पेट्रोलियम एवं
प्राकृतिक गैस मंत्रालय
MINISTRY OF
PETROLEUM AND NATURAL GAS

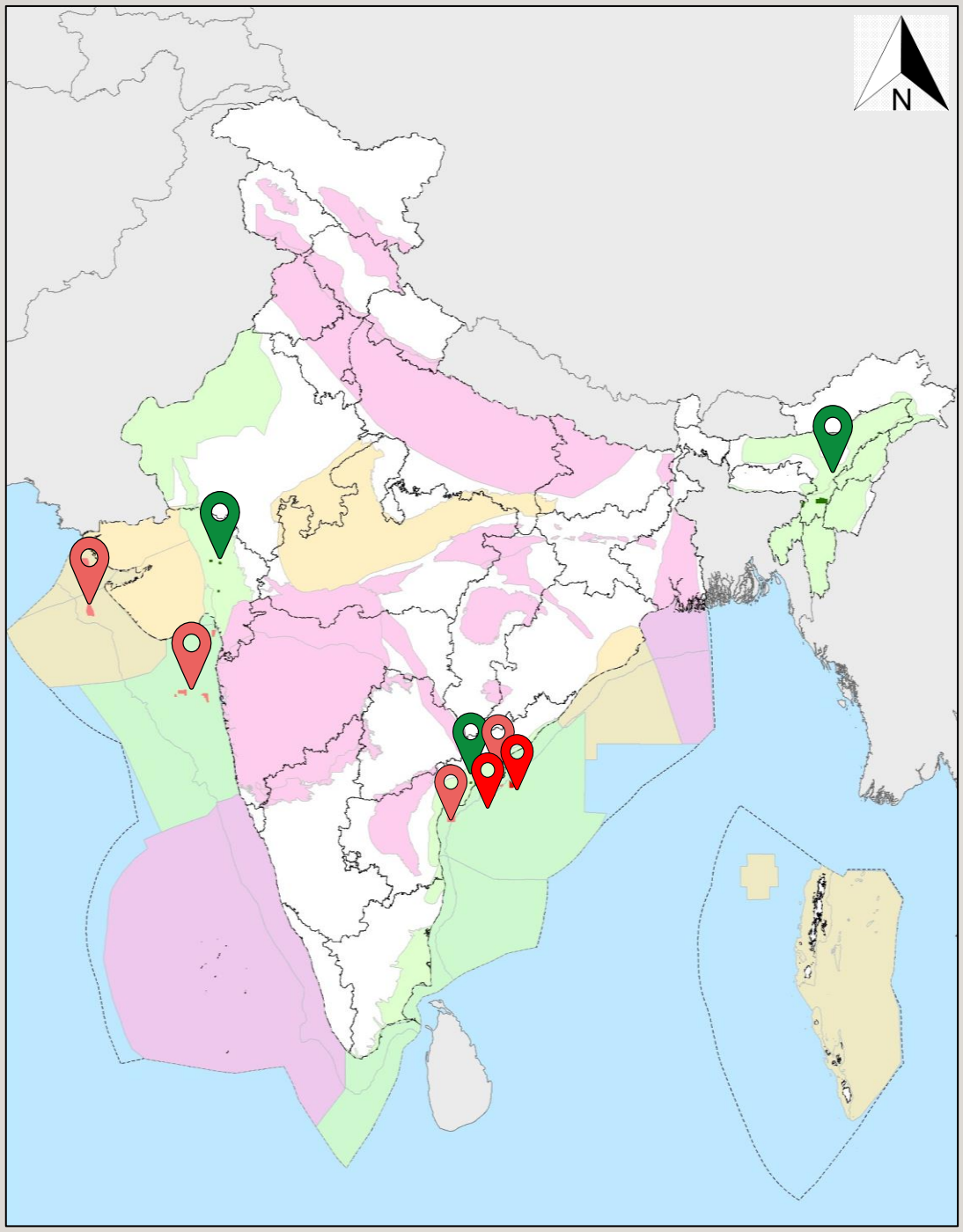
सत्यमेव जयते

DGH

DIRECTORATE GENERAL OF HYDROCARBONS

(Ministry of Petroleum & Natural Gas,Government of India)

INFORMATION DOCKET



CONTRACT AREA

MB/OSDSF/MUMBAI OFFSHORE/2025

DISCOVERED SMALL FIELD BID ROUND - IV

DISCLAIMER

This document, titled Information Docket, provides a consolidated overview of the Contract Area comprising the discoveries/fields offered under the Discovered Small Fields (DSF) Bid Round-IV. This docket has been prepared based on original inputs /information received from National Oil Companies, Private Operators/JV and available at National Data Repository (NDR).

Third Parties were engaged to independently assess the information and estimate the in-place volumes. In conducting these estimations, Third Parties used the available data/information and employed assumptions, procedures and methods deemed necessary given the timeframe available for evaluation.

The accuracy and clarity of the information presented herein, including the reported hydrocarbon resources, are thus limited to the data available at the time of analysis and the verifications performed by the Third Parties during the evaluation timeframe. The findings are subject to further review and validation by bidders upon receipt of additional and clarified data/information.

Given these limitations, all bidders are hereby advised to undertake their own independent technical and commercial due diligence and conduct thorough evaluations of the data and resource potential to support informed investment and bidding decisions.

Contents

INTRODUCTION

With the extension of the DSF policy 2015, DSF Bid Round IV offers 55 small-to-mid-size oil and gas discoveries through international competitive bidding. There are 9 contract areas under DSF-IV spread over Cambay, Assam & Arakan, Gulf of Kutch, Mumbai Offshore and Krishna Godavari Basins. Out of 55 discoveries, there are 19 onshore discoveries in 3 contract areas, 26 shallow water discoveries in four contract areas and 10 Deepwater discoveries in two Contract Areas. The discoveries have been suitably clustered in order to leverage shared resources and operational flexibility.

In terms of hydrocarbon prospectivity, the fields-on-offer lie in 5 sedimentary basins which include 8 Contract areas in Category I basins with hydrocarbon reserves and 1 Contract area in Category II basins with contingent resources.

Each contract area on offer has multiple discoveries, comprehensively described in this Information Docket to bring in all relevant subsurface facts of geo-scientific and engineering information. This technical booklet will be useful if read while working with the Data Package which would be available on sale once the Data Room is set up for viewing.

1. CONTRACT AREA DESCRIPTION

The contract area, titled MB/OSDSF/MUMBAI OFFSHORE/2025 (**Table 1-1 and Figure 1-1**) is located within the Mumbai Offshore basin and has an offered area of 864.31 sq. km. under this DSF Bid Round IV. The contract area consists of 5 polygons (C-39-14, C-23-9, WO5, BH68 and B174) of varying area with total 8 discovery wells (C-39-14, C-23-9, WO-5-11, BH-68, B-172-9, B-183-1, B-51-1 and B-174-1) and 18 additional wells.

Table 1-1: Details of Contract Area MB/OSDSF/Mumbai offshore/2025

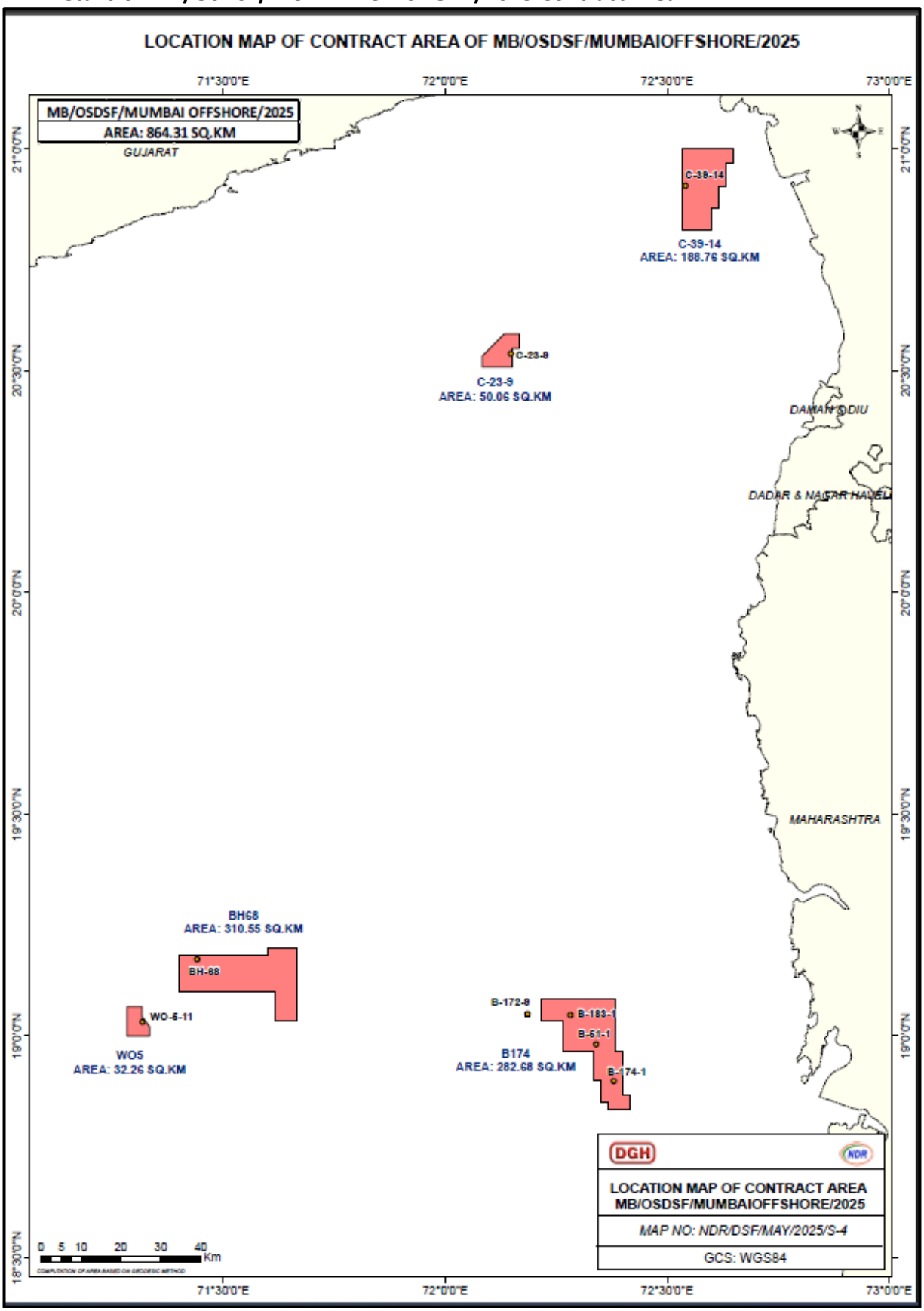
Details of Contract Area MB/OSDSF/Mumbai offshore/2025

Total Contract Area : **864.312** SqKm
No. of Discovery Wells in Contract Area : **8**
Total No. of Wells in Contract Area : **26** (including Discovery wells)
No. of Polygons Covered in Contract Area : **5**

S. No.	Name of Polygon	Area, SqKm	No. of Discovery Wells	Total No. of Wells	In-place (O+OEG) MMTOE	In Place (O+OEG) MMTOE (As per Erstwhile Operator)
1	C-23-9	50.06	1	5	1.91	1.24
2	C-39-14	188.76	1	2	6.87	5.46
3	WO5	32.26	1	1	0.94	0.76
4	BH68	310.55	1	6	0.06	0.05
	B-174					
5	B-174-1	282.68	1	12	2.24	1.48
6	B-183-1		1		0.94	0.07
7	B-51-1		1		0.88	0.68
8	B-172-9		1		1.93	0.07
Total		**864.31**	**8**	**26**	**15.77**	**9.81**

In the map, enclosed with the NIO (Notice Inviting Offer) Document, the contract area is referred to as S-3. The following figure(s) show(s) the contract area details across the field(s) and/or cluster(s).

Figure 1-1:Details of MB/OSDSF/MUMBAI OFFSHORE/2025 Contract Area



The area has information of 1702.31 line km of 2D seismic data and 829.01 sq km of 3D seismic data. There is a total of 26 wells (including 8 discovery wells) in the contract area. The **Figure 1-2, Figure 1-3, Figure 1-4 and**

Figure 1-5 show(s) the coverage of available seismic 2D and 3D data along with wells drilled across field(s) and/or cluster(s).

Figure 1-2: Seismic and well data coverage in MB/OSDSF/MUMBAI OFFSHORE/2025 Contract Area: C-23-9

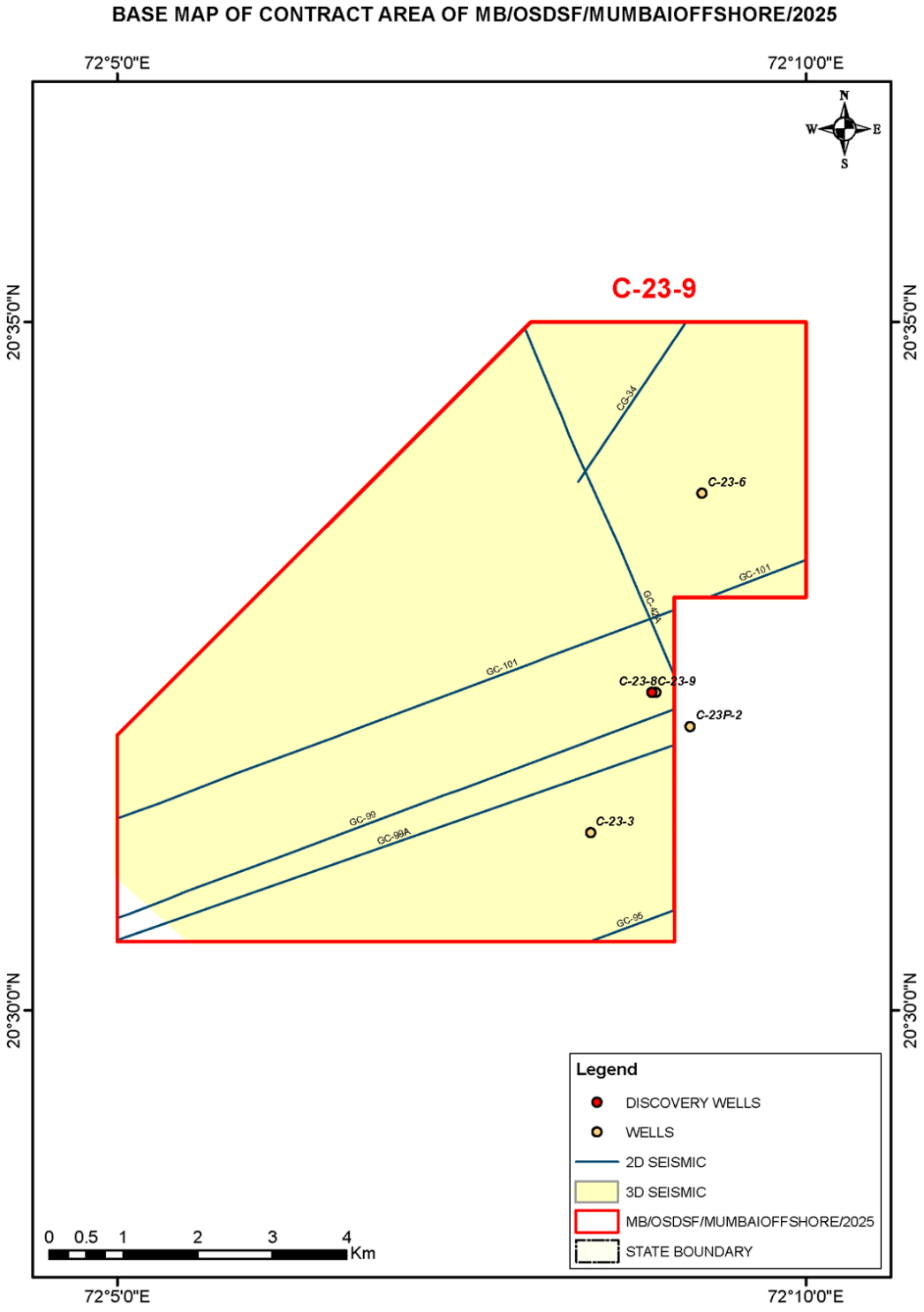


Figure 1-3: Seismic and well data coverage in MB/OSDSF/MUMBAI OFFSHORE/2025 Contract Area: C-39-14

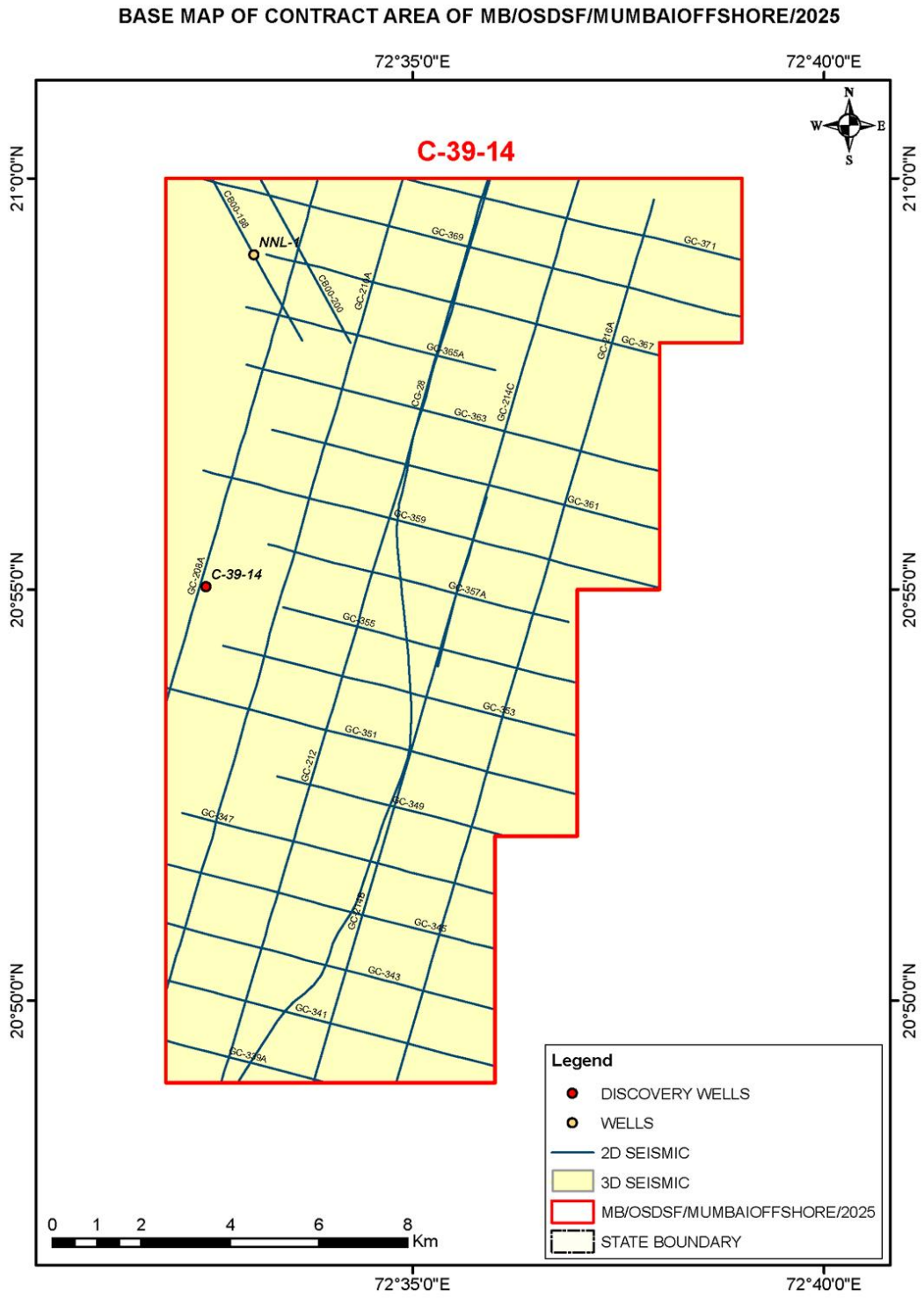


Figure 1-4: Seismic and well data coverage in MB/OSDSF/MUMBAI OFFSHORE/2025 Contract Area: BH68 and WO5

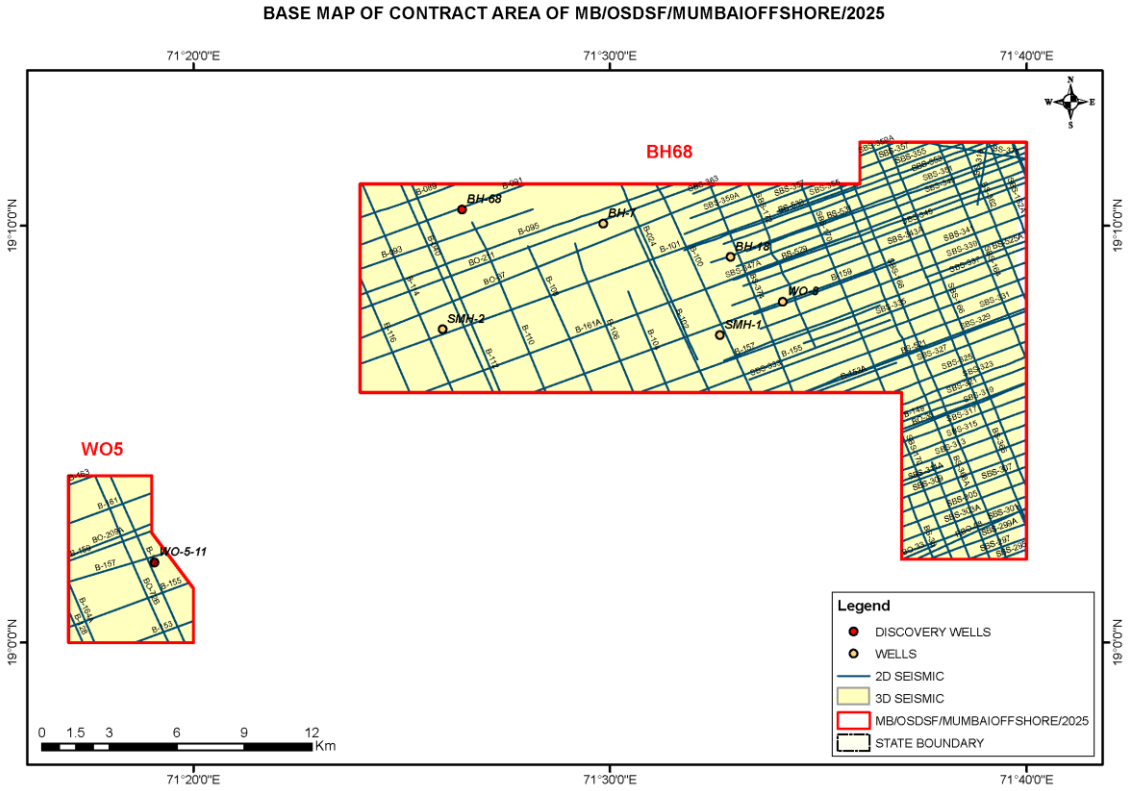
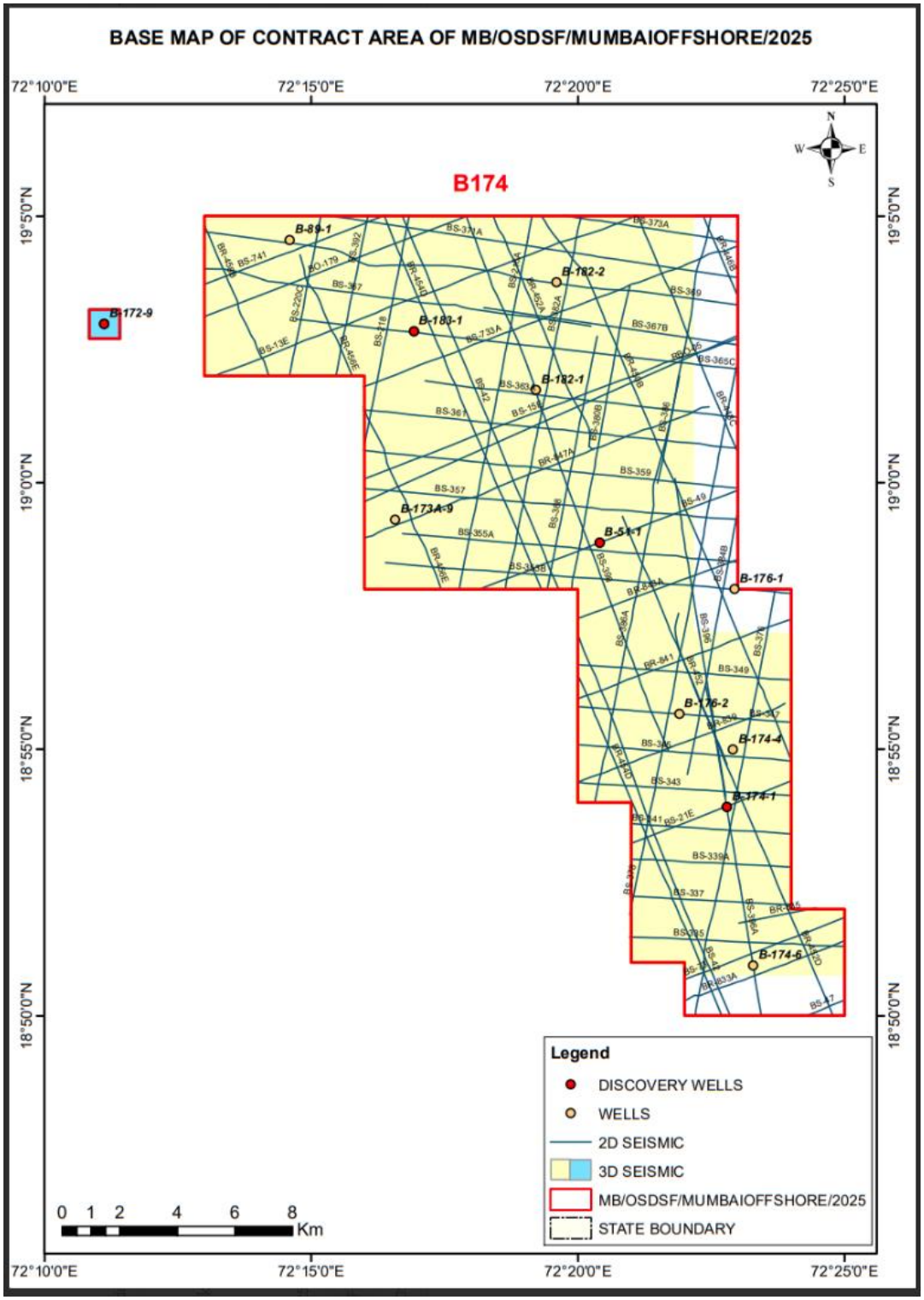


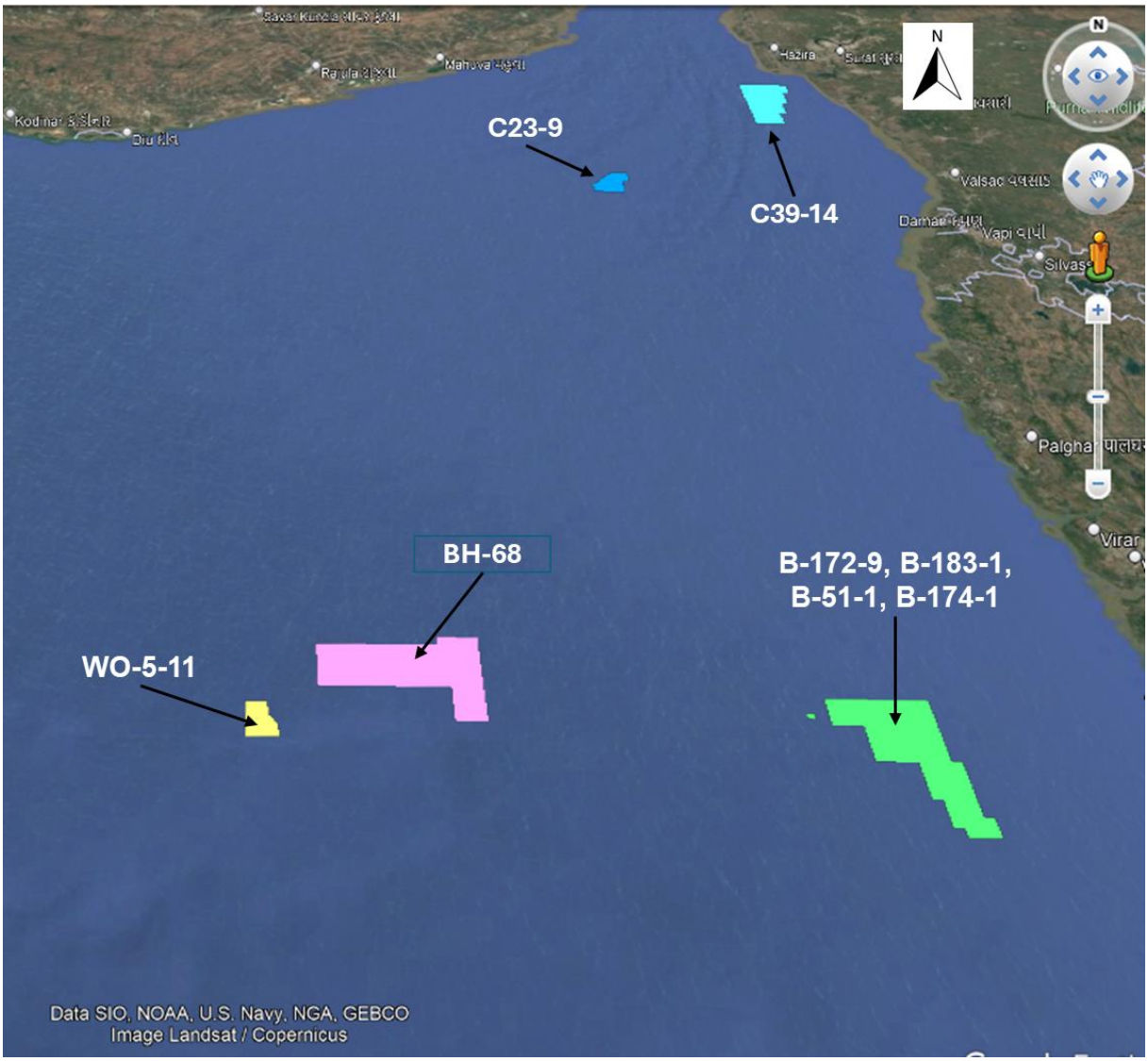
Figure 1-5: Seismic and well data coverage in MB/OSDSF/MUMBAI OFFSHORE/2025 Contract Area: B-174



2. PHYSIOGRAPHY AND ACCESSIBILITY OF THE AREA

The western continental shelf has a variable width, widest with 300 Km off Mumbai that narrows down both toward northwest off Kutch to 160 Km and southward to 60 Km off Cochin. On land, a hilly tract, locally known as Western Ghats, run parallel and close to the coast. There is no significant variation in summer and winter temperatures in the coastal region. December to February are relatively cooler months. There is a long spell of summer from March to June and is followed by southwest monsoon with a rainfall of more than 250 cms over the west coast. The atmospheric pressure and wind directions record significant variations during April to November. Fair weather conditions are from November to June. Mumbai city, the nearest coastal metropolis, is the business capital of India. It is equipped with modern seaport and international airport facilities. All services required for offshore operations are available in and around Mumbai city. Distance of offered area from Mumbai ranges from 50+ KM (B174 Block) to 150+ KM (BH 68 & WO5 Blocks) approximately. **Figure 2-1** is the satellite imagery of the Contract area showing its location.

