG-DWN-2005/2	D-17	BP EXPLORATION (50) & RIL (50)	22-12-2008	1949	1949	0
22		KG-OSN-2005/1	S-7	ONGC (60), GSPC (20) & HMEL (20)	22-12-2008	2810	2810	0

23	**KG**	KG-OSN-2005/2	S-8	ONGC (80) & HMEL (20)	22-12-2008	1881	1881	0
24		KG-DWN-2005/1	D-16	ONGC (70), IOCL (20) & GSPC (10)	22-12-2008	1727	1727	0
25	**AN**	AN-DWN-2005/1	D-19	ONGC (90) & OIL (10)	22-12-2008	11837	11837	0
26	**CB**	CB-ONN-2005/8**	24	VASUNDHARA RESOUR (100)	22-12-2008	133	133	0
27		CB-ONN-2005/6	22	OMKAR NATUAL RESOUR. (100)	22-12-2008	102	102	0
28		CB-ONN-2005/11	27	QUEST (20), QQVS (40), SREI (20), VIPL2 (10) & PRIM (10)	22-12-2008	257	257	0
29	**GV**	GV-ONN-2005/3	10	ONGC (80) & TATA PETRO (20)	22-12-2008	2227	2227	0
30	**MB**	MB-DWN-2005/2*	D-6	BHP BILLITON (26) & GVK (74)	22-12-2008	3660	3660	0
31		MB-DWN-2005/3*	D-7	BHP BILLITON (26) & GVK (74)	22-12-2008	3097	3097	0
32		MB-DWN-2005/4*	D-8	BHP BILLITON (26) & GVK (74)	22-12-2008	3408	3408	0
33		MB-DWN-2005/5*	D-9	BHP BILLITON (26) & GVK (74)	22-12-2008	3169	3169	0
34		MB-DWN-2005/7*	D-11	BHP BILLITON (26) & GVK (74)	22-12-2008	3324	3324	0
35		MB-DWN-2005/9*	D-13	BHP BILLITON (26) & GVK (74)	22-12-2008	3138	3138	0
36		MB-OSN-2005/5*	S-5	ONGC (70) & GSPC (30)	22-12-2008	2402	2402	0
37		MB-OSN-2005/6*	S-6	ONGC (80) & GSPC (20)	22-12-2008	2820	2820	0
38	**AA**	AA-ONN-2005/1*	1	ONGC (60), OIL (30) & ACL (10)	22-12-2008	363	363	0
39	**PA**	PA-ONN-2005/1*	2	ONGC (100)	22-12-2008	1096	1096	0
40	**RJ**	RJ-ONN-2005/3*	16	GSPC (60) & ONGC (40)	22-12-2008	1217	1217	0
41	**PR**	PR-ONN-2005/1*	28	ONGC (80) & TATA PETRO. (20)	22-12-2008	1807	1807	0
SUB TOTAL RELINQUISHED/PFR BLOCKS						**86333**	**86333**	**0**
TOTAL AREA:						**112985**	**87769**	**25215.88**

*NOTE: *PROPOSED FOR RELINQUISHMENT ** PSC TERMINATED BY MoPNG ## PEL NOT GRANTED BY GUJARAT GOVT.*

Table 10.9: Exploration blocks awarded under NELP-VIII (as on 01.04.2015)

SL. NO.	BASIN	BLOCK NAME	REF. NO. ON MAP	CONSORTIUM (PARTICIPATING INTEREST IN %)	DATE OF SIGNING CONTRACT	AWARDED AREA (in sq.km)	RELINQ. AREA (in sq.km)	PRESENT AREA (in sq.km)
CURRENT ACTIVE BLOCKS (25 BLOCKS)								
DEEPWATER								
1	MB	MB-DWN-2009/1	D-1	**CIL (100)**	30-06-2010	2961	0	2961
2	AN	AN-DWN-2009/1	D-7	**ONGC (70)** & OIL (30)	30-06-2010	4981	0	4981
3		AN-DWN-2009/2	D-8	**ONGC (60)** & OIL (40)	30-06-2010	3995	0	3995
4		AN-DWN-2009/3	D-9	**ONGC (60)** & OIL (40)	30-06-2010	3992	0	3992
5		AN-DWN-2009/5	D-11	**ONGC (90)** & GSPC (10)	30-06-2010	4002	0	4002
SUB TOTAL DEEPWATER						**19931**	**0**	**19931**
SHALLOW WATER								
6	GK	GK-OSN-2009/1	S-1	**ONGC (40)**, GSPC (20), AWEL (20) & IOC (20)	30-06-2010	1264	0	1264
7		GK-OSN-2009/2	S-2	**ONGC (40)**, AWEL (30) & IOC (30)	30-06-2010	1242	0	1242
8	CY	CY-OSN-2009/2	S-20	**OIL (50)** & ONGC (50)	30-06-2010	1621	0	1621
9	KG	KG-OSN-2009/1	S-22	**ONGC (80)**, APGIC (10) & NTPC (10)	30-06-2010	1472	0	1472
10		KG-OSN-2009/2	S-23	**ONGC (90)** & APGIC (10)	30-06-2010	1471	0	1471
11		KG-OSN-2009/3	S-24	**CIL (100)**	30-06-2010	1988	0	1988
12		KG-OSN-2009/4	S-25	**ONGC (50)**, OIL (30), NTPC (10) & APGIC (10)	30-06-2010	835	0	835
SUB TOTAL SHALLOW WATER						**9893**	**0**	**9893**
ONLAND								
13	AA	AA-ONN-2009/1	1	**JOGPL (47)**, JEKPL (17) & JODPL (36)	30-06-2010	2217	0	2217
14		AA-ONN-2009/2	2	**JOGPL (47)**, JEKPL (17) & JODPL (36)	19-07-2010	1740	0	1740
15		AA-ONN-2009/3	3	**ONGC (50)** & OIL (50)	30-06-2010	84	0	84
16		AA-ONN-2009/4	4	**OIL (50)** & ONGC (50)	30-06-2010	84	0	84
17	VN	VN-ONN-2009/3	9	**ONGC (100)**	30-06-2010	1250	0	1250
18	CB	CB-ONN-2009/1	11	**SINTEX Oil & GAS (100)**	30-06-2010	113	0	113
19		CB-ONN-2009/2	12	**SINTEX Oil & GAS (100)**	30-06-2010	68	0	68
20		CB-ONN-2009/3##	13	**HCIL (100)**	30-06-2010	71	0	71
21		CB-ONN-2009/4	14	**ONGC (50)** & GSPC (50)	30-06-2010	58	0	58
22		CB-ONN-2009/5	15	**NTPC (100)**	30-06-2010	165	0	165
23		CB-ONN-2009/6##	16	**HCIL (100)**	30-06-2010	177	0	177
24		CB-ONN-2009/7	17	**SINTEX OIL** & GAS (100)	30-06-2010	144	0	144
25		CB-ONN-2009/8	18	**JPIL (87)** & JPPL (13)	30-06-2010	136	0	136
SUB TOTAL ONLAND						**6307**	**0**	**6307**
SUB TOTAL ACTIVE BLOCKS						**36131**	**0.0**	**36131**
RELINQUISHED BLOCKS/PROPOSED FOR RELINQUISHMENT (7 BLOCKS)								
26	KG	KG-DWN-2009/1	D-6 (A&B)	BGEPIL (30), OIL (15), ONGC (45) & APGIC (10)	30-06-2010	1800	1800	0
27	CY	CY-OSN-2009/1	S-19	Bengal Energy International Inc (100)	30-06-2010	1362	1362	0
28	AN	AN-DWN-2009/13*	D-19	ONGC (70), NTPC (10), GAIL (10) & GSPC (10)	30-06-2010	4007	4007	0
29		AN-DWN-2009/18*	D-24	ONGC (60), OIL (30) & GAIL (10)	30-06-2010	4040	4040	0
30	MB	MB-OSN-2009/3*	S-5	BHP (100)	30-06-2010	1492	1492	0
31		MB-OSN-2009/6*	S-8	BHP (100)	30-06-2010	1876	1876	0
32		MB-OSN-2009/7*	S-9	BHP (100)	30-06-2010	1865	1865	0
SUB TOTAL RELINQUISHED/PFR BLOCKS						**16442**	**16442**	**0**
TOTAL AREA:						**52573**	**16442.0**	**36131**

NOTE: * PROPOSED FOR RELINQUISHMENT ## PEL NOT YET GRANTED

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Table 10.10: Exploration blocks awarded under NELP-IX (as on 01.04.2015)

SL. NO.	BASIN	BLOCK NAME	REF. NO. ON MAP	CONSORTIUM (PARTICIPATING INTEREST IN %)	DATE OF SIGNING CONTRACT	AWARDED AREA (in sq.km)	RELINQ. AREA (in sq.km)	PRESENT AREA (in sq.km)
CURRENT ACTIVE BLOCKS (17 BLOCKS)								
SHALLOW WATER								
1.	**GK**	GK-OSN-2010/1	S-1	**ONGC (60)**, OIL (30) & GAIL (10)	28-03-2012	1361	0	1361.00
2.		GK-OSN-2010/2	S-2	**ONGC (90)** & GAIL (10)	28-03-2012	1625	0	1625.00
3.	**MB**	MB-OSN-2010/2	S-4	**OIL (50)**, HPCL (30) & BPRL (20)	30-08-2012	3411	0	3411.00
SUB TOTAL SHALLOW WATER						**6397**	**0**	**6397.00**
ONLAND								
4.	**A A**	AA-ONN-2010/2	2	**OIL (40),** ONGC(30), GAIL(20) & East West Petroleum (10)	28-03-2012	396	0	396.00
5.		AA-ONN-2010/3	3	**OIL (40)**, ONGC(40) & BPRL(20)	28-03-2012	171	0	171.00
6.	**VN**	VN-ONN-2010/1##	4	**Deep Energy LLC(10) & KGN Industries(90)**	28-03-2012	3776	0	3776.00
7.		VN-ONN-2010/2##	5	**Deep Energy LLC (10), Deep Natural Resources Limited (15)** & Safak WSB Energy Pvt.Ltd. (75)	28-03-2012	4909	0	4909.00
8.	**RJ**	RJ-ONN-2010/2##	8	**FEL (10)** & Birkbeck Investments Ltd. (90)	28-03-2012	535	0	535.00
9.	**CB**	CB-ONN-2010/1	9	**ONGC (100)**	28-03-2012	782	0	782.00
10.		CB-ONN-2010/3##	11	**Deep Energy LLC (10) & KGN Oil & Gas Pvt. Ltd. (90)**	28-03-2012	534	0	534.00
11.		CB-ONN-2010/4##	12	**Pratibha Oil & Natural Gas Pvt. Ltd.(100)**	28-03-2012	61	0	61.00
12.		CB-ONN-2010/5	13	**Pan India Consultants (20) & Frost International Ltd. (80)**	28-03-2012	49	0	49.00
13.		CB-ONN-2010/6	14	**ONGC (80)** & IOCL (20)	28-03-2012	39	0	39.00
14.		CB-ONN-2010/8	16A&B	**BPRL(25)**, GAIL(25), EIL(20), BFIL(20) & MIEL(10)	30-08-2012	42	0	42.00
15.		CB-ONN-2010/9	17	**ONGC (100)**	30-08-2012	120	11	109.36
16.		CBONN-2010/10##	18	**Sankalp Oil & Natural Resources Ltd. (100)**	27-06-2012	122	0	122.00
17.		CB-ONN-2010/11	19	**BPRL (25)**, GAIL (25), EIL (20) BFIL (15) & MIEL (15)	28-03-2012	131	0	131.00
SUB TOTAL ONLAND						**11667**	**11**	**11656.36**
SUB TOTAL ACTIVE BLOCKS						**18064**	**10.64**	**18053.36**
RELINQUISHED BLOCKS/PROPOSED FOR RELINQUISHMENT(2 BLOCK)								
18.	**MB**	MB-DWN-2010/1	D-2	BGEPIL (50) & BHP (50)	10-09-2012	7963	7963	0.00
19.	**A A**	AA-ONN-2010/1	1	PPCL(20) & ABGEL (80)	30-08-2012	401	401	0.00
SUB TOTAL RELINQUISHED/PFR BLOCKS						**8364**	**8364**	**0.00**
TOTAL AREA :						**26428**	**8374.64**	**18053.36**

NOTE: PROPOSED FOR RELINQUISHMENT ## PEL NOT YET GRANTED

Table 10.11: Basin-wise distribution of PEL areas under operation (Pre-NELP & NELP blocks) (as on 01.04.2015)

BASIN (No. of Blocks)	PRE-NELP	NELP-I	NELP-II	NELP-III	NELP-IV	NELP-V	NELP-VI	NELP-VII	NELP-VIII	NELP-IX	TOTAL
DEEPWATER (10)											
MUMBAI (1)	-	-	-	-	-	-	-	-	2,961	-	2,961
CAUVERY (1)	-	-	-	6,860	-	-	-	-	-	-	6,860
KRISHNA-GODAVARI (2)	-	7,593	-	-	-	-	-	-	-	-	7,593
MAHANADI-NEC (1)	-	4,988	-	-	-	-	-	-	-	-	4,988
ANDAMAN-NICOBAR (5)	-	-	-	-	-	13,110	-	-	16,970	-	30,080
TOTAL AREA :	**-**	**12,581**	**-**	**6,860**	**-**	**13,110**	**-**	**-**	**19,931**	**-**	**52,482**
SHALLOW WATER (24)											
GUJARAT-KUTCH (4)	-	-	-	-	-	-	-	-	2,506	2,986	5,492
GUJARAT-SAURASHTRA (2)	-	-	600	-	-	-	4,942	-	-	-	5,542
CAMBAY (4)	60	-	-	-	-	1,795.50	2,616	-	-	-	4,471.50
MUMBAI (4)	-	-	-	-	-	-	-	5,687	-	3,411	9,098
CAUVERY (1)	-	-	-	-	-	-	-	-	1,621	-	1,621
KRISHNA-GODAVARI (6)	-	-	-	530.50	-	-	1,131	-	5,766	-	7,427.50
MAHANADI-NEC (2)	-	4,640	4,061	-	-	-	-	-	-	-	8,701
PALAR (1)	-	-	-	-	-	-	9,417	-	-	-	9,417
TOTAL AREA :	**60**	**4,640**	**4,661**	**530.5**	**-**	**1,795.50**	**18,106**	**5,687**	**9,893**	**6,397**	**51,770**
ONLAND (75)											
VINDHYAN (5)	-	-	-	-	-	-	7,677	-	1,250	8,685	17,612
GUJARAT-KUTCH (1)	775	-	-	-	-	-	-	-	-	-	775
RAJASTHAN (7)	2,000.0	-	-	-	-	2,164	10.24	2,668	-	535	7,377.24
CAMBAY (37)	1,231.4	-	440.71	26	38.29	648	545.73	840.88	932	1,869	6,572.34
CAUVERY (3)	-	-	-	-	140	-	375	946.00	-	-	1,461
ASSAM-ARAKAN (14)	1,901	-	-	3,620	2,355	-	1252	-	4,125	567	13,820
KRISHNA-GODAVARI (2)	-	-	-	-	-	315	354.46	-	-	-	669.46
MIZORAM (1)	-	-	-	-	-	-	3,213	-	-	-	3,213
PURNEA (1)	-	-	-	-	-	-	-	2,552	-	-	2,552
BENGAL (3)	-	-	-	-	-	-	-	11,733	-	-	11,733
SOUTH REWA (1)	-	-	-	-	-	-	-	789	-	-	789
TOTAL AREA :	**5,907.4**	**-**	**440.71**	**3,646**	**2,533.29**	**3,127**	**13,427.43**	**19,528.88**	**6,307**	**11,656**	**66,574.04**
GRAND TOTAL :	**5,967.4**	**17,221**	**5,101.71**	**11,036.50**	**2,533.29**	**18,032.50**	**31,533.43**	**25,215.88**	**36,131**	**18,053.36**	**170,826.04**

Table 10.12: Company-wise distribution of PEL areas under operation (Pre-NELP & NELP Rounds) (as on 01.04.2015)

COMPANY OPERATOR	BLOCKS	PRE-NELP	NELP-I	NELP-II	NELP-III	NELP-IV	NELP-V	NELP-VI	NELP-VII	NELP-VIII	NELP-IX	TOTAL
ONGC	43	1337	12283	4061	3646	157	1795.50	14670.73	17397	24646	3916.36	83909.59
RIL	5	-	4938	600	6860	-	476	-	-	-	-	12874.00
Oil	10	-	-	-	-	1095	-	3577.7	1517	1705	3978	11872.70
CAIRN	6	0	-	-	-	-	315	9417	-	4949	-	14681.00
GSPC	5	1210	-	440.71	530.50	21.29	172	-	-	-	-	2374.50
HOEC	3	312.64	-	-	-	-	-	-	1151	-	-	1463.64
CRL	1	319	-	-	-	-	-	-	-	-	-	319.00
ESSAR	3	13.73	-	-	-	-	-	1252	1685	-	-	2950.73
JOGPL	3	-	-	-	-	1260	-	-	-	3957	-	5217.00
FEL	5	2775	-	-	-	-	2164	2616	-	-	535	8090.00
GAIL	1	-	-	-	-	-	-	-	946	-	-	946.00
IOCL	2	-	-	-	-	-	-	-	276.68	-	-	276.68
ENI	1	-	-	-	-	-	13110	-	-	-	-	13110.00
ADAANI WELSPUN	1	-	-	-	-	-	-	-	1191	-	-	1191.00
DEEP ENERGY	1	-	-	-	-	-	-	-	789	-	-	789.00
MERCATOR PET.	2	-	-	-	-	-	-	-	180.2	-	-	180.20
OMKAR NATURAL	1	-	-	-	-	-	-	-	83	-	-	83.00
SINTEX Oil & GAS	3	-	-	-	-	-	-	-	-	325	-	325.00
HCIL	2	-	-	-	-	-	-	-	-	248	-	248.00
JPIL	1	-	-	-	-	-	-	-	-	136	-	136.00
NTPC	1	-	-	-	-	-	-	-	-	165	-	165.00
PRATIBHA Oil	1	-	-	-	-	-	-	-	-	-	61	61.00
PAN INDIA/ FROST INT.	1	-	-	-	-	-	-	-	-	-	49	49.00
SANKALP Oil	1	-	-	-	-	-	-	-	-	-	122	122.00
BPRL / GAIL	2	-	-	-	-	-	-	-	-	-	173	173.00
DEEP ENERGY / DNRL*	3	-	-	-	-	-	-	-	-	-	9219	9219.00
NIKO**	1	-	-	0	-	-	-	-	-	-	-	0.00
TOTAL :	**109**	**5967.37**	**17221**	**5101.71**	**11036.5**	**2533.29**	**18032.5**	**31533.43**	**25215.88**	**36131**	**18053.36**	**170826.04**

Table 10.13: PELs operated by OIL as on 01.04.2015

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	Tinsukia	OA-6	01.04.02	471.00	
2		Namchik	OA-10	01.05.05	195.00	
3		Jairampur Extn.	OA-11	01.04.06	23.25	
		Dibrugarh	OA-14	01.04.02	427.00	
4		Deomali	OA-17	18.02.05	113.50	1229.75
NOMINATION TOTAL						**1229.75**
PRE-NELP / NELP BLOCKS						
1	Rajasthan	RJ-ONN-2004/2	20	21.01.08	10.24	
2		RJ-ONN-2005/2	15	22.12.08	1517.00	1527.24
3	Assam-Arakan	AA-ONN-2002/3	N-48	05.02.05	1095.00	
4		AA-ONN-2009/4	4	30.06.10	84.00	
5		AA-ONN-2010/2	2	28.03.12	396.00	
6		AA-ONN-2010/3	3	28.03.12	171.00	1746.00
7	Mizoram	MZ-ONN-2004/1	7	22.05.07	3213.00	3213.00
8	Krishna - Godavari	KG-ONN-2004/1	28	16.02.08	354.46	354.46
9	Cauvery	CY-OSN-2009/2	S-20	30.06.10	1621.00	1621.00
10	Mumbai	MB-OSN-2010/2	S-4	30.08.12	3411.00	3411.00
PRE-NELP / NELP TOTAL						**11,872.70**
GRAND TOTAL PELS OPERATED BY OIL						**13,102.45**

Table 10.14: PELs operated by ONGC as on 01.04.2015

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	Sibsagar District	UA-1	01.04.02	87.10	
2		Golaghat District	DH-4	20.01.01	54.40	
3		Sector-V C (Assam)	CH-4	01.04.04	824.00	
4		Bhagty Bhandari	NG-1	28.04.06	620.00	
5		Singphan	NG-2	28.04.06	320.00	
6		Dimapur	NG-3	28.04.06	650.00	2555.50
7	Himalayan Foreland	Kangra-Mandi	HP-1	10.11.03	1828.00	1828.00
8	Vindhyan	Damoh-Jabera-Katni	MP-1	10.11.03	4208.00	4208.00
TOTAL ONLAND NOMINATION BLOCKS						**8591.50**
OFFSHORE BLOCKS						
9	Gujarat-Kutch Offshore	GK-DW-1	K-5	01.10.04	16557.00	16557.00
10	Mumbai Offshore	BB-OS-DW-I	B-9	28.12.04	7537.00	
11		BB-OS-DW-II	B-10	28.12.04	8950.00	16487.00
12	K-G Offshore	KG-OS-DW-III	KGO-7	15.05.03	1190.00	1190.00
TOTAL OFFSHORE NOMINATION BLOCKS						**34,234.00**
TOTAL NOMINATION BLOCKS						**42,825.50**
PRE-NELP / NELP BLOCKS						
1	Cambay	CB-OS/1	6	19.11.06	60.00	
2		CB-ONN-2001/1	N45	19.08.03	26.00	

3	Cambay	CB-ONN-2002/1	N52	18.10.04	17.00	
4		CB-OSN-2003/1	N57	05.12.05	1795.50	
5		CB-ONN-2004/1	22	20.10.07	9.73	
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-2005/4	20	22.12.08	31.00	
9		CB-ONN-2005/10	26	22.12.08	270.00	
10		CB-ONN-2009/4	14	30.06.10	58.00	
11		CB-ONN-2010/1	9	28.03.12	782.00	
12		CB-ONN-2010/6	14	28.03.12	39.00	
13		CB-ONN-2010/9	17	30.08.12	109.36	3733.59
14	Cauvery Onland	CY-ONN-2002/2	N56	31.08.04	140.00	
15		CY-ONN-2004/2	31	30.05.08	375.00	515.00
16	Assam-Arakan	AA-ONJ/2	11	-	1277.00	
17		AA-ONN-2001/1	N39	01.05.03	960.00	
18		AA-ONN-2001/2	N40	29.07.03	2660.00	
19		AA-ONN-2009/3	3	30.06.10	84.00	4981.00
20	Purnea	PA-ONN-2005/2	3	22.12.08	2552.00	2552.00
21	Vindhyan	VN-ONN-2004/1	17	17.01.08	4331.00	
22		VN-ONN-2004/2	18	17.01.08	3346.00	
23		VN-ONN-2009/3	9	30.06.10	1250.00	8927.00
PELs OPERATED BY ONGC						
24	Gujarat - Kutch -	GS-OSN-2004/1	1	25.04.07	4942.00	
25	Saurashtra Offshore	GK-OSN-2009/1	S-1	30.06.10	1264.00	
26		GK-OSN-2009/2	S-2	30.06.10	1242.00	
27		GK-OSN-2010/1	S-1	28.03.12	1361.00	
28		GK-OSN-2010/2	S-2	28.03.12	1625.00	10434.00
29	Mumbai Offshore	MB-OSN-2005/1	S-1	22.12.08	2811.00	2811.00
30	K-G Offshore	KG-DWN-98/2	D2	12.04.00	7295.00	
31		KG-OSN-2004/1	6	25.05.07	1131.00	
32		KG-OSN-2009/1	S-22	30.06.10	1472.00	
33		KG-OSN-2009/2	S-23	30.06.10	1471.00	
34		KG-OSN-2009/4	S-25	30.06.10	835.00	12204.00
35	Mahanadi-NEC Offshore	MN-DWN-98/3	D7	19.05.00	4988.00	
36		MN-OSN-2000/2	N24	16.08.01	4061.00	9049.00
37	Bengal	WB-ONN-2005/2	5	22.12.08	3792.00	
38		WB-ONN-2005/3	6	22.12.08	4001.00	
39		WB-ONN-2005/4	7	22.12.08	3940.00	11733.00
40	Andaman-Nicobar Off.	AN-DWN-2009/1	D-7	30.06.10	4981.00	
41		AN-DWN-2009/2	D-8	30.06.10	3995.00	
42		AN-DWN-2009/3	D-9	30.06.10	3992.00	
43		AN-DWN-2009/5	D-11	30.06.10	4002.00	16970.00
TOTAL PELs IN PRE-NELP/NELP						**83,909.59**
GRAND TOTAL PELs OPERATED BY ONGC						**126,735.09**

Table 10.15: PELs under Pre-NELP & NELP blocks with Pvt. / JV Companies (as on 01.04.2015)

SL. NO.	COMPANY / OPERATOR	BASIN	BLOCK NAME	REF. NO. ON MAP	EFFECTIVE DATE OF PEL	AREA (Sq.Km.)	TOTAL AREA (Sq. Km.)
1	**RIL**	K-G Offshore	KG-DWN-98/3	D3	07.06.00	298.00	
2		Cauvery Offshore	CY-DWN-2001/2	D20	03.04.03	6860.00	
3		Mahanadi-NEC Offs.	NEC-OSN-97/2	N15	07.06.00	4640.00	
4		Gujarat-Saurashtra	GS-OSN-2000/1	N18	16.08.01	600.00	
5		Cambay	CB-ONN-2003/1(A&B)	N66	05.06.06	476.00	**12874.00**
6	**CAIRN**	Krishna Godavari	KG-ONN-2003/1	N69	08.02.07	315.00	
7			KG-OSN-2009/3	S-24	30.06.10	1988.00	
8		Palar offshore	PR-OSN-2004/1	5	24.04.07	9417.00	
9		Mumbai offshore	MB-DWN-2009/1	D-1	30.06.10	2961.00	**14681.00**
10	**ESSAR**	Cambay	CB-ON/3	19	11.02.03	13.73	
11		Assam-Arakan	AA-ONN-2004/3	11	02.05.08	1252.00	
12		Mumbai offshore	MB-OSN-2005/3	S-3	22.12.08	1685.00	**2950.73**
13	**HOEC**	Assam - Arakan	AAP-ON-94/1	14	28.11.00	305.00	
14		Rajasthan	RJ-ONN-2005/1	14	22.12.08	1151.00	
15		Cambay	CB-ON/7	22	-	7.64	**1463.64**
16	**FOCUS**	Rajasthan	RJ-ON/6	16	21.08.99	2000.00	
17			RJ-ONN-2003/2	N65	28.01.06	2164.00	
18			RJ-ONN-2010/2	8	28.03.12	535.00	
19		Gujarat-Kutch	GK-ON/4	21	30.06.98	775.00	
20		Cambay	CB-OSN-2004/1	2	28.05.07	2616.00	**8090.00**
21	**CRL**	Assam-Arakan	AA-ON/7	13	27.03.01	319.00	**319.00**
22	**GSPC**	Cambay	CB-ON/2	23	23.11.00	1210.00	
23			CB-ONN-2000/1	N29	17.07.01	440.71	
24			CB-ONN-2002/3	N54	29.07.04	21.29	
25			CB-ONN-2003/2	N67	01.04.06	172.00	
26		Krishna Godavari	KG-OSN-2001/3	N38	12.03.03	530.50	**2374.50**
27	**JOGPL**	Assam-Arakan	AA-ONN-2002/1	N47	07.04.04	1260.00	
28			AA-ONN-2009/1	1	30.06.10	2217.00	
29			AA-ONN-2009/2	2	30.06.10	1740.00	**5217.00**
30	**GAIL**	Cauvery	CY-ONN-2005/1	29	22.12.08	946.00	**946.00**
31	**IOCL**	Cambay	CB-ONN-2005/2	18 A&B	22.12.08	77.68	
32			CB-ONN-2005/7	23	22.12.08	199.00	**276.68**
33	**Adani Welspun**	Mumbai offshore	MB-OSN-2005/2	S-2	22.12.08	1191.00	**1191.00**
34	**Deep Energy**	Satpura-Rewa	SR-ONN-2005/1	11	22.12.08	789.00	**789.00**
35	**Mercator Petr.**	Cambay	CB-ONN-2005/3	19	22.12.08	48.00	

36			CB-ONN-2005/9	25	22.12.08	132.20	**180.20**
37	**Omkar Natural**	Cambay	CB-ONN-2005/5	21	22.12.08	83.00	**83.00**
51	**SINTEX Oil & GAS**	Cambay	CB-ONN-2009/1	11	30.06.2010	113.00	
52			CB-ONN-2009/2	12	30.06.2010	68.00	
53			CB-ONN-2009/7	17	30.06.2010	144.00	**325.00**
54	**HCIL**	Cambay	CB-ONN-2009/3	13	30.06.2010	71.00	
55			CB-ONN-2009/6	16	30.06.2010	177.00	**248.00**
56	**NTPC**	Cambay	CB-ONN-2009/5	15	30.06.2010	165.00	**165.00**
57	**JPIL**	Cambay	CB-ONN-2009/8	18	30.06.2010	136.00	**136.00**
58	**PAN India / Frost Int. Ltd.**	Cambay	CB-ONN-2010/5	13	-	49.00	**49.00**
59	**Pratibha Oil**	Cambay	CB-ONN-2010/4	12	-	61.00	**61.00**
60	**BPRL/ GAIL**	Cambay	CB-ONN-2010/8	16 A&B	-	42.00	
61			CB-ONN-2010/11	19	28.03.2012	131.00	**173.00**
62	**SANKALP**	Cambay	CB-ONN-2010/10	18	27.06.2012	122.00	**122.00**
63	**Deep Energy LLC**	Vindhyan	VN-ONN-2010/2	5	28.03.2012	4909.00	
64	**DNRL**	Vindhyan	VN-ONN-2010/1	4	28.03.2012	3776.00	
65		Cambay	CB-ONN-2010/3	11	28.03.2012	534.00	**9219.00**
66	**ENI**	Andaman	AN-DWN-2003/2	D40	23.09.2005	13110.00	**13110.00**
TOTAL PELs BY PVT./JV COS.							**75043.75**

Grand Total of PELs awarded in the country : 214,881.3 Sq.km (NOC's & Pvt. / JV Companies)

Table 10.16: Company Wise PEL distrubution

Company/ Operator	PEL AREA	
	Sq. Km.	(%)
ONGC	126735.09	58.94
RIL	12874.00	6.03
CAIRN	14681.00	6.87
OIL	13102.45	5.94
ENI	13110.00	6.14
FOCUS	8090.00	3.79
DEEP ENERGY/DNRL	9219.00	4.32
GSPC	2374.50	1.11
JOGPL	5217.00	2.44
ESSAR	2950.73	1.38
HOEC	1463.64	0.69
ADANI WELSPUN	1191	0.56
GAIL	946	0.44
DEEP ENERGY	789.00	0.37

Company/ Operator	PEL AREA	
	Sq. Km.	(%)
SINTEX OIL AND GAS	325.00	0.15
CRL	319.00	0.15
IOCL	276.68	0.13
HCIL	248.00	0.12
OMKAR NATURAL	83.00	0.04
MERCATOR	180.20	0.08
BPRL/GAIL	173.00	0.08
NTPC	165.00	0.08
JPIL	136.00	0.06
SANKALP OIL	122.00	0.06
PRATIBHA OIL	61.00	0.03
PAN INDIA/FROST INT. LTD.	49.00	0.02

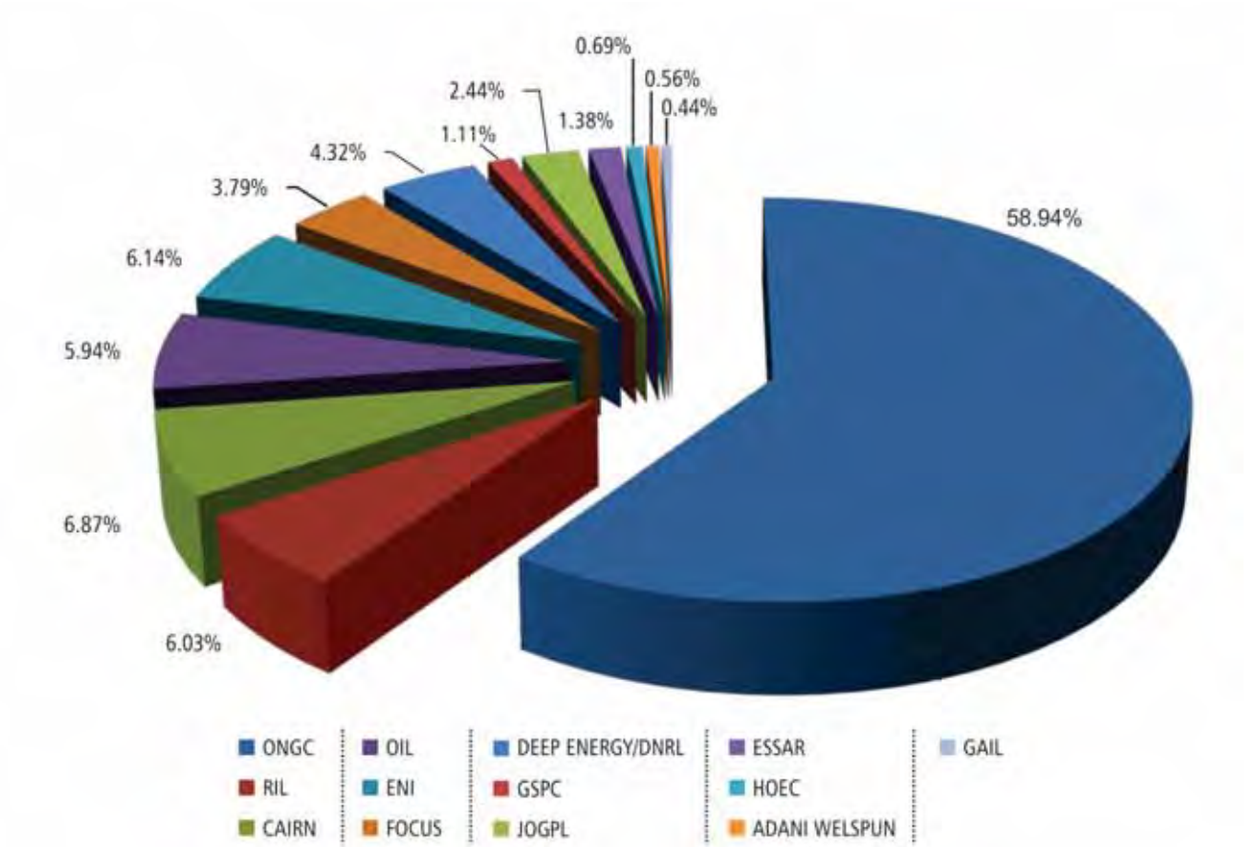

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Table 10.17: Basin wise PEL distribution

OFFSHORE/BASIN	PEL AREA	
	Sq. Km.	%
OFFSHORE		
WESTERN	60608.50	28.37
EASTERN	47797.50	22.37
ANDAMAN-NICOBAR	30080.00	14.08
TOTAL OFFSHORE	138486.00	64.82
ONLAND		
MADHYA PRADESH	22609.00	10.58
NORTH-EASTERN STATES	20818.25	9.16
RAJASTHAN	7377.24	3.45
WEST BENGAL	11733.00	5.49
GUJARAT	7347.34	3.44
BIHAR	2552.00	1.19
TAMIL NADU	1461.00	0.68
HIMACHAL PRADESH	1828.00	0.86
ANDHRA PRADESH	669.46	0.31
TOTAL ONLAND	76395.29	35.18
GRAND TOTAL	214881.3	100.00