Figure 2-1: Satellite imagery of the contract area:



3. RELEVANT SEDIMENTARY BASIN INFORMATION

3.1 MUMBAI OFFSHORE (MB) BASIN DESCRIPTION

The basin is the most prolific petroliferous province of India, contributing nearly half of oil and two- third of gas production of ONGC annually. Mumbai basin is characterized by primarily carbonate-to- siliciclastic shelf margin, situated along the West Coast of Indian peninsula. The Mumbai Offshore basin is still under active exploration stage. Commercial hydrocarbon occurrences spread over the Tertiary stratigraphic interval ranging from the oldest sediments of Paleogene to the youngest sediments of Plio-Pleistocene complex. Though the basin is a major thermogenic hydrocarbon province, recently biogenic gas field has been discovered with strati-structural entrapment conditions. The basin is a peri- cratonic, rift/extensional-passive margin basin, with several individual rift grabens forming sub- basins. This basin hosts thick piles of sediments, mainly ranging from Paleocene to Recent. The basin extends into areas of both shallow water and deepwater of Arabian sea.

The basin is a Category I basin in the newly formulated three-tier category, implying a fact that the basin has potential commercial discovered in-place ('Reserves'), which needs efficient exploitation through accelerated and enhanced production. The current categorization is in tune with the industry- standard PRMS guidelines and conforms to various policies in place or under implementation by Government of India.

The basin has an area of 212000 sq. km. with 118389 sq. km. shallow water area (upto 400m water depth) and 93611 sq. km. deepwater area. In the basin, there are 10 plays identified within Basement, Tertiary (Mid-Late Miocene biogenic), Pliocene-Pleistocene (Biogenic).

The basin has been assessed earlier during 1995-96 study along with 14 other basins. During 2017 study, 3D PSM approach has been used due to availability of adequate datasets.

3.2 BASIN PROSPECTIVITY

The Mumbai Offshore basin has a total unrisked hydrocarbon in-place of 9646 MMTOE, out of which 4794 MMTOE has been discovered, and it includes both commercial and sub-commercial in-place. The remaining, 4852 MMTOE, nearly 50% of total in-place is potential to be explored and discovered.

The play-level hydrocarbon in-place (unrisked total petroleum) for Mumbai Offshore basin is tabulated

Quarternary Pleistocene-Recent Biogenic	**: 2 MMTOE**
Tertiary Pliocene - Biogenic	**: 138 MMTOE**
Tertiary Late Miocene Biogenic	**: 126 MMTOE**
Tertiary Mid Miocene	**: 402 MMTOE**
Tertiary Early Miocene	**: 2232 MMTOE**
Tertiary Late Oligocene	**: 2293 MMTOE**
Tertiary Early Oligone	**: 370 MMTOE**
Tertiary Mid-Late Eocene	**: 2220 MMTOE**
Tertiary Paleocene-Early Eocene	**: 1675 MMTOE**
Mesozoic Basement - Basal Clastics	**: 188 MMTOE**

As per India Hydrocarbon Outlook (2023-24), Commercial production in Shallow water sub-basin commenced in 1976. Major producing fields with cumulative production in parenthesis are namely Mumbai High (534 MMT, 191 BCM), Neelam & Heera (123 MMT, 0.096 BCM), Bassein & Satellite (103 MMT, 368 BCM). The sub-basin has 26 fields with 1,742 wells.

3.3 OPPORTUNITIES IN THE BASIN

Exploration in the Mumbai Offshore Basin (**Figure 3-1**) started in the early sixties when regional geophysical surveys were conducted by the Russian seismic ship. The first oil discovery in this basin was made in the Miocene limestone reservoir of Mumbai High field in February 1974. Subsequent intensification in exploration and development activities in this basin have resulted in several significant discoveries including oil and gas fields like Heera, Panna, Bassein, Neelam, Mukta, Ratna, Soth Tapti, Mid Tapti etc. In addition, several marginal fields like B-55, B-173A, B-119/121, D-1 and D-18 have been put on production in the last decade.

The resource reassessment study has incorporated 48000 LKM of 2D seismic data, 30000 SKM of 3D seismic data, 900 drilled well information. Data availability is good. Geochemical, 2D/3D seismic, well data and reports are excellent while gravity data are good and magnetic data are fair. Reliability of results is good. 3D PSM and Trap Density method have been used to assess hydrocarbon resources since a robust static 3D model can be constructed for adequate input data. Deepwater areas have sparse seismic data and very few wells were drilled. Paleocene and Eocene plays can be future exploration targets. Deeper sequences and plays are recommended to be future target of exploration, particularly in Tapti-Daman area.

As per India Hydrocarbon Outlook (2023-24), NDR has archived data of 805,764 LKM 2D seismic, 208,050 SKM 3D seismic and 4,787 wells of Mumbai Offshore Basin. Under various campaigns by GoI, geophysical data were acquired in the offshore area. The basin was part of 46,453 LKM West Coast EEZ 2D seismic survey.

In the following section, the given figures (**Figure 3-2, Figure 3-3 and Figure 3-4**) illustrate location of the basin, field or cluster of fields in the basin, generalized basin stratigraphy and tectonic framework of the basin.

Figure 3-1: : Reference sedimentary basin:

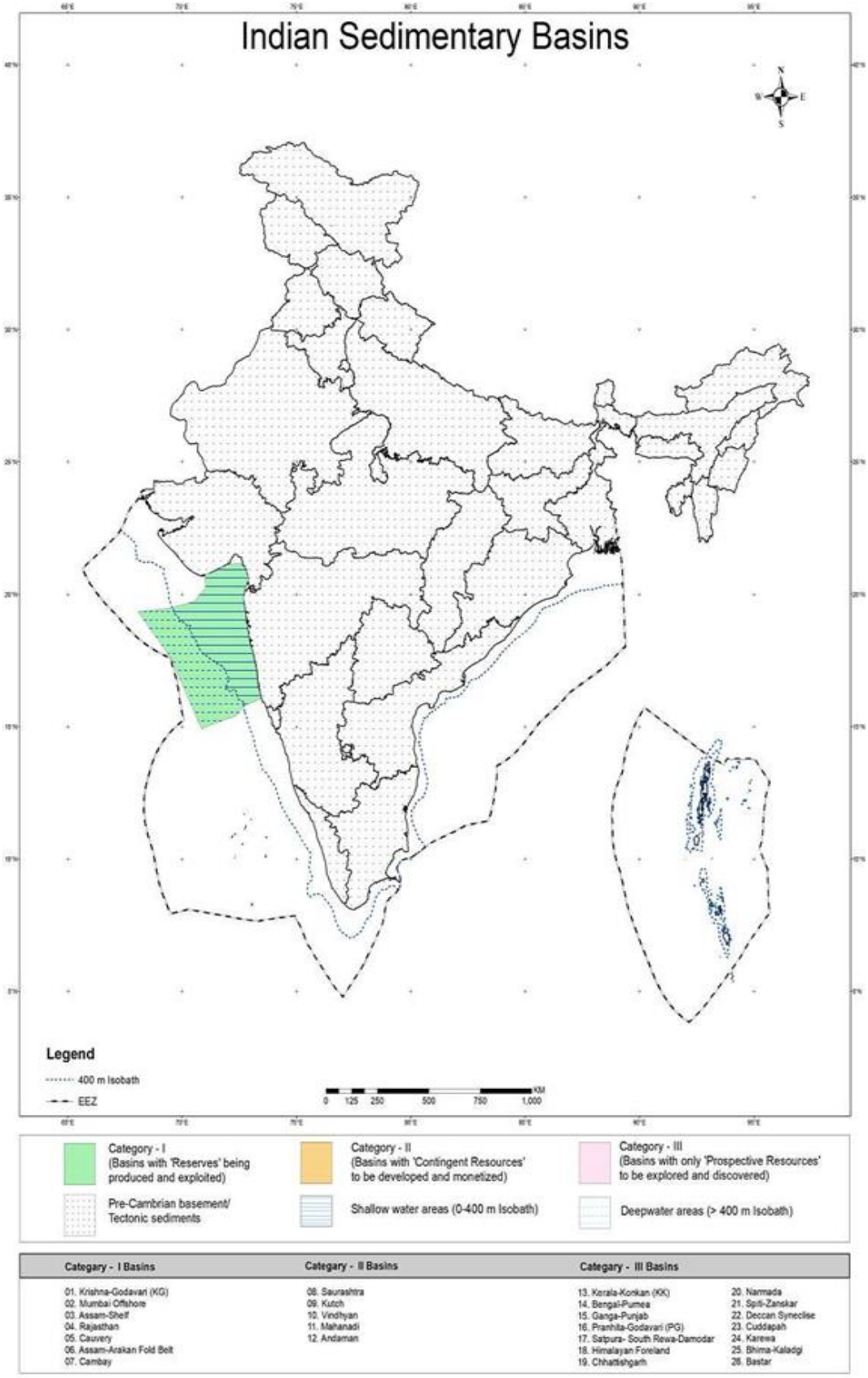


Figure 3-2: Fields on Offer

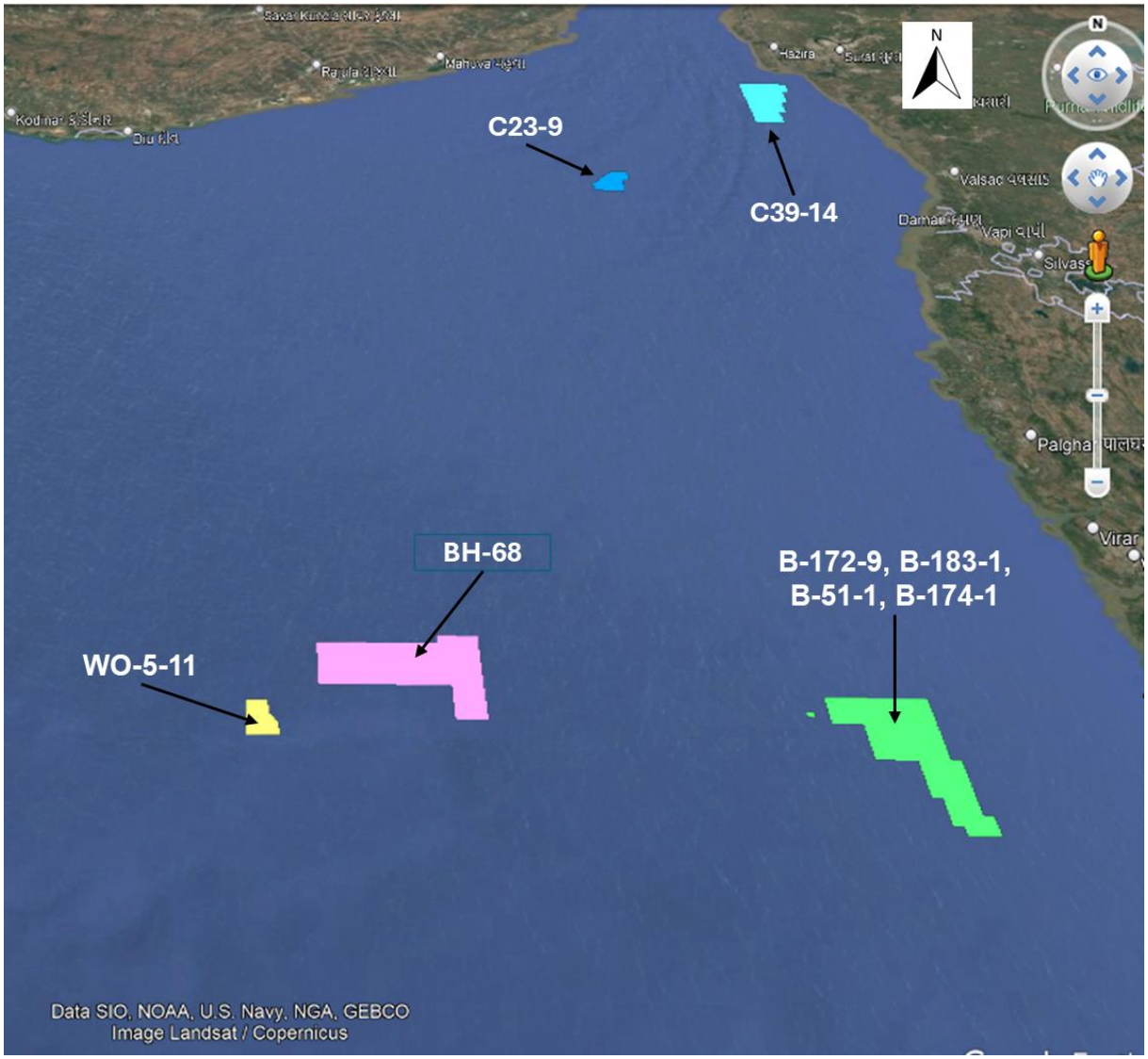


Figure 3-3: Generalised stratigraphy

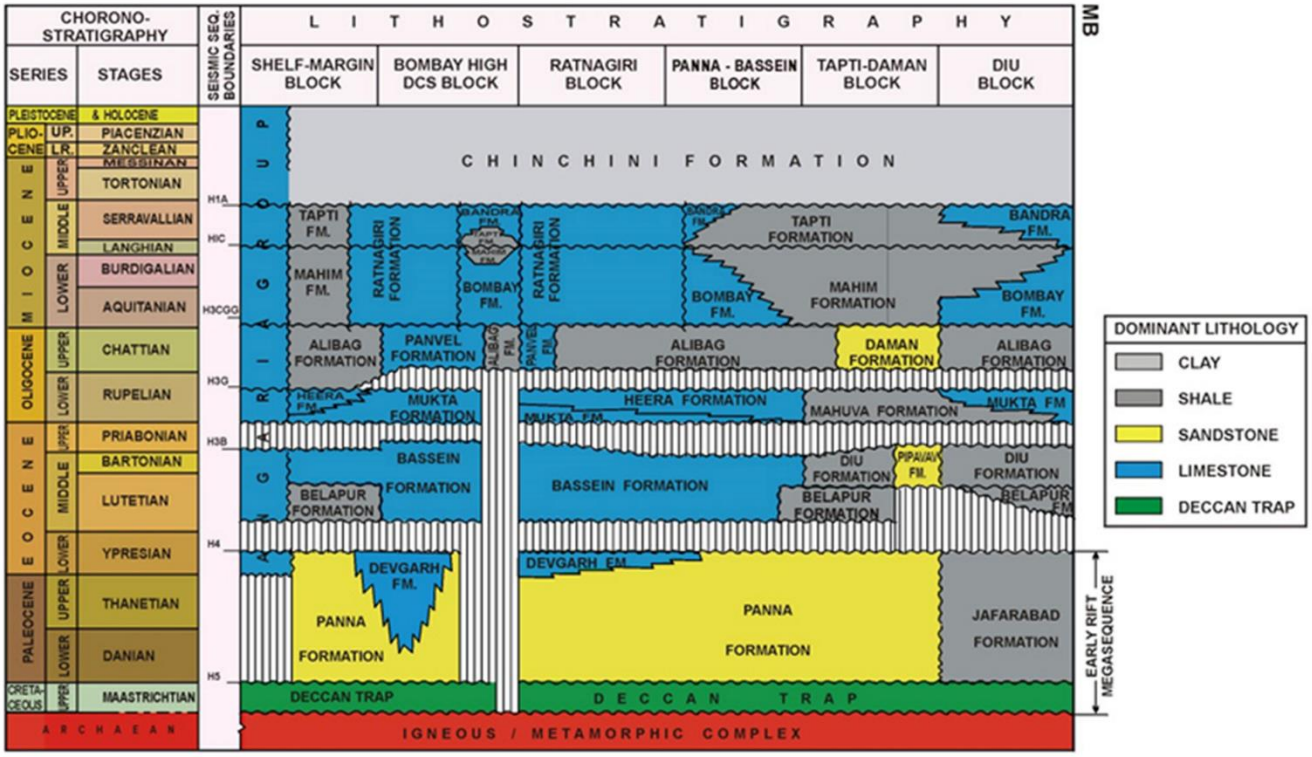
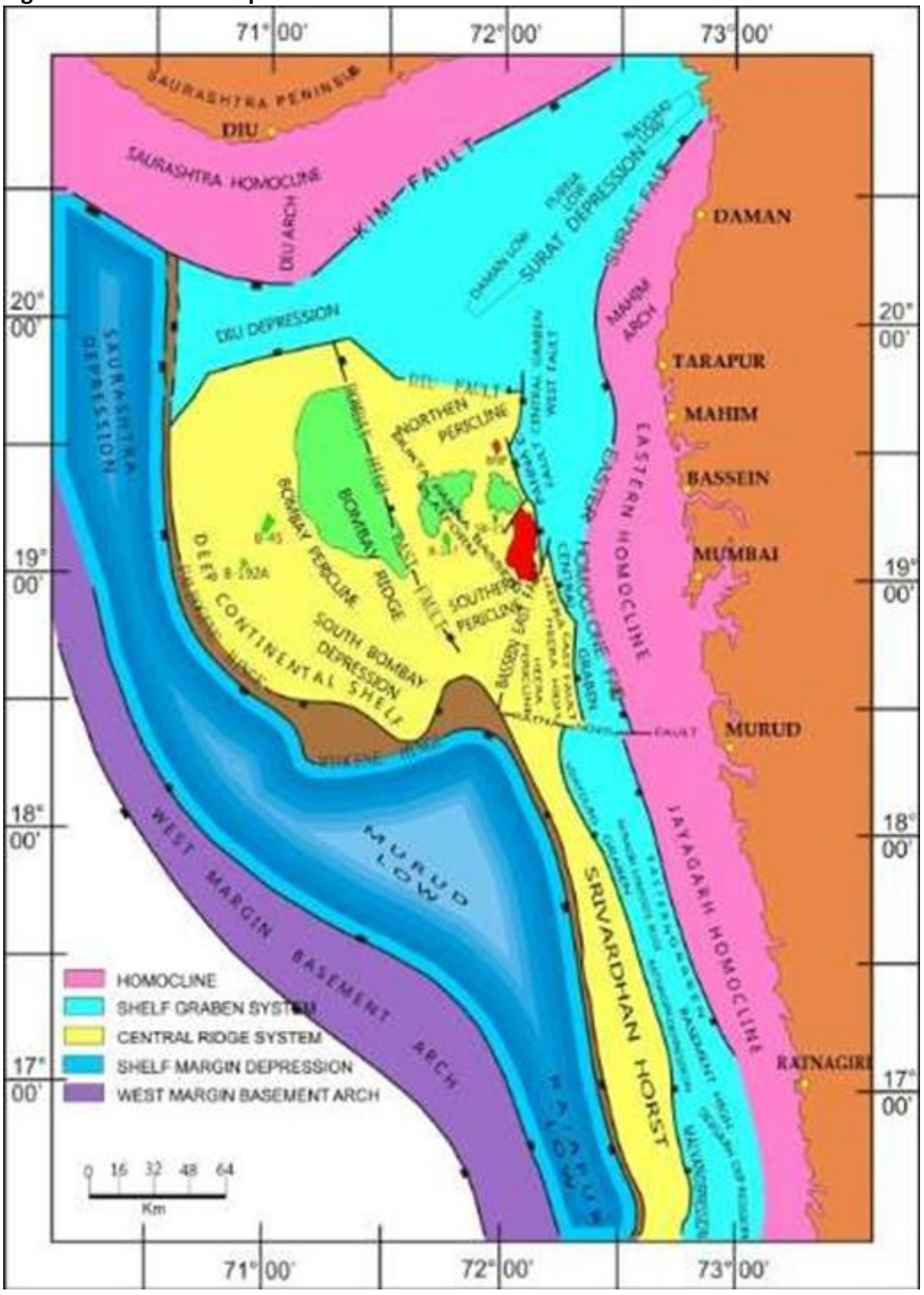


Figure 3-4: Tectonic map of the basin:



4. DISCOVERY AND FIELD DESCRIPTION

The information docket is presented in the manner that each oil/gas discovery (i.e. the field) is described along with other wells, drilled and/or tested in the contract area. The available information of geo-scientific and engineering findings, studies and interpretations are sequentially showcased and in process, all subsurface and surface data from drilling, logging, testing and production data have been collated. Reservoir studies wherever available have been described with facts. Geological interpretations are suitably illustrated through correlations, sections and maps to bring in subsurface picture of the contract area. In the end, discovered hydrocarbon in-place and its recoverable contingent resources (wherever available) have been given with parameters and range of estimates.

For the sake of continuity in reading domain contents like drilling, logging, testing, reservoir studies and geology, each field is described domain-wise into comprehensive illustration of all constituent wells and reservoirs in one go. For example, when a contract area has more than one discovery/field, each such discovery/field starts with a new page describing key information pertaining to drilling, logging, testing and other subsurface details.

Emphasis is given on factual presentation of data and available information on interpretations and results. Figures and pictures are extensively used for illustrations to establish a preliminary basis for field understanding and contents of data. As outlined under the disclaimer, all information contained in this report are made available by NOCs and Contractors through their specific submissions.

All the 8 discoveries covered in the offered contract area falls in 5 polygons C-23-9 (1 well), C-39-14 (1 well), BH68 (1 well), WO5 (1 well, WO-5-11), and B174 (4 wells: B-172-9 , B-183-1, B-51-1 , B-174-1). Discovery wise description is given in this section.

MUMBAI OFFSHORE- C-23-9 FIELD

4.1 DESCRIPTION OF MUMBAI OFFSHORE C-23-9 FIELD

The well C-23-9 (C-23-IA) was released as an Exploratory 'B' Category, located in Tapti-Daman area of C-23 structure of western offshore basin. The well C-23-9 was drilled in 2010 with the objective to explore the Hydrocarbon potential of Carbonates within Panna and Hydrocarbon potential of Sands within Mahuva and Daman Formations.

The well, drilled down to 4580m, has penetrated all the normal sequences of Chinchini, Tapti, Mahim, Daman, Mahuva and has bottomed in Panna Formation. As compared to prognosis, the well has shown considerable thinning in Mahuva Formation, and thickening of the Panna Formation. Although envisaged, Basement was not encountered in this well. The status of the well is gas bearing.

C-23-9 field (**FIGURE 4-1, FIGURE 4-2 AND FIGURE 4-3**) covers an area of **50.06 Sq. km**. The co-ordinates of the endpoints defining the cluster boundary are tabulated below in **TABLE 4-1**

Table 4-1: Coordinates of C-23-9 field

	C-23-9 Boundary Points		
	Area: 50.06 sq km		
	Point	**Longitude**	**Latitude**
	A	72°09'2.633" E	20°30'30.012" N
	B	72°05'0.000" E	20°30'30.000" N
	C	72°05'0.000" E	20°32'0.000" N
	D	72°08'0.000" E	20°35'0.000" N
	E	72°10'0.000" E	20°35'0.000" N
	F	72°10'0.000" E	20°33'0.000" N
	G	72°09'2.598" E	20°33'0.000" N
	A	72°09'2.633" E	20°30'30.012" N
SL. No.	**Well**	**Longitude**	**Latitude**
1	C-23-9	72°08'52.952" E	20°32'18.427" N

Figure 4-1: Contract Area map of C-23-9

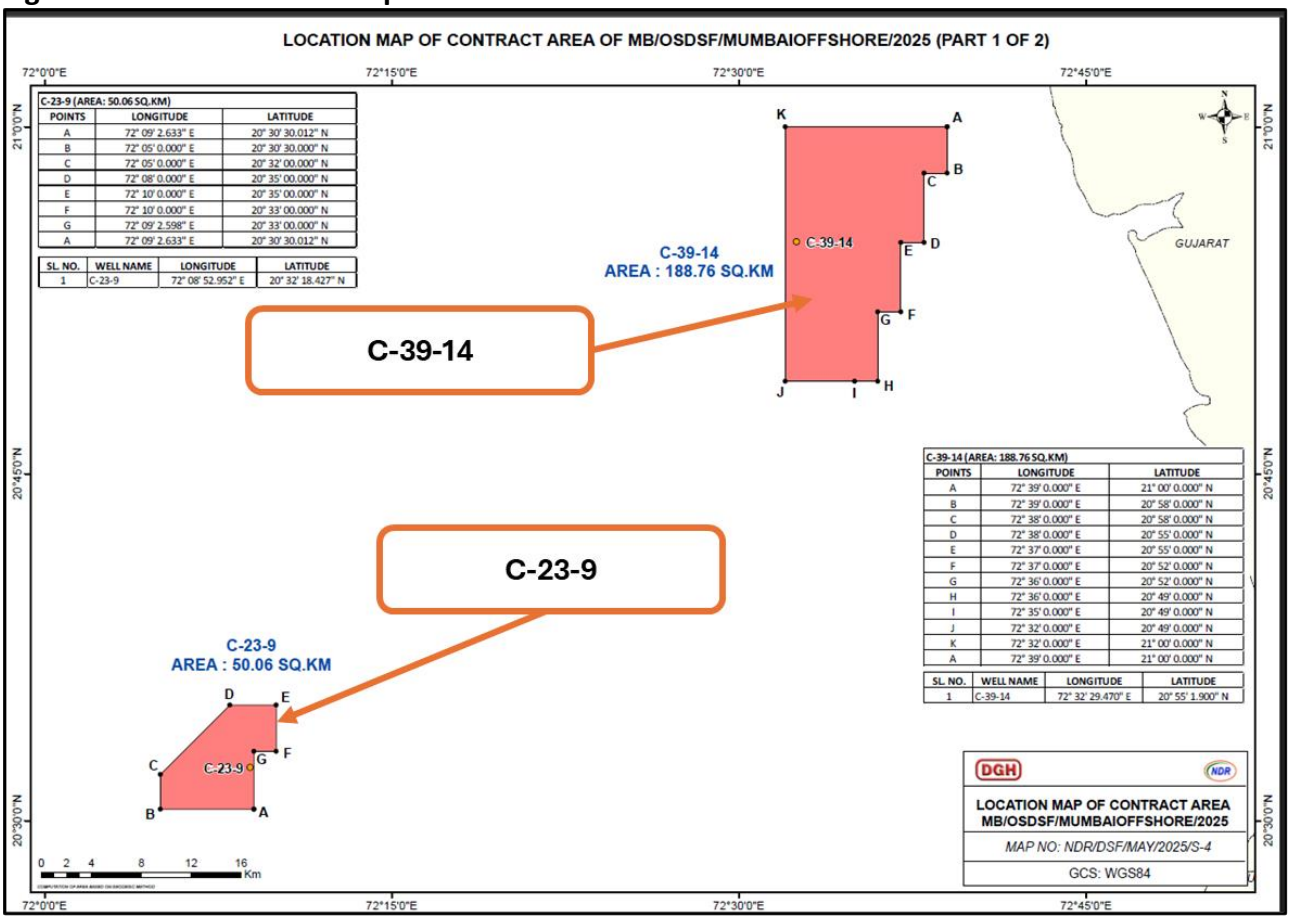


Figure 4-2: Location map of C-23-9

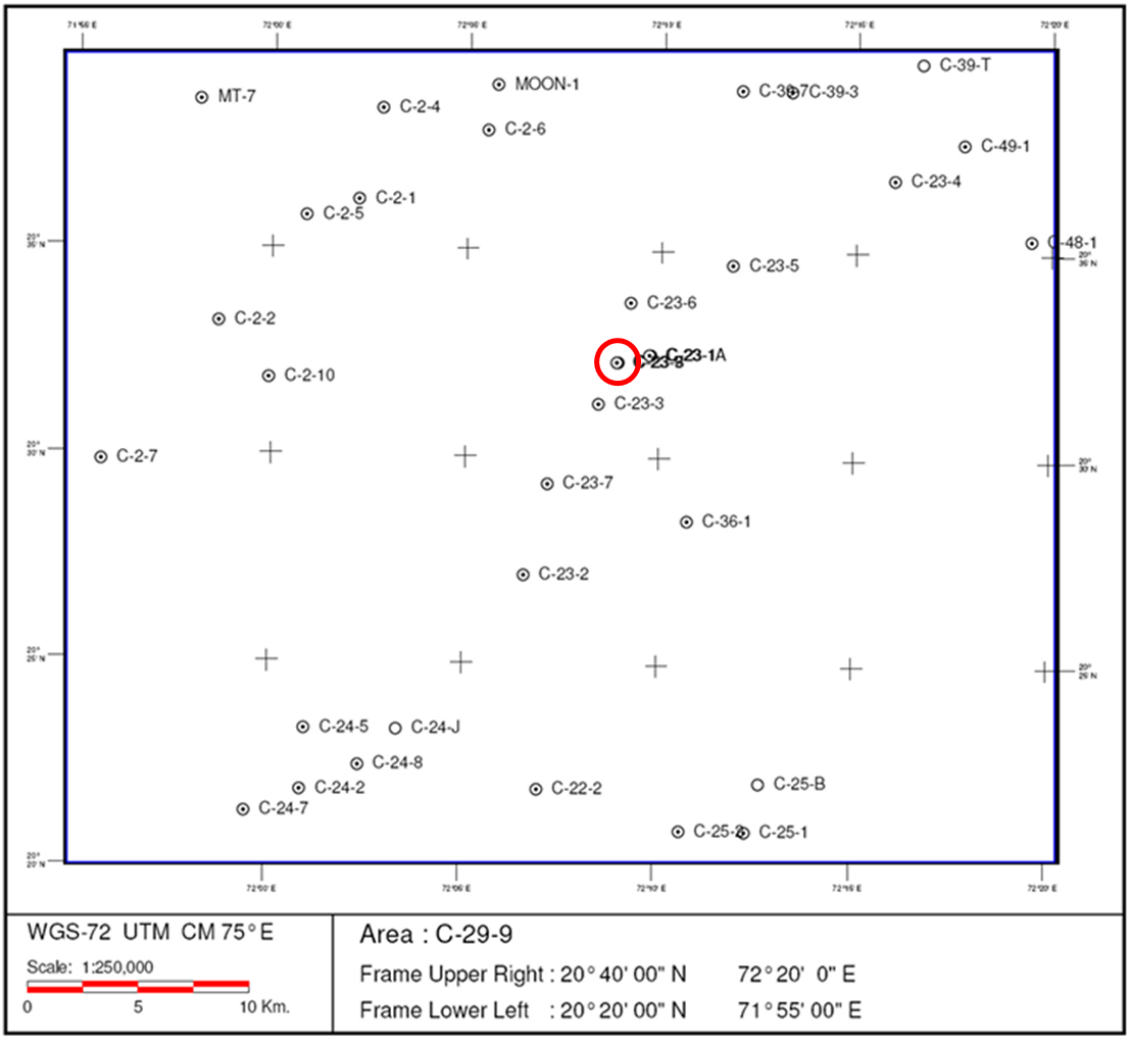
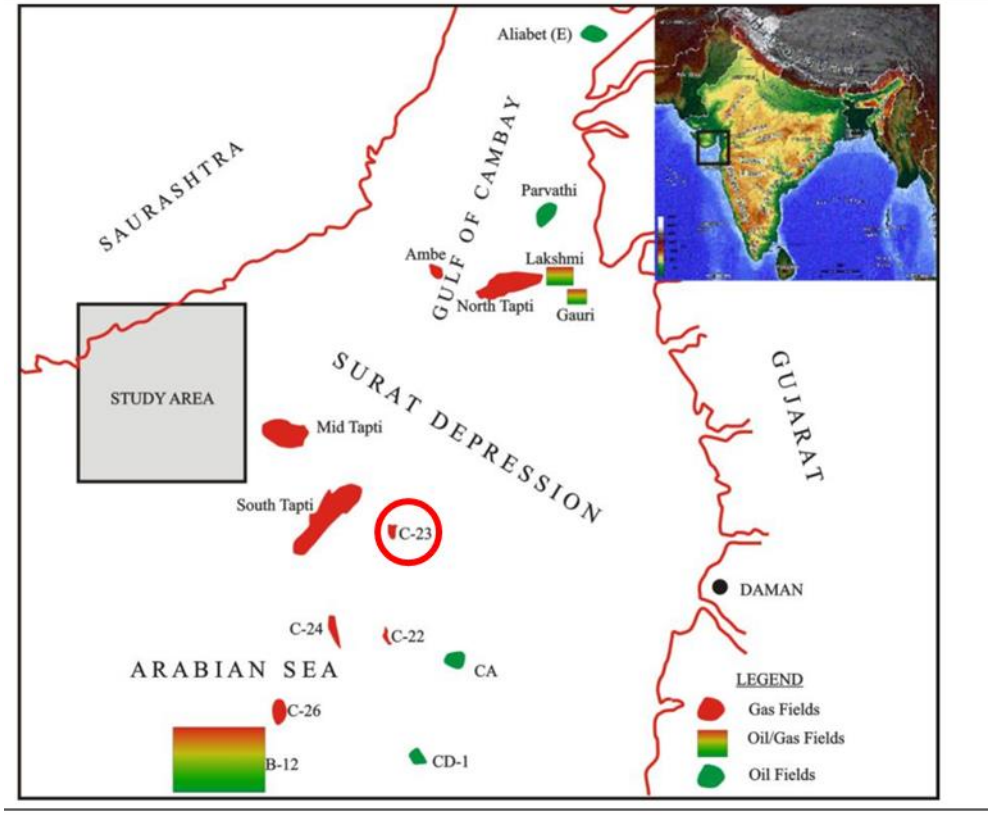


Figure 4-3:.: Surrounding oil and gas fields of C23:



4.1.1 Drilling and well completion

Key information of drilled wells have been collated and presented hereunder. The adjoining figures wherever shown illustrate the Well Construction Diagram and the Litho-column Information for key wells. Other well statics like kelly bush reference depth, water depth, drilled and logged depth including well coordinates are made available in Sections through various cross-references.

Well diagram, litho-section information, and stragraphic sequences in the well C-23-9 are given in **FIGURE 4-4, FIGURE 4-5, AND FIGURE 4-6.** Stratigraphic correlation is given in **Table 4-2**.

Figure 4-4:.Well profile of C-23-9 :

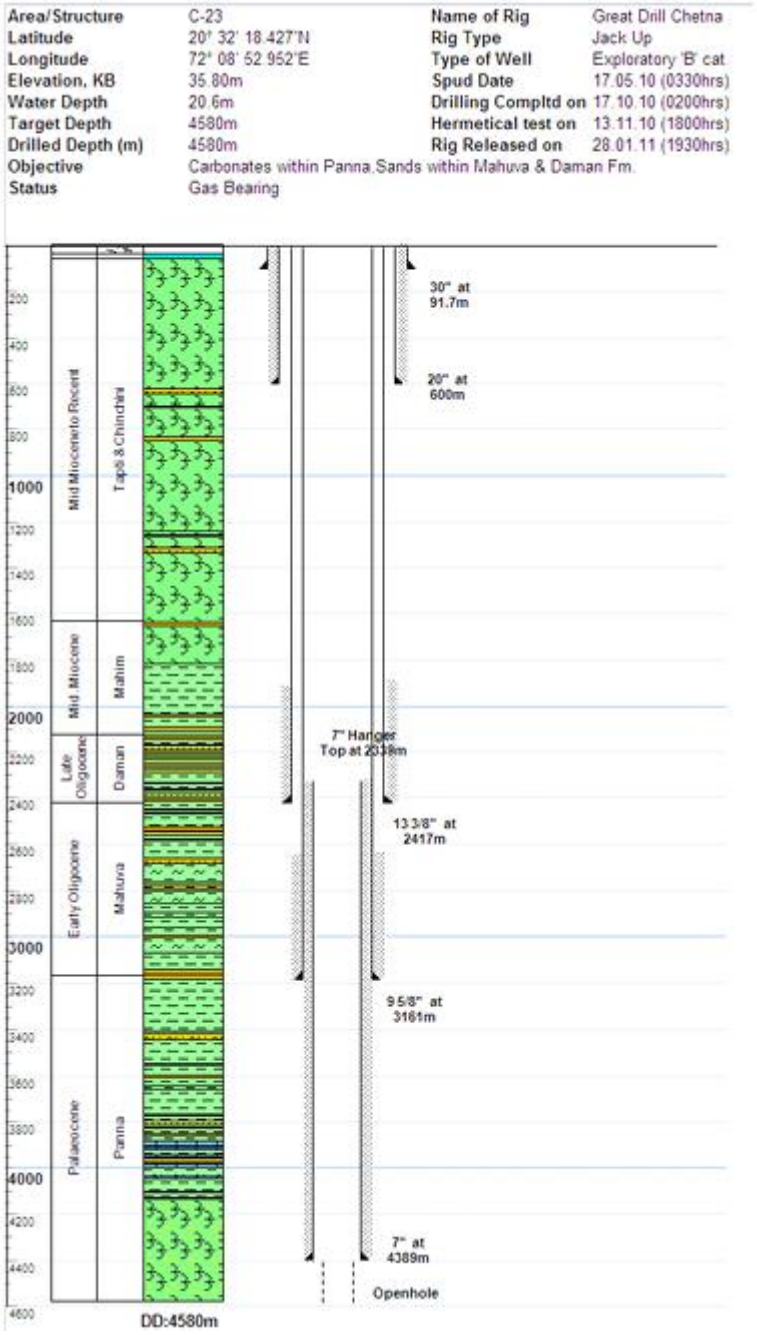


Figure 4-5:.: Litho-section information of C-23-9 :

Seismic Marker / Formation	Depth (MSL) (m)
H1C – Mahim Top	1610
H3CGG – Daman Top	2085
H3G - Mahuva Top	2345
H3A – Lr. Mahuva Top	2580
H4 - Panna Top	3200
Early Eocene Carbonate Top	3460
H5 - Paleocene Top	3970
Paleocene Carbonate Top	4045
Trap Top	4300

Figure 4-6:: COMPARISON OF STRATIGRAPHY- PROGNOSED VS ACTUAL (C-23-9)

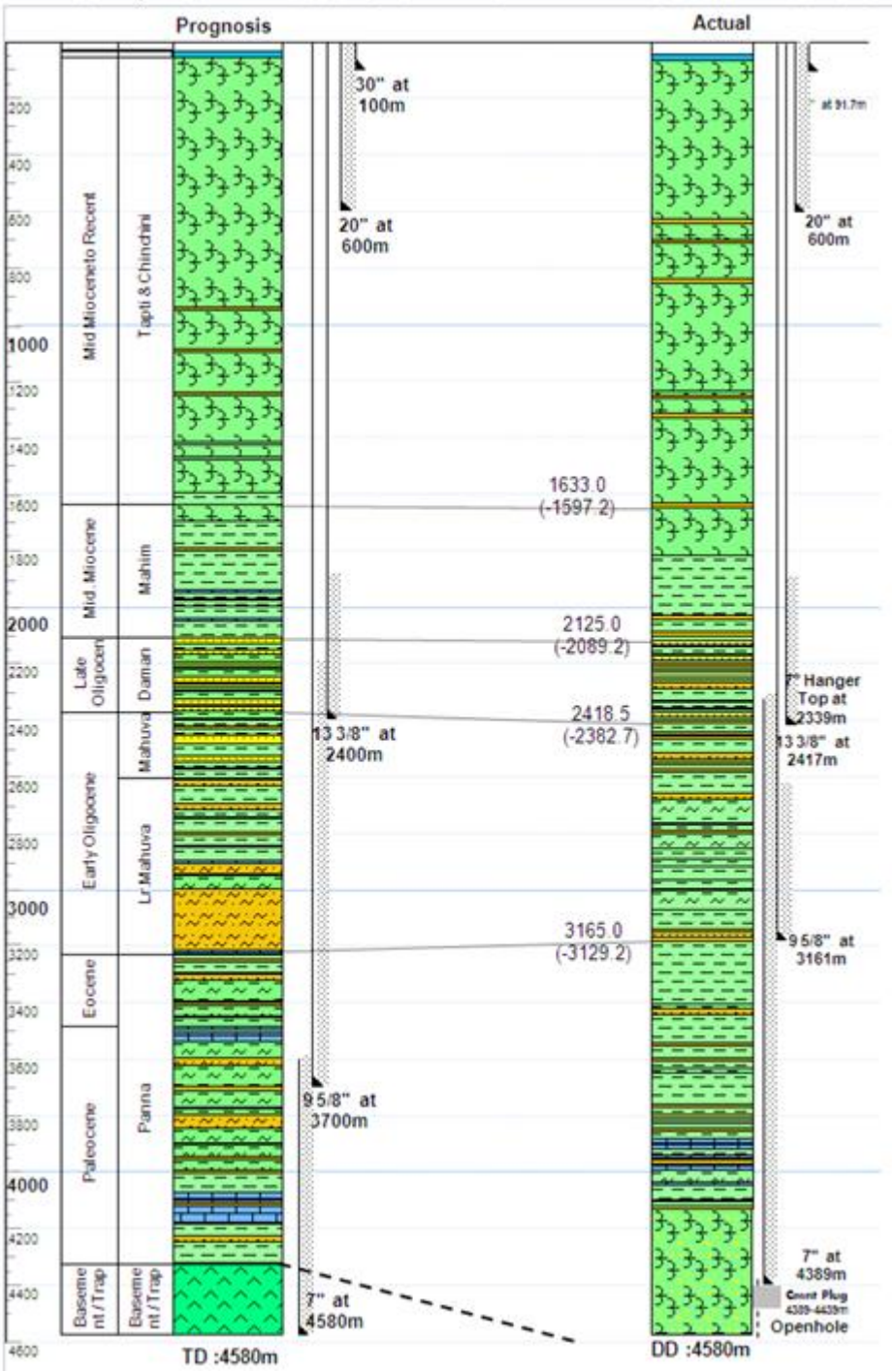


Table 4-2: Stratigraphic Correlation of C-23-9 with nearby wells

Age	Formation	C-23-1A (KB: 33.50m)	C-23-3 (KB: 30.80m)	C-23-6 (KB: 29.40m)	Moon-1 (KB: 38.48m)	C-23-8 (KB: 34.90m)	C-23-9 (KB: 35.80m)
Mid. Miocene To Recent	Chinchini & Tapti	SB-1648.5 (-1615)	55-1673 (-1642.2)	SB-1626 (-1596.6)	971.5 (-932.52)	SB-1648.6 (-1613.7)	SB-1655.5 (-1619.7)
Middle Miocene	Mahim (H1c)	1648.5-2110 (1615-2076.5)	1673-2147.5 (1642.2-2116.7)	1626-2083 (1596.6-2053.6)	1354.5 (932.52-1315.52)	1648.6-2118.5 (1613.7-2083.6)	1655.5-2126 (1619.7-2090.2)
Late Oligocene	Daman (H3)	2110-2430+ (2076.5-2396.5)	2147.5-2477 (2116.7-2446.2)	2083-2401 (2053.6-2371.6)	1899.3 (1315.52-1860.82)	2118.5-2414.3 (2083.6-2379.4)	2126-2416 (2090.2-2390.2)
Early Oligocene	Mahuva (H3g)	-	2477-2730+ (2446.2-2699.2)	2401-2610+ (2371.6-2580.6)	2141 (1860.82-2102.52)	2414.3-(2379.4-)	2416-3160 (2380.2-3124.2)
Eocene to Paleocene	Panna (H4)	-	-	-	2369.5 (2102.52-2331.02)	-	3160-4580+ (3124.2-4544.2+)
Upper Cretaceous	Basement	-	-	-	-	-	Not drilled
Drilled Depth (DD),m		2430	2730	3610	4238	2810	4580

4.1.2 Well logging and formation evaluation

The well logs of all discovery wells along with some key wells in the contract area have been reviewed. The logs recorded in various open-hole sections along with cased-hole logs and information of conventional and other wireline formation test data are presented in this docket. The availability of key input reports like Well Completion Reports (WCR) and Formation Evaluation Report (FER) have been checked and information given. Reservoir parameters of interesting zones and results of the tested zone(s) have been included in this report. Log motifs of tested/ interesting zone of key wells are also appended.

A| Well completion and log evaluation reports availability (C-23-9) :

WCR/ FER availability	Spud date	KB	Drilled depth
Both available	17.05.2010	35.8m	4580 m

Logs suites acquired in C-23-9 and VSP recorded are given in **Table 4-3 and Table 4-4**

B| Well logs acquired (C-23-9) :

Table 4-3: Logs Recorded

SN	Hole/ Casing Size (")	Date	Interval (m)	Logs	Remarks
1	17 ½"	06.06.2010	2412-600.8	PEX-AIT-HNGS-SONIC	BHT: 107.7°C Schl. Wireline
2	17 ½"	07.06.2010	2404-302	VSP	Zero offset survey at 15m interval. Schl. Wireline
3	17 ½"	08.06.2010	2426-2300	PEX-HNGS	Schl. Wireline
4	17 ½"	08.06.2010 09.06.2010	2392.2-2390.0 2384.0-2383.0 2378.0-2376.2	MDT 12 Pretest: Good-1, Tight: 7, Lost Seal: 4	MDT Sampling @2390.8m
5	12 ½"	17.06.2010-24.06.2010	2418-2951	LWD (Resistivity/TNPH/ RHOB/GR	LWD Porosity/Density logs recorded from shoe to 2765m only, due to failure of tools
6	12 ¼"	15.07.2010	3171-2417	HAPS-HLDS-HNGS	BHT: 150°C Schl. Wireline
7	12 ¼"	18.07.2010 19.07.2010	3168-2417	QAIT-Sonic scanner-PPC-GPIT-EDTC	Tool could not go beyond 3168m. due to held up
8	9 5/8''	08.08.2010	3113-2312	CBL-VDL-GR-CCL	Schl. Wireline
9	8 ½''	26.08.2010	3305-3164	QAIT-HAPS-HLDS-HNGS	BHT: 161°C Schl. Wireline
10	8 ½''	26.08.2010	3305-3164	DSI-HNGS	Schl. Wireline

11	8 ½''	27.08.2010	3164-2840	ECS inside 9 5/8'' csg	Schl. Wireline
12	8 ½''	30.08.2010	3855-3164	QAIT-HAPS-HLDS-HNGS	BHT: 180°C Schl. Wireline.
13	8 ½''/ 9 5/8''	30.09.2010	3255-2358	VSP	Zero offset survey at 15m interval
14	8 ½''	17.10.2010	4039-3461	QAIT-QSLT-QLDT-QCNT-GR	Logging was undertaken thru 51/2" drill pipe, end kept at 3450m, using slim extreme tools. Tooll did not go below 4039m. BHT: 190°C Schl. Wireline.
15	8 ½''	17.10.2010	3825-3149	QAST (HT VSP)	Logging was undertaken thru 51/2" drill pipe, end kept at 3450m, using slim extreme tools. Tooll did not go below 3825m. Survey at every 15m interval
16	8 ½''	22.10.2010	4178-4024.5	QAIT-QSLT-QLDT-QCNT-GR	Logging was undertaken thru 51/2" drill pipe, end kept at 4144m, using slim extreme tools. Tooll did not go below 4181m. Survey at every 15m interval BHT: 185°C Schl. Wireline.
17	8 ½''	22.10.2010-23.10.2010	4095-3765	QAST (HT VSP)	Survey at 15m interval
18	7''	9/11/2010	4352-2952	CBL-VDL-GR	In Cased hole. BHT: 205°C
19	7"	10.11.2010	4290-4020	QAST	. BHT: 207°C
20	7"	11.11.2010	4353-3210	HAPS-ECS-QLDT-GR	Schl. Wireline.

VSP DATA

Table 4-4: VSP data recorded in C-23-9

SN.	Hole/ casing size(")	Date	Interval (m)	Offset	VPP	Remarks
1	17 ½"	06.06.2010	2404-302	Zero	VSP at 15m interval	Schlwireline
2	8 ½"	30.08.2010	3255-2358	Zero	VSP at 15m interval	Schlwireline
3	8 ½"	17.10.2010	3825-3149	Zero	QAST (HT VSP) at 15m interval	Schlwireline
4	8 ½"	22.10.2010-23.10.2010	4095-3765	Zero	QAST (HT VSP) at 15m interval	Schlwireline
5	7"	9.11.2010-10.11.2010	4290-4020	Zero	QAST (HT VSP) at 15m interval	Schlwireline

Conventional core was not cut in this well.

Side Wall Cores were not taken in this well.

C| Well log evaluation and initial test results (C-23-9):

In **Table 4-5** detailed log evaluation is tabulated for C-23-9.

Table 4-5: Well log evaluation of C-23-9

Sr no.	Interval (m)	Lithology	Porosity	Remarks
1	SB-1655.5	Lithology mainly consists of clay stone and very little siltstone at places below 1200 m. minor shale	Effective porosity almost nil	This interval belongs to Chinchini /Tapti formation and there is **no reservoir** development.
2	1655.5-2126	Lithology mainly consists of shale with limestone intercalations at places and minor siltstone at bottom.	Effective porosity almost nil.	The top of the Mahim formation is 1655.5 m. There is **no reservoir** development.
3	2126-2185	Lithology mainly consists of shale, siltstone, claystone and sandstone	Effective porosity 12% in the interval 2139-2140 m and 20% in the interval 2142.5-2143.7 m, and 21% in the interval 2178-2184 m.	The top of the Daman formation is at 2126 m, moderate reservoir development in the interval 2139-2140 m, 2142.5-2143.7 m and 2178-2184 m, but all devoid of hydrocarbon only water movable**. Sw is 100%.**
4	2185-2416	Lithology mainly consists of shale, siltstone, claystone and sandstone	Effective porosity is nil except in the interval 2331-2338 m where effective porosity varies from 20-18% and effective porosity varies from 22-20% in the interval 2388-2392 m	The reservoir development is good in the interval 2331-2338 m and in the interval 2388-2392 m, but devoid of hydrocarbon only water movable. **Sw is 100%.**
5	2416-2900	Lithology mainly consists of siltstone, shale and limestone streaks at places and in the interval 2631-2632 m and 2774-2778 m clayey sand	Effective porosity reading less than 9%.	Top of the Mahuva formation is at 2416 m. This interval is not interesting from hydrocarbon point of view. Only water wet. **Sw is 100%.**
6	2900-3150	Lithology mainly consists of claystone and limestone streaks at places	Effective porosity reading less than 10%.	This interval is interpreted as not interesting from hydrocarbon point of view

Sr no.	Interval (m)	Lithology	Porosity	Remarks
				and Sw is 100%.
7	3150-3160 Mahuva	Lithology mainly consists of moderately **clean sandstone**	Effective porosity varies from 17%-5%	**This interval is interpreted as hydrocarbon bearing zone and Sw reading 20-80%.**
8	3160-3250 Panna	Lithology mainly consists of claystone and siltstone	Effective porosity reading less than 5%.	Top of the Panna formation is at 3160 m. This interval is not interesting from hydrocarbon point of view. Only **water wet. Sw is 100%.**
9	3250-3345	Lithology mainly consists of shale and siltstone.	Effective porosity varies from 12-8%.	This interval is interpreted as not interesting from hydrocarbon point of view. **Sw is 100%.**
10	3345-3495	Lithology mainly consists of siltstone	Effective porosity reading less than 4%.	**Sw is 100%.**
11	3495-3830	Lithology mainly consists of shale.	Effective porosity reading less than 7%.	Not interesting from hydrocarbon point of view. **Sw is 100%.**
12	3830-4025	Lithology mainly claystone, shale, siltstone and limestone streaks at places	Effective porosity reading between 20-4%.	Entire interval is interpreted as moderate reservoir development at places but devoid of hydrocarbon**. Sw is 100%.**
13	4025-4043.6	Lithology mainly claystone, shale, siltstone and limestone streaks at places	Effective porosity reading between 22-10%.	Good reservoir development but devoid of hydrocarbon. Only **water movable. Sw is 100%.**
14	4043.6-4045.3	Lithology mainly consists clayey sand.	Effective porosity varies from 17-3%.	In this interval a moderately good reservoir development is seen saturated with hydrocarbon. The phase of the **hydrocarbon is gas. Sw varies from 60-72%.**
15	4045.3-4141.5	Lithology mainly consists of claystone, siltstone and shale.	Effective Porosity development is in the range of 9-4%.	There is no reservoir development seen in this interval and **Sw is 100%.**
16	4141.5-	Lithology mainly consists	Effective porosity	This interval is interpreted as

Sr no.	Interval (m)	Lithology	Porosity	Remarks
	4175	of clean to clayey sandstone.	varies from 22-10%.	good reservoir development but **devoid of hydrocarbon**. Sw is 100%.
17	4175-4380	Lithology mainly consists of sandy claystone.	Effective porosity varies from 12-5%.	There is no reservoir development seen in this interval and **Sw is 100**%.