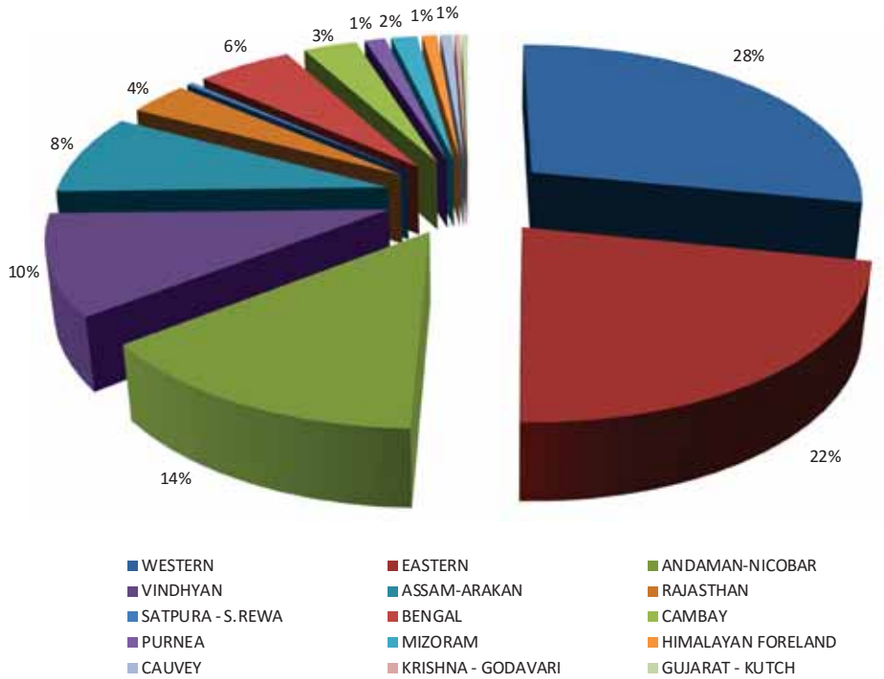

Table 10.18 : ML areas under operation In Nomination regime as on 01.04.2015

SL. NO.	COMPANY / OPERATOR	BASIN	BLOCK NAME	REF. NO. ON MAP	EFFECTIVE DATE OF ML	VALID DATE OF PML	PML AREA (Sq. Km.)	TOTAL PML AREA (Sq. Km.)
1	ONGC	Rajasthan	Manhera Tibba Field	RJM-1	01.05.2014	30.04.2034	24.00	
2			Bakriwala	RJM-2	10.01.2001	09.01.2021	1.00	
3			Ghotaru Ext. - I	RJM-3	10.01.2001	09.01.2021	564.60	
4			Chinnewala Tibba	RJM-4	15.10.2003	14.10.2023	114.86	
5			South Kharatar (Part A & B)	RJM-5	25.03.2011	24.03.2031	180.39	884.85
6		Cambay	Lanwa	MM-1	09.12.2002	08.12.2022	30.00	
7			Balol	MM-2	25.05.2010	24.05.2030	24.00	
8			Jotana Ext.-I	MM-3	28.11.2006	27.11.2026	57.70	
9			West Sobhasan	MM-4	23.04.2003	22.04.2023	9.60	
10			Mehsana City	MM-5	08.08.1996	07.08.2016	8.85	
11			Mehsana City Ext.-II	MM-6	18.07.1995	17.07.2015	7.58	
12			Sobhasan	MM-7	20.08.2013	19.08.2033	35.89	
13			Geratpur	MM-8	20.08.2000	19.08.2020	18.31	
14			Linch Ext.-II	MM-9	24.03.2007	23.03.2017	13.35	
15			North Sobhasan Ext.-I	MM-10	12.03.2001	11.03.2021	56.85	
16			Jotana	MM-11	26.07.2000	25.07.2020	39.50	
17			Santhal	MM-12	09.06.2014	08.06.2034	19.46	
18			Bechraji	MM-13	31.08.2011	30.08.2028	37.11	
19			Bechraji Ext.-I	MM-14	29.03.2004	28.03.2024	3.06	
20			Charada Mansa	MM-15	23.10.2012	22.10.2027	187.50	
21			N. Kadi Ext.-I New	MM-16	03.05.2013	02.05.2029	61.43	
22			Kadi	MM-17	18.08.2008	17.08.2028	64.49	
23			Linch Ext.- I	MM-18	18.03.2007	17.03.2017	34.25	
24			Linch	MM-19	16.10.2013	15.10.2033	43.73	
25			Nandasan Ext.-I	MM-20	18.07.1995	17.07.2015	26.39	
26			Mansa	MM-21	26.07.1995	25.07.2015	58.72	
27			Nandasan - Langnaj	MM-22	27.04.2006	26.04.2026	61.90	
28			Chanasma	MM-23	28.09.1996	27.09.2016	2.81	
29			Dedana (ML)	MM-24	04.11.1996	03.11.2016	5.44	
30			Lanwa Ext.-I	MM-25	16.12.1996	15.12.2016	2.15	
31			Jotana Ext.-II	MM-26	16.06.1997	15.06.2017	0.87	
32			Jakasna(ML)	MM-27	02.06.2001	01.06.2021	9.80	
33			South Patan	MM-28	16.06.1997	15.06.2017	6.99	
34			N. Sobhasan Pt. A+B	MM-29	25.01.1999	24.01.2019	12.05	
35			East Sobhasan	MM-30	28.06.2002	27.06.2022	22.42	
36			North Sobhasan Ext.-II	MM-31	17.11.2001	16.11.2021	23.00	
37			West Mewad(ML)	MM-32	11.10.2000	10.10.2020	13.20	
38			Langhnaj-Wadasma	MM-33	05.02.2001	04.02.2021	13.84	
39			Sanganpur ML	MM-34	05.06.2002	04.06.2022	6.97	
40			Langhnaj ML	MM-35	23.07.2002	22.07.2022	17.92	
41			Chandrora	MM-36	16.02.2004	15.02.2024	1.39	
42			Kadi Asjol	MM-37	28.08.2003	27.08.2023	0.72	
43			Jotana-Warosan	MM-38	24.06.2005	23.06.2025	38.05	

SL. NO.	COMPANY / OPERATOR	BASIN	BLOCK NAME	REF. NO. ON MAP	EFFECTIVE DATE OF ML	VALID DATE OF PML	PML AREA (Sq. Km.)	TOTAL PML AREA (Sq.Km.)
44	ONGC		Charada Mansa Extn.-I	MM-39	20.09.2008	19.09.2028	12.50	
45			Jotana South	MM-40	10.03.2008	09.03.2024	23.00	
46			Kamboi	MM-41	25.12.2007	24.12.2018	2.35	
47			Patan-Tharad	MM-42	04.09.2013	03.09.2033	13.62	
48			Rajpur	AM-1	26.06.1995	25.06.2015	6.76	
49			Wadu	AM-2	26.05.2010	25.05.2030	15.41	
50			Kalol North-East	AM-3	15.03.2010	14.03.30	9.44	
51			Paliyad-Kalol-Limbodra	AM-4	26.06.1995	25.06.2015	161.48	
52			Limbodra	AM-5	21.12.2005	01.12.2025	15.75	
53			Limbodra Ext.-I	AM-6	25.03.1998	24.03.2018	14.96	
54			Halisa	AM-7	30.01.1998	29.01.2018	143.44	
55			Kalol (Main)	AM-8	13.05.2004	12.05.2024	35.84	
56			Kalol Ext.-I	AM-9	04.08.2006	03.08.2026	159.92	
57			Kalol Ext.-II	AM-10	11.04.2009	10.04.2029	15.50	
58			Motera Ext.-II	AM-11	25.03.1998	24.03.2018	26.02	
59			Motera	AM-12	14.08.1996	13.08.2016	12.70	
60			Motera Ext.-I	AM-13	25.03.1997	24.03.2017	23.65	
61			Wamaj	AM-14	25.03.1997	24.03.2017	19.44	
62			Viraj	AM-15	26.07.2000	25.07.2020	17.49	
63			Lohar	AM-16	16.11.2004	15.11.2024	8.29	
64			Sanand	AM-17	10.05.2009	09.05.2029	81.36	
65			Sanand Ext.-I	AM-18	30.04.2013	29.04.2033	18.51	
66			Sanand Ext.-II	AM-19	23.03.1999	22.03.2019	10.37	
67			Sanand Ext.-III	AM-20	11.11.2011	11.11.2031	19.30	
68			Gamij	AM-21	26.06.1995	25.06.2015	39.16	
69			Gamij Ext.-I	AM-22	25.03.1997	24.03.2017	81.22	
70			Hirapur	AM-23	24.10.1997	23.10.2017	87.92	
71			Ahmedabad-Bakrol	AM-24	05.08.2009	04.08.2029	30.16	
72			Ahmedabad Ext.-I	AM-25	22.02.2001	21.02.2021	17.29	
73			Ahmedabad Ext.-II	AM-26	29.07.2008	28.07.2028	5.98	
74			Ahmedabad Ext.-III	AM-27	11.11.2011	10.11.2031	34.75	
75			Nandej East	AM-28	26.06.1995	25.06.2015	20.92	
76			Nandej	AM-29	25.03.1997	24.03.2017	90.18	
77			Nawagam Main	AM-30	28.03.2007	27.03.2027	72.23	
78			Nawagam Ext.-I	AM-31	21.03.2003	20.03.2023	2.77	
79			Wadu Ext.-I	AM-32	19.05.1997	18.05.2017	55.17	
80			Ahmedabad Ext.-IV	AM-33	08.10.1998	07.10.2018	10.21	
81			Rajpur Ext.-I	AM-34	02.02.1999	01.02.2019	8.70	
82			Asmali ML	AM-35	15.06.1998	14.06.2017	43.26	
83			Kadi Ext-III	AM-36	02.02.1999	01.02.2019	16.07	
84			Nawagam Ext.-II	AM-37	26.11.1999	25.11.2019	14.66	
85			Ahmedabad Ext-V	AM-38	08.05.2000	07.05.2020	17.75	
86			Gamij Ext.-III ML	AM-39	08.02.2002	07.02.2022	15.41	
87			Nandej Ext.-I	AM-40	08.02.2002	07.02.2022	56.18	
88			Gamij Ext. - II	AM-41	04.04.2001	03.04.2021	116.22	
89			South Wamaj ML	AM-42	28.06.2002	27.06.2022	18.29	
90			Nawagam Ext. - III	AM-43	31.08.2000	30.08.2020	56.00	
91			Kalol West Extn.-I	AM-44	03.02.2006	02.02.2022	54.25	
92			Kalol West ML	AM-45	21.11.2003	01.11.2023	14.53	

SL. NO.	COMPANY / OPERATOR	BASIN	BLOCK NAME	REF. NO. ON MAP	EFFECTIVE DATE OF ML	VALID DATE OF PML	PML AREA (Sq. Km.)	TOTAL PML AREA (Sq.Km.)
93	ONGC		Nawagam South Ext.-I	AM-46	21.11.2003	20.11.2023	30.88	
94			Nawagam South Ext.-II	AM-47	21.11.2003	20.11.2023	43.94	
95			Rupal	AM-48	29.10.2004	28.10.2024	14.06	
96			Kadi Extn.-IV	AM-49	13.11.2003	12.11.2023	5.28	
97			Nawagam South Ext.-III	AM-50	13.12.2005	12.12.2025	53.71	
98			Valod	AM-51	07.11.2007	06.11.2017	8.58	
99			Kalol West Ext.-II	AM-52	20.09.2007	19.09.2022	20.00	
100			Balasar	AM-53	08.06.2009	07.06.2030	12.00	
101			Varsoda Halisa Extn.-I	AM-54	21.11.2010	21.11.2028	169.00	
102			Kadi Extn.-V	AM-55	22.11.2010	21.11.2027	13.00	
103			Valod Extn.-I	AM-56	22.11.2010	21.11.2027	110.00	
104			Varsoda Halisa	AM-57	29.08.2008	28.08.2025	155.00	
105			Cambay	CM-1	14.12.2004	13.12.2024	2.60	
106			Siswa	CM-2	12.02.2000	11.02.2020	37.78	
107			Kathana	CM-3	20.11.2008	19.11.2028	16.95	
108			Padra Field	CM-4	03.09.2013	02.09.2033	172.24	
118			Akholjuni	CM-14	27.07.2000	26.07.2020	81.25	
119			Anklav Ext.-I	CM-15	15.02.2002	14.02.2022	61.00	
120			Kathana Ext.-I	CM-16	15.03.2004	14.03.2024	16.99	
122			Chaklasi-Rasnol	CM-18	06.12.2007	05.12.2027	42.00	
123			Vasad Kathol Extn.-III	CM-19	08.07.2011	07.07.2029	103.18	
124			Chaklasi Rasnol Extn.-I	CM-20	16.11.2010	15.11.2027	168.00	
125			Dabka Ext.-I	ANM-1	23.08.2008	22.08.2028	12.85	
126			Dabka Ext.-II	ANM-2	30.06.2009	29.06.2024	0.56	
127			Dabka	ANM-3	01.05.1993	30.04.2013	21.67	
128			Umera	ANM-5	10.08.2007	09.08.2027	8.44	
129			Umera Ext.-I	ANM-6	19.10.1994	18.10.2014	9.93	
130			Malpur (ML)	ANM-7	04.06.2007	03.06.2027	1.00	
131			Nada	ANM-8	19.02.2009	18.02.2029	9.85	
132			Gandhar Ext.-IV	ANM-9	30.08.1994	29.08.2014	36.75	
133			Gandhar Ext.-I	ANM-10	08.10.2006	07.10.2026	32.75	
134			Gandhar	ANM-11	07.01.2005	06.01.2025	11.78	
135			Gandhar Ext.-II (Denwa)	ANM-12	08.07.2006	07.07.2026	54.30	
136			Gandhar Ext.-III	ANM-13	24.02.2007	23.02.2027	235.38	
137			Gandhar Ext.-V	ANM-14	22.03.1996	21.03.2016	29.43	
138			Dahej Ext.-I	ANM-15	17.04.1994	16.04.2014	90.90	
139			Dahej	ANM-16	06.02.2005	05.02.2025	18.52	
140			Pakhajan(ML)	ANM-17	21.08.2007	20.08.2027	6.25	
141			Pakhajan Ext.-I	ANM-18	10.01.1995	09.01.2015	18.00	
142			Kasiyabet	ANM-19	12.09.2009	11.09.2029	5.06	
143			Ankleshwar Ext.-I	ANM-20	26.05.2005	25.05.2025	17.43	
144			Ankleshwar (Main)	ANM-21	15.08.2001	14.08.2021	38.98	
145			Motwan	ANM-22	04.07.1999	03.07.2019	42.20	
146			Sanaokhurd	ANM-23	30.12.1996	29.12.2016	23.29	
147			Kudara	ANM-24	28.06.2002	07.06.2022	2.60	

SL. NO.	COMPANY / OPERATOR	BASIN	BLOCK NAME	REF. NO. ON MAP	EFFECTIVE DATE OF ML	VALID DATE OF PML	PML AREA (Sq. Km.)	TOTAL PML AREA (Sq.Km.)
148	ONGC		Elav	ANM-25	30.03.1990	29.03.2010	10.37	
149			Kharach	ANM-26	23.03.1995	22.03.2015	0.72	
150			Kosamba	ANM-27	03.01.2008	02.01.2028	19.17	
151			Olpad (A)	ANM-28	24.11.2002	23.11.2022	2.75	
152			Dabka Ext.-IV (D#6)	ANM-29	20.02.1997	19.02.2017	1.00	
153			Kim(ML)	ANM-30	10.03.1997	09.03.2017	18.33	
154			Gandhar Ext.-VI (G#388)	ANM-31	22.01.1997	21.01.2017	44.47	
155			Nada Ext.-I	ANM-32	03.09.1998	02.09.2018	6.12	
156			Dabka Ext.-V (D#38)	ANM-33	29.06.1999	28.06.2019	2.00	
157			Gandhar Ext.-VII(G#155)	ANM-34	24.04.1999	23.04.2019	25.82	
158			Gandhar Ext.-VIII	ANM-35	16.08.2000	15.08.2020	7.23	
159			Kural (ML)	ANM-36	03.04.2001	02.04.2021	83.49	
160			Gandhar Ext. - IX	ANM-37	20.08.2002	19.08.2022	40.91	
161			Olpad - Dandi Ext. - I	ANM-38	01.01.2004	31.12.2023	94.40	
162			Pakhajan Extn. - II	ANM-39	16.09.2002	15.09.2022	38.50	
163			Kim Ext. - I	ANM-40	04.01.2002	03.01.2022	56.11	
164			Kosamba Extn.-I	ANM-41	01.03.2003	28.02.2023	39.00	
165			Umra Extn.-II	ANM-42	13.03.2003	12.03.2017	34.43	
166			South Dahej	ANM-43	12.11.2008	11.11.2025	27.00	
167			Jambusar-Dabka	ANM-44	25.03.2008	24.03.2028	101.50	
168			Charada	ANM-45	06.10.2009	05.10.2019	10.60	
169			Matar	ANM-46	01.10.2009	30.09.2029	66.50	
170			Balol Extn.-I	ANM-47	26.12.2008	25.12.2013	5.83	
171			Gandhar Extn.-X	ANM-48	19.06.2009	18.06.2017	9.00	
172			Gandhar Extn.-XI	ANM-49	19.06.2009	18.06.2019	7.20	
173			Gandhar Extn.-XII	ANM-50	19.06.2009	18.06.2025	29.00	
174			Degam	ANM-51	25.03.2008	25.03.2025	15.47	5785.95
175		Cauvery	Greater Bhuvanagiri	CYM-1	15.12.2007	14.12.2027	14.00	
176			Mattur	CYM-2	04.05.2014	03.05.2014	3.00	
177			Nannilam-I	CYM-3	26.04.2013	25.04.2013	4.70	
178			Kamalapuram-II	CYM-4	04.05.2014	03.05.2014	3.50	
179			Kamalapuram-I	CYM-5	27.05.1999	26.05.2019	23.50	
180			Adiyakka Mangalam	CYM-6	27.05.1999	26.05.2019	17.80	
181			Greater Kovilkalappal	CYM-7	15.05.2007	14.05.2027	33.61	
182			Nannilam-II	CYM-8	27.05.1999	26.05.2019	1.00	
183			Perungulam-Periyapattinam	CYM-9	15.07.1997	14.07.2017	75.00	
184			Tulsapatnam	CYM-10	27.05.1999	26.05.2019	3.70	
185			Pundi	CYM-11	27.05.1999	26.05.2019	1.00	
186			Kizhavalur	CYM-12	27.05.1999	26.05.2019	3.60	
187			Kuthalam	CYM-13	01.06.2001	31.05.2021	91.00	
188			Kuthalam-13	CYM-14	12.02.2004	11.02.2024	12.00	
189			Kali	CYM-15	01.06.2001	31.05.2021	19.00	
190			Vijayapuram #13	CYM-16	03.11.2002	02.11.2022	2.00	

SL. NO.	COMPANY / OPERATOR	BASIN	BLOCK NAME	REF. NO. ON MAP	EFFECTIVE DATE OF ML	VALID DATE OF PML	PML AREA (Sq. Km.)	TOTAL PML AREA (Sq.Km.)
191	ONGC		Greater Kamalapuram	CYM-17	26.12.2004	24.12.2024	22.00	
192			Kuthanallur	CYM-18	26.02.2004	25.02.2024	6.25	
193			Kali-6	CYM-19	01.01.2004	31.12.2023	1.60	
194			Kanjirangudi	CYM-20	13.10.2003	12.10.2023	68.00	
195			Greater Narimanam	CYM-21	27.01.2006	26.01.2026	54.00	
196			PBS-1-1	CYM-22	01.10.2003	30.09.2023	9.00	
197			Adichapuram	CYM-23	13.04.2007	12.04.2027	2.30	
198			Neyveli	CYM-24	15.03.2008	15.03.2028	3.84	
199			Karaikal	CYM-25	10.09.2008	09.09.2028	2.00	
200			Vadatheru	CYM-26	31.12.2007	30.12.2027	15.18	
201			Tiruvarur-19	CYM-27	12.02.2004	11.02.2024	2.00	
202			Greater Kali	CYM-28	21.07.2010	20.07.2030	36.00	
203			Ramanathpuram	CYM-29	21.11.2012	20.11.2019	493.21	
204			L-I	CYM-30	31.12.2012	30.12.2019	948.16	
205			L-II	CYM-31	31.12.2012	30.12.2019	1542.02	3513.97
206		KG Onland	Endamuru-I	KGM-1	03.04.2012	02.04.2019	3.00	
207			Endamuru-4	KGM-2	30.04.2003	29.04.2023	6.00	
208			Pasarlapudi-9	KGM-3	23.07.2012	22.07.2032	6.60	
209			Pasarlapudi-8	KGM-4	27.06.2012	26.06.2027	5.50	
210			Tatipaka-Pasarlapudi	KGM-5	14.02.2014	13.02.2034	62.00	
211			Kesanapalli-I	KGM-6	18.07.2012	17.07.2032	3.70	
212			Mori-5	KGM-7	02.06.1994	01.06.2014	1.56	
213			Mori-1	KGM-8	07.04.2011	06.04.2031	6.50	
214			Razole-1 & 2	KGM-9	23.01.2008	22.01.2026	18.85	
215			Elamanchali	KGM-10	21.02.2011	20.02.2031	6.00	
216			Medapadu-1	KGM-11	08.07.2012	07.07.2032	16.60	
217			Penumadam-1	KGM-12	03.04.2012	02.04.2022	9.60	
218			Lingala	KGM-13	21.12.2009	20.12.2024	7.60	
219			Kaikalur-3	KGM-14	10.09.2006	09.09.2026	9.00	
220			Vadali	KGM-15	20.04.2010	19.04.2020	4.00	
221			Mandapeta	KGM-16	22.08.1995	21.08.2015	40.00	
222			Mandapeta-19	KGM-17	01.05.1998	30.04.2018	6.00	
223			Mandepeta West	KGM-18	01.06.2004	31.05.2024	20.00	
224			Addvipalem-Ponnamanda	KGM-19	30.07.1996	29.07.2016	95.00	
225			Nandigama	KGM-20	31.01.2000	30.01.2020	55.00	
226			Enugupalli	KGM-21	06.07.2000	05.07.2020	7.00	
227			Kesavadasupalem	KGM-22	30.07.2002	29.07.2022	26.50	
228			Suryaraopeta	KGM-23	30.07.2002	29.07.2022	56.00	
229			Lingala Ext. & Kaikalur-12	KGM-24	30.07.2002	29.07.2022	30.00	
230			Lakshmaneswaram	KGM-25	30.07.2002	29.07.2022	23.50	
231			Endamuru-7&9	KGM-26	19.05.2003	18.05.2023	7.30	
232			Penumadam-2	KGM-27	01.07.2004	31.05.2024	3.20	
233			Srikatpalli	KGM-28	30.07.2002	29.07.2022	163.00	
234			Turputallu	KGM-29	28.11.2013	27.11.2033	39.58	
235			Achanta	KGM-30	28.11.2008	27.11.2028	14.10	
236			Kavitam	KGM-31	12.10.2007	11.10.2027	156.35	
237			Bantumilli Extn.	KGM-32	05.01.2009	20.11.2019	155.67	

SL. NO.	COMPANY / OPERATOR	BASIN	BLOCK NAME	REF. NO. ON MAP	EFFECTIVE DATE OF ML	VALID DATE OF PML	PML AREA (Sq. Km.)	TOTAL PML AREA (Sq.Km.)
238	ONGC		Manapalli Extn.	KGM-33	12.11.2009	11.11.2024	10.00	
239			West Godavari	KGM-34	01.01.2013	31.12.2019	1278.32	
240			Godavari Onland	KGM-35	01.01.2013	31.12.2019	2176.00	
241			Chintalapalli Extn.	KGM-36	12.11.2009	11.11.2019	18.56	
242			Mahadevapatnam	KGM-37	28.11.2008	27.11.2028	138.89	
243			Malleswaram	KGM-38	22.11.2011	21.11.2017	241.18	4927.66
		Assam-Arakan	Sonari	UAM-1	01.08.2009	31.07.2026	30.00	
245			Banamali	UAM-2	17.12.2002	16.12.2022	50.00	
246			Lakwa	UAM-3	29.09.2008	28.09.2028	172.49	
247			Laipling-Gaon	UAM-4	13.10.2003	13.10.2023	26.00	
248			Panidihing	UAM-5	19.05.2004	18.05.2024	34.00	
249			North Rudrasagar	UAM-6	30.01.2006	29.01.2026	149.00	
250			Rudrasagar	UAM-7	30.05.2009	29.05.2029	70.50	
251			Charali	UAM-8	20.03.1999	19.03.2019	51.64	
252			Charali Ext.-I	UAM-9	20.05.1998	19.05.2018	45.00	
253			West Charali	UAM-10	23.03.2012	22.03.2032	12.00	
254			Changmaigaon	UAM-11	07.02.2004	06.02.2024	10.00	
255			Namti	UAM-12	09.11.2007	08.11.2027	35.55	
256			Geleki	UAM-13	16.08.1990	15.08.2030	27.94	
257			Geleki Ext.-I	UAM-14	23.11.2009	22.11.2029	5.01	
258			Geleki Ext.- II	UAM-15	14.12.2001	13.12.2021	2.65	
259			SE Geleki	UAM-16	30.01.2006	29.01.2026	20.50	
260			Mekeypore-Santak-Nazira	UAM-17	30.01.2006	29.01.2026	77.00	
261			Changmaigaon East	UAM-18	30.01.2006	29.01.2026	15.00	
262			LaiplingGaon Extn.	UAM-19	26.09.2011	25.09.2023	30.45	
263			Charaideo-Nahorhabi	UAM-20	30.01.2006	29.01.2026	14.00	
264			Mekeypore-Santak-Nazira Bihupur Extn.	UAM-21	26.09.2011	25.09.2031	50.00	
265			East Changmaigaon Extn.	UAM-22	01.12.2011	30.11.2031	35.00	
266			SE Geleki Extn.	UAM-23	26.09.2011	25.09.2031	28.00	
267			Charaideo-Nahorhabi Extn.	UAM-24	26.09.2011	25.09.2031	41.00	
268			Changpang ML	NGM-1	14.03.2007	13.03.2027	12.00	
269			Borholla	DHM-1	17.06.1998	16.06.2018	32.12	
270			Mekrang	DHM-2	19.09.1997	18.09.2017	16.00	
271			East Lakhibari	DHM-3	23.07.2003	23.07.2023	8.50	
272			East Lakhibari Extn.	DHM-4	27.01.2006	09.10.2020	49.00	
273			Khoraghat	DHM-5	27.07.2009	25.07.2024	3.00	
274			Khoraghat Ext. - I	DHM-6	17.07.2000	16.07.2020	83.00	
275			Namber	DHM-7	05.09.1999	04.09.2019	26.00	
276			Namber Extn.	DHM-8	27.01.2006	26.01.2026	20.00	
277			Kalyanpur	DHM-9	13.04.2007	12.04.2027	40.00	
278			Badarpur	CHM-1	01.08.2009	31.07.2029	2.30	
279			Banaskandi	CHM-2	21.07.1997	20.07.2017	15.00	
280			Adamtila	CHM-3	24.11.2009	23.11.2014	4.00	
281			Bhubandar	CHM-4	22.12.2002	21.12.2022	6.00	

SL. NO.	COMPANY / OPERATOR	BASIN	BLOCK NAME	REF. NO. ON MAP	EFFECTIVE DATE OF ML	VALID DATE OF PML	PML AREA (Sq. Km.)	TOTAL PML AREA (Sq.Km.)
282	ONGC		Adamtila Extn.	CHM-5	03.03.2012	02.03.2032	63.00	
283			North Patharia	CHM-6	30.03.2012	29.03.2029	60.00	
284			Cachar Distt.	CHM-7	04.01.2013	03.01.2020	732.00	
			Sector-Vc				497.00	
285			Baramura Field (BRM-1,10,11,12)	TM-1	01.10.2013	30.09.2033	10.75	
286			Agartala Dome (AD-1)	TM-5	01.05.2009	30.04.2029	15.75	
287			Agartala Dome (AD-4)	TM-6	01.01.1998	31.12.2017	32.58	
288			Konaban Field	TM-7	19.03.2014	03.03.2034	33.00	
289			Manikya Nagar (RO-15)	TM-8	01.01.1998	31.12.2017	0.80	
290			Rokhia (RO-2)	TM-9	14.11.2008	13.11.2028	5.04	
291			Rokhia (RO-19)	TM-10	26.02.2012	25.02.2012	0.58	
292			Agartala Dome Extn.-II	TM-11	01.02.2006	31.01.2026	160.86	
293			Baramura Extn.-IV	TM-12	01.02.2006	31.01.2026	150.25	
294			Sundulbari-Agartala Dome	TM-13	13.12.2010	12.12.2026	301.00	
295			Manikyanagar-Sonamura Extn-I	TM-15	01.02.2006	31.01.2026	138.55	
296			Tichna block	TM-16	07.02.2006	06.02.2026	195.41	
297			Gojalia block	TM-17	07.02.2006	06.02.2026	271.17	
298			Kunjaban	TM-18	14.07.2008	13.07.2028	288.00	
299			Titabar	TM-19	24.12.2008	23.12.2023	10.00	
300			Kasomarigaon	TM-20	09.12.2009	08.12.2025	76.00	
301			Tulamura	TM-21	20.11.2009	19.11.2031	83.75	
302			Golaghat Extn. II-A	TM-22	09.12.2009	08.12.2024	85.00	
303			Agartala Dome Extn.-III	TM-23	30.03.2011	29.03.2031	60.00	
304			West Tripura	TM-24	04.01.2013	03.01.2020	1327.58	5947.72
305		Mumbai Off.	Single PML MH Field	BM-1	24.10.2010	23.10.2030	1953.83	
306			Extn. of NW-Mumbai High	BM-2	17.11.2008	16.11.2028	2480.00	
307			C-37 (BOFF I, II & III)	BM-3	12.09.2007	11.09.2027	469.17	
308			B-55	BM-4	30.06.1999	29.06.2019	135.85	
309			South Bassein	BM-5	01.10.1987	30.09.2027	743.00	
310			B-119 / B-121	BM-6	15.05.1997	14.05.2017	113.40	
311			B-173A	BM-7	01.06.1998	31.05.2018	51.95	
312			Neelam	BM-8	14.11.2009	13.11.2029	213.00	
313			Heera	BM-9	20.11.2004	19.11.2024	448.05	
314			D-1 Field	BM-10	31.07.2005	30.07.2025	25.60	
315			Bassein Field Extn. (SB-II)	BM-11	15.06.2005	14.06.2031	22.55	
316			D-18	BM-12	01.01.2005	31.12.2024	194.00	
317			North Tapti Field	BM-13	09.01.2006	08.01.2026	68.14	
318			C-Series Fields	BM-14	01.04.2006	31.03.2026	3620.00	
319			Around D-1 Field	BM-27	14.09.2009	13.09.2025	1167.00	
320			Mumbai High NW	BM-16	01.04.2006	31.03.2026	1567.67	
321			Mumbai High-SW	BM-17	01.04.2006	31.03.2026	1064.71	

SL. NO.	COMPANY / OPERATOR	BASIN	BLOCK NAME	REF. NO. ON MAP	EFFECTIVE DATE OF ML	VALID DATE OF PML	PML AREA (Sq. Km.)	TOTAL PML AREA (Sq.Km.)
322	ONGC		Mumbai High-South	BM-18	09.01.2006	08.01.2026	801.54	
323			West of Bassein	BM-19	01.04.2006	31.03.2026	835.00	
324			Vasai East	BM-20	01.04.2006	31.03.2026	103.69	
325			S&E of Bassein	BM-21	01.04.2006	31.03.2026	1447.31	
326			North Heera	BM-22	04.12.2007	03.12.2022	121.00	
327			Ratna (R-12) field	BM-23	11.02.2001	10.02.2021	67.93	
328			D-33 (BOFF I, III, SWBH)	BM-24	05.09.2006	04.09.2026	603.00	
329			BOFF	BM-25	03.01.2013	02.01.2020	11595.00	
330			SW-BH Extn.	BM-26	03.01.2013	02.01.2020	482.00	30394.39
331		K-G Off.	GS-15 & 23	KGM-37	04.09.1998	03.09.2018	80.00	
332			G-1 Field	KGM-38	05.09.2003	04.09.2023	105.00	
333			Vainateyam	KGM-39	20.09.2008	19.09.2022	221.00	
334			GS-29	KGM-40	30.10.2009	29.10.2029	35.00	
335			GS-49	KGM-41	22.10.2009	21.10.2029	52.50	
336			Yanam	KGM-42	19.11.2009	18.11.2029	268.50	
337			Godavari	KGM-43	24.01.2008	23.01.2028	111.50	
338			Vasistha	KGM-44	15.02.2008	14.02.2028	119.00	
339			Vainateyam Extn.	KGM-45	11.01.2011	10.01.2029	78.00	
340			GS-29 Extn.	KGM-46	07.12.2011	06.12.2027	137.62	
341			GS-49 Extn.	KGM-47	06.09.2013	05.09.2033	77.68	1285.80
342		Cauvery Off.	PBS-1-1 Extn.	CYM-32	01.04.2009	31.03.2025	96.83	96.83
343		Gujarat-Kutch	KD Field	GKM-1	01.04.2011	31.03.2025	430.00	
344			GK-28	GKM-2	21.11.2012	09.10.2027	1242.50	1672.50
ONGC TOTAL								**54509.67**
345	OIL	Rajasthan	Dandewala (Jaisalmer)	ORJM-1	01.01.2006	31.12.2025	250.00	
346			Baghewala	ORJM-2	30.05.2003	29.05.2023	210.00	460.00
347		Assam-Arakan	Moran	OAM-1	01.11.2006	09.01.2021	429.42	
348			Moran Extn.	OAM-2	01.11.2006	31.10.2026	560.00	
349			Dum-Duma BK-A	OAM-3	26.11.2009	25.11.2029	98.42	
350			Nahorkatiya	OAM-4	04.02.2004	03.02.2024	1.42	
351			Nahorkatiya Extn.	OAM-5	10.01.2011	09.01.2031	165.76	
352			Hugrijan	OAM-6	10.01.2001	09.01.2021	725.20	
353			Dum-Duma BK-B	OAM-7	26.11.2009	25.11.2029	311.96	
354			Digboi	OAM-8	14.10.2001	13.10.2021	49.33	
355			Dum-Duma BK-C	OAM-9	26.11.2009	25.11.2029	85.47	
356			Dum-Duma BK-D	OAM-10	26.11.2009	25.11.2029	10.36	
357			Ningru	OAM-11	27.11.2003	26.11.2023	540.67	
358			Tinsukia	OAM-12	02.08.2001	06.12.2021	250.00	
359			Dibrugarh	OAM-13	06.08.2001	21.01.2018	186.00	
360			Borhapjan	OAM-14	07.08.2001	06.08.2020	87.00	
361			Dholiya	OAM-15	02.08.2001	17.10.2022	131.00	
362			Ningru Extension	OAM-16	04.06.2003	03.06.2023	75.00	
363			Chabua	OAM-17	12.06.2002	11.06.2022	189.00	
364			Tinsukia Extension	OAM-18	17.05.2003	16.05.2023	185.00	
365			Baghjan	OAM-19	14.05.2003	13.05.2023	75.00	
366			Mechaki	OAM-20	19.05.2003	18.05.2023	195.00	
367			Sapkaint (Murkong-NF)	OAM-21	24.12.2007	23.12.2027	105.00	