CBL/VDL Interpretation:

CBL-VDL-GR-CCL Log was recorded in 7" liner, against the interval 4352 – 2952 m, at '0' PSI and at '700' PSI. There was no appreciable change in both the logs.

The proposed Object-I (4277-4272 m, 4210-4200 m and 4150.5-4141.5 m) and Object-II (4045.5-4043.5 m) were in Panna Formation and the proposed Object-III (3159.5-3149.5 m) was in Mahuva Formation.

From the Logs, it was found that the Cement Bond was good against these three Objects, and they were properly isolated as moderate to good formation arrivals were seen, throughout. Hence, no cement squeeze job was carried out.

Log motifs of CBD Belapur pay, C-23-9 tested Objects-I, II and II are given in **Figure 4-7, Figure 4-8, Figure 4-9 and Figure 4-10.**

Figure 4-7: Log Motif of C-23-9 Belapur Pay:

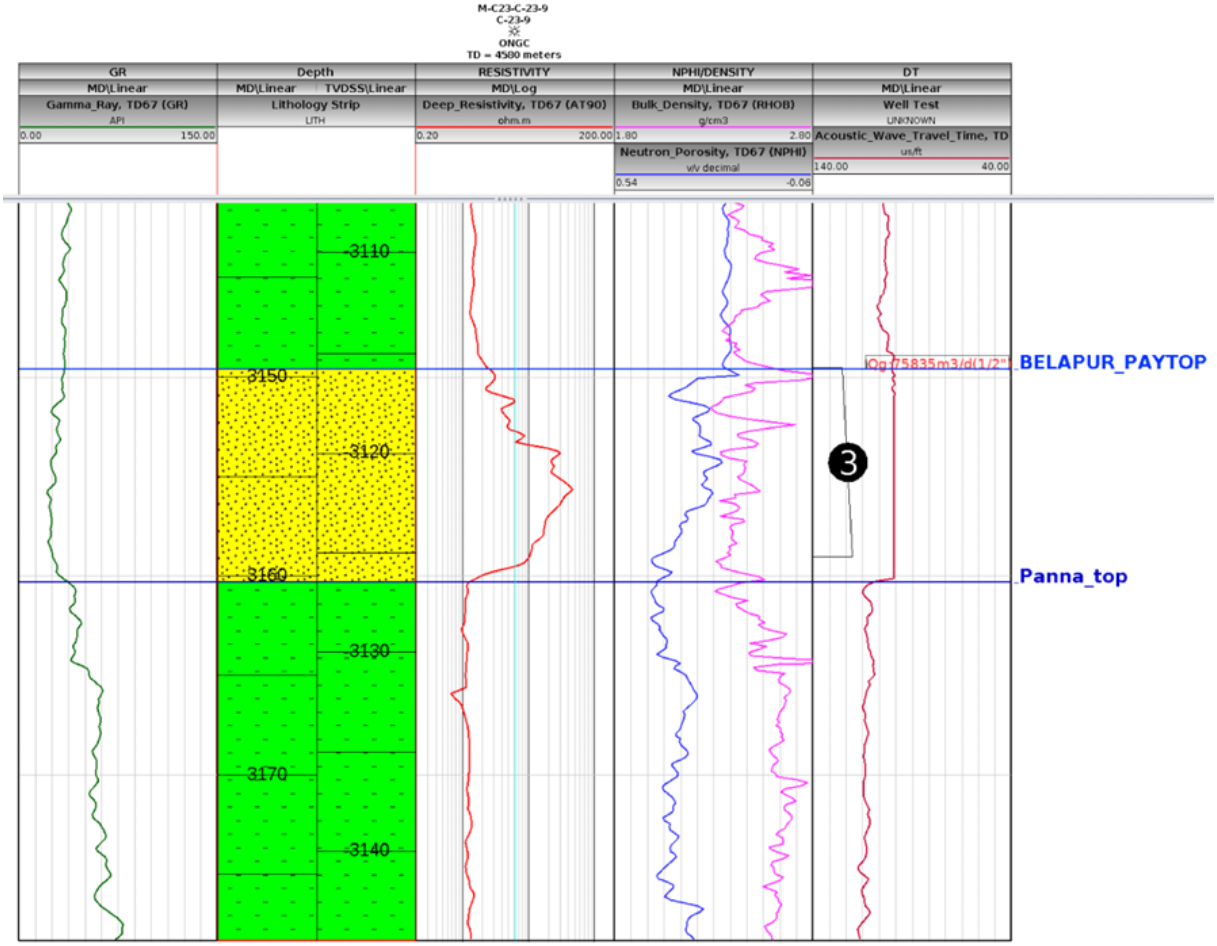


Figure 4-8: Log motif of Object-I of C-23-9:

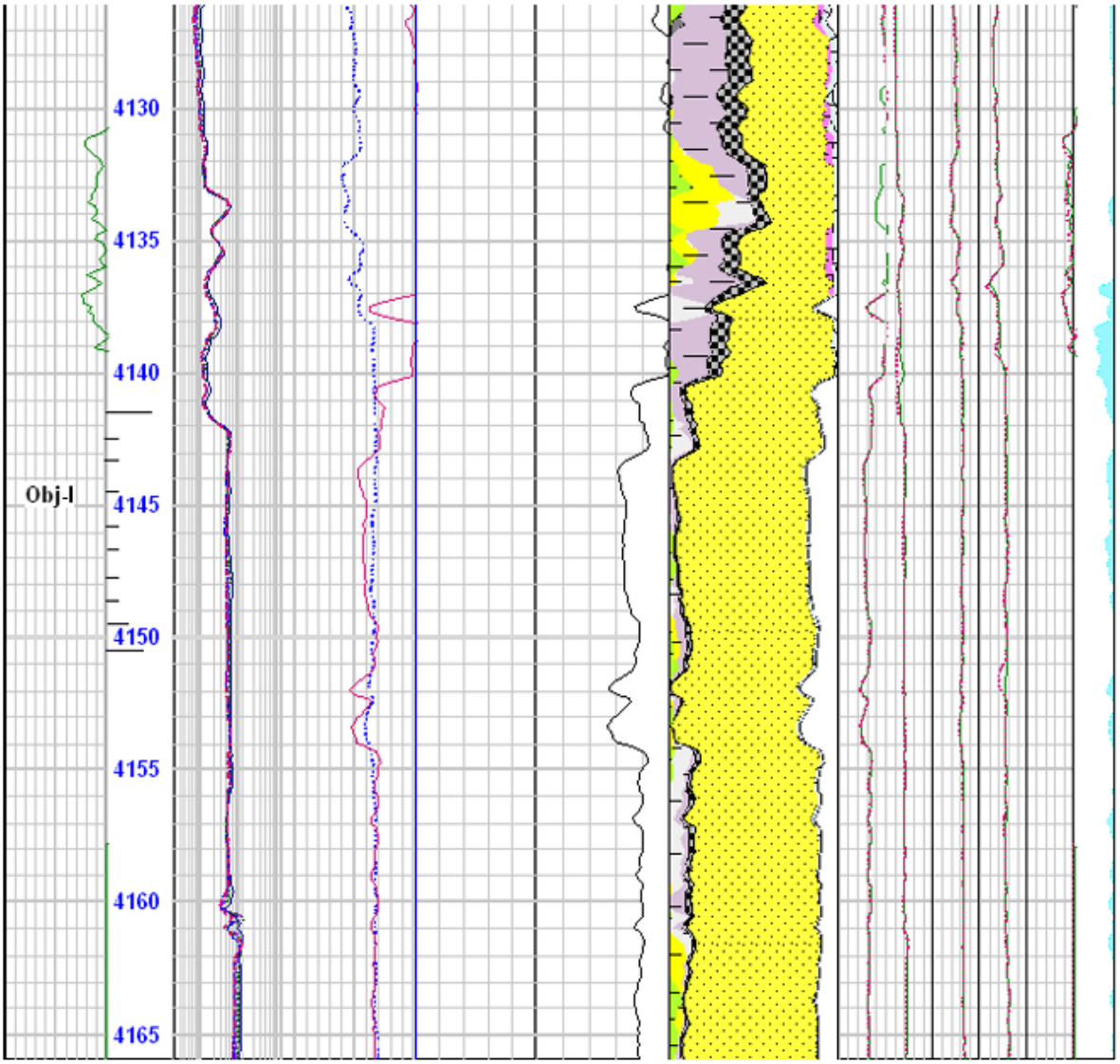


Figure 4-9: Log motif of Object-II of C-23-9:

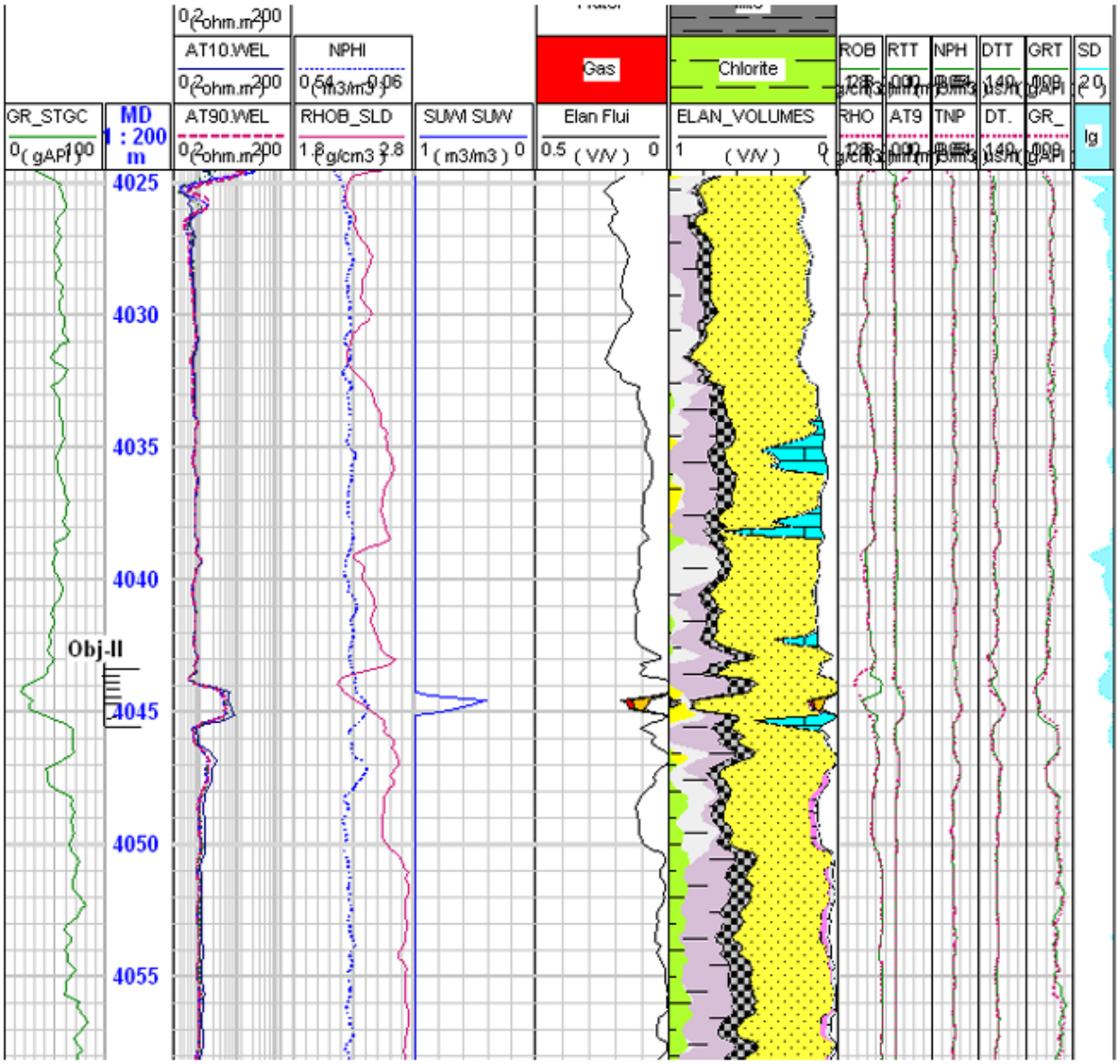
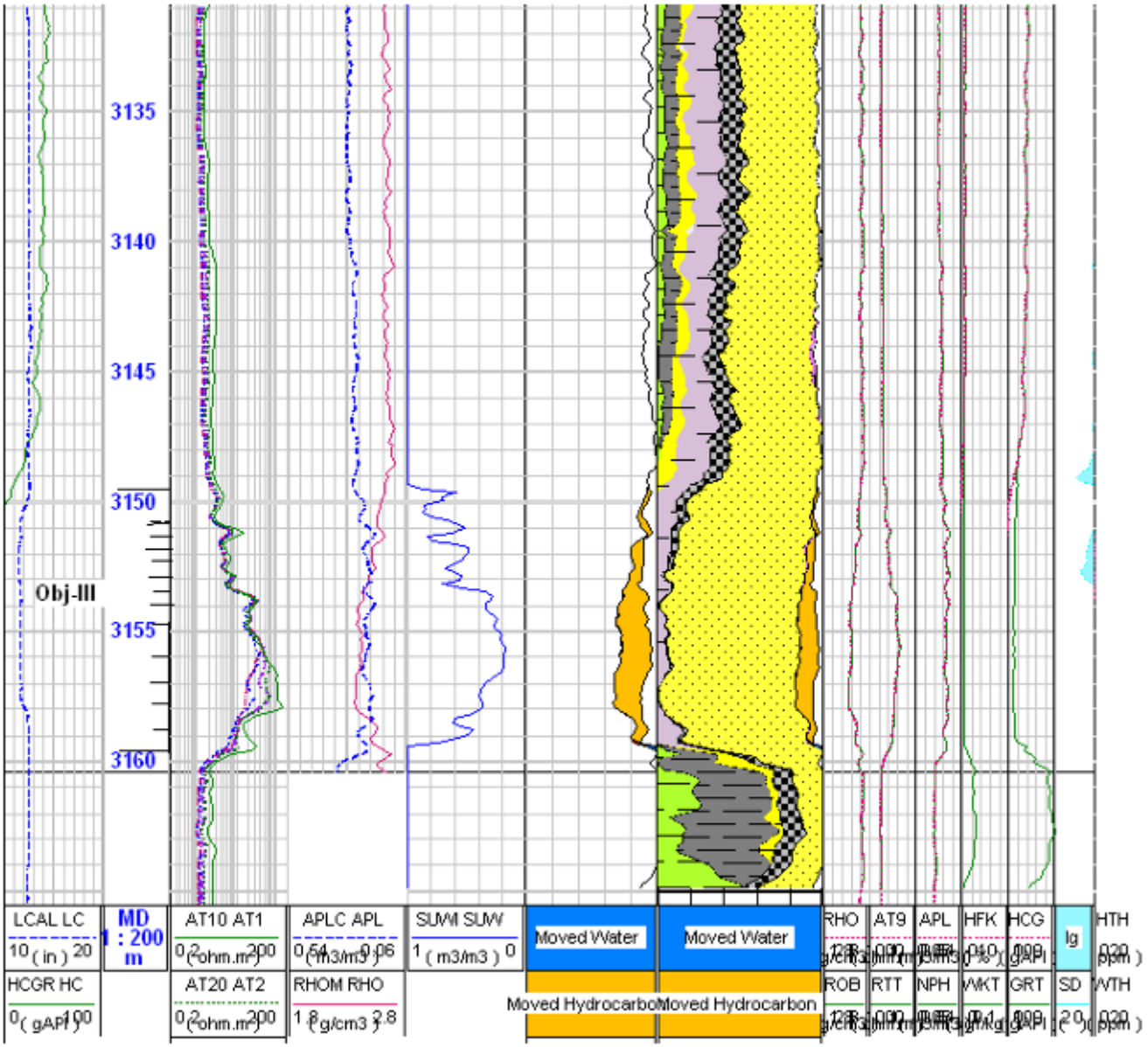


Figure 4-10: Log motif of Object-III of C-23-9:



4.1.3 Well testing and workover history

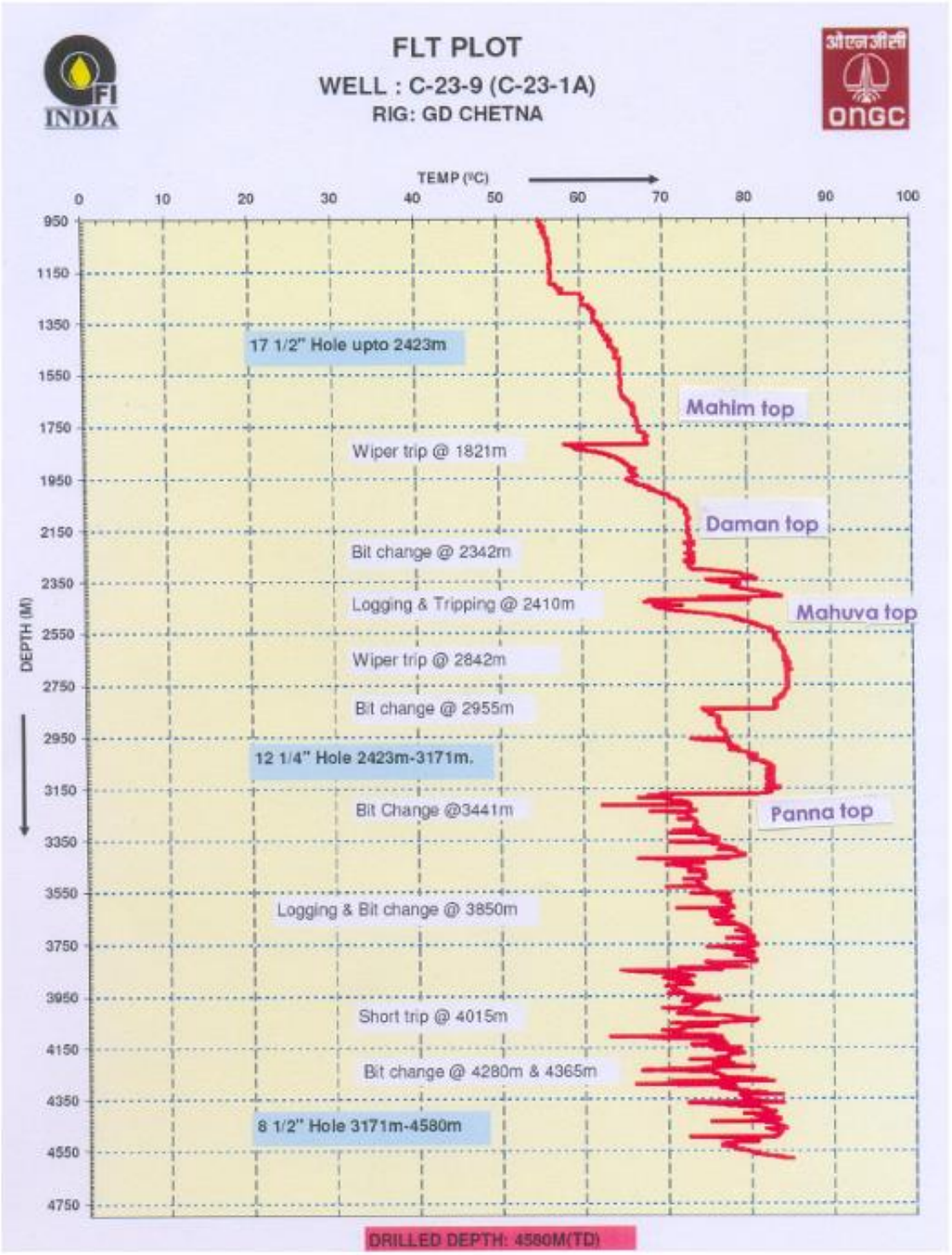
A total of 3 objects were tested, the details are given below in **Table 4-6**. No downhole pressure gauges were deployed while testing the objects because of temperature & pressure constraints.

Only Mahuva object flowed hydrocarbon (Gas and traces of condensate). The FLT recorded also shows evidence of temperature increase in front of Mahva formation. In **Figure 4-11,**

Table 4-6: Testing details of well C-23-9

Object	Interval(s) (m)	Formation	Results
I	4150.5-4141.5 4277.0-4272.0 4210.0-4200.0	Panna	No flow/activity
II	4045.5-4043.5	Panna	Flowed gas (Not measurable)
III	3159.5-3149.5	Mahuva	Flowed gas with traces of condensate. ¼" choke=61568 M^3/day at FTHP=1625 psi, FTHT=115°F 3/8" choke=67015 M^3/day at FTHP=900 psi, FTHT=118°F ½" choke=68202 M^3/day at FTHP=490 psi, FTHT=120°F ½" choke=75835 M^3/day at FTHP=550psi, FTHT=120°F (After Build up) STHP=7600psi

Figure 4-11: FLT plot of C-23-9



4.1.4 Reservoir engineering studies and analysis

Key reservoir engineering datasets, wherever available have been collated and presented under various data genres. In a comprehensive data presentation, the results are included from well tests, formation dynamics tests, reservoir pressure build-up study and PVT data/ results.

MDT Sample details in 17 ½" section: (Table 4-7 and Table 4-8)

Two samples were collected at 2390.8 m with different pump out durations. These two samples yielded (1) Fluid i.e mixture of base oil and water in first attempt and (2) only water in second attempt. A total of 12 pressure tests were attempted out of which only one test was good and the rest of the tests were either tight or lost seal tests.MDT was not carried out in 8 ½" section.

Table 4-7: MDT Sample details in 17 ½" section

SN	Depth (m)	Fluid	Salinity as NaCl ppm	Ph	Vol. (ml)	Resistivity	Mud Salinity (ppm as NaCl)	Pump out Details	Remarks
1.	*2390.8*	*Mixture of base oil and water*	*5940*	8	*Sample capacity: 418 ml* *Vol. collected surface: 330 ml*	42.5 Ohm-m @ 80.5°F	82500	*Pump out started at: 03:05AM* *Sample collected at: 08:30 AM* *Pump out duration: 251min.* *Total Pump out Vol. 27.1 lt.* *Sample Date: 09.05.10*	*Base oil-water mixture dark brown in colour*
2.	*2390.8*	*Water*	*2970*	8	*Sample capacity:418 ml* *Vol. collected surface: 350 ml*	1.295 Ohm-m @ 79.7°F	82500	*Pump out started at: 03:05AM* *Sample collected at: 01:30 PM* *Pump out duration: 498min.* *Total Pump out Vol. 64.9 lt.* *Sample Date: 09.05.10*	*Water Near transparent*

Table 4-8: MDT Pretests in 17 ½" section

Sl. No.	Depth (m)	Hydrostatic Pressure (psi)		Mobility (md/cp)	Formation Pressure (psi)	Pretest Volume (cc)	Test type	Remarks
		Before	After					
1	2390.8	4775.9	4768.6	48.7	3534.81	10/5	VD	Good: 2 samples were taken @ 2390.8m
2	2383.5	4754.8	4754.7	NA	NA	10-May	VD	Tight
3	2383.8	4755.3	4754	NA	NA	10-May	VD	Lost seal
4	2381.3	4749.8	4749.7	NA	NA	10	VD	Tight
5	2381	4749.2	4749	NA	NA	10	VD	Tight
6	2381.2	4749.5	4749.3	NA	NA	10-May	VD	Lost seal
7	2383.4	4754.4	4753.9	NA	NA	10	VD	Lost seal
8	2377.8	4742.5	4742.4	NA	NA	10	VD	Lost seal
9	2377.6	4742.2	4742.1	NA	NA	10-May	VD	Tight
10	2376.6	4740.1	4740	NA	NA	10-May	VD	Tight
11	2376.3	4739.7	4739.3	NA	NA	10-May	VD	Tight
12	2378	4743	4742.8	NA	NA	10-May	VD	Tight

Oil/Gas composition analysis (C-23-9)

Characteristics of oil of Mahuva formation (Object -III (3159.5 - 3149.5 m) is given in **Table 4-9** Chromatography results are in **Table 4-10 and Figure 4-12.**

Table 4-9: Characteristics of the Crude Oil of C-23-9

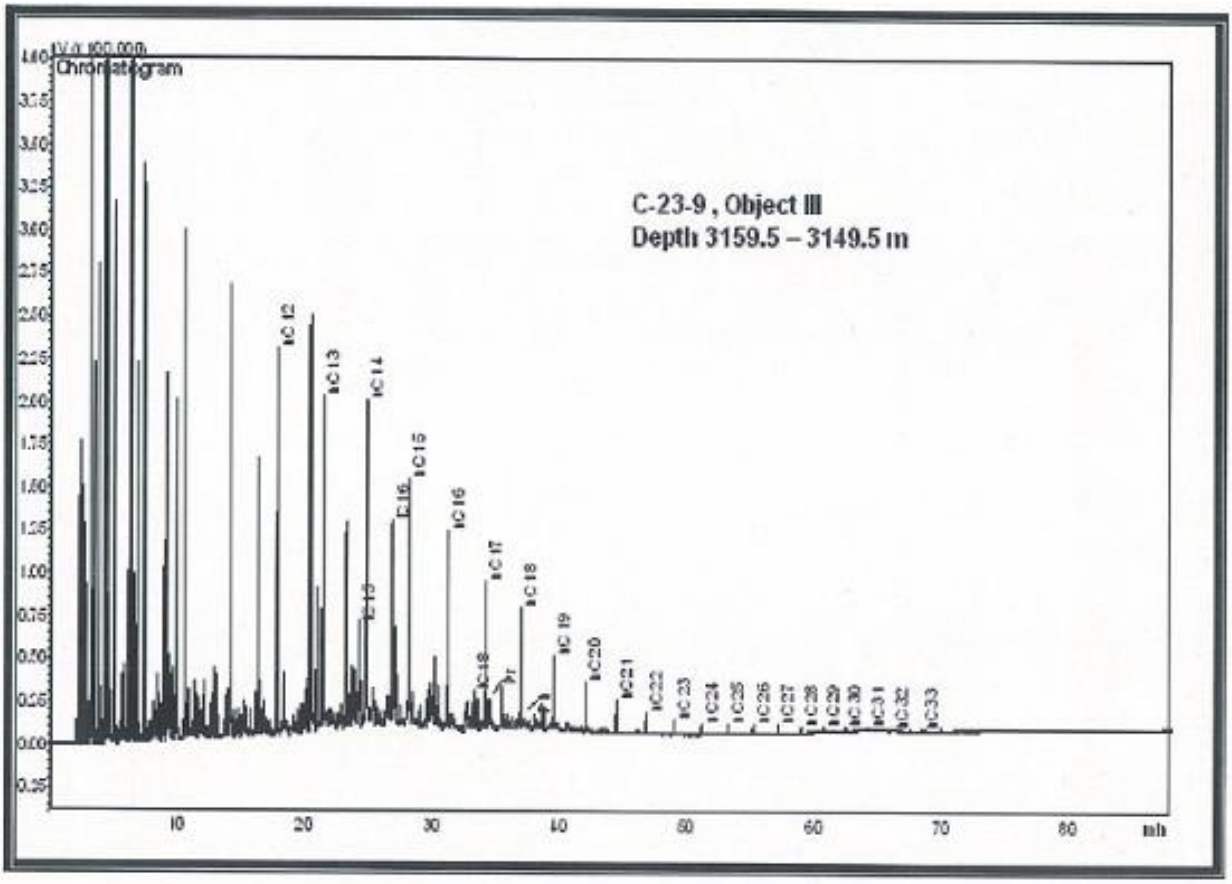
Characteristics of the Crude Oil of C-23-9		
S.N.	**Parameter**	**Results**
1.	Density at 15°C, g/ml	0.8303
2.	Specific gravity at 60/60°F	0.8307
3.	API gravity at 60°F	38.76
4.	Kinematic Viscosity at 37.8°C (cst)	1.03
5.	Water content, % vol	Traces
6.	Sediments, % vol	Nil
7.	Asphaltene, % wt	0.02
8.	Resin, % wt	1.03
9.	Wax, % wt	0.3
10.	Pour point °C	<0

Table 4-10: C-23-9 Obj-III Results of Gas analysis

RESULTS: C-23-9 Obj III				
CONSTITUENT	**VOL %**	**VOL %**	**VOL %**	**VOL %**
METHANE	84.65	80.83	84.36	67.60
ETHANE	3.22	3.09	3.22	2.62
PROPANE	0.36	0.35	0.26	0.29
ISO-BUTANE	0.14	0.14	0.14	0.11
N-BUTANE	0.07	0.07	0.07	0.05
ISO-PENTANE	0.06	0.05	0.06	0.04
N-PENTANE	0.03	0.03	0.03	0.02
HEXANES +	0.36	0.34	0.53	0.77
NITROGEN	1.19	5.30	0.50	15.83
CARBON DI OXIDE	9.92	9.80	10.73	12.67
Mol. Wt.	19.90	20.32	20.17	22.87
Sp. Gravity	0.6887	0.7030	0.6978	0.7808
Net Calorific value (Kcal/m^3)	7650	7306	7694	6298.74
iC4/nC4	2.00	2.00	2.00	2.20
C2/C3+	3.16	3.15	2.71	2.05

Gas chromatographic analysis of whole oil of C-23-9 is depicted below:

Figure 4-12: Gas Chromatogram of oil sample of well C-23-9, Object-III



Whole oil Gas Chromatogram of oil sample of well C-23-9 , Obj. III
Depth :(3159.5 – 3149.5 m)

4.1.5 Geology and Reservoir Description of C-23-9 Field:

The geology of the area has been comprehensively reviewed using correlations, sections and maps. The well correlation, seismic sections, top structure, seismic attribute/amplitude and net sand/pay maps have been used to illustrate the magnitude and distribution of key reservoir properties in and around the discovered oil/gas pools (accumulations). The local tectonic setting and geological section of the area, wherever available are also given. These maps/sections are sequentially shown field-wise and reservoir unit-wise through figures, appropriately titled and illustrated in the following section.