SL. NO.	COMPANY / OPERATOR	BASIN	BLOCK NAME	REF. NO. ON MAP	EFFECTIVE DATE OF ML	VALID DATE OF PML	PML AREA (Sq. Km.)	TOTAL PML AREA (Sq.Km.)
368	OIL		Mechaki Extension	OAM-22	06.07.2010	05.07.2030	9.00	
369			Borhat	OAM-23	13.08.2013	12.08.2033	81.00	4546.01
OIL TOTAL PML AREA								**5006.01**
ONGC TOTAL PML AREA								**54509.67**
NOMINATION (OIL+ONGC) TOTAL PML AREA								**59515.68**
Pvt. / JV TOTAL PML AREA								**8674.04**
GRAND TOTAL OF MLS AWARDED IN THE COUNTRY (NOC'S & PVT. / JV COMPANIES)								**68189.72**

Table 10.19: ML areas under operation In PSC regime as on 01.04.2015

SL. NO.	CONTRACTOR	BASIN	BLOCK NAME	Pre-NELP/ Field/ NELP	REF. NO. ON MAP	EFFECTIVE DATE OF ML	AREA (Sq. Km.)	TOTAL AREA (Sq.Km.)
1	**CAIRN**	K-G Offshore	Ravva	Field	—	28-10-1994 (On) 07.07.1997 (Off)	331.26	
2		Gulf of Cambay (CB-OS/2)	Lakshmi	Pre-NELP	—	07.07.1998	121.06	
3			Gauri		—	—	52.70	
4			Ambe		—	—	107.47	
5			CBX		—	—	33.28	
6		Rajasthan	Mangala (RJ-ON-90/1)	Pre-NELP	—	21.06.2005	1859.00	
7			Bhagyam-Shakti		—	15.11.2006	430.17	
8			Kameshwari West		-	27.10.2009	822.00	**3756.94**
9	**ONGC**	Cambay	West Patan (CB-ONN-2002/1)	NELP-IV	—	30.03.2015	17.00	
10			Nadiad – 1 (CB-ONN-2001/1)	NELP-III	—	22.04.2015	26.00	**43.00**
11	**BG-RIL-ONGC**	Mumbai Off.	Mid & South Tapti	Field	—	22.12.1994	1471.00	
12			Panna		—	22.12.1994	430.00	
13			Mukta		—	22.12.1994	777.00	**2678.00**
14	**GEOENPRO**	Assam-Arakan	Kharsang	Field	—	21.10.1997	10.00	**10.00**
15	**ACIL**	Assam-Arakan	Amguri	Field	—	01.11.2003	52.75	**52.75**
16	**HOEC**	Cambay	Asjol	Field	—	09.04.1996	15.00	
17			N. Balol	Field	—	21.03.2002	27.30	
18			Pramoda & Palej		—	21.09.2005	7.64	
19		Cauvery Off.	PY-1	Field	—	06.10.1995	75.00	**124.94**
20	**INTERLINK**	Cambay	Baola	Field	—	12.12.1996	4.00	
21			Modhera		—	19.05.2007	12.70	**16.70**
22	**JTI**	Cambay	Wavel	Field	—	20.02.1995	9.00	
23			Dholka		—	20.02.1995	48.00	**57.00**

24	**NIKO**	Cambay	Hazira	Field	—	23.09.1994	50.00	**50**
25	**SELAN**	Cambay	Lohar	Field	—	13.03.1995	5.00	
26			Indrora	Field	—	13.03.1995	130.00	
27			Bakrol	Field	—	13.03.1995	36.00	
28			Karjisan	Field	—	23.11.2005	5.00	
29			Ognaj	Field	—	05.08.2008	13.65	**189.65**
30	**HERAMEC**	Cambay	Kanawara	Field	—	04.02.2003	6.30	
31			Dholasan	Field	—	27.02.2003	8.80	
32			Allora	Field	—	16.05.2003	6.85	
33			N. Kathana	Field	—	11.06.2003	12.20	**34.15**
34	**HYDROCARBON-RES. DEV.-PPC**	Cambay	Sanganpur		—	27.02.2002	4.40	**4.40**
35	**OilEX**	Cambay	Cambay	Field	—	23.09.1994	161.00	
36			Bhandut	Field	—	23.09.1994	6.00	**167.00**
37	**GSPCL**	Cambay	Unawa	Field	—	19.05.2003	5.65	
38			Ingoli & SE-1 Field (CB-ONN-2000/1)	NELP-II		05.09.2005	15.71	
39			"Ank-21 (CB-ONN-2002/3)"	NELP-V		25.02.2014	1.60	
40			"Miroli (M1-M6) CB-ONN-2002/3"	NELP-IV		25.02.2014	3.29	
41			"Sanand (SE 4, 8 & 10) CB-ONN-2002/3"	NELP-IV		20.03.2015	18.00	
42			"Tarapur #1, #G CB-ON/2"			"12.02.2009 03.03.2014"	2.64	
44		KG Off.	"DDW KG-OSN-2001/3"	NELP-III		11.08.2010	37.50	**84.39**
45	**FOCUS**	Rajasthan	RJ-ON/6 (SGL)	Pre-NELP	—	23.06.2010	176.00	**176.00**
46	**HARDY**	Cauvery Off.	CY-OS-90/1 (PY-3)	Field	—	20.07.1998	81.00	**81.00**
47	**RIL**	KG Off.	KG-DWN-98/3(D-1&3)	NELP-I	—	02.03.2005	339.40	
48			KG-DWN-98/3 (D-26)		—	17.04.2008	49.72	
49			KG-DWN-98/3 (D-2,6,19&22)		—	21.06.2012	229.00	
50			KG-DWN-98/3 (D-34)		—	30.09.2013	530.00	**1148.12**
TOTAL OF MLS AWARDED IN PSC REGIME								**8674.04**
TOTAL OF MLS AWARDED IN NOMINATION REGIME								**59515.68**
GRAND TOTAL OF MLS AWARDED IN THE COUNTRY (NOC'S & PVT. / JV COMPANIES)								**68189.72**

Production

Table 10.20 : Trend in production of crude il and natural gas in PSC regime during the period 2005-06 to 2014-15 along with the growth over the previous year

Year	GAS (MMSCM)	%age Growth over previous year	Oil + Condensate (TMT)	%age Growth over previous year
2005-06	7357.63	-	4552.24	6%
2006-07	7039.70	-4%	4829.91	6%
2007-08	7727.39	10%	5086.92	5%
2008-09	8090.05	5%	4674.29	-8%
2009-10	21985.12	172%	5262.53	13%
2010-11	26774.49	22%	9681.99	84%
2011-12	21608.96	-19%	10526.96	9%
2012-13	14490.88	-33%	11640.05	11%
2013-14	9497.09	-34%	12076.41	4%
2014-15	8911.95	-6%	11785.22	-2%

Table 10.21 : Country production from 2007-08 to 2014-15

FY	Oil ('000 tonnes)	Gas (MMSCM)
2007-08	34118	32417
2008-09	33508	32845
2009-10	33690	47496
2010-11	37684	52219
2011-12	38090	47559
2012-13	37862	40679
2013-14	37788	35407
2014-15	37462	33429

Reserves

Table 10.22 : In-Place Volume Trend over the year under the PSC regime

In place				
As on	Oil+COND (MMT)	Gas (BCM)	O + OEG (MMT)	%Growth with Base Year 2008
01.04.2008	638.82	980.42	1619.24	
01.04.2009	658.36	981.71	1640.07	1%
01.04.2010	814.19	1148.48	1962.67	21%
01.04.2011	820.67	1208.705	2029.38	25%
01.04.2012	816.56	1255.30	2071.87	28%
01.04.2013	829.92	1291.70	2121.62	31%
01.04.2014	972.36	1317.82	2290.18	41%
01.04.2015	975.35	1460.18	2435.54	50%

Table 10.23 : Ultimate Reserve Trend over the year under the PSC regime

Ultimate				
As on	Oil+COND (MMT)	Gas (BCM)	O + OEG (MMT)	% Growth with Base Year 2008
01.04.2008	172.36	550.99	723.34	
01.04.2009	178.12	550.28	728.39	1%
01.04.2010	194.31	600.84	795.15	10%
01.04.2011	194.89	640.67	835.56	16%
01.04.2012	194.89	676.59	871.48	20%
01.04.2013	197.21	680.06	877.27	21%
01.04.2014	214.58	715.56	930.14	29%
01.04.2015	215.38	767.28	982.66	36%

Table 10.24 : Basin-wise In-Place volume and Ultimate Reserve trend (O+OEG IN MMT) under PSC regime

INITIAL									
As on	CBM	Assam-Arakan	Cambay	Cauvery	Krishna Godavari	Mahanadi	Mahanadi-NEC	Mumbai	Rajasthan
01.04.2008	142.45	21.08	90.07	34.14	695.61		27.05	308.96	299.88
01.04.2009	142.45	20.70	109.79	34.14	686.49		27.05	308.96	310.49
01.04.2010	230.06	20.48	121.30	34.14	714.26		27.05	504.89	310.49
01.04.2011	264.04	20.48	126.29	34.36	716.86	24.92	27.05	504.89	310.49
01.04.2012	264.04	20.48	126.54	34.36	763.45	24.92	27.05	504.89	306.13
01.04.2013	281.00	20.48	138.89	34.36	764.50	24.92	27.05	504.89	325.53
01.04.2014	281.00	25.12	141.41	29.22	943.89	24.92	27.05	504.89	312.68
01.04.2015	281.00	61.99	146.95	52.56	959.94	24.92	27.05	504.89	376.23
ULTIMATE									
As on	CBM	Assam-Arakan	Cambay	Cauvery	Krishna Godavari	Mahanadi	Mahanadi-NEC	Mumbai	Rajasthan
01.04.2008	39.84	5.69	26.21	13.91	410.78		13.81	129.88	83.21
01.04.2009	39.84	7.42	33.90	13.92	401.72		13.81	129.88	87.90
01.04.2010	73.96	7.27	36.87	13.92	413.70		13.81	147.73	87.90
01.04.2011	97.74	7.27	37.56	14.08	413.70	15.77	13.81	147.73	87.90
01.04.2012	97.74	7.27	37.56	14.08	449.62	15.77	13.81	147.73	87.90
01.04.2013	101.06	7.27	39.14	14.08	450.45	15.77	13.81	147.73	87.95
01.04.2014	101.06	6.11	38.11	10.32	514.12	15.77	13.81	147.73	83.11
01.04.2015	101.06	10.31	39.66	21.37	524.55	15.77	13.81	147.73	108.39

State-Wise In-place volume (O+OEG) (MMT) Distribution under PSC Regime As on 01.04.2015

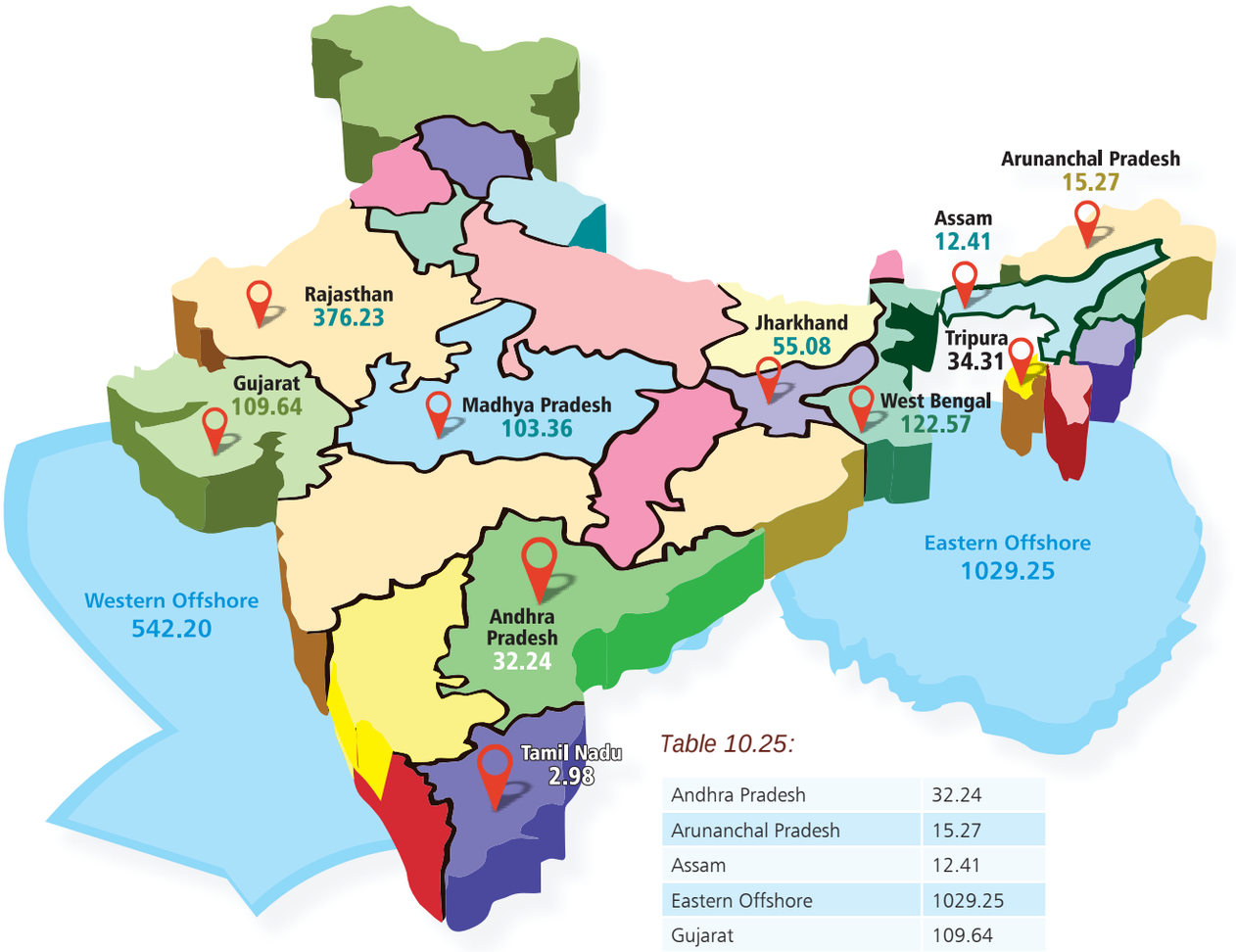

Table 10.25:

Andhra Pradesh	32.24
Arunanchal Pradesh	15.27
Assam	12.41
Eastern Offshore	1029.25
Gujarat	109.64
Jharkhand	55.08
Madhya Pradesh	103.36
Rajasthan	376.23
Tamil Nadu	2.98
Tripura	34.31
West Bengal	122.57
Western Offshore	542.20

Table 10.26: Bidding Round-wise In-place volume Distribution under PSC Regime as on 01.04.2015

Bidding Round	In-Place Volume (MMT)
Pre-NELP	447.91
Field	692.72
NELP I	793.47
NELP II	34.56
NELP III	78.49
NELP IV	39.84
NELP V	38.48
NELP VI	29.07
CBM	281.00

Table 10.27: Company-wise In-place volume Distribution under PSC Regime as on 01.04.2015

OPERATOR TYPE	In-Place Volume (MMT)
Foreign	1056.85
Private	1025.53
PSU	353.16
Grand Total	**2435.54**

Table 10.28: Reserve Replacement Ratio from 01.04.2008 to 01.04.2015 under PSC Regime

	Reserve accretion			Production			RRR		
As on	Oil+COND (MMT)	Gas (BCM)	O + OEG (MMT)	OilCOND_ MMT	GAS_ BCM	O+OEG (MMT)	Oil	Gas	O+OEG
01.04.2008	0.85	39.73	40.58	5.09	7.73	12.81	0.17	5.14	3.17
01.04.2009	5.76	-0.71	5.05	4.67	8.09	12.76	1.23	-0.09	0.40
01.04.2010	16.20	50.56	66.76	5.26	21.99	27.25	3.08	2.30	2.45
01.04.2011	0.57	39.83	40.40	9.68	26.77	36.46	0.06	1.49	1.11
01.04.2012	0.00	35.92	35.92	10.53	21.61	32.14	0.00	1.66	1.12
01.04.2013	1.71	3.24	4.96	11.64	14.49	26.13	0.15	0.22	0.19
01.04.2014	17.37	35.50	52.88	12.08	9.50	21.57	1.44	3.74	2.45
01.04.2015	0.80	51.71	52.51	11.82	8.92	20.74	0.07	5.80	2.53
Grand Total	**43.27**	**255.79**	**299.06**	**70.77**	**119.09**	**189.86**	**0.61**	**2.15**	**1.58**

Table 10.29: Basin Wise R/P Ratio under PSC Regime as on 01.04.2015

Oil (MMT)			
Basin	**Balance Oil (on 01.04.2015)**	**Oil Prod (14-15)**	**R/P**
Assam-Arakan	1.46	0.07	21.21
Cambay	10.42	0.54	19.45
Cauvery	2.41	0.00	NP
Krishna Godavari	31.76	1.37	23.15
Mahanadi	0.00	0.00	NP
Mahanadi-NEC	0.00	0.00	NP
Mumbai	15.04	0.96	15.69
Rajasthan	37.32	8.85	4.22
Total Oil	**98.40**	**11.79**	**8.35**
Gas (BCM)			
Basin	**Balance Gas (on 01.04.2015)**	**Gas Prod (14-15)**	**R/P**
Assam-Arakan	6.73	0.02	#
Cambay	7.93	0.21	37.43
Cauvery	14.21	0.03	#
CBM	100.36	0.23	#
Krishna Godavari	371.44	4.90	75.86
Mahanadi	15.77	0.00	NP
Mahanadi-NEC	13.81	0.00	NP
Mumbai	37.07	2.55	14.53
Rajasthan	29.46	0.97	30.34
Total Gas	596.78	8.91	66.96
Grand Total	**695.19**	**20.70**	**33.59**

1. Low production rates is giving inflated figures of R/P
2. NP: No Production

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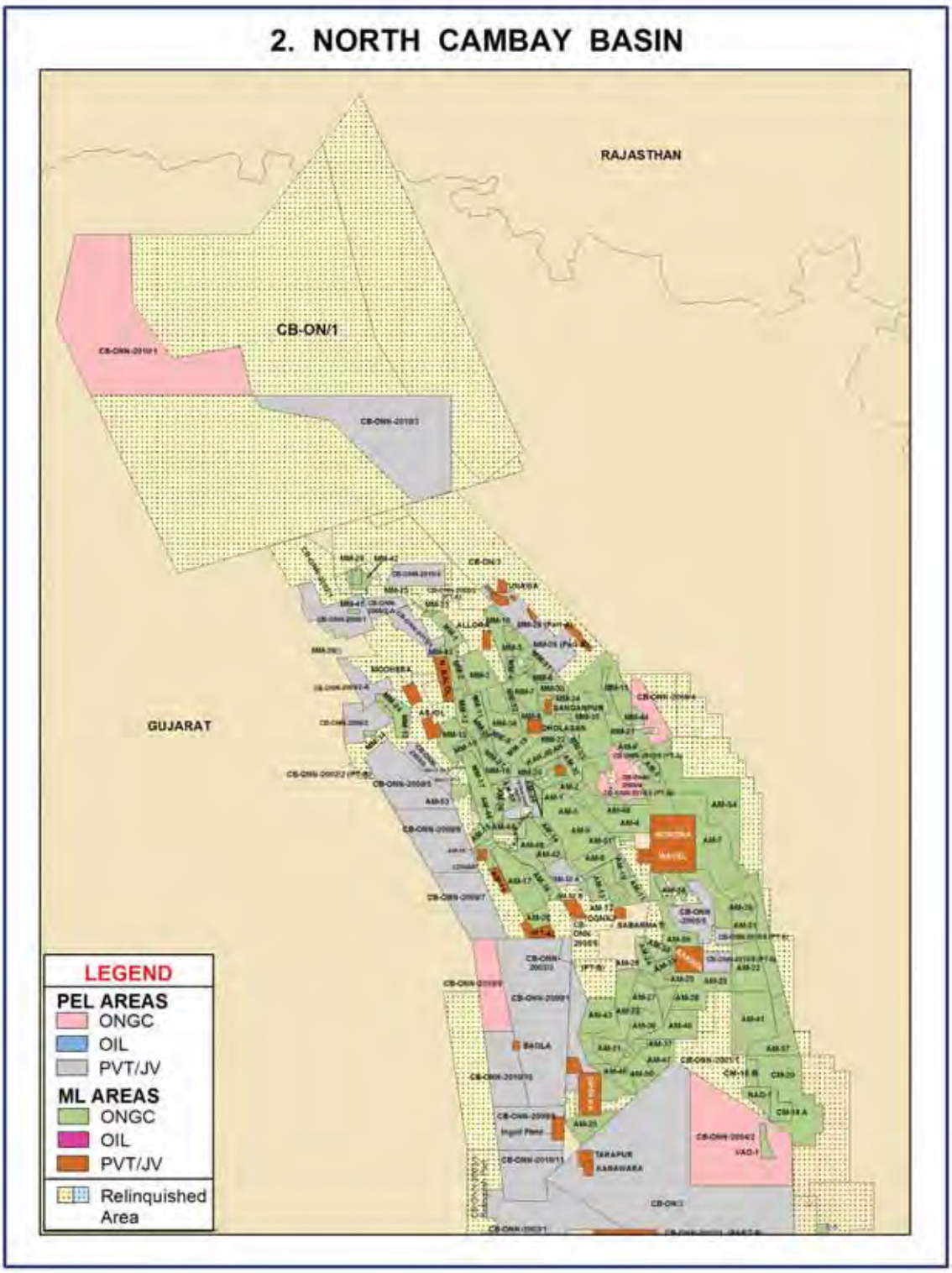
1. RAJASTHAN BASIN
P A K I S T A N
RJ-ONN-2004/1
RJ-ONN-2001/1
RJ-ONN-2002/1
RJ-ONN-2004/2
ORJM-1
RJM-3
RJM-1
RJM-4
RJM-5
RJM-2
RJ-ONN-2005/1
RJ-ONN-2005/2
RJ-ONN-2005/3
RJ-ONN-2010/2
RJ-ONN- 2000/1
ORJM-2
RJ-ONN-2004/3
RJ-ON/6
RJ-ONN-2003/2
RAJASTHAN
AJMER
RJ-ONN-2003/1
RJ-2
RJ-ON-90/1
BHAGYAM SHAKTI FIELD
MANGALA ML
KAAMESHWARI (W)
BS(5)-CBM-2005/III
BS(4)-CBM-2005/III
BS(1)-CBM-2003/II
BS(2)-CBM-2003/II
BS(3)-CBM-2003/II
LEGEND
PEL AREAS
ONGC
OIL
PVT/JV
ML AREAS
ONGC
OIL
PVT/JV
Relinquished Area

2. NORTH CAMBAY BASIN



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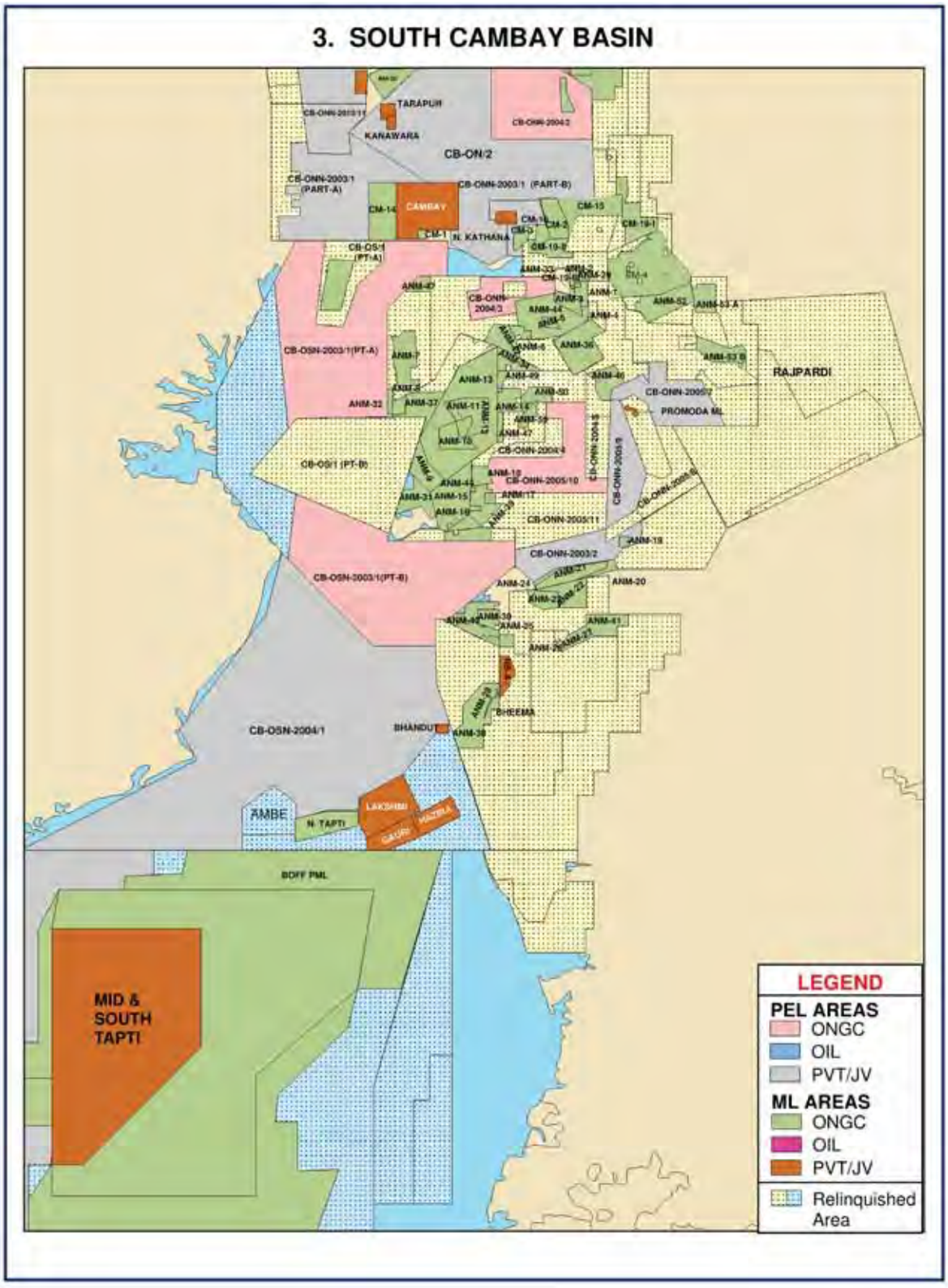
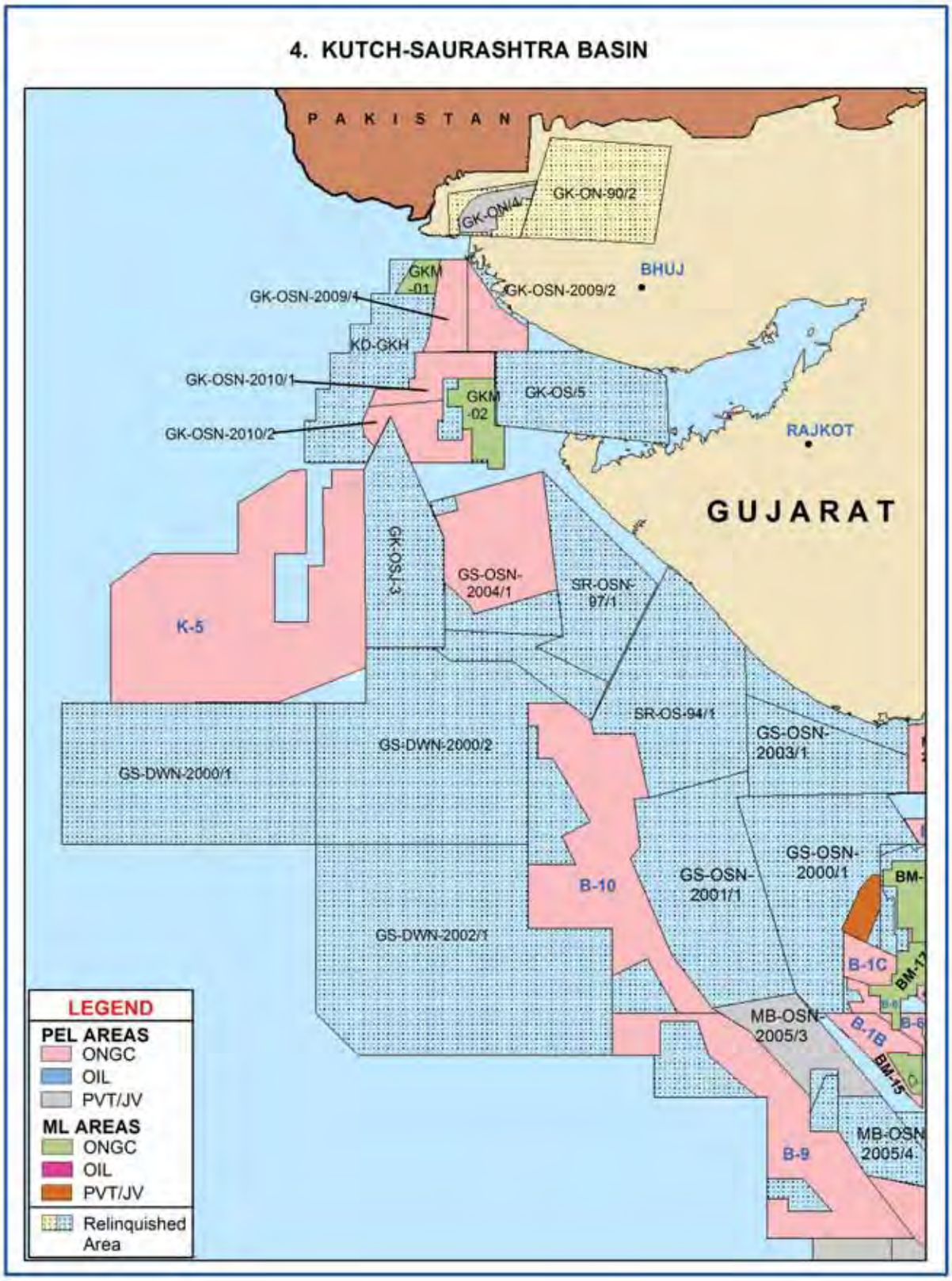
3. SOUTH CAMBAY BASIN



4. KUTCH-SAURASHTRA BASIN



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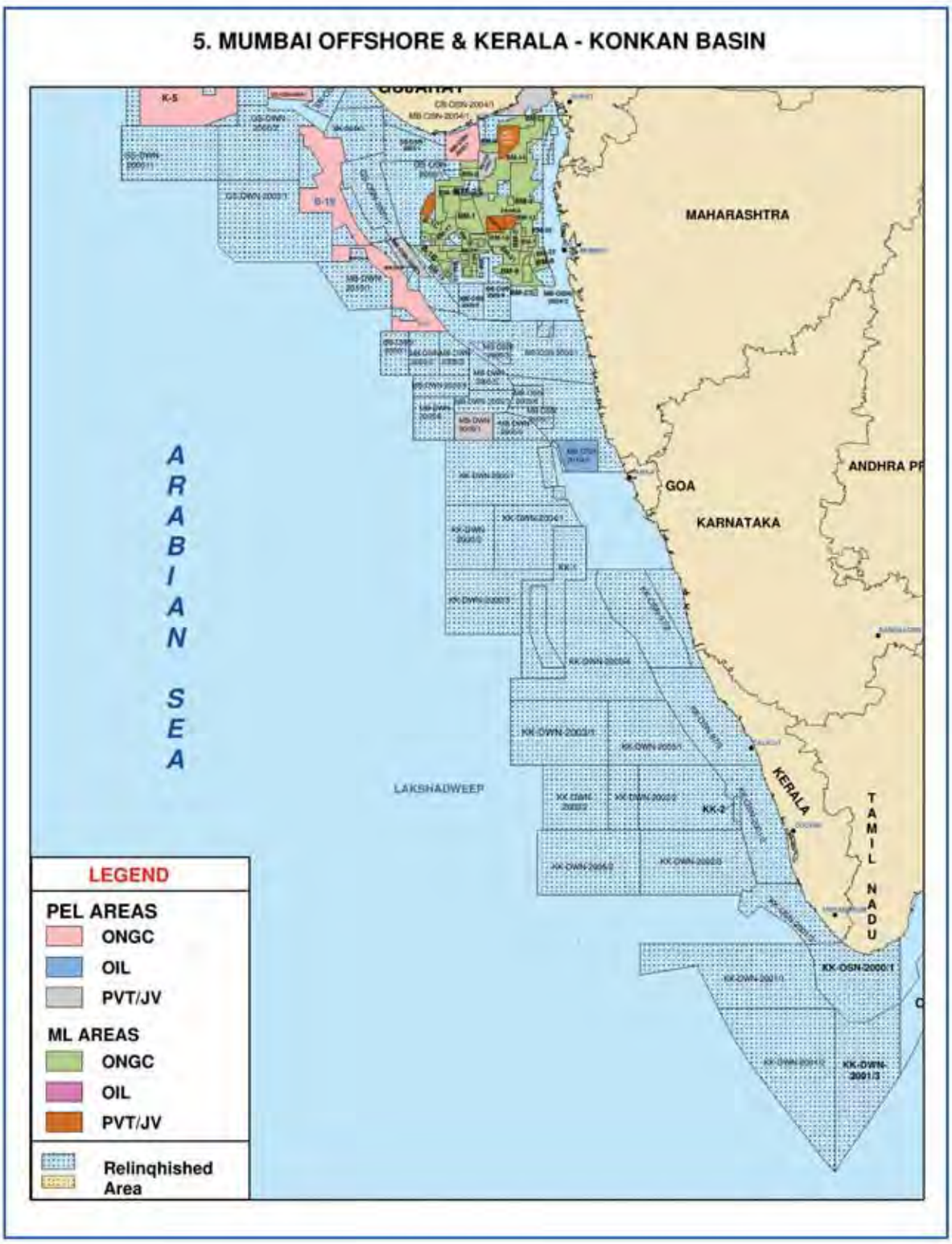
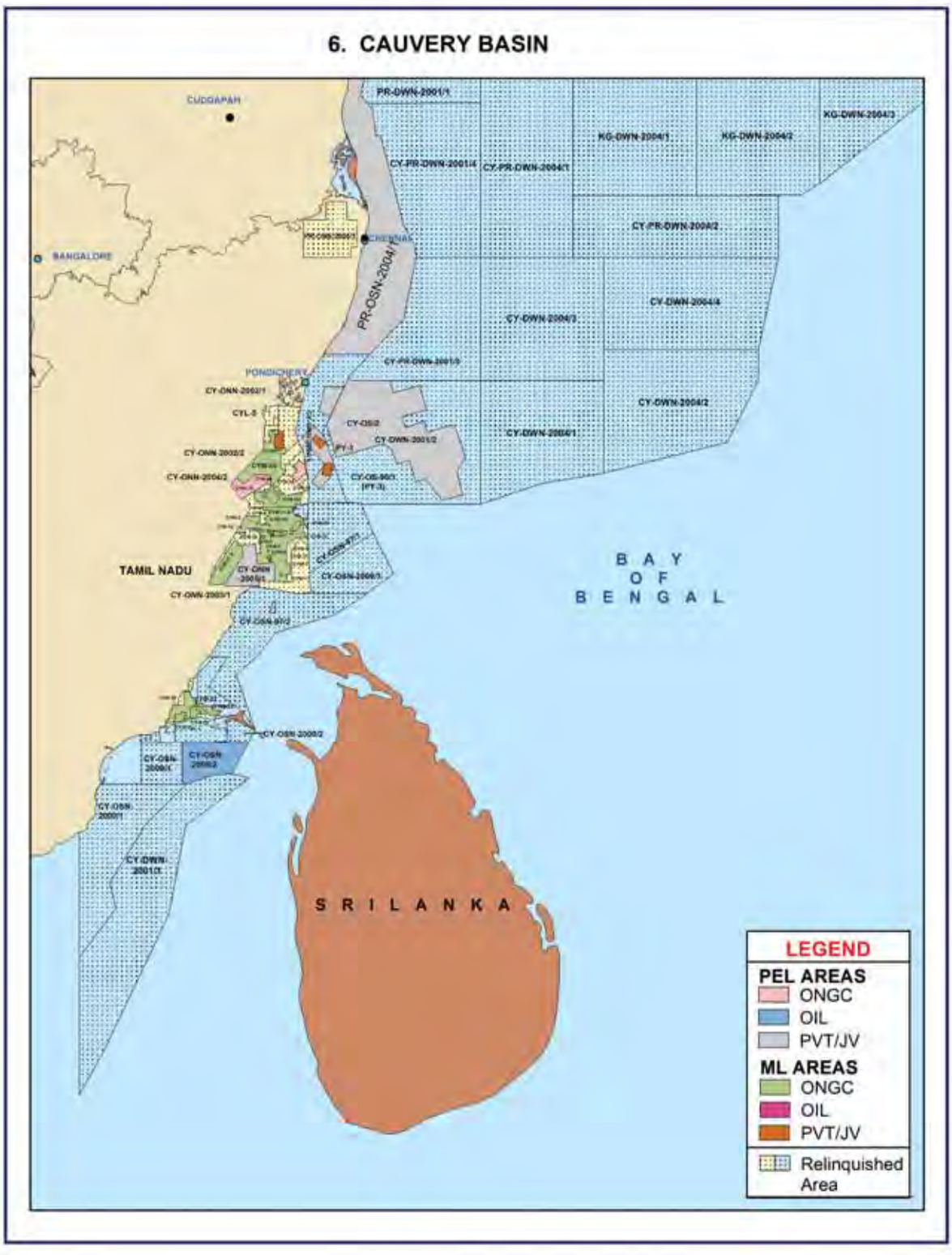
5. MUMBAI OFFSHORE & KERALA - KONKAN BASIN