Geological correlations, sections and maps (C-23-9 Field):

Maps for C-23-9 are as below:

Time Relief and Depth map of C-23-9 Belapur Pay: **Figure 4-13**

Seismic sections along the well of C-23-9: **Figure 4-14**

Depth structure map of RESERVOIR of C-23-9: **Figure 4-15**

Isopay map of Belapur Pay: **Figure 4-16**

Product map of Belapur Pay: **Figure 4-17**

Correlation (top) of C-23-9 with the nearby wells **Table 4-11**

Stratigraphic correlation in C23 structure: **Table 4-12**

Figure 4-13: Time and Depth map of C-23-9 Belapur Pay

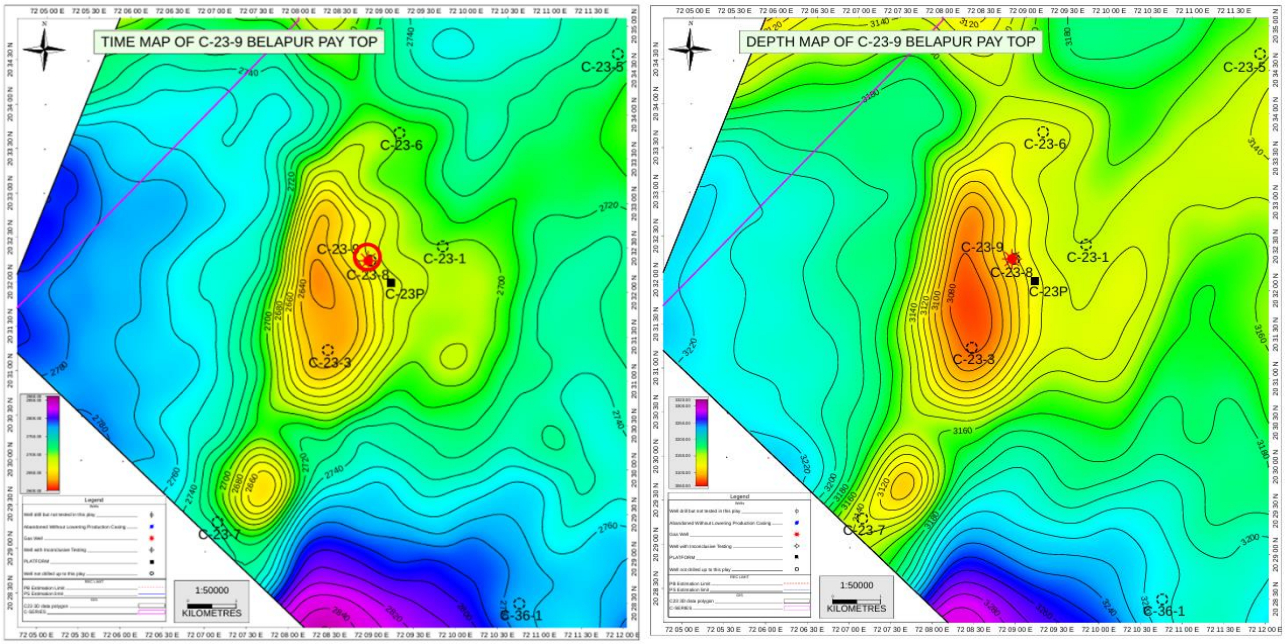


Figure 4-14: Seismic sections along the well of C-23-9 :

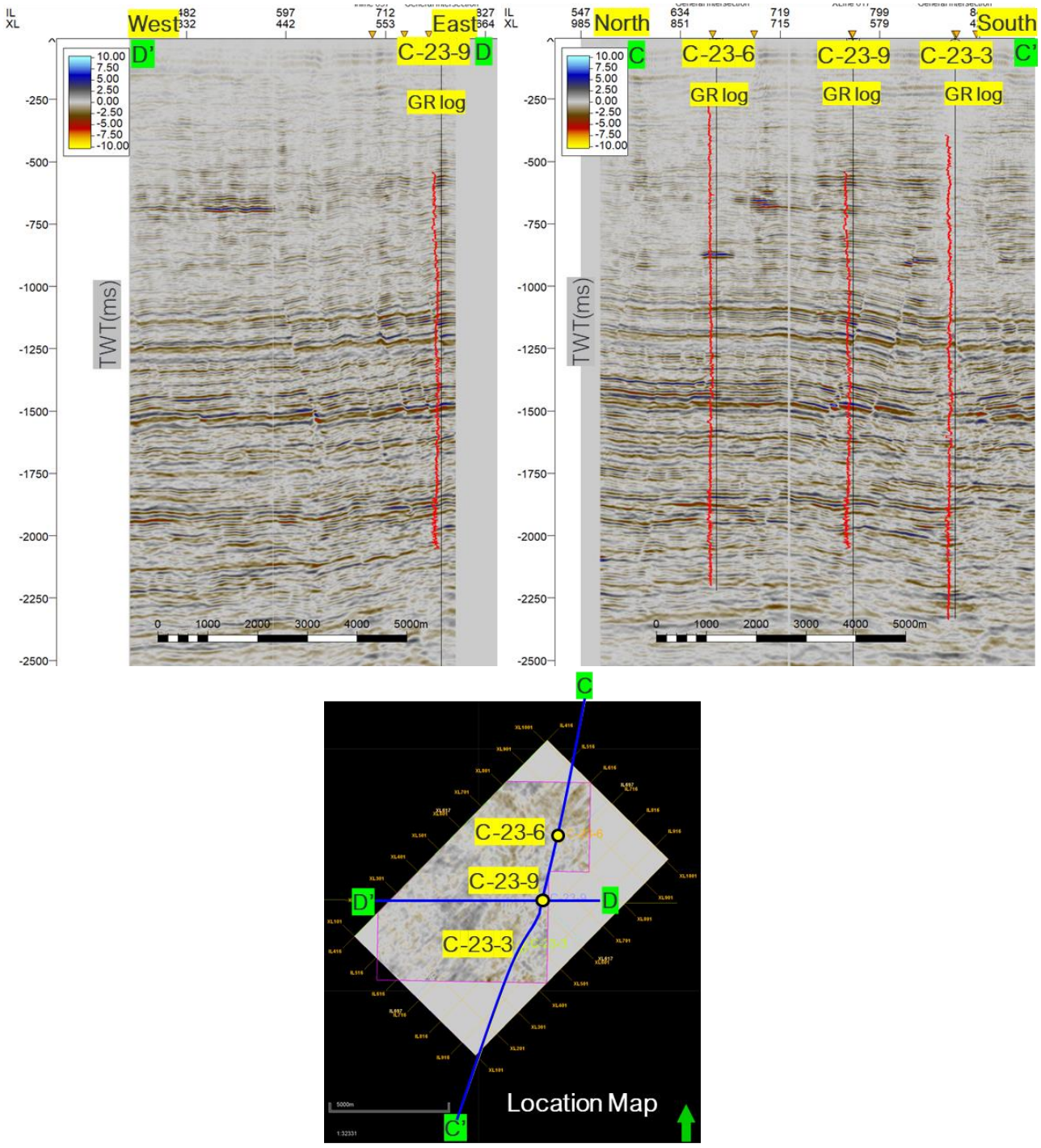


Figure 4-15: Depth structure map of RESERVOIR of C-23-9:

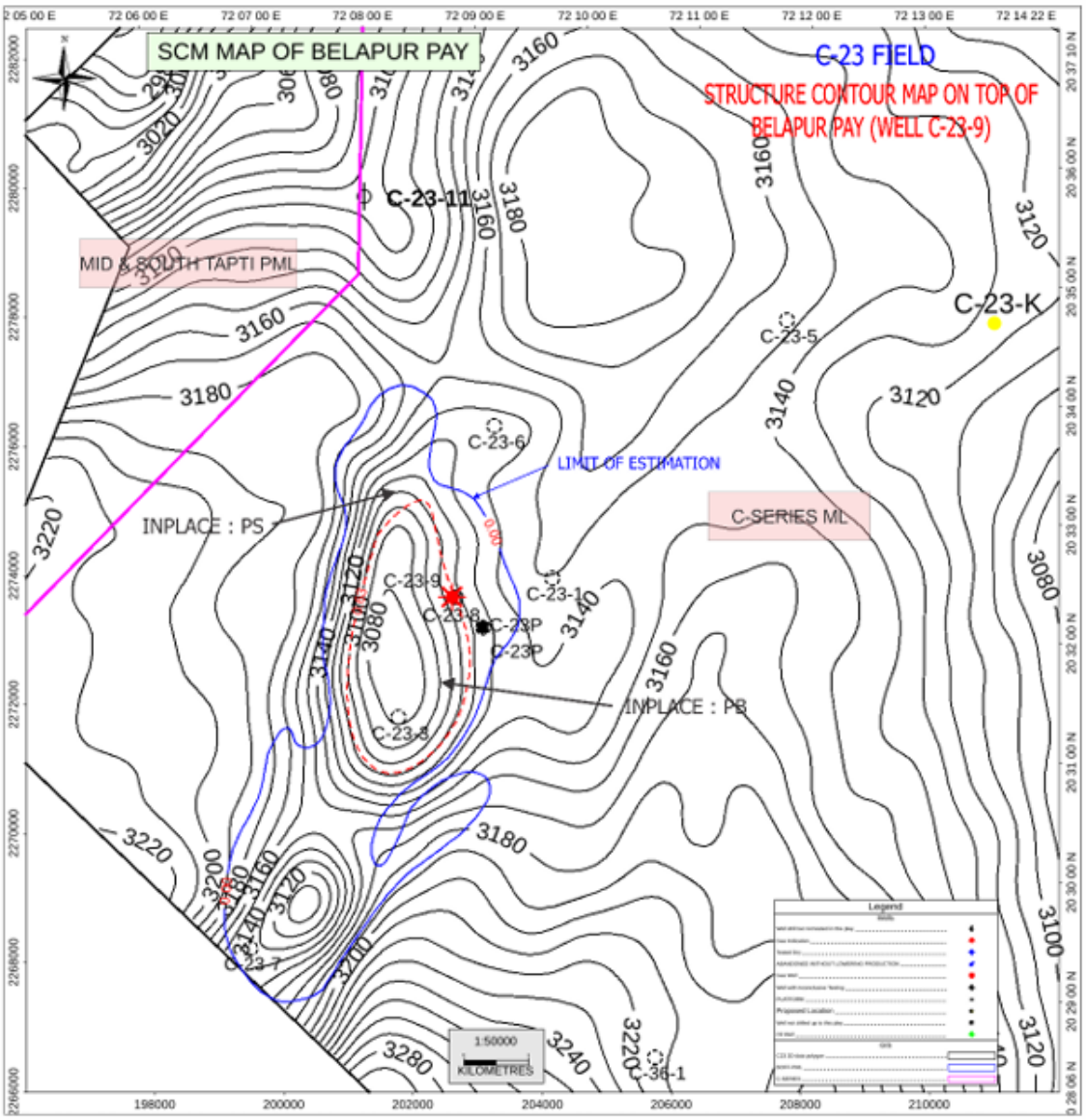


Figure 4-16: Isopay map of Belapur Pay

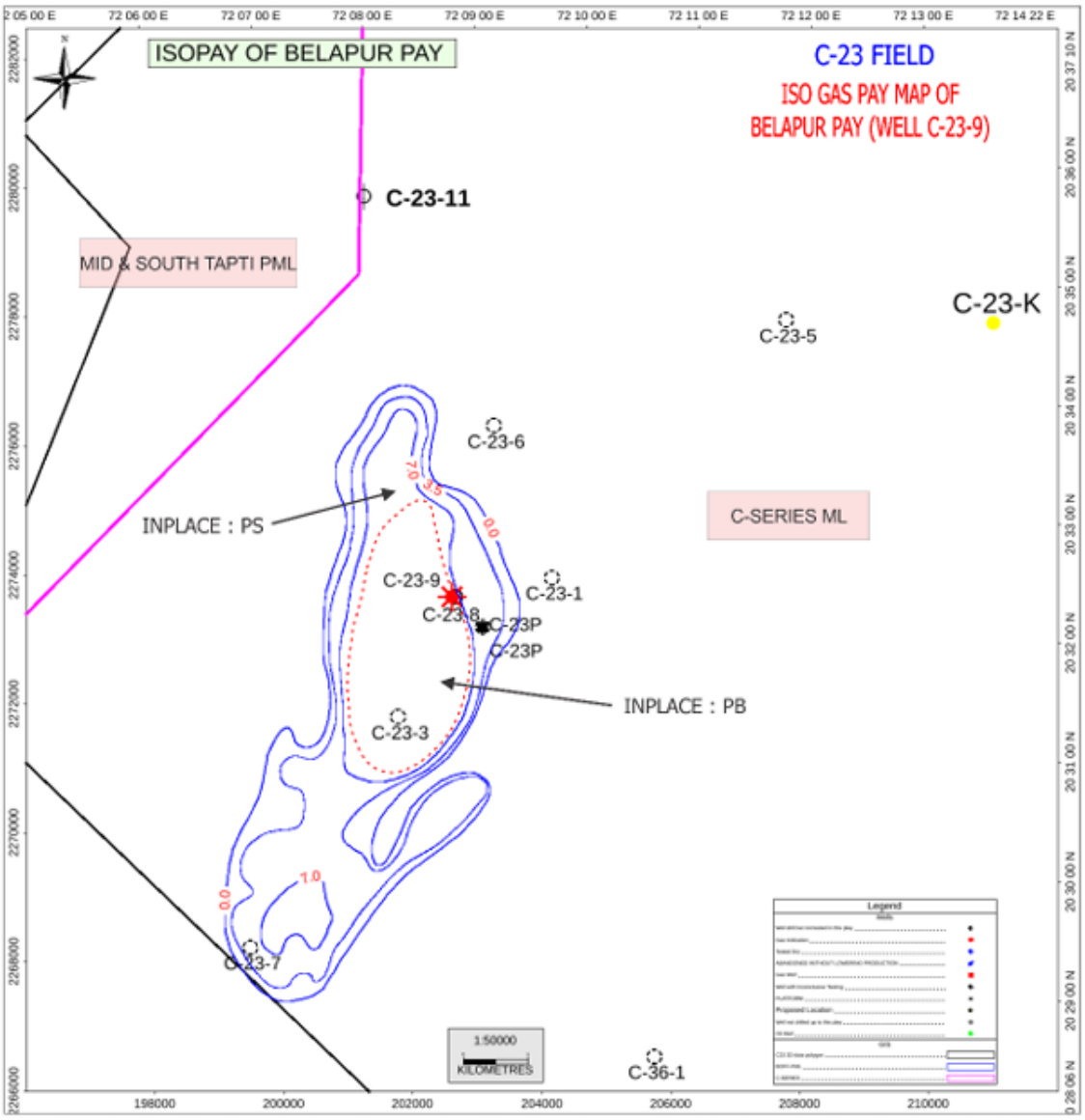


Figure 4-17: Product map of Belapur Pay

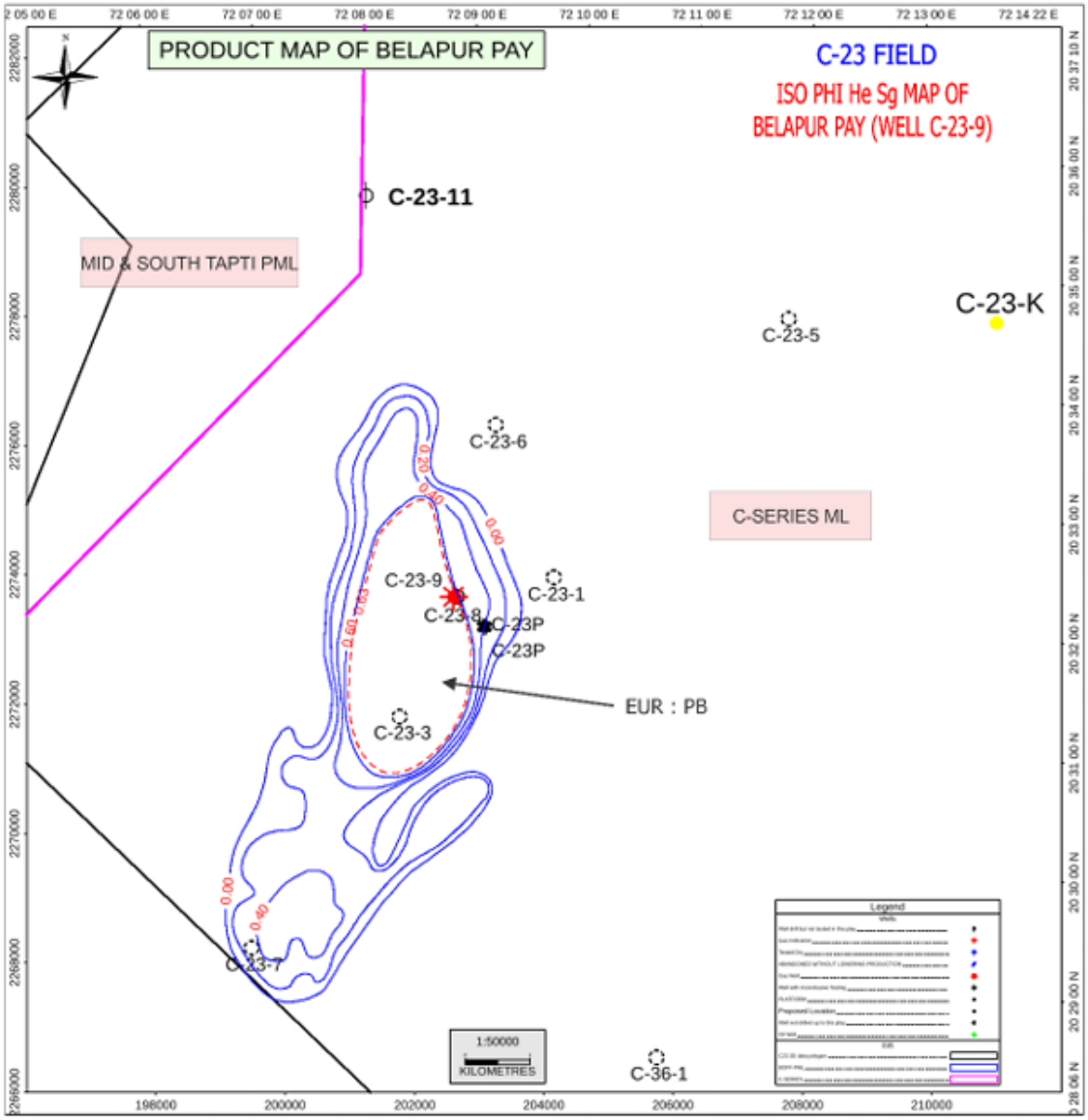


Table 4-11: The Stratigraphic sequence encountered in this well is as follows

Age	Formation	Interval MD-KB (m)	Thickness (m)	Lithology
Middle Miocene to Recent	Chinchini & Tapti	SB-1655.5 (SB-1619.7)	1655.5	Mainly clay/claystone, with siltstone and shale towards bottom
Middle Miocene	Mahim (H1C)	1655.5-2126 (1619.7-2090.2)	470.5	Dominantly shale with limestone intercalations at places and minor siltstone at bottom
Upper Oligocene	Daman (H3)	2126-2416 (2090.2-2380.2)	290	Interbedded sandstone, siltstone, shale and claystone
Lower Oligocene	Mahuva (H3G)	2416-3160 (2380.2-3124.2)	744	Dominantly Claystone with siltstone intercalation.
Paleocene to Eocene	Panna (H4)	3160-4580+ (3124.2-4544.2+)	1420+	Dominantly Shale/Claystone at top part, Siltyshale with Limestone intercalations in middle and sandy claystone towards bottom.

(Depths in bracket are in MSL)

Stratigraphic Correlation

Table 4-12: Stratigraphic correlation in C23 structure

Age	Formation	C-23-1 (KB: 30.70m)	C-23-1A (KB: 33.50m)	C-23-3 (KB: 30.80m)	C-23-6 (KB: 29.40m)	C-23-8 (KB: (34.90m)	C-23-9 (KB: 35.80m) Planned	C-23-9 (KB: 35.80m) Actual
Mid. Miocene To Recent	Chinchini& Tapti	SB-1648.5 (-1617.8)	SB-1648.5 (-1615)	55-1673 (24.2-1642.2)	SB-1626 (SB-1596.6)	SB-1648.6 (SB-1613.7)	SB-1645.8 (SB-1610)	SB-1655.5 (SB-1619.7)
Middle Miocene	Mahim	1648.5-2105.5 (1617.8-2074.8)	1648.5-2110 (1615-2076.5)	1673-2147.5 (1642.2-2116.7)	1626-2083 (1596.6-2053.6)	1648.6-2118.5 (1613.7-2083.6)	1645.8-2120.8 (1610-2085)	1655.5-2126 (1619.7-2090.2)
Upper Oligocene	Daman	2105.5-2428 (2074.8-2397.3)	2110-2430+ (2076.5-2396.5)	2147.5-2477 (2116.7-2446.2)	2083-2401 (2053.6-2371.6)	2118.5-2414.3 (2083.6-2379.4)	2120.8-2380.8 (2085-2345)	2126-2146 (2090.2-2380.2)
Lower Oligocene	Mahuva	2428-2641+ (2397.3-2610.3)	--	2477-2730+ (2446.2-2699.2)	2401-2610+ (2371.6-2580.6)	2414.3- (2379.4-	2380.8-3235.8 (2345-3200)	2146-3160 (2380.2-3124.2)
Paleocene to Eocene	Panna	--	--	--	--	--	3235.8-4335.8 (3200-4300)	3160-4580+ (3124.2-4544.2+)
Upper Cretaceous	Basement	--	--	--	--	--	4335.8- (4300-	
TD		2641	2430	2730	3610		4580	4580

**** Depths given in bracket are in MSL.***

4.1.6 Reservoir parameters and hydrocarbon estimates C-23-9 Field:

The estimates of hydrocarbon in-place have been worked out under various field assumptions, and all inputs, working and results, as available and sourced are presented in the following section.

The Petrophysical parameters used in volumetrics are provided below in **Table 4-13 and Table 4-14**.

Table 4-13: Petrophysical and Fluid parameters of C-23-9

Petrophysical parameters and wellbore estimates for C-23-9	
Interval.	3159.5-3149.5m
Area:	21.71 SqKM
Thickness:	8m
Effective porosity:	12.2
Sw reading	52%
API:	38.76 degree
Sp.gravity:	0.83108
Bg:	0.005312 rm3/sm3

Table 4-14: Hydrocarbon In-Place estimates (2P)

Field	**O+OEG, MMTOE**
C-23-9	**1.91**

Erstwhile Operator-reported estimates on record:

The field, C-23-9 has a hydrocarbon estimate (O+OEG) **1.24 MMTOE**.

All these hydrocarbon estimates are subject to future assessments based on Operator's own technical insights and additional information/data, which may warrant possible revision of the currently reported estimates.

4.1.7 Production Facility for Oil and Gas Evacuation:

Approachable from the existing C-23 Well Head Platform (WHP).

MUMBAI OFFSHORE C-39-14 FIELD

4.2 DESCRIPTION OF MUMBAI OFFSHORE C-39-14 FIELD

The exploratory well C-39-14 (C-39-V) was drilled in 2012 with the objective to explore the hydrocarbon potential of clastic reservoirs of Mahim (MBS), Daman and Mahuva Formations. This well was released as an exploratory 'B' category location targeted to a depth of 2138 m. The well was drilled through Chinchini, Tapti, Mahim, MBS, Daman, Mahuva and Lower Mahuva formations & it was terminated at a depth of 2138 m (MD) as planned. The well is located in the eastern part of C-39 structure, in Tapti-Daman sub-basin in western offshore.