6. CAUVERY BASIN



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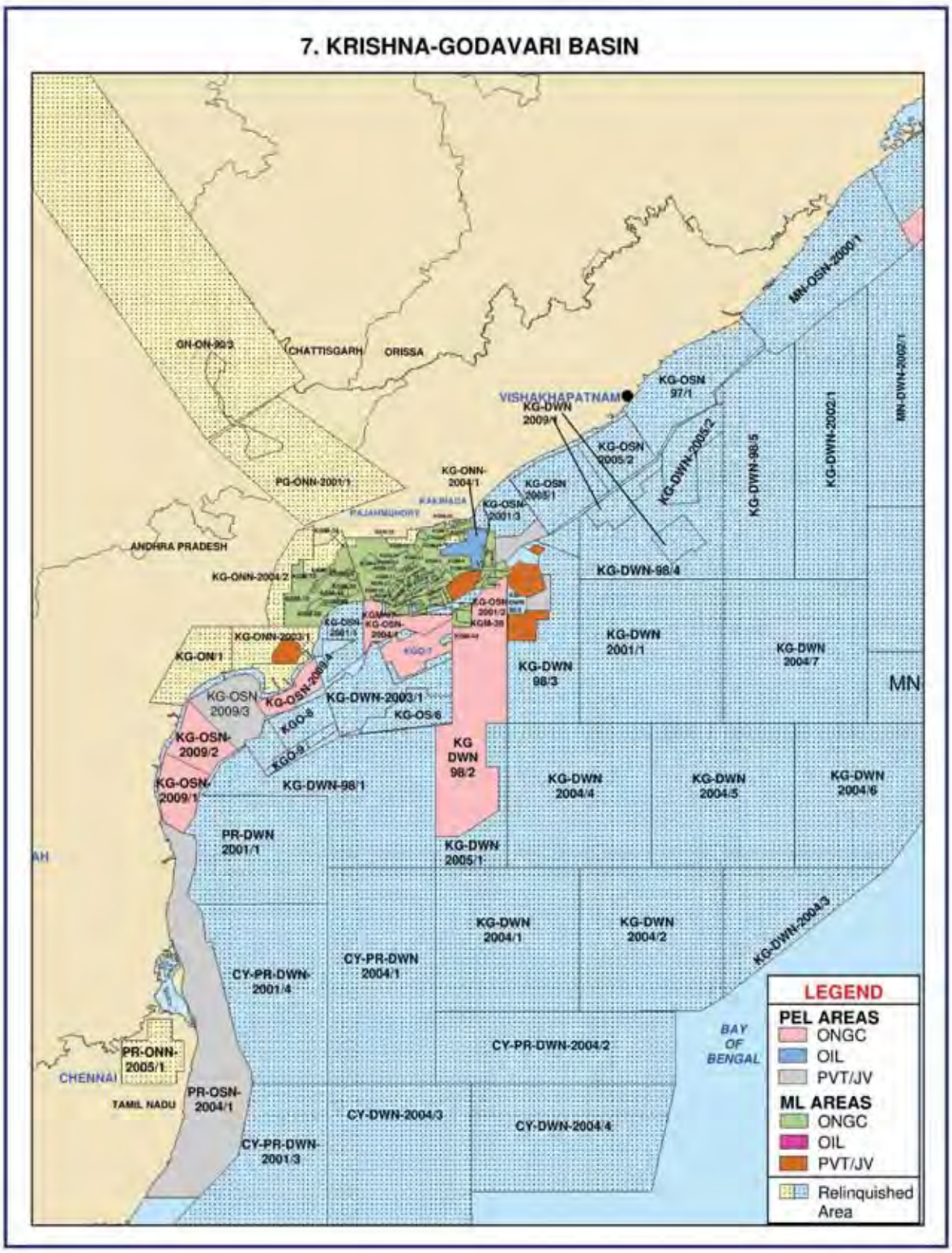
7. KRISHNA-GODAVARI BASIN
GN-ON-20/3
CHATTISGARH
ORISSA
VISHAKHAPATNAM
KG-OSN 97/1
KG-DWN 2009/1
KG-OSN 2005/2
KG-DWN-2005/2
KG-DWN-98/5
KG-DWN-2002/1
MN-OSN-2000/1
MN-DWN-2002/1
PG-ONN-2001/1
KG-ONN-2004/1
KG-OSN 2005/1
KG-OSN-2001/3
ANDHRA PRADESH
KG-ONN-2004/2
KG-DWN-98/4
KG-ONN-2003/1
KG-ON/1
KG-OSN-2009/4
KG-OSN 2009/3
KG-DWN-2003/1
KG-OS/6
KG-DWN 2001/1
KG-DWN 98/3
KG-DWN 2004/7
MN
KG-OSN-2009/2
KG-OSN-2009/1
KG-DWN-98/1
KG DWN 98/2
KG-DWN 2004/4
KG-DWN 2004/5
KG-DWN 2004/6
PR-DWN 2001/1
KG-DWN 2005/1
KG-DWN 2004/1
KG-DWN 2004/2
KG-DWN-2003/3
CY-PR-DWN-2001/4
CY-PR-DWN 2004/1
CY-PR-DWN-2004/2
BAY OF BENGAL
PR-ONN-2005/1
CHENNAI
TAMIL NADU
PR-OSN-2004/1
CY-DWN-2004/3
CY-DWN-2004/4
CY-PR-DWN-2001/3
LEGEND
PEL AREAS
ONGC
OIL
PVT/JV
ML AREAS
ONGC
OIL
PVT/JV
Relinquished Area

8. MAHANADI - NEC - BENGAL - DAMODAR BASINS

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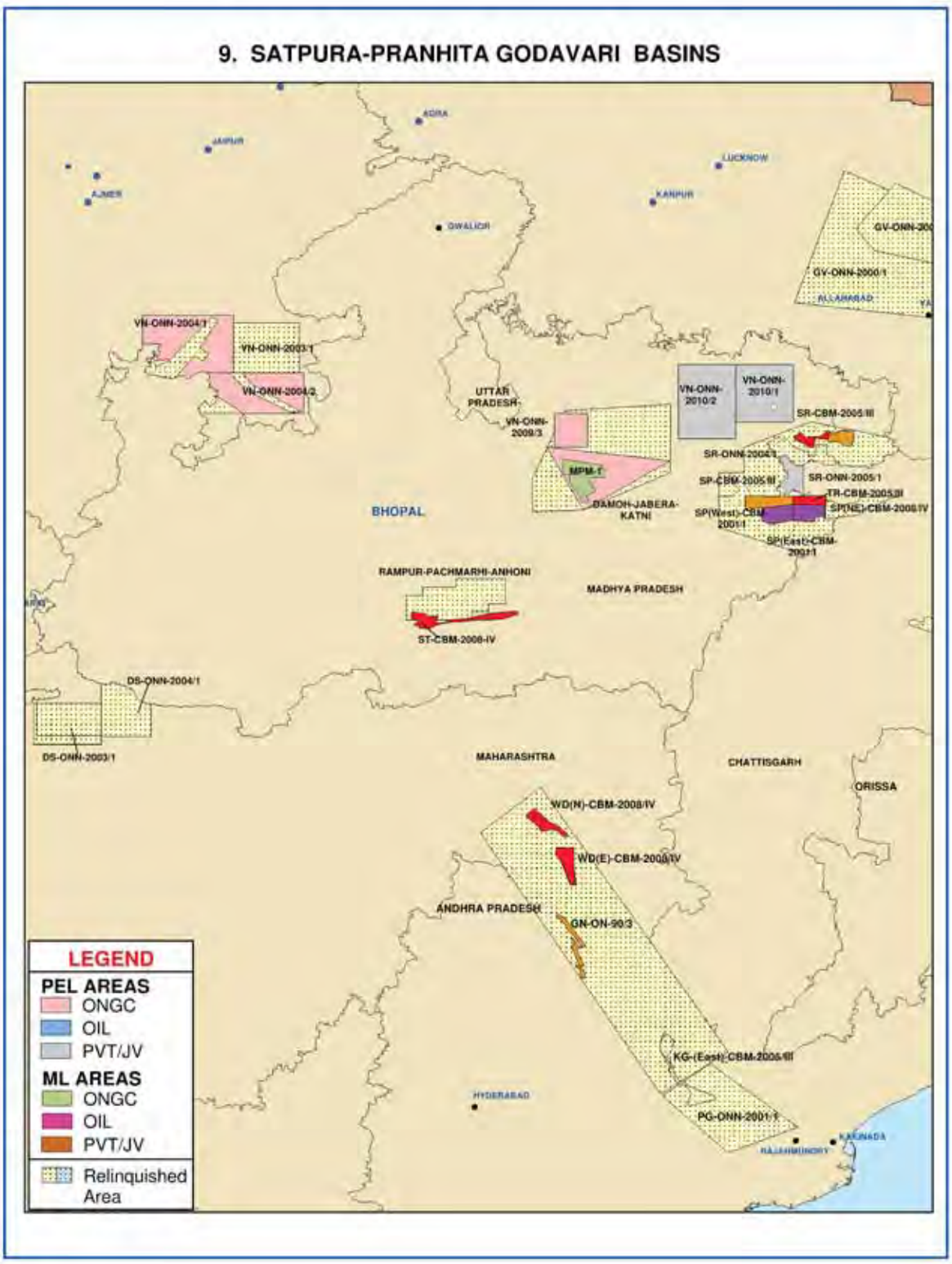
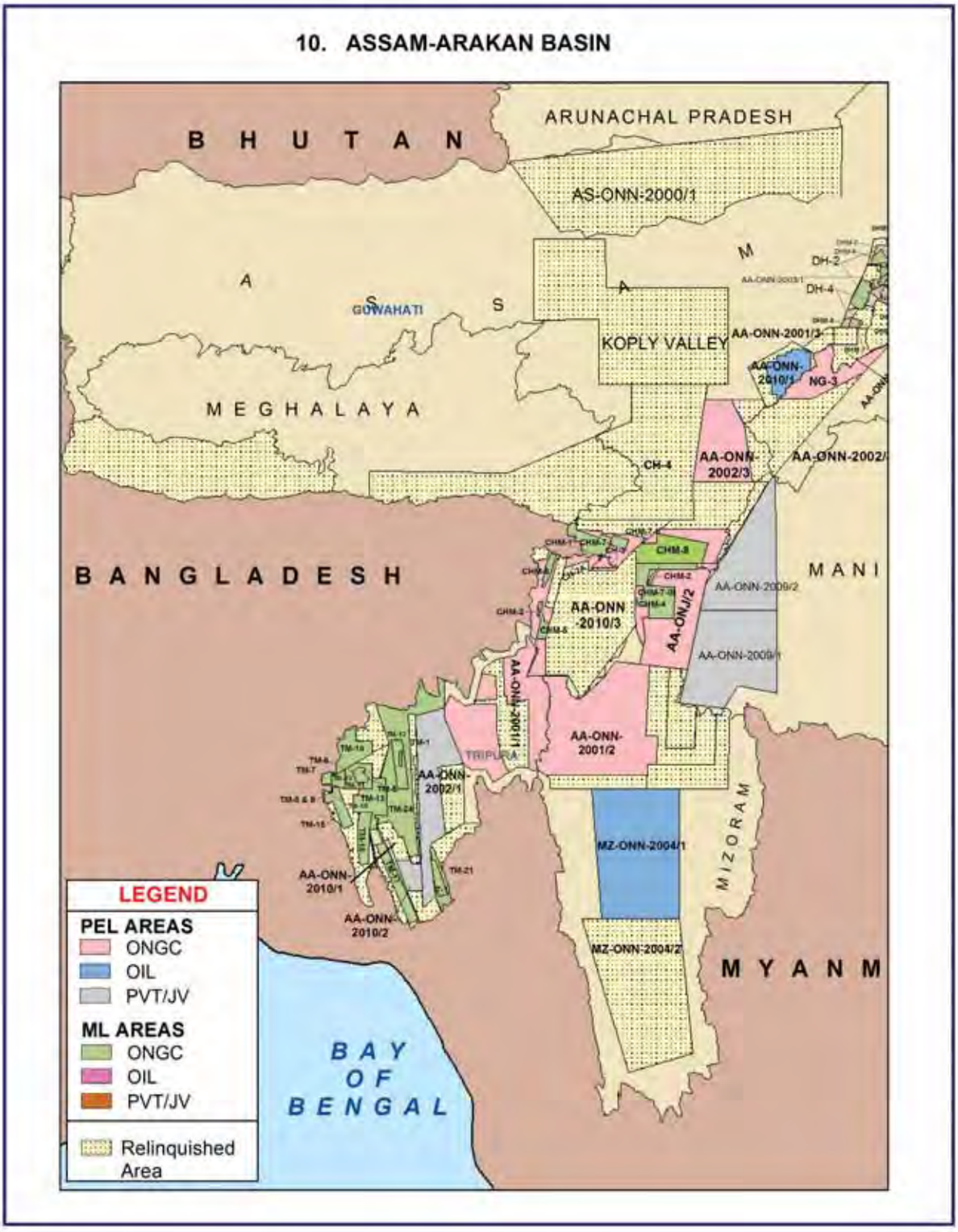
9. SATPURA-PRANHITA GODAVARI BASINS



10. ASSAM-ARAKAN BASIN



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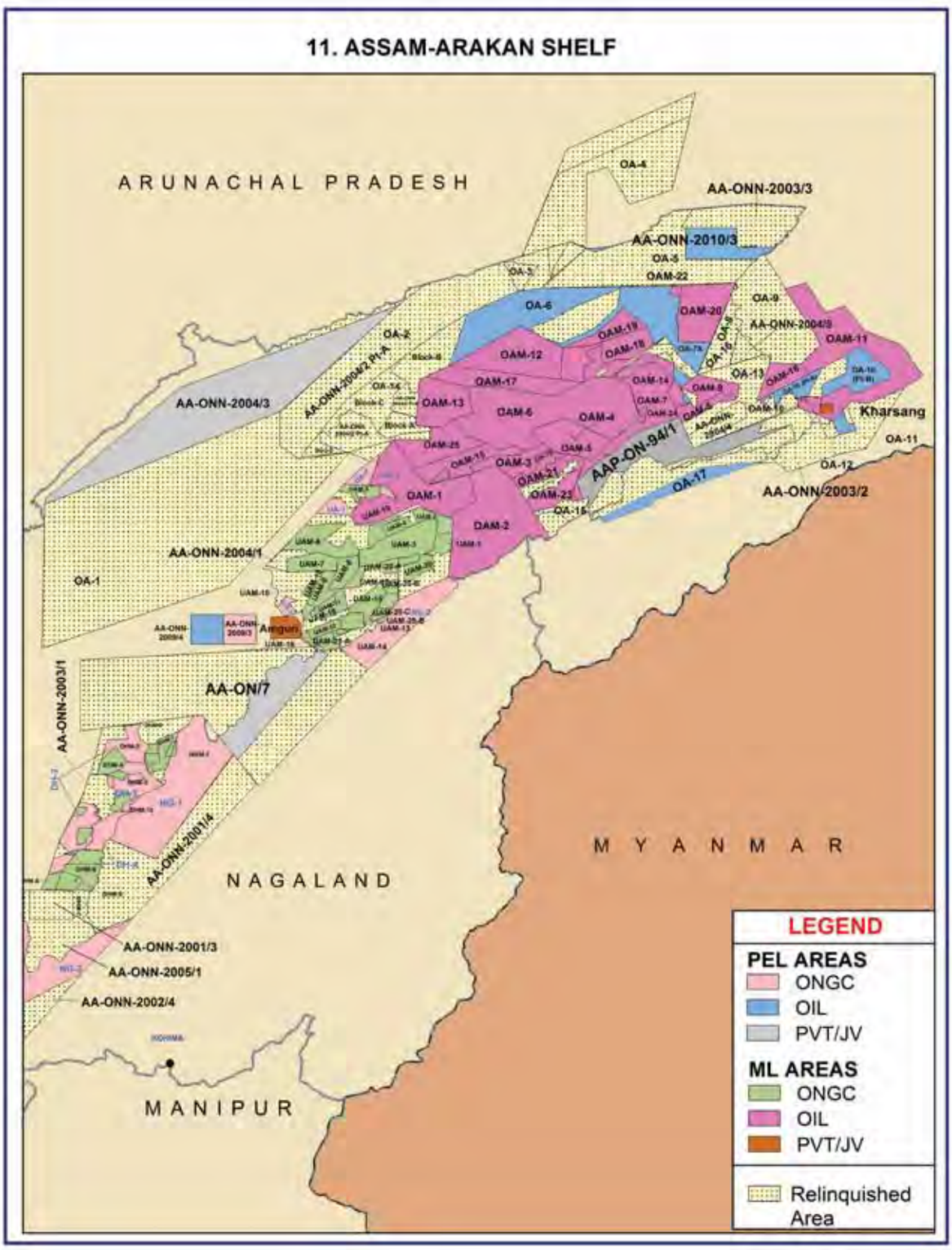
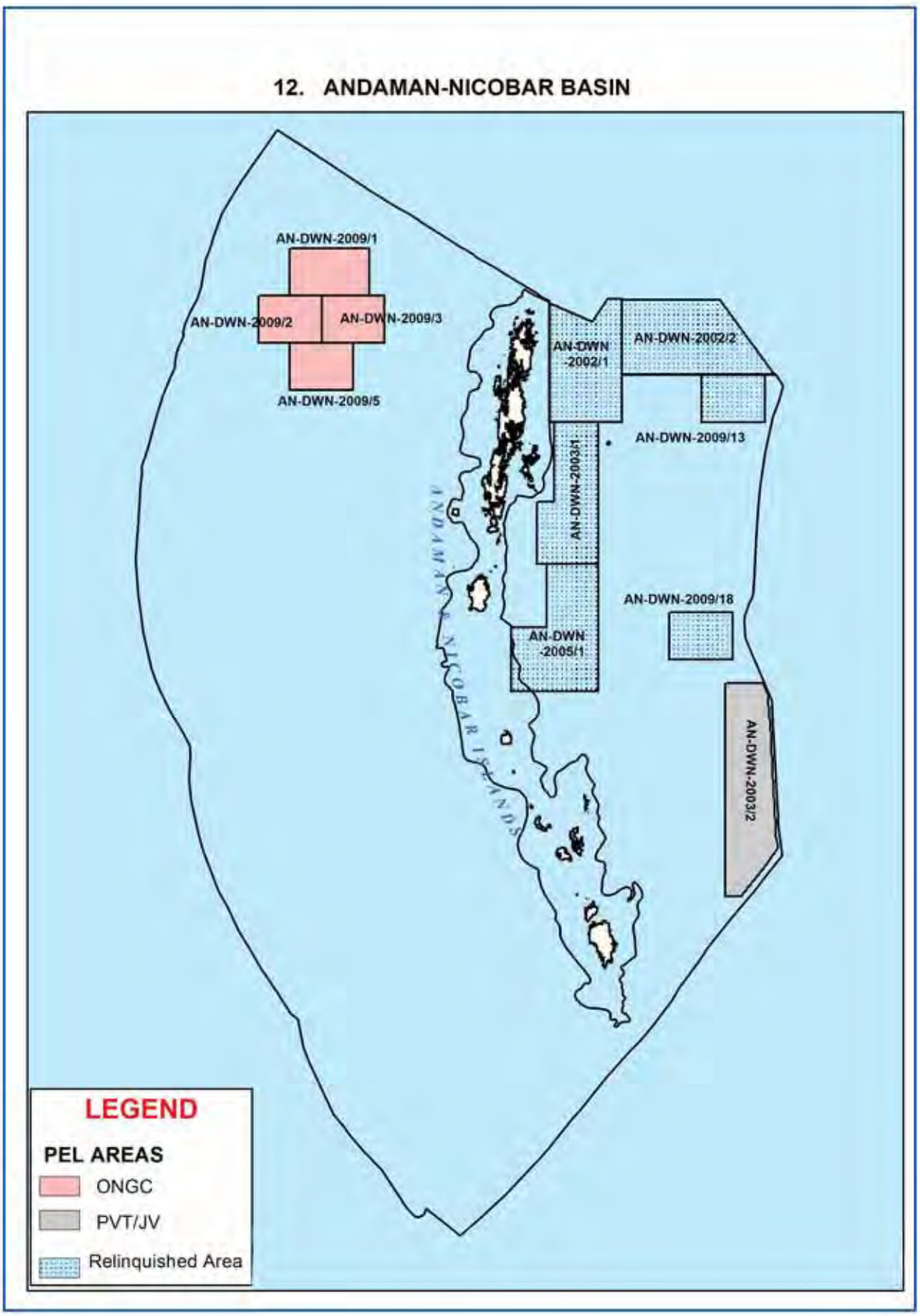
11. ASSAM-ARAKAN SHELF



12. ANDAMAN-NICOBAR BASIN



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Website: wwwapgicin

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Facsimile: 022-22713874
Website: www.bharatpetroleum.co.in

Bharat Petro Resources Ltd.
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Maharashtra, India
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Fax: 022-22713874

Engineers India Limited
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Facsimile : 011-26178210, 26194715
E-mail: eilmktg@eil.co.in
Website : www.engineersindia.com

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RK Puram, New Delhi – 110066, India
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Facsimile: 011-26178210, 26194715
E-mail: N/A
Website: www.gailonline.com

Gujarat State Petroleum Corporation Limited
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Gandhinagar-382 010, Gujarat, India
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Facsimile: 079-2323 6375
E-mail: info@gspc.in
Website: www.gspcgroup.com

Hindustan Petroleum Corp. Ltd.
Petroleum House, 17, Jamshedji Tata Road,
Mumbai, Maharashtra 400020 India
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Facsimile: 022-22872992
E-mail: N/A
Website: www.hindustanpetroleum.com

Indian Oil Corporation Ltd.
Corporate Office, 3079/3 J B Tito Marg, Sadiq Nagar
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Website : www.iocl.com

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Oil & Natural Gas Corporation Limited
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Website: www.ongcindia.com

Oil India Limited
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Website: www.Oil-india.com

Prize Petroleum Co. Ltd.
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New Delhi-110 001, India
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E-mail: prizepetroleum@prizepetro.com
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Dart Energy Unit No 406 - 406A, 4th Floor, Tower-B, Global Business Park, MG Road Gurgaon, 122002, India **Ph:** +91 124 499 0502 **Facisimile:** +91 124 499 0501 **E-mail:** N/A	**Deep Industries Ltd.** Opp Suryanarayan Bunglows, Sabarmati Kalol Highway NH No 8, Motera, Ahmedabad – 380005, Gujarat, India **Ph:** 079-27571128 **Facsimile:** 079-26862077 **E-mail:** info@deepindustriescom **Website:** www.deepindustries.com
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GGR Oil & Gas (India) Private Limited Plot No 273/2, Sector 7A Gandhinagar Gujarat – 382007, India **Ph:** 079-23243684 **Facsimile:** 079-23243684 **E-mail:** info@geoglobalcom **Website:** www.geoglobalresources.com	**Geopetrol International Inc. (CBM)** Lane W 4 D/6, Western Avenue, Sainik Farms New Delhi-110062, India **Ph:** 011 26532066, 26602487 **Facsimile:** 011 26515233 **E-mail:** N/A **Website:** www.geopetrol.net
Hardy Exploration & Production (India) Inc. V Floor, Westminster Building 108, Dr Radhakrishnan Salai Chennai - 600 004, India **Ph:** 044 28471990 **Facsimile:** 044 28471064 **Email:** info@hardyOil.co.in **Website:** www.hardyOil.com	**Heramec Ltd.** 2nd Floor, V V Mansion, # 6-3-885/7/B/4, Somajiguda, Hyderabad - 500082 Andhra Pradesh, India **Ph:** 040 23332525/4646/5656 **Facsimile:** 040 23332323 **E-mail:** info@herameccom **Website:** www.heramec.com

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Website: www.nikoresources.com

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Website: www.Oilex.com.au

Petrogas E&P LLC, Project Office (India)
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Ph: 0124 4304651
Facsimile: 0124 4304659
E-mail: petrogas@petrogas.com.om
Website: www.petrogasep.com

Ravva Oil (Singapore) Pte Ltd.
16 Raffles Quay 40-01A Hong Leong Building Singapore 0104
Ph: N/A
Fax: N/A
Email: N/A
Website: N/A

Santos International Operations Pvt. Ltd.
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Facsimile: 011 4351 2070
E-mail: investorrelations@santos.com
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Facsimile: 079 2656 5500
E-mail: info@adani.com
Website: www.adani.com

Adani Welspun Exploration Ltd.
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Ahmedabad - 380 015, Gujarat (India)
Ph: 079-25556850
Facsimile: 079-25556846
E-mail: info@awel.com
Website: www.awel.com

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Assam Tea House
52, Chowringhee Road
Kolkata -700 071, India
Tel: 033 - 2283-8306, 22838309, 22838312
Facsimile: 033 - 22838334, 22838333
E-mail: assamco@vsnl.com
Website: www.assamco.com

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Capital Goods Division CS-8-10, 6th Floor,
Tower A The Corenthum Bldg, A-41, Sector 62,
NOIDA – 201301, UP (India)
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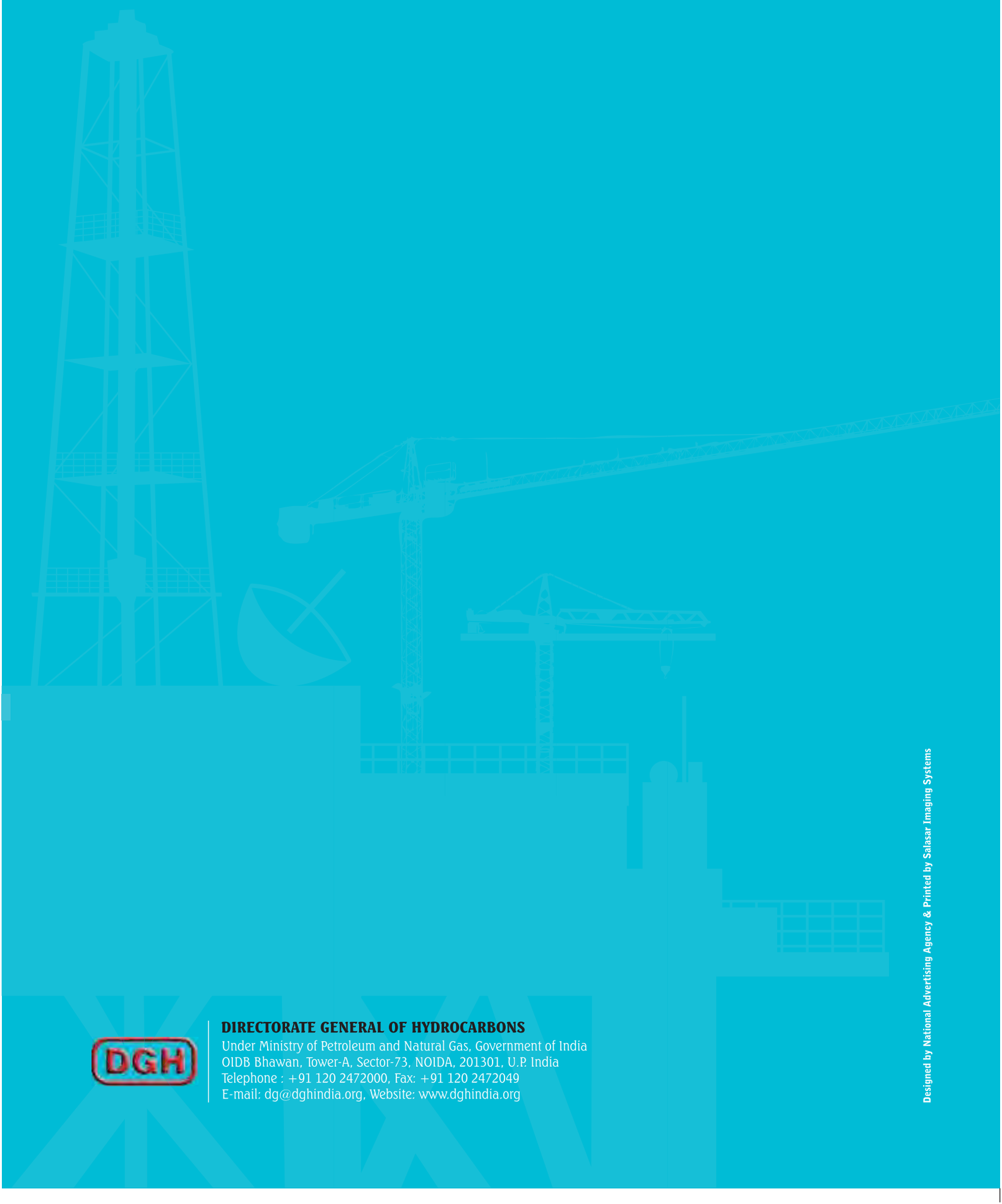
ABBREVIATIONS

DGH	Directorate General of Hydrocarbons
2D	2 Dimension
3D	3 Dimension
AOC	Assam Oil Company
API	American Petroleum Institute
ASP	Alkaline Surfactant Polymer
ATCS	Automatic Tube Cleaning System
AVO	Amplitude Versus Offset
BCM	Billion Cubic Meter
BHT	Bottom Hole Temperature
BOC	Burma Oil Company
BOPD	Barrels of Oil Per Day
BPCL	Bharat Petroleum Corporation Limited
CBM	Coal Bed Methane
CCD	Centrifugal Cutting Driers
CCEA	Cabinet Committee of Economic Affairs
CCS	Carbon Capture Storage
CCSP	Carbon Capture and Storage Program
CCU	Carbon Capture Utilization
CMPDI	Central Mine Planning and Design Institute
CRP	Control Riser and Platform
CRZ	Coastal Regulation Zone
CSR	Conductor Slot Recovery
CSS	Cyclic Steam Stimulation
CWI	Carbonated Water Injection
CWT	Continuous Wavelet Transform
DA	Development Area
DFN	Discrete Fracture Network
DoC	Declaration of Commerciality
DRDO	Defence Research and Development Organization
DST	Drill Stem Testing
E&P	Exploration and Production
EAC	Expert Appraisal Committee
EC	Environment Clearance
ECD	Equivalent Circulating Density
EIA	Environment Impact Assessment
EPS	Early Production System
ESS	Expandable Sand Screen
EWPL	East West Pipeline
FC	Forest Clearance
FDP	Field Development Plan
FHGG	Fast Hydrating Guar Gum
FIVs	Formation Isolation Valves
FPSO	Floating Production Storage and Offloading
G&G	Geology and Geophysics
GAIL	Gas Authority of India Limited
GCM	Geo Cellular Modeling
GEM	Gas Export Manifold
GGS	Gas/Group Gathering Station
GIP	Gas In Place
GIPIP	Good International Petroleum Industry Practices
GSPC	Gujarat State Petroleum Corporation Limited
HCPV	Hydrocarbon Pore Volume
HGS	Hollow Glass Sphere
HPHT	High Pressure High Temperature
ICB	International Competitive Bidding
ICG	Indian Coast Guard
INCOIS	Indian National Centre for Ocean Information Services
IOCL	Indian Oil Corporation Limited
IOR-EOR	Improved Oil Recovery- Enhanced Oil Recovery
JIP	Joint Industry Project
JOGMEC	Japan Oil, Gas and Metals National Corporation
KDMIPE	Keshava Deva Malviya Institute of Petroleum Exploration
KLPD	Kilo Litres Per Day
LCM	Lost Circulation Material
LCMD	Lakh Cubic Meters per Day
LD	Liquidated Damages
LKM	Line Kilometer
LWD	Logging While Drilling
MC	Management Committee

MCA	Multi Channel Analyzer
mD	Milli Darcy
MEOR	Microbial Enhanced Oil Recovery
MMbbls	Million Barrels
MMBO	Million Barrels of Oil
MMSCF	Million Standard Cubic Feet
MMSCMD	Million Standard Cubic Meters per Day
MMT	Million Metric Tonne
MoC	Ministry of Coal
MoD	Ministry of Defence
MoEF&CC	Ministry of Environment , Forest and Climate Change
MOHA	Ministry of Home affairs
MoP&NG	Ministry of Oil and Natural Gas
MoU	Memorandum of Understanding
MPD	Managed Pressure Drilling
MPT	Mangala Processing Terminal
MT	Magnetotelluric/Thousand Tonnes
MWP	Minimum Work Program
NDR	National Data Repository
NELP	New Exploration Licensing Policy
NGHP	National Gas Hydrate Program
NIOT	National Institute of Ocean Technology
NoCs/Pvt/JV	National Oil Company/Private/Joint Venture
NOS-DCP	National Oil Spill - Disaster Contigency Plan
O+OEG	Oil plus Oil Equivalent Gas
OALP	Open Acreage Licensing Policy
OIDB	Oil Industry Development Board
OIL	Oil India Limited
ONGC	Oil and Natural Gas Corporation Limited
ONGD	Oil and Natural Gas Directorate
OOSA	Online Oil Spill Advisory
PCI	Potential Commercial Interest
PDB	Paraffin Deposition Bacteria
PEL	Petroleum Exploration License
PHPA	Partially Hydraulised Polyacrylamide
PLEMs	Pipeline End Manifold
PML	Petroleum Mining Lease
PSC	Production Sharing Contract
PSDM	Post Stack Depth Migration
PSI	Pounds per Square Inch
PSUs	Public Sector Undertaking
PVT	Pressure Volume Temperature
RCA	Reservoir Connectivity Analysis
RDG	Raageshwari Deep Gas
RIL	Reliance Industry Limited
RRR	Reserve-Replacement Ratio
SACEP	South Asia Co-operative Environment Program
SBM	Synthetic Oil Based Mud
SCAL	Special Core Analysis
SCMD	Standard Cubic Meter per Day
SKM	Square Kilometer
SOBM	Synthetic Oil Based Mud
SRFS	Site Restoration Fund Scheme
STOIIP	Stock Tank Original Oil-Place
TCF	Trillion Cubic Feet
TMT	Thousand Metric Tons
TPD	Tonnes Per Day
TVDSS	True Vertical Depth Sub Sea
UAT	User Acceptance Test
US DOE	United States Department of Energy
USGS	United States Geological Survey
VSP	Vertical Seismic Profiling
WAG	Water Alternating Gas
WARP	Weighting Agent Reduction Particle
WP&P	Work Program and Budget
WSO	Water Shut off



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