C-39-14 field (**Figure 4-18, Figure 4-19 and Figure 4-20**) covers an area of **188.16** Sq. km. The co-ordinates of the endpoints defining the cluster boundary are tabulated below in **TABLE 4-15**

Table 4-15: Coordinates of C-39-14 field

	C-39-14 Boundary Points		
	Area: 188.76 sq km		
	Point	**Longitude**	**Latitude**
	A	72°39′0.000″ E	21°0′0.000″ N
	B	72°39′0.000″ E	20°58′0.000″ N
	C	72°38′0.000″ E	20°58′0.000″ N
	D	72°38′0.000″ E	20°55′0.000″ N
	E	72°37′0.000″ E	20°55′0.000″ N
	F	72°37′0.000″ E	20°52′0.000″ N
	G	72°36′0.000″ E	20°52′0.000″ N
	H	72°36′0.000″ E	20°49′0.000″ N
	I	72°35′0.000″ E	20°49′0.000″ N
	J	72°32′0.000″ E	20°49′0.000″ N
	K	72°32′0.000″ E	21°0′0.000″ N
	A	72°39′0.000″ E	21°0′0.000″ N
SL.No.	**Well**	**Longitude**	**Latitude**
1	C-39-14	72°32′29.470″ E	20°55′1.900″ N

Figure 4-18: Contract Area map of C-39-14

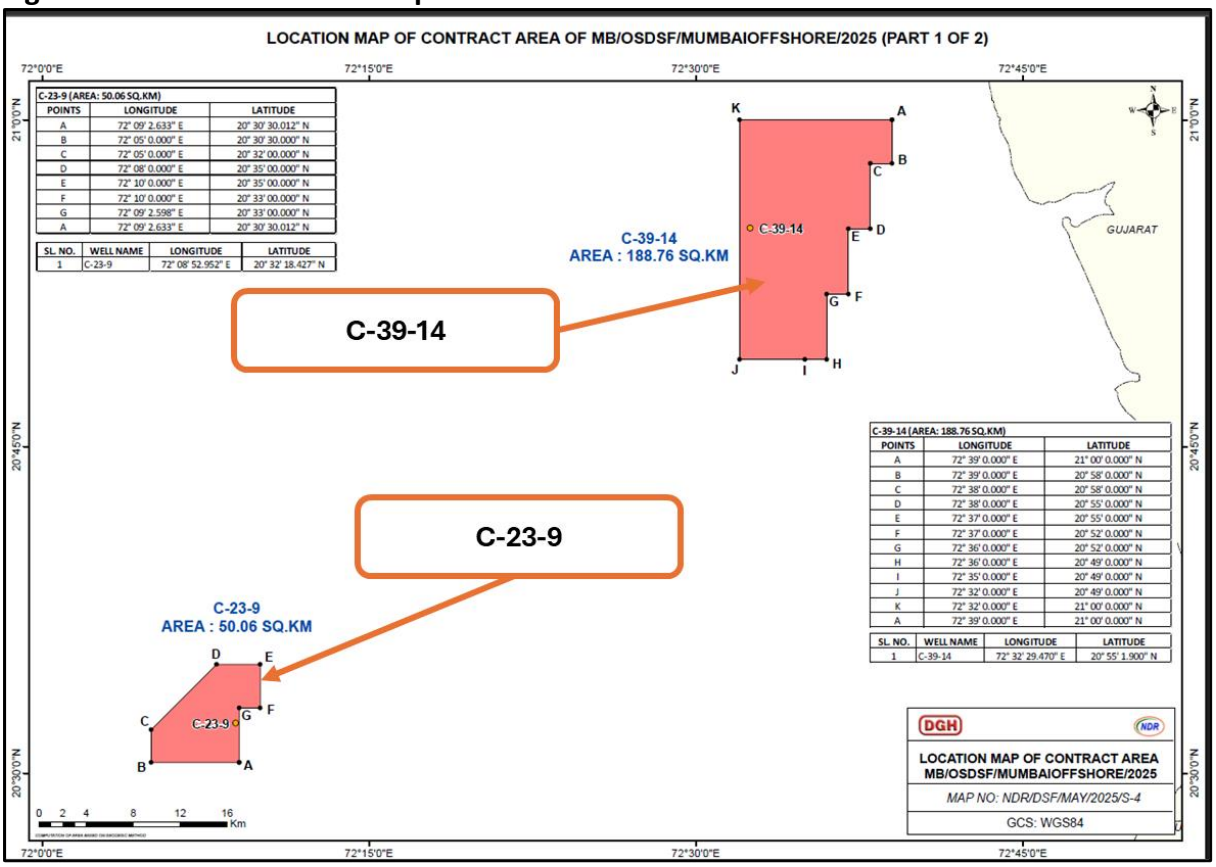


Figure 4-19: Location map of C-39-14

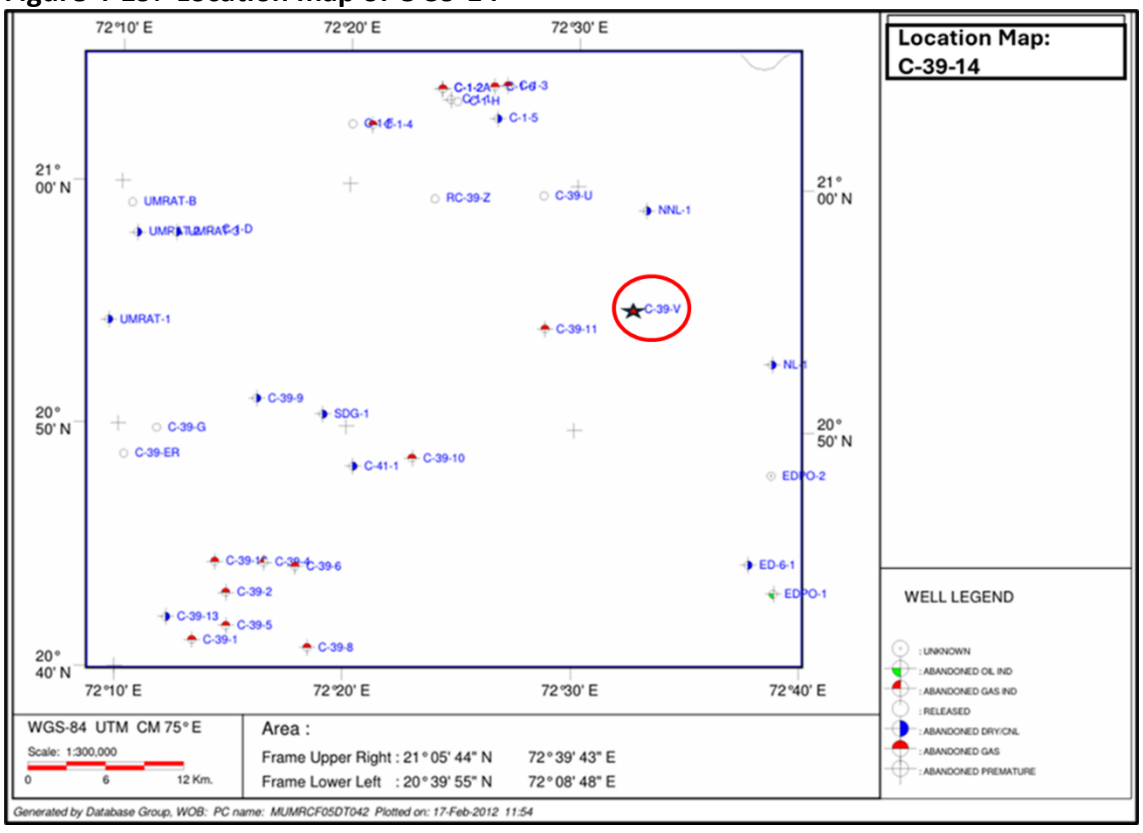
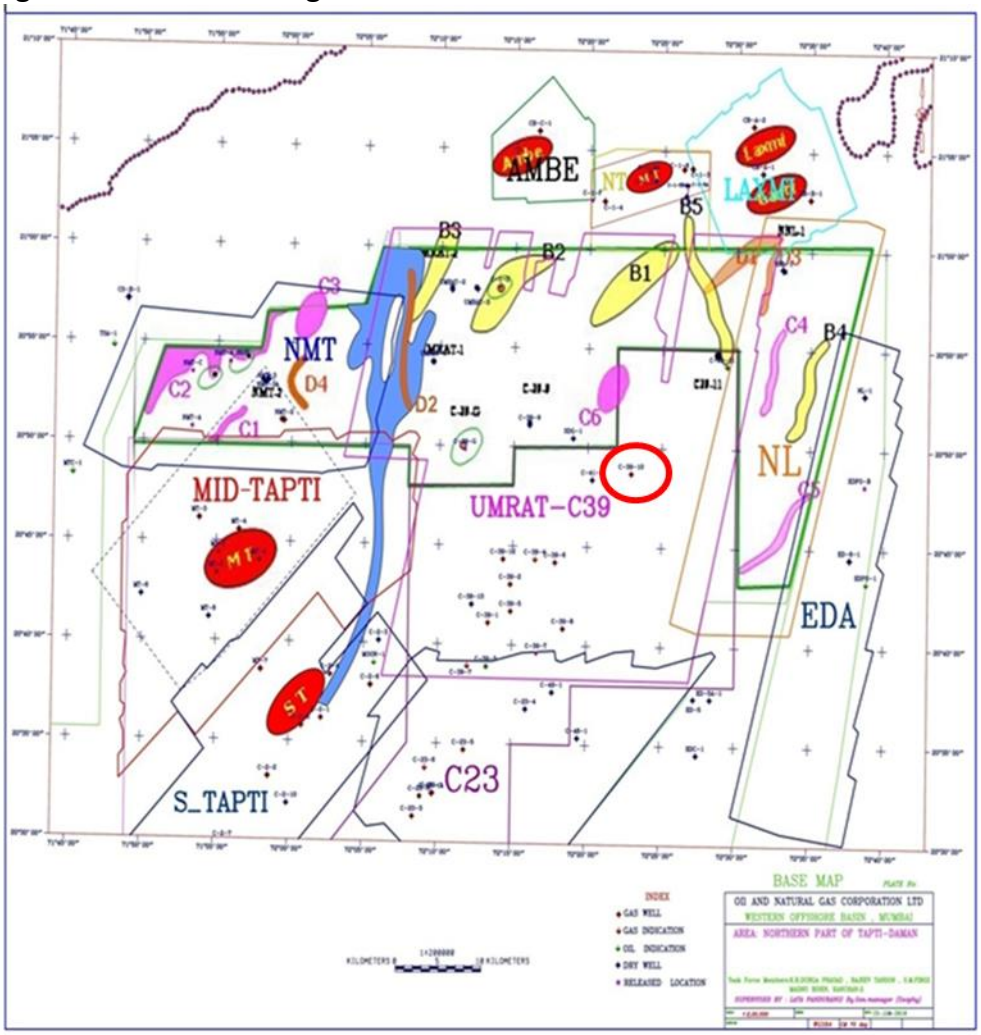


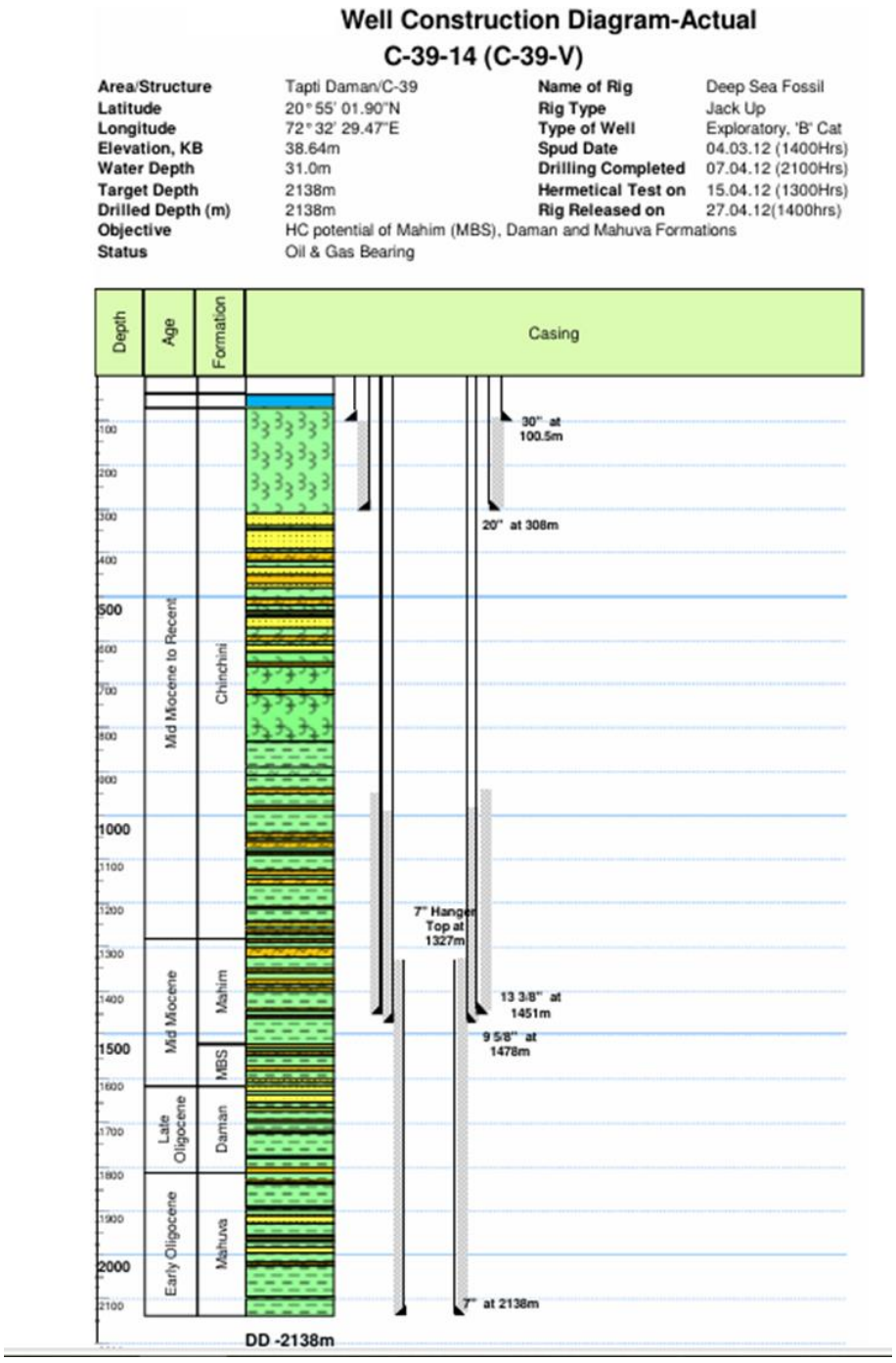
Figure 4-20: Surrounding Oil and Gas Fields of C-39-14



4.2.1 Drilling and well completion

Key information of drilled wells have been collated and presented hereunder. The adjoining figures wherever shown illustrate the Well Construction Diagram (**Figure 4-21**) and the Litho-column Information for key wells. Other well statics like kelly bush reference depth, water depth, drilled and logged depth including well coordinates are made available in Sections through various cross-references.

Figure 4-21: Well profile of C-39-14 :



4.2.2 Well logging and formation evaluation

The well logs of all discovery wells along with some key wells in the contract area have been reviewed. The logs recorded in various open-hole sections along with cased-hole logs and information of conventional and other wireline formation test data are presented in this docket. The availability of key input reports like Well Completion Reports (WCR) and Formation Evaluation Report (FER) have been checked and information given. Reservoir parameters of interesting zones and results of the tested zone(s) have been included in this report. Log motifs of tested/ interesting zone of key wells are also appended.

A| Well completion and log evaluation reports availability (C-39-14) :

WCR/ FER availability	Spud date	KB	Drilled depth
Both available	04.03.2012	38.6 m	2138 m

B| Well logs acquired (C-39-14) :

Table 4-16: Logs acquired in C-39-14

No	Hole / Casing Size (inch)	Date	Interval (m)	Logs	Remarks
1.	17 ½" Hole	17.03.2012	1457.1-307.5	GR-RTEX-CN-ZDL-DAL-SP-CAL	BHT: 157°F at 1423 m MF Sal: 14866 ppm as NaCl RM: 0.29 ohm-m @ 89°F RMF: 0.26 ohm-m @ 89°F RMC:0.31 ohm-m @ 89°F
2.	8 ½" Hole	07.04.2012	2139-1477.8	GR-RTEX-XMAL-MLL-SP-CAL	BHT: 186.9°F at 2106.78 m MF Sal: 17060 ppm as NaCl RM: 0.042 ohm-m @ 80°F RMF: 0.031 ohm-m @ 80°F RMC:0.078 ohm-m @ 80°F
3.	8 ½" Hole	08.04.2012	2138.24-1477.8	GR-CN-ZDL	BHT: 198.7°F at 2131.31 m MF Sal: 17060 ppm as NaCl RM: 0.042 ohm-m @ 80°F RMF: 0.031 ohm-m @ 80°F RMC:0.078 ohm-m @ 80°F
4.	8 ½" Hole	08.04.2012	2110-1600	VSP	Recorded in 15 m interval
5.	8 ½" Hole	08.04.2012-09.04.2012	1994-1774.48	RCI	Pretest recorded at 19 points and sample collected at 6 points.
6.	8 ½" Hole	09.04.2012	1600-400	VSP	Recorded in 15 m interval
7.	7" Liner Casing	14.04.2012-	2102-1361	CBL-VDL-GR	BHT: 204°F at 2089 m.

No	Hole / Casing Size (inch)	Date	Interval (m)	Logs	Remarks
		15.04.2012			Pressure pass recorded in the interval 2102.5-1650 m
8.	7" Liner Casing	18.04.2012-19.04.2012	1875-1600	CCL-GR	Depth correlation for Obj-1 perforation

VSP Survey: VSP survey was recorded in the interval 2210 – 400 m @ 15 m interval.
Conventional Core Data: Conventional Cores were not taken in this well.
Side Wall Core Data: Side Wall Cores were not taken in this well.

C| Well log evaluation and initial test results (C-39-14):

The objective of the well was to explore hydrocarbon potential of Mahim (MBS), Daman and Mahuva Formations. The formation Evaluation of this well is presented below:

Lower Mahuva Formation: (1995 - 2135 m)

It belongs to early Oligocene age. This section consists of mainly shale. The top of this formation is at 1995 m. At the top of this formation, this well is structurally up by 91 m and 29 m w.r.t. well nos. C-39-11 & NNL-1, respectively. The resistivity is in the range of 0.8 – 2.0 Ω-m. This section is non-reservoir & not interesting from the hydrocarbon point of view.

Mahuva Formation: (1995-1810 m)

Mahuva Formation belongs to early Oligocene age. The top of this formation is at 1810 m. At the top of this formation, this well is structurally up by 93 m and 48 m w.r.t. well nos. C-39-11 & NNL-1, respectively.

1995.0-1983.5 m: Lithology is dominantly Sandstone with Vclay is in the range of 0-8% and porosity is in the range of 25-30%. The interval 1984.0-1984.5 m is marginally saturated with hydrocarbon with Sw in the range of 85-100%. Rest of the interval is water bearing. 2 nos. of RCI samples were collected at 1984.5 m and at 1990.0 m which yielded muddy grey water. The formation pressure is 2991 PSI @ 1990.0 M. From the pre-tests data, it is interpreted that the formation has good permeability.

1983.5-1927.0 m: Lithology is dominantly Sandstone and Shale sequence. The intervals 1981.0-1979.0 m, 1972.0-1971.0 m, 1965.0-1964.0 m, 1962.0-1960.0 m, 1958.5-1957.5 m, 1951.0-1949.0 m and 1933.0-1932.0 m consists of mainly Sandstone with Vclay is in the range of 10-25%. All these Sandstone intervals are water bearing. Rest of the intervals consist of mainly shale. One RCI sample was collected at 1960.4 m which yielded muddy grey water. The formation pressure is 2834 PSI @ 1960.4 M.

1927.0-1910.0 m: Lithology is dominantly Sandstone with Vclay is in the range of 5-25% and porosity is in the range of 15-30%, except the intervals 1915.0-1914.0 m and 1913.0-1912.0 m which consists of shale.

The interval 1927.0-1919.5 m is water bearing with Sw in the range of 90-100%. Vclay is in the range of 5-10% and porosity is in the range of 25-30%. One RCI sample was collected at 1920.5 m which yielded muddy grey water. The formation pressure is 2750 PSI @ 1920.5 M.

The interval 1919.5-1917.0 m is marginally saturated with hydrocarbon with Sw in the range of 80-85%. Vclay is in the range of 25-30% and porosity is in the range of 15-20%.

The interval 1917.0-1915.0 m is oil bearing with Sw in the range of 40-45%. Vclay is in the range of 5-10%

and porosity is in the range of 25-28%. One RCI sample was collected at 1915.8 m which yielded Oil(450 ml) & Gas, out of 750 ml sample collected. The formation pressure is 2746 PSI @ 1915.8 M.

The interval 1914.0-1913.0 m is oil bearing with Sw in the range of 65-70%. Vclay is in the range of 10-15% and porosity is about 18%.

The interval 1912.0-1910.0 m is oil bearing with Sw in the range of 50-60%. Vclay is in the range of 5-10% and porosity is in the range of 22-25%. One RCI sample was collected at 1911.0 m which yielded Oil (550 ml) & Gas, out of 550 ml sample collected. The formation pressure is 2750 PSI @ 1911.0 M.

The intervals 1915.0-1914.0 m & 1913.0-1912.0 m consist of shale.

1910.0-1810.0 m: : Lithology is dominantly Clay/Claystone/Shale except the interval 1897.0-1895.0 m which is dominantly Sandstone with Vclay is in the range of 10-35% and porosity is in the range of 10-22%. This interval is water bearing. Rest of the section is non-reservoir.

Daman Formation: (1810-1611 m)

Daman Formation belongs to Late Oligocene age. The top of this formation is at 1611 m. At the top of this formation, this well is structurally up by 60 m and 47 m w.r.t. well nos. C-39-11& NNL-1, respectively.

1810.0-1777.0 m: Lithology is dominantly Clay/Claystone/Shale. It is non-reservoir.

1777.0-1773.0 m: Lithology is dominantly Sandstone with Vclay is in the range of 0-10% and porosity is in the range of 28-30%. This interval is water bearing. The formation pressure obtained in the pre-test with RCI is 2423 PSI @ 1774.5 M.

1773.0-1672.0 m: Lithology is dominantly Clay/Claystone/Shale. It is non-reservoir.

1672.0-1670.0 m: Lithology is dominantly Sandstone with Vclay is in the range of 5-12% and porosity is in the range of 25-30%. This interval is water bearing.

1670.0-1649.0 m: Lithology is dominantly/Shale. It is non-reservoir.

1649.0-1640.5 m:: Lithology is dominantly Sandstone with Vclay is in the range of 0-10% and porosity is in the range of 20-32%. This interval is water bearing. However, the interval 1648.0-1646.0 m is shale.

1640.5-1622.0 m: Lithology is dominantly/Shale. It is non-reservoir.

1622.0-1611.0 m: Lithology is dominantly Sandstone with Vclay is in the range of 0-5% and porosity is in the range of 28-32%. This interval is water bearing. However, the intervals 1617.0-1615.5 and 1614.5-1613.5 m comprise of mainly shale.

MBS (Mahim) Formation: (1611-1520 m)

This formation belongs to Middle Miocene age.

1611.0-1600.0 m: Lithology is dominantly Sandstone with Vclay is in the range of 6-30% and porosity is in the range of 20-25%. This interval is water bearing.

1600.0-1545.5 m: Lithology is dominantly Clay/ Clay Stone//Shale. It is non-reservoir.

1545.5-1543.0 m: Lithology is dominantly Sandstone with Vclay is in the range of 0- 5% and porosity is in the range of 30-32%. This interval is water bearing.

1543.0-1520.0 m: Lithology is dominantly Clay/ Clay Stone//Shale. It is non-reservoir.

Mahim Formation: (1520-1284 m)

This formation belongs to Middle Miocene age.

Lithology is dominantly Clay/ Clay Stone//Shale/Silty Shale/Silt Stone. The entire interval is non-reservoir

Tapti/Chinchini Formation: (1284.0 – 308.0 m)

Lithology is dominantly Clay/ Clay Stone/Shale/Silty Shale/ Silt/ Silt Stone. The resistivity is in the range of 0.6 – 1.5 Ohm-m. The entire interval is non-reservoir.

Elan processed results indicate that the intervals 1917.0-1915.0 m , 1914.0-1913.0 m & 1912.0-1910.0 m of Mahuva formation are hydrocarbon bearing having Sw in the range of 40-70%, Porosity in the range of 18-28% and Vclay in the range of 5-15%.

One object was approved for production testing in this well by TCP-DST, in the intervals 1917.0-1915.0 m (2 m), 1914.0-1913.0 m (1 m) & 1912.0-1910.0 m (2m). It was perforated @ 12 SPF, with TCP.
Object-I produced Oil @ 294 BPD and Gas @ 94900 m^3/day through ½" Choke with FTHP of 1150 PSI. The API Gravity of Oil was 52 ^{0} & STHP was 1300 PSI.

Log motifs of C-39-14 are placed at **Figure 4-22 and Figure 4-23.**

Figure 4-22: Well log motif of C-39-14 :

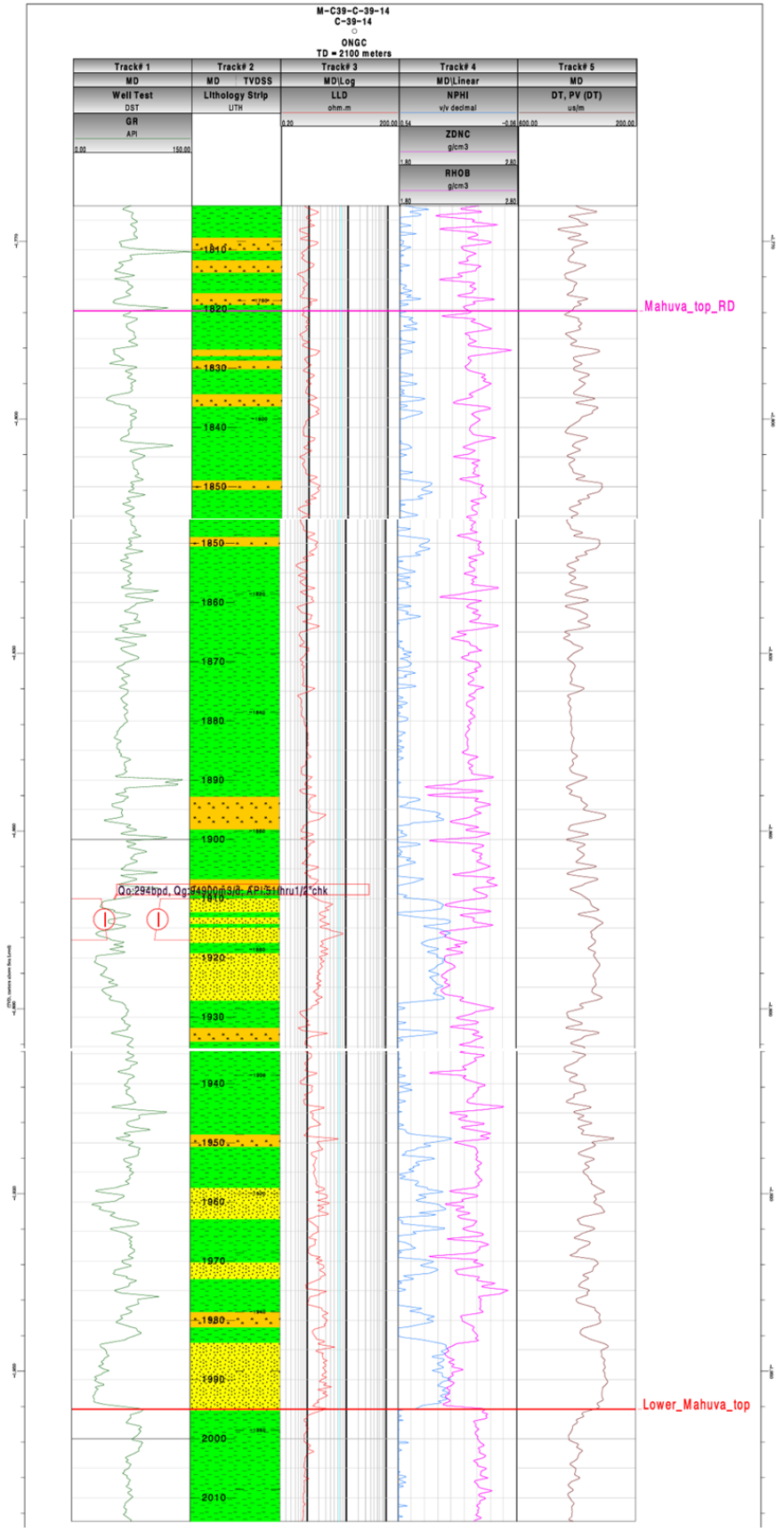
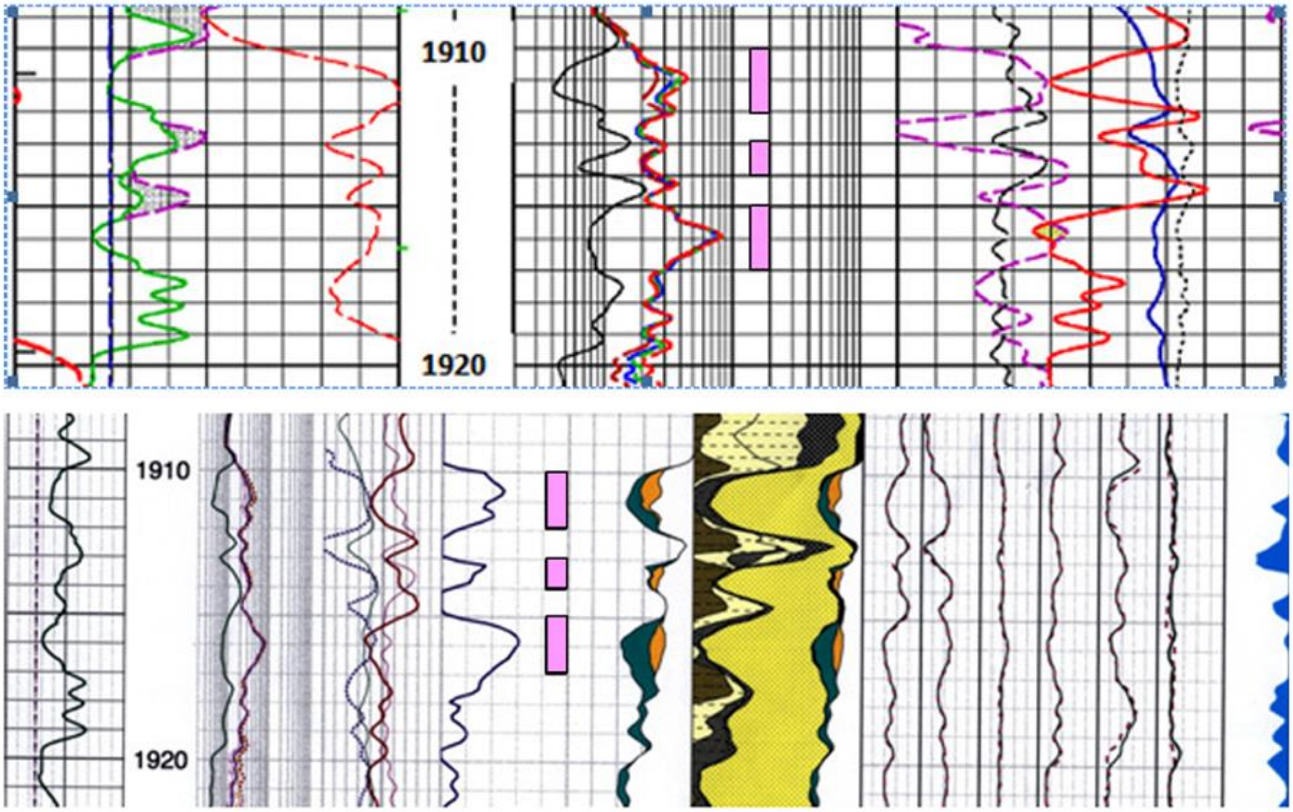


Figure 4-23: LOG MOTIF and ELAN OF OBJ-I (1917-1915m, 1914-1913m, 1912-1910m, Mahuva Formation)



4.2.3 Well testing and workover history

One object was tested by TCP-DST in this well C-39-14. The Object-I, in the intervals: 1917.0 – 1915.0 m, 1914.0 – 1913.0 m and 1912.0 – 1910.0 m of Mahuva Formation was perforated with TCP @ 12 SPF and produced Oil @ 294 BPD and Gas @ 94900 m3/day through ½" Choke with FTHP of 1150 PSI. The API Gravity of Oil was 52 degree & STHP was 1300 PSI.

The brief production testing results are tabulated below in (**Table 4-17**) :

Table 4-17: Testing Results of C-39-14 (Object-I)

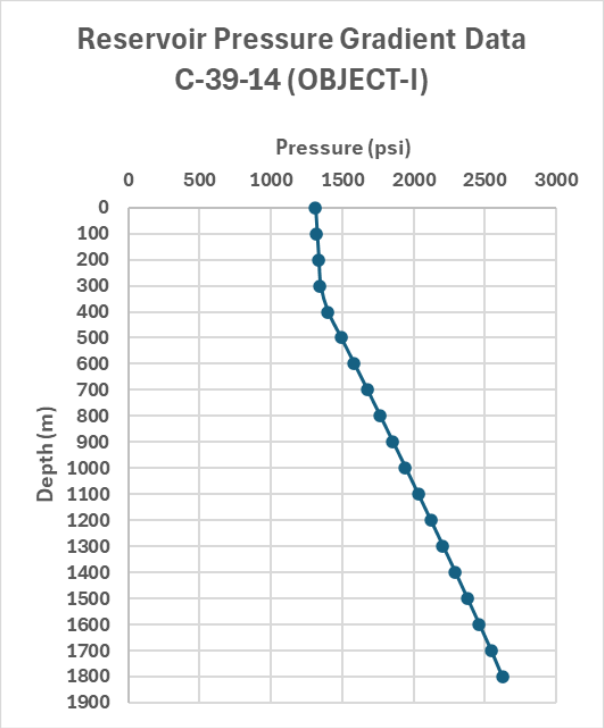
Object	*Choke size*	FTHP (PSI)	FTHT (ºF)	Oil (BPD)	Gas (m^3/d)	TG (%)	API Gravity
Object-I Mahuva Sandstone, Siltstone **1917.0 – 1915.0 m, 1914.0 – 1913.0 m, 1912.0 – 1910.0 m (Total 5m)**	*1/4"*	1260	90	20	37730	-	51
	3/8"	1200	95	198	61800	-	51
	1/2 "	1150	110	294	94900	-	51

Note: STHP- 1300 PSI.

FLT Data analysis (Figure 4-24 and Table 4-18):

The flow-line temperature plot against depth displays an overall positive gradient, with temperature increasing with depth. Some localized deviations (at 965 m and 2042 m) from the trend are attributed to pull-out for wiper trips and bit change. The sharp drop in temperature at 1458 m is because of 13 3/8" casing test failure. The trend does not reflect any abnormal temperature, which in turn indicates a normal pressure regime.

Figure 4-24: Pressure and Temperature gradient in C-39-14



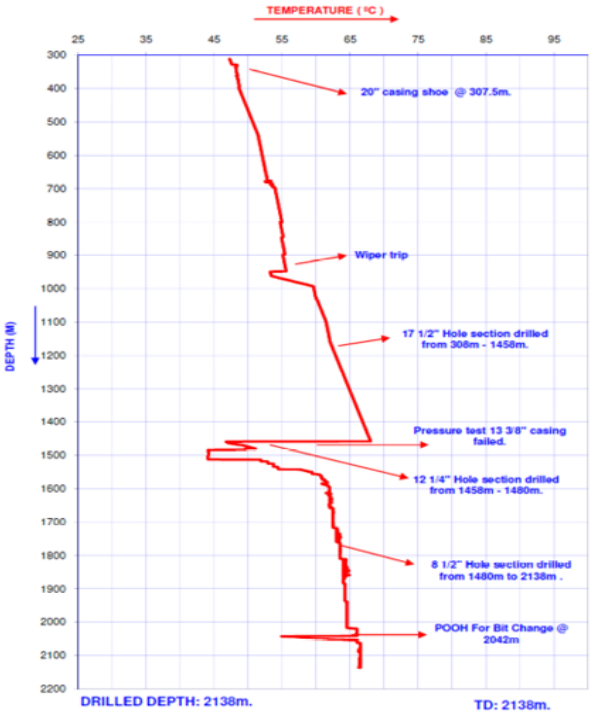


Table 4-18: Reservoir Pressure Gradient Data C-39-14 (OBJECT-I)

Reservoir Pressure Gradient Data C-39-14 (OBJECT-I)			
Perforation Interval (m)	**1917-1915m, 1914-1913m, 1912-1910m**		
Formation/Lithology	**Mahuva/Siltstone, Sandstone**		
Depth (m)	**Pressure (psi)**	**Gradient (psi/m)**	**Gradient (psi/ft)**
1800	2621.367		
1700	2543.608	0.778	0.237
1600	2460.497	0.831	0.253
1500	2376.865	0.836	0.255
1400	2292.014	0.849	0.259
1300	2205.927	0.861	0.262
1200	2118.719	0.872	0.266
1100	2031.282	0.874	0.266
1000	1942.988	0.883	0.269
900	1853.781	0.892	0.272
800	1763.819	0.900	0.274
700	1673.353	0.905	0.276
600	1581.685	0.917	0.279
500	1489.199	0.925	0.282
400	1396.585	0.926	0.282
300	1344.667	0.519	0.158
200	1332.658	0.120	0.037
100	1320.621	0.120	0.037
0	1309.316	0.113	0.034

4.2.4 Reservoir engineering studies and analysis

Key reservoir engineering datasets, wherever available have been collated and presented under various data genres. In a comprehensive data presentation, the results are included from well tests, formation dynamics tests, reservoir pressure build-up study and PVT data/ results.

The following is the summary of Fluid Samples collection and analysis details in **Table 4-19**.

Table 4-19: Fluid Samples collection and analysis for C-39-14

Samples	Depth m MD	Sample Type	Fluid Volume (CC)	Sample Resistivity (OHMM)@ DEG F
1	1990.0	Muddy Grey/Water	700	0.248 @ 76.0 DEG F
2	1984.5	Muddy Grey/Water	800	0.415 @ 75.5 DEG F
3	1960.4	Muddy Grey/Water	830	0.675 @ 75.0 DEG F
4	1920.5	Muddy Grey/Water	700	0.347 @ 75.0 DEG F
5	1915.8	Oil(450 ml) & Gas	750	Out of range
6	1911.0	Oil(550ml) & Gas	550	Out of range

Formation dynamics tests (C-39-14)

RCI Pressure Tests (**Table 4-20**) and Fluid Samples were attempted in 8 ½" section. A total of 19 Pre-tests, which include Sample points, were attempted. All the 19 Pre-tests were good. A total of 6 Fluid Samples were attempted and all the 6 Samples were successfully collected. The details of Pre-tests and Fluid Samples collected are given below.

Table 4-20: RCI data in C-39-14

Sl No	Depth (m)	Formation Pressure (psia)	Test Code	Mobility (mD/cP)	Temperature (°F)	Pump-out Vol (L)	Pump-out Time (min)	Closing Pressure (psi)	Minimum Pressure (psi)	Drawdown vs Hydrostatic (psi)	Drawdown vs Formation (psi)	Remarks
1	1994.0	2972.2	Good	2869	198.62				2986	1096.5	11.2	
2	1993.1	2995.9	Good	3154.4	200.47				2978	1104.5	17.9	
3	1992.0	2994.3	Good	883.8	201.57				2977	1102.4	17.3	
4	1990.0	2991.4	Good	428.6	204.18	31.3	45.4	7191.4	2908	1171.3	83.4	Sample-1
5	1988.0	2988.4	Good	2689.4	204.74				2976	1119.7	12.4	
6	1987.0	2986.8	Good	897.3	204.99				2950	1124.7	36.8	
7	1985.7	2985.0	Good	576	205.22				2890	1178.3	95.0	
8	1984.5	2983.5	Good	1536.4	206.00	21.7	33.3	7183.5	2950	1116.1	33.5	Sample-2
9	1960.4	2834.0	Good	Very High	204.36	30.2	46.7	7034.0	2780	1254.0	54.0	Sample-3
10	1926.0	2756.2	Good	3160	203.20				2743	1216.9	13.2	
11	1923.6	2753.1	Good	1055	202.80				2728	1222.7	25.1	
12	1923.0	2752.5	Good	468.4	202.87				2590	1358.7	162.5	
13	1922.0	2751.5	Good	62	203.01				1900	2050.0	851.5	
14	1924.5	2754.7	Good	917.3	203.12				2720	1239.4	34.7	
15	1920.5	2749.6	Good	132	203.23	31.0	76.7	6949.6	2650	1291.7	99.6	Sample-4

16	1918.5	2747.6	Good	4417.6	203.99				2710	1240.6	37.6	
17	1915.8	2745.7	Good	3585	204.43	36.0	77.8	6945.7	2733	1205.2	12.7	Sample-5
18	1911.0	2750.1	Good	590.7	205.09	35.0	76.7	6950.1	2720	1206.3	30.1	Sample-6
19	1774.5	2423.1	Good	314.4	191.68				2370	1282.1	53.1	

Note: Salinity of mud filtrate during drilling was 90730 ppm as NaCl.

Pressure build-up study

No build up study carried out in this well.

Phase behavior studies and Compositional analysis of gas and oil

During production testing, Object-I (1917-1915m, 1914-1913m, 1912-1910m, Mahuva Formation) flowed oil and gas. Phase behavior studies and Compositional analysis of gas and oil were carried out to determine stream composition and for complete description of the reservoir fluid of the bottom hole sample collected from exploratory well no. C-39-14 from Daman Formation (Object: I,) perforated interval 1917-1915m, 1914-1913m, 1912-1910m).

Summary of analyses of oil and gas from C-39-14 are given in **Table 4-21, Table 4-22, Figure 4-25 and Figure 4-26**

Oil composition analysis

Table 4-21: Summary of Fluid analysis : C-39-14

S.No	SUMMARY OF RESERVOIR FLUID/SAMPLE ANALYSIS Well No: C-39-14 Depth: 1700m Temperature 90 °C	
1	**Reservoir Pressure (kg/cm²)**	**178.799**
2	Reservoir Temperature (°C)	88.95
3	Saturation Pressure At Reservoir Temperature (kg/cm²)	100
4	Iso Thermal Compressibility Of Reservoir Fluid (cc/cc/kg/cm²)	2.8920×10^{-3}
5	Iso Baric Thermal Expansion Of Reservoir Fluid (cc/cc/° C)	8.83×10^{-4}
6	Flash GOR (V/V)	215.6
7	Flash F.V.F At reservoir pressure	1.8264
8	Flash F.V.F At Bubble Point Pressure	2.0246
9	Gas Gravity Of Liberated Gas (Air=1)	1.0928
10	Mean Gas Solubility (cc/cc/kg/cm²)	2.156
11	Stock Tank Oil Density (g/cc) At STP	0.7903
12	Stock Tank API Gravity	47.55
13	Oil Shrinkage of Reservoir Oil	45.247

Gas composition analysis

Table 4-22: Composition analysis of gas liberated from oil of Well No C-39-14

Composition analysis of gas liberated of Well No C-39-14 at 90°C and pressure 190 kg/cm2		
S.No	**Lab S.No**	**139/OT/2012**
1	Methane	51.20
2	Ethane	13.56
3	Propane	17.12
4	Iso-butane	6.41
5	N-butane	5.14

Composition analysis of gas liberated of Well No C-39-14 at 90°C and pressure 190 kg/cm2		
S.No	**Lab S.No**	**139/OT/2012**
6	Iso-pentane	2.10
7	N-Pentane	1.73
8	Hexane+	2.03
9	CO2	0.71
10	Gas gravity (air = 1)	1.0928
11	Molecular weight	31.81
12	Calorific Value (Net) KCal/m3	14933.56
13	Compressibility factor(Z)	0.9910

Figure 4-25:. Geochemical characteristics of crude oils from exploratory well C-39-14

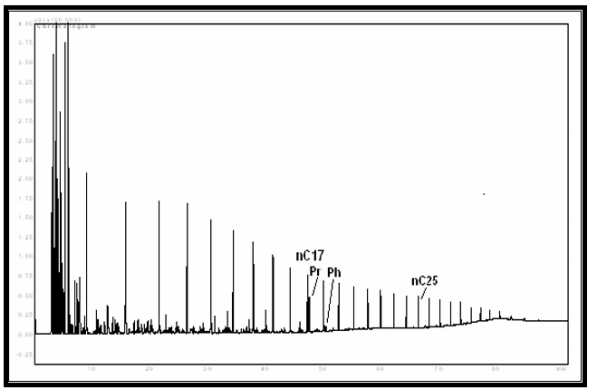


Fig3. GC of Flash oil of well C-39-14 (PVT)

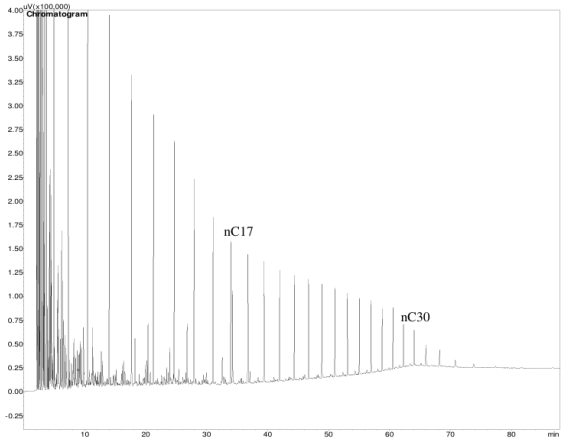
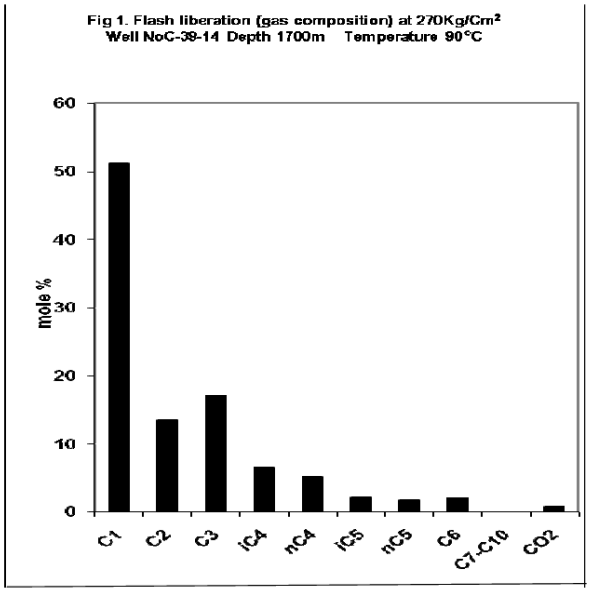


Fig.2: Whole oil Gas chromatogram of C-39-14 (Obj. I, 1917-1915m, 1914-1913m, 1912-1910m)

Figure 4-26:. Composition analysis of gas of Well No C-39-14



4.2.5 Geology and Reservoir Description of C-39-14 Field:

The geology of the area has been comprehensively reviewed using correlations, sections and maps. The well correlation, seismic sections, top structure, seismic attribute/amplitude and net sand/pay maps have been used to illustrate the magnitude and distribution of key reservoir properties in and around the discovered oil/gas pools (accumulations). The local tectonic setting and geological section of the area, wherever available, are also given. These maps/sections are sequentially shown field-wise and reservoir unit-wise through figures, appropriately titled and illustrated in the following section.

Geological correlations, sections and maps (C-39-14 Field):

STRATIGRAPHY

The details of Stratigraphy encountered in this well are as follows (**Table 4-23**):

Table 4-23: Stratigraphy encountered in C-39-14

Age	Formation	C-39-14 (KB: 38.637m)
Recent to mid Miocene	Chinchini	Seabed
Middle Miocene	Tapti	--
	Mahim	1284 (-1245)
	MBS	1520 (-1481)
Late Oligocene	Daman	1611 (-1572)
Early Oligocene	Mahuva	1810 (-1771)
	Lr. Mahuva	1995 (-1956)

Values within parentheses are TVD-MSL depths.

STRATIGRAPHIC CORRELATION

Wire line logs correlation indicates that the current well is structurally up at all levels w.r.t nearby wells C-39-11 & NNL-1. This well is structurally up by 54 m at Mahim, 61 m at MBS (Mahim), 60 m at Daman, 93 m at Mahuva and 91 m at Lower Mahuva levels, respectively w.r.t the well C-39-11. This well is structurally up by 69 m at Mahim, 62 m at MBS (Mahim), 47 m at Daman, 48 m at Mahuva and 29 m at Lower Mahuva levels, respectively w.r.t the well NNL-1.

Structural correlation of well C-39-14 with the nearby wells C-39-11 & NNL-1 is tabulated in **Table 4-24**.

Table 4-24: Structural correlation of C-39 area wells

Formation / Marker	C-39-11 (KB: 29.6m)	C-39-14 (KB: 38.6m)	NNL-1 (KB: 31.7m)	Structural Disposition w.r.t	
				C-39-11	NNL-1
Mahim	1443 (-1299)	1284 (-1245)	1346 (-1314)	54m ▲	69m ▲
MBS (Mahim)	1711 (-1542)	1520 (-1481)	1575 (-1543)	61m ▲	62m ▲
Daman	1803 (-1632)	1611 (-1572)	1651 (-1619)	60m ▲	47m ▲
Mahuva	2037 (-1864)	1810 (-1771)	1851 (-1819)	93m ▲	48m ▲
Lower Mahuva	2225 (-2047)	1995 (-1956)	2017 (-1985)	91m ▲	29m ▲

Values within parentheses are TVD-MSL depths.

Maps given in section below.
Seismic sections along the wells C-39-14 & NNL-1: **Figure 4-27**
Inline 2286 Passing through C-39-14: **Figure 4-28**
Depth structure map of Mahuva Sand in C-39-14: **Figure 4-29**
Oil/Gas Iso Pay map of Mahuva Sand in C-39-14: **Figure 4-30**

Figure 4-27:. Seismic sections along the wells C-39-14 & NNL-1

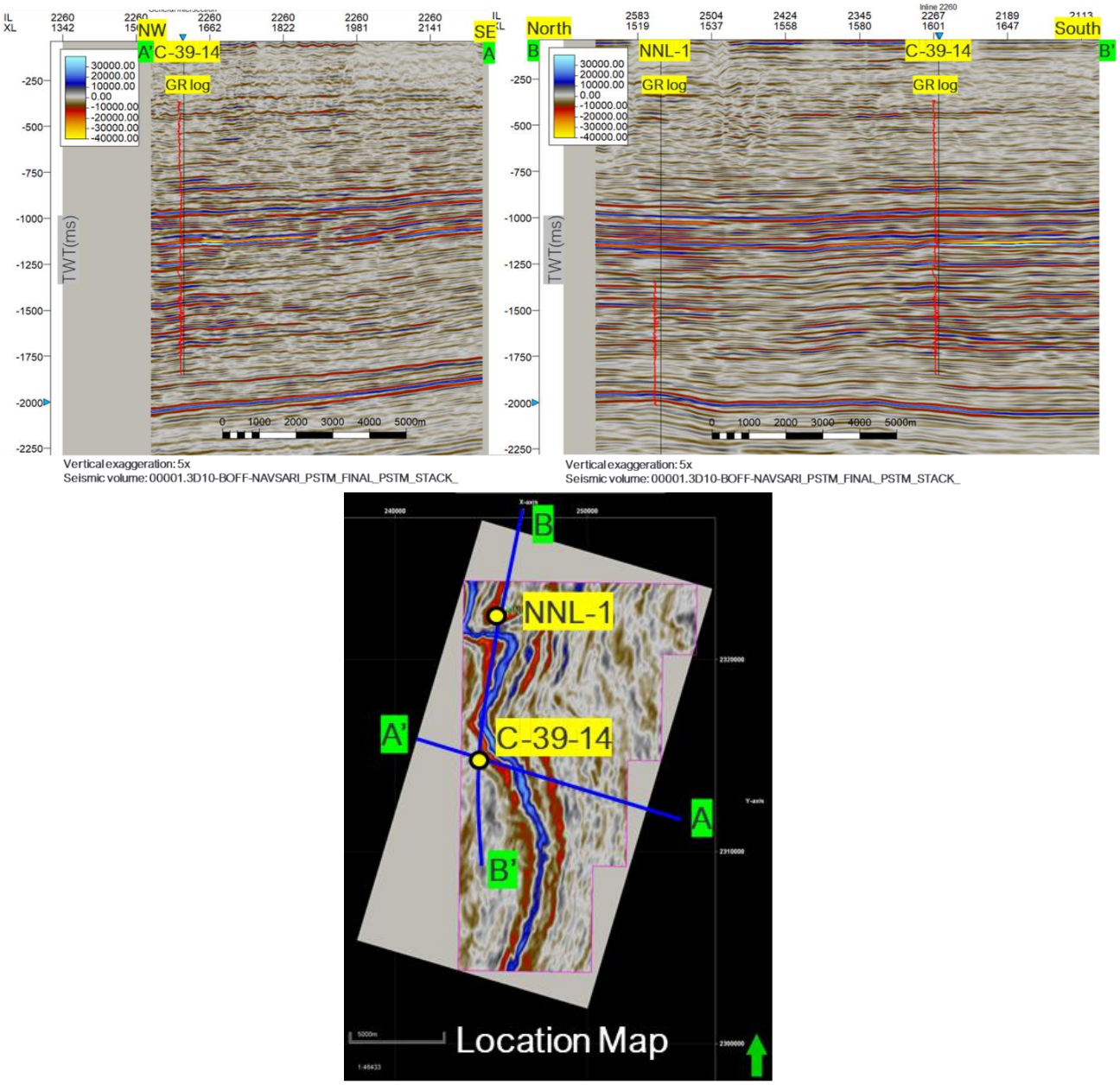


Figure 4-28:.Inline 2286 Passing through C-39-14

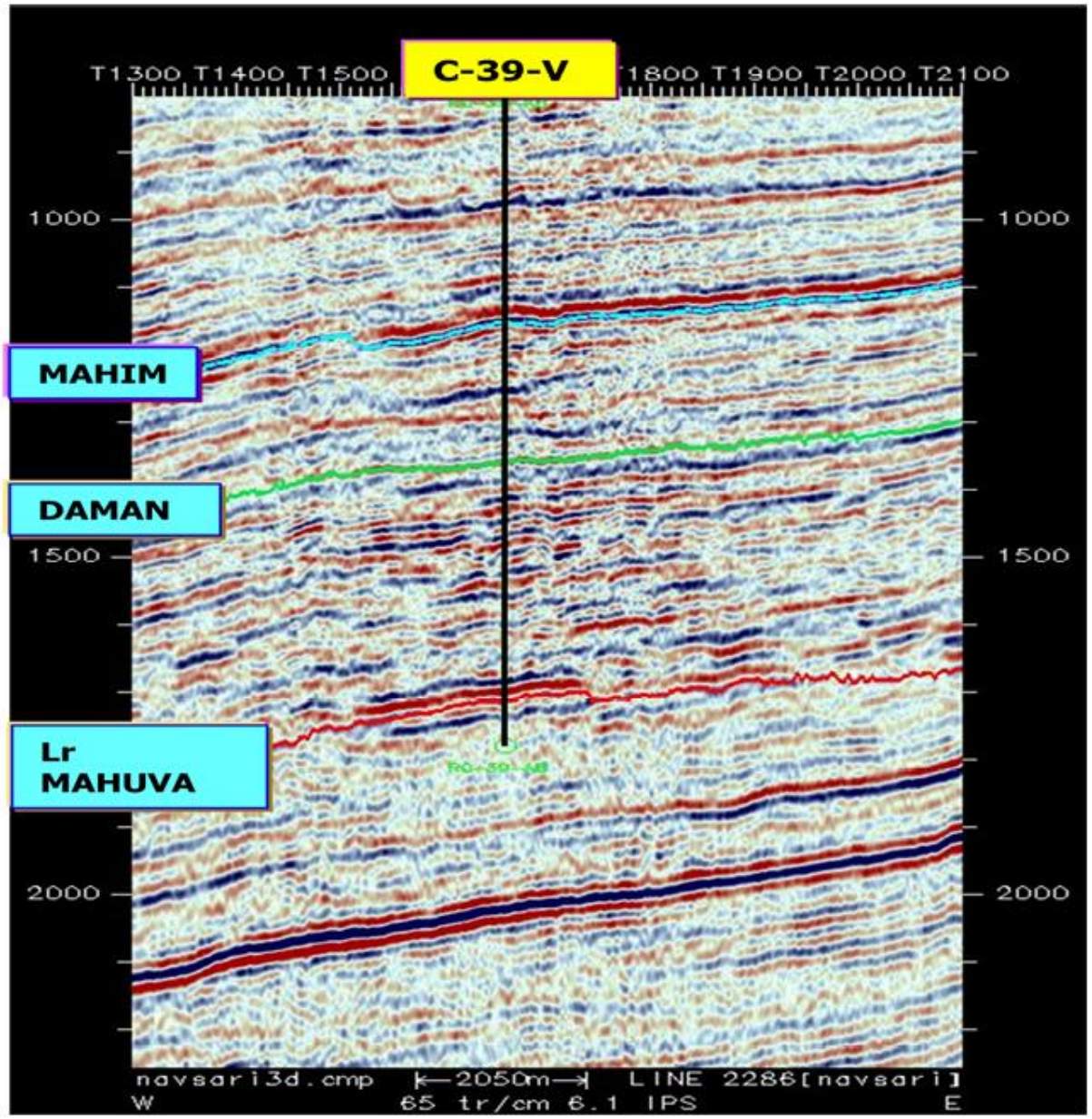


Figure 4-29:.Depth structure map of Mahuva Sand in C-39-14 :

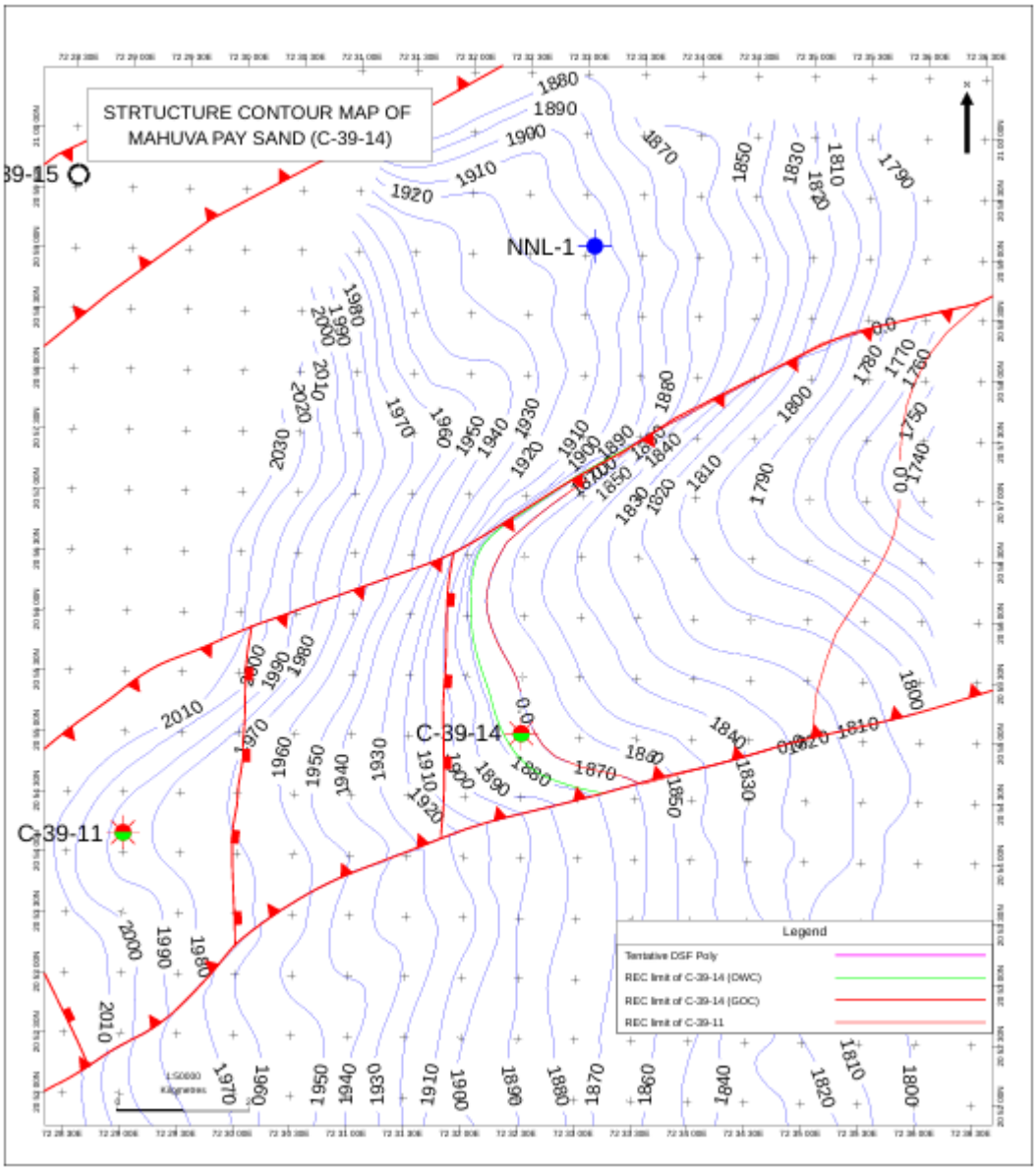
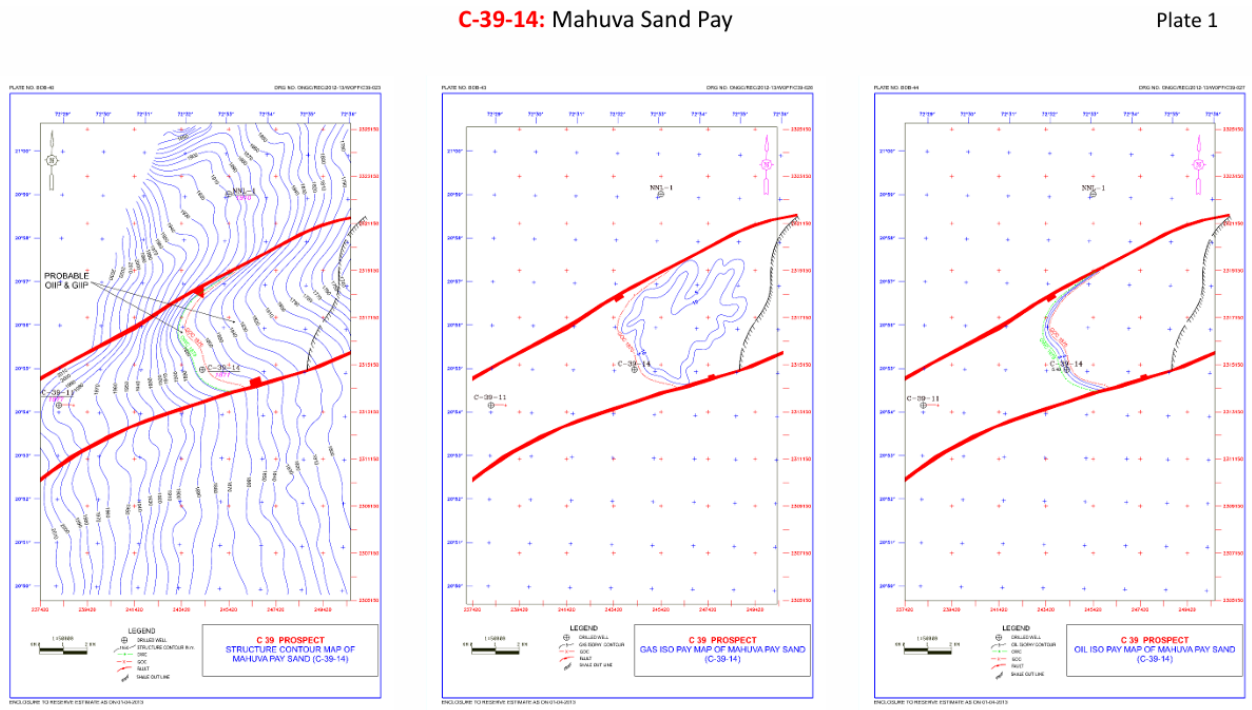


Figure 4-30:.Oil/Gas Iso Pay map of Mahuva Sand in C-39-14 :



During drilling, hydrocarbon shows in the form of gas in insignificant quantity (Max. TG: 2.11%) was reported in MLU from 1340-1390 m (Mahim Formation) whereas the ditch samples collected during drilling did not indicate any HC show. Hydrocarbon shows in the form of gas were also reported in MLU in the intervals 1880-1985 m (Mahuva Formation) and 2135-2138 m (Lower Mahuva Formation) with Max. TG of 3.5% in the interval 1910-1915 m (Mahuva Formation). Details of formation lithology, gas analysis is given in Table 4-26.

Table 4-25: Formation Lithology, Gas analysis in C-39-14

Depth (M)	Formation	Lithology	H/C Shows	Gas Analysis (%)	Remarks
1340-1345	Mahim	Clay 20% Shale 80%	NF/NC	Max TG- 0.807% C1-0.21%, C2-0.035%, C3-0.03%, iC4-0.02%, nC4-0.036, Ic5-0.036	Traces of Silt
1345-1350	Mahim	Shale 90% Silt 10%	NF/NC	Max TG- 2.11% C1-1.23%, C2-0.21%, C3-0.13%	Traces of Sand
1350-1355	Mahim	Clay 30% Shale 70%	NF/NC	Max TG- 0.676% C1-0.185%, C2-0.031%, C3-0.027%, iC4-0.21%, nC4-0.031, iC5-0.028	Traces of Silt
1355-1360	Mahim	Shale 90% Silt 10%	NF/NC	Max TG- 1.153% C1-0.134%, C2-0.055%, C3-0.07%, iC4-0.042%, nC4-0.075, iC5-0.09	Traces of Sand
1360-1365	Mahim	Clay 20% Shale 80%	NF/NC	Max TG- 0.255% C1-0.249%, C2-0.007%	Traces of Silt
1370-1375	Mahim	Clay 30% Shale 50% Silty Shale 20%	NF/NC	Max TG- 0.45% C1-0.121%, C2-0.07%	Traces of Silt
1375-1380	Mahim	Clay 10% Shale 40% Silty Shale 50%	NF/NC	Max TG- 0.449% C1-0.363%, C2-0.043%	Traces of Silt
1380-1385	Mahim	Shale 50 % Silty Shale 50%	NF/NC	Max TG- 0.211% C1-0.161%, C2-0.011%	Traces of Silt
1385-1390	Mahim	Clay 10% Shale 80% Silty Shale 10%	NF/NC	Max TG- 0.134% C1-0.073%, C2-0.005%	Traces of Silt
1880-1885	Mahuva	Clay 60% Shale 40%	NF/NC	Max TG- 0.370% C1-0.106%, C2-0.020%, C3-0.010%, iC4-0.005%, nC4-0.006, iC5-0.006	Traces of Silt
1890-1895	Mahuva	Clay 40% Shale 40% Silt/Sand 10% Carbonaceous Material 10%	NF/NC	Max TG- 2.10% C1-0.380%, C2-0.120%, C3-0.09%, iC4-0.003%, nC4-0.001.	---
1895-1900	Mahuva	Clay 50% Shale 30% Silt/Sand 20%	NF/NC	Max TG- 2.71% C1-0.490%, C2-0.280%, C3-0.075%, iC4-0.025%.	Traces of Carbonaceous Material
1910-1915	Mahuva	Clay 30% Shale 30% Silt/Sand. 40%	NF/NC	Max TG- 3.5% C1-0.91%, C2-0.49%, C3-0.28%, iC4-0.075%, nC4-0.025.	---

1915-1920	Mahuva	Clay 40% Shale 30% Silt/Sand 30%	NF/NC	Max TG- 1.6% C1-0.70%, C2-0.1%, C3-0.002%, iC4-0.001%.	---
1935-1940	Mahuva	Clay 50% Shale 40% Silt/Sand 10%	NF/NC	Max TG- 2.61% C1-0.97%, C2-0.5%, C3-0.05%, iC4-0.008%.	Traces of Carbonaceous material
1940-1945	Mahuva	Clay 40% Shale 60%	NF/NC	Max TG- 1.15% C1-0.50%, C2-0.07%, C3-0.01%, iC4-0.004%.	Traces of Silt/Sand
1965-1970	Mahuva	Clay 30% Shale 30% Silt/Sand 20% Carbonaceous Material 20%	NF/NC	Max TG- 0.94% C1-0.50%, C2-0.05%, C3-0.01%, iC4-0.002%.	---
1970-1975	Mahuva	Clay 30% Shale 30% Silt/Sand 30% Carbonaceous Material 10%	NF/NC	Max TG- 1.20% C1-0.61%, C2-0.12%, C3-0.005%, iC4-0.001%.	---
1980-1985	Mahuva	Clay 40% Shale 30% Silt/Sand 30%	NF/NC	Max TG- 0.21% C1-0.08%, C2-0.03%, C3-0.001%.	---

4.2.6 Reservoir parameters and hydrocarbon estimates C-39-14 Field:

The estimates of hydrocarbon in-place have been worked out under various field assumptions, and all inputs, working and results, as available and sourced are presented in the following section.

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Petrophysical parameters and hydrocarbon estimates:

The Petrophysical parameters used in volumetrics and In-Place are provided below in **Table 4-26 and and Table 4-27.**

Table 4-26: Petrophysical and Fluid parameters of C-39-14

Field/	Reservoir	Area	He	Phi	So	FVF, Bo	API	Oil	GOR	OOIP	GIIP	O+OEG
	Sand/ layer	SqKM				v/v		Sp gr	Sm3/m3	MMstb	MMm3	MMTOE
C-39-14	1917.0-1915.0 m of Mahuva	29.35	2	0.26	0.32	1.8246	47.6	0.79028	200	16.84	535	2.65
C-39-14	1914.0-1913.0 m mahuva	29.35	1	0.18	0.32	1.8246	47.6	0.79028	200	5.83	185	0.92
C-39-14	1912.0-1910.0 m Mahuva	29.35	2	0.23	0.45	1.8246	47.6	0.79028	200	20.94	666	3.30
										43.61	**1387**	**6.87**

Table 4-27: Hydrocarbon In-Place estimates (2P)

Field	O+OEG, MMTOE
C-39-14	6.87

Erstwhile Operator-reported estimates on record:

The field C-39-14 has reported hydrocarbon In-place (O+OEG) estimates **5.46 MMTOE**.

All these hydrocarbon estimates are subject to future assessments based on Operator's own technical insights and additional information/data, which may warrant possible revision of the currently reported estimates.

4.2.7 Production Facility for Oil and Gas Evacuation:

Evacuation: TCPP

MUMBAI OFFSHORE WO-5-11 FIELD

4.3 DESCRIPTION OF MUMBAI OFFSHORE WO-5-11 FIELD

The well WO-5-11 (WO-5-G) was drilled in 2014 to a depth of 2265m against the target depth of 2350m MSL/Basement with the objective to explore the hydrocarbon potential of Mukta and Bassein formations. The status of the well is Oil bearing in Panna Formation.

The location is situated on Paleo-high and forms an independent four-way closure. This well is shallower at all levels with respect to wells WO-5-6 in the south-east direction and B-43-1 in the west direction, which suggests that the well is situated on a paleo high compared to these two wells.

The structure represents an early formed high and favorable facies development envisaged in carbonate reservoirs of Mukta and 'B' Upper pays (WO-5-1 equivalent). B-Lower pay (Equivalent of WO-5-10) and is likely to be wedging out very close to location and could help to prove the wedge out limit.

WO-5 field (**Figure 4-31**) covers an area of **32.26 Sq. km.** The co-ordinates of the endpoints defining the cluster boundary are tabulated below in **Table 4-28**. The field's location and surrounding oil and gas fields are shown in **Figure 4-32 and Figure 4-33.**

Table 4-28: Coordinates of WO-5 field

	WO-5 Boundary Points		
	Area: 32.26 sq km		
	POINTS	**LONGITUDE**	**LATITUDE**
	A	71°20'0.000" E	19°0'0.000" N
	B	71°17'0.000" E	19°0'0.000" N
	C	71°17'0.000" E	19°4'0.000" N
	D	71°19'0.000" E	19°4'0.000" N
	E	71°19'0.000" E	19°2'37.926" N
	F	71°20'0.000" E	19°1'18.074" N
	A	71°20'0.000" E	19°0'0.000" N
SL. No.	**Well**	**Longitude**	**Latitude**
1	WO-5-11	71°19'4.109" E	19°1'54.951" N

Figure 4-31:. Contract Area Map of WO-5

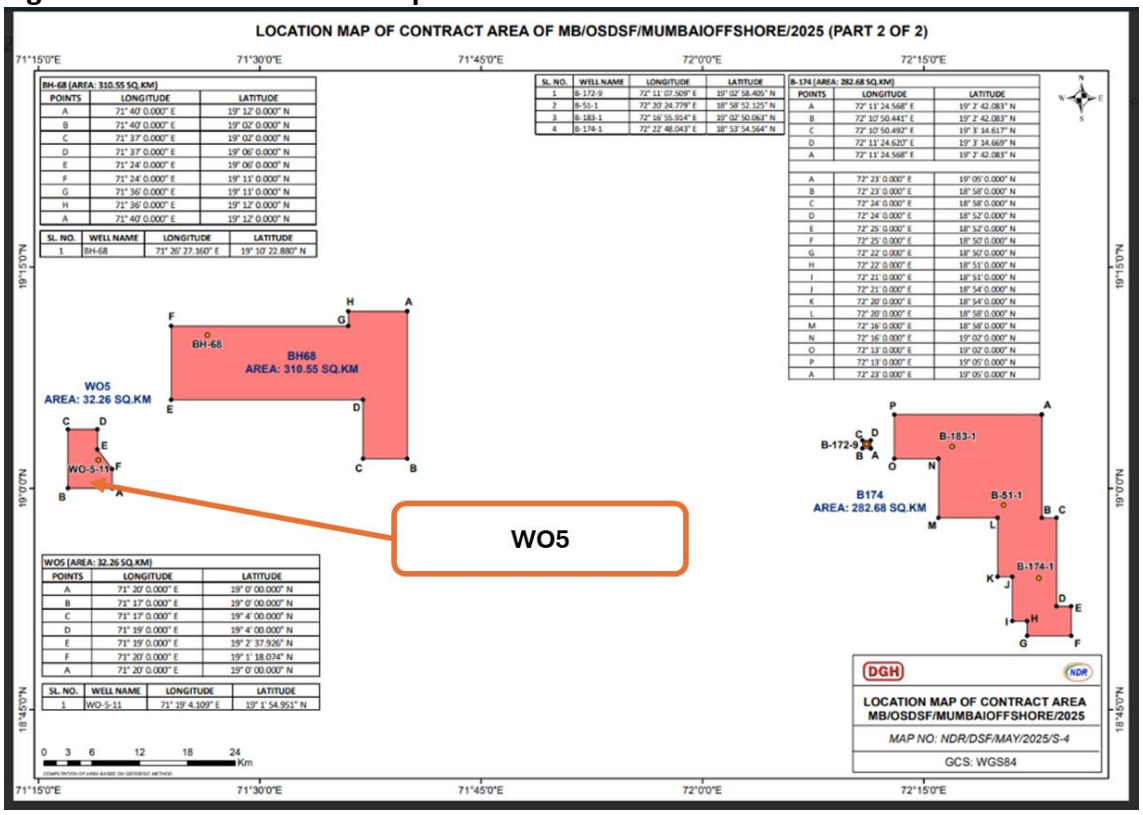


Figure 4-32:. Location Map of WO-5-11

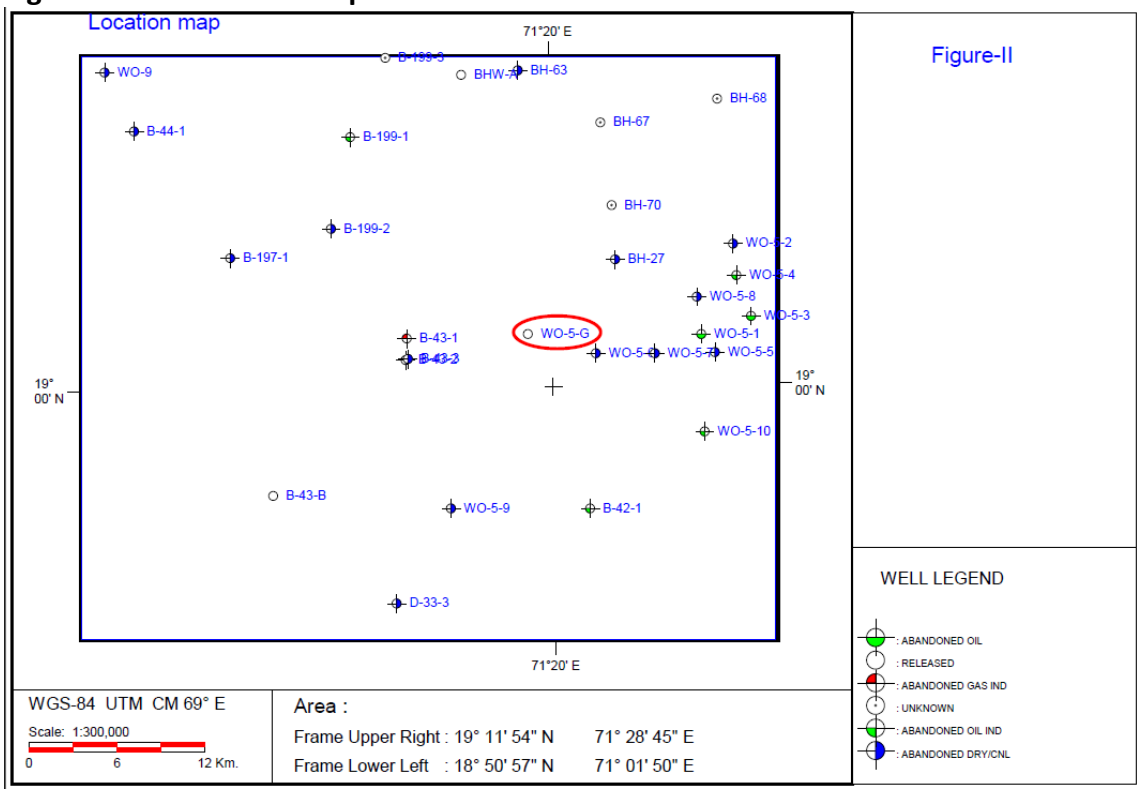
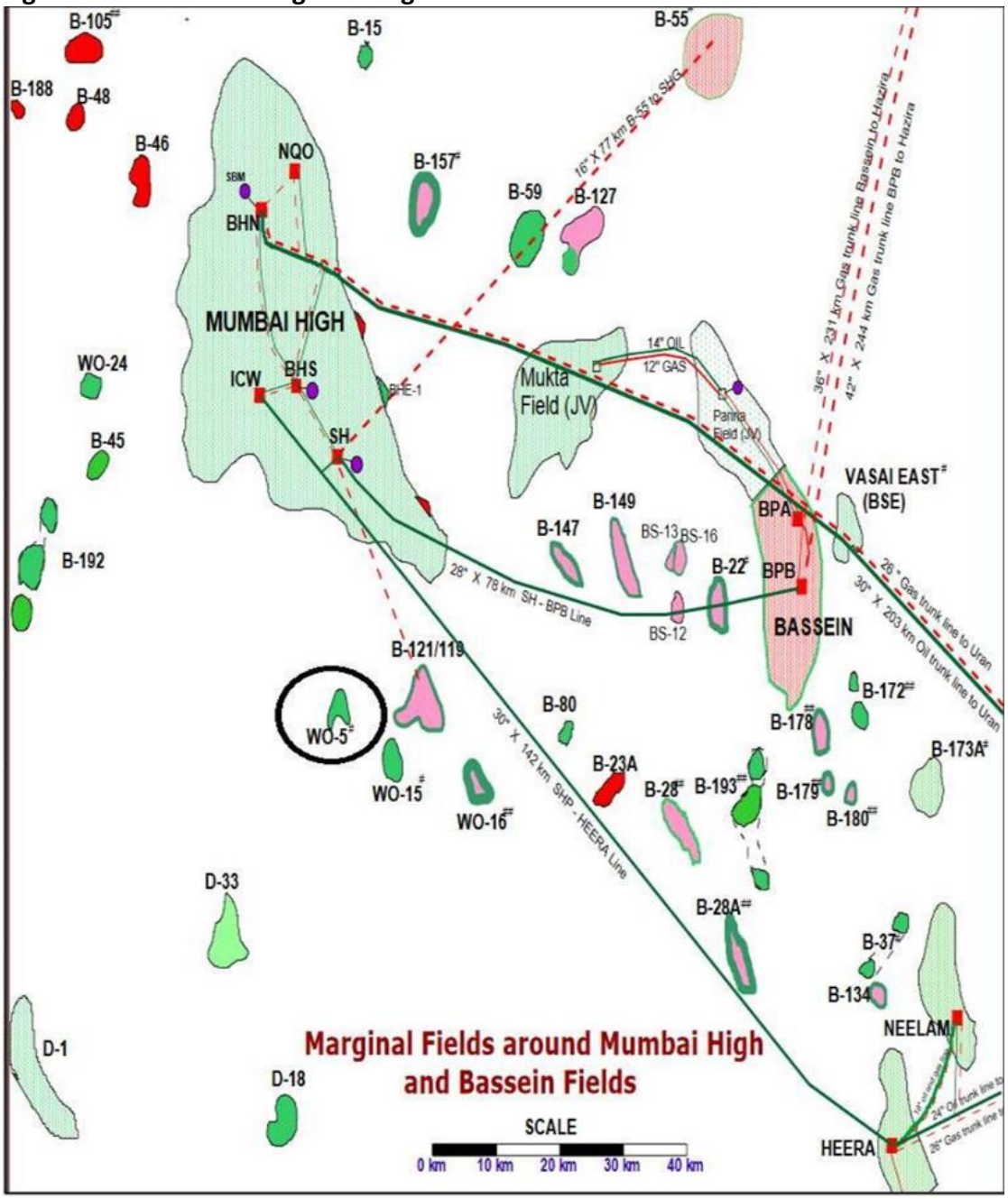


Figure 4-33:. Surrounding oil and gas fields:



4.3.1 Drilling and well completion

Key information of drilled wells have been collated and presented hereunder. The adjoining figures wherever shown illustrate the Well Construction Diagram and the Litho-column Information for key wells. Other well statics like kelly bush reference depth, water depth, drilled and logged depth including well coordinates are made available in Sections through various cross-references.

Well construction diagram of WO-5-11 and litho-section are placed at **Figure 4-34 and Figure 4-35**

Figure 4-34:. Well profile of WO-5-11 :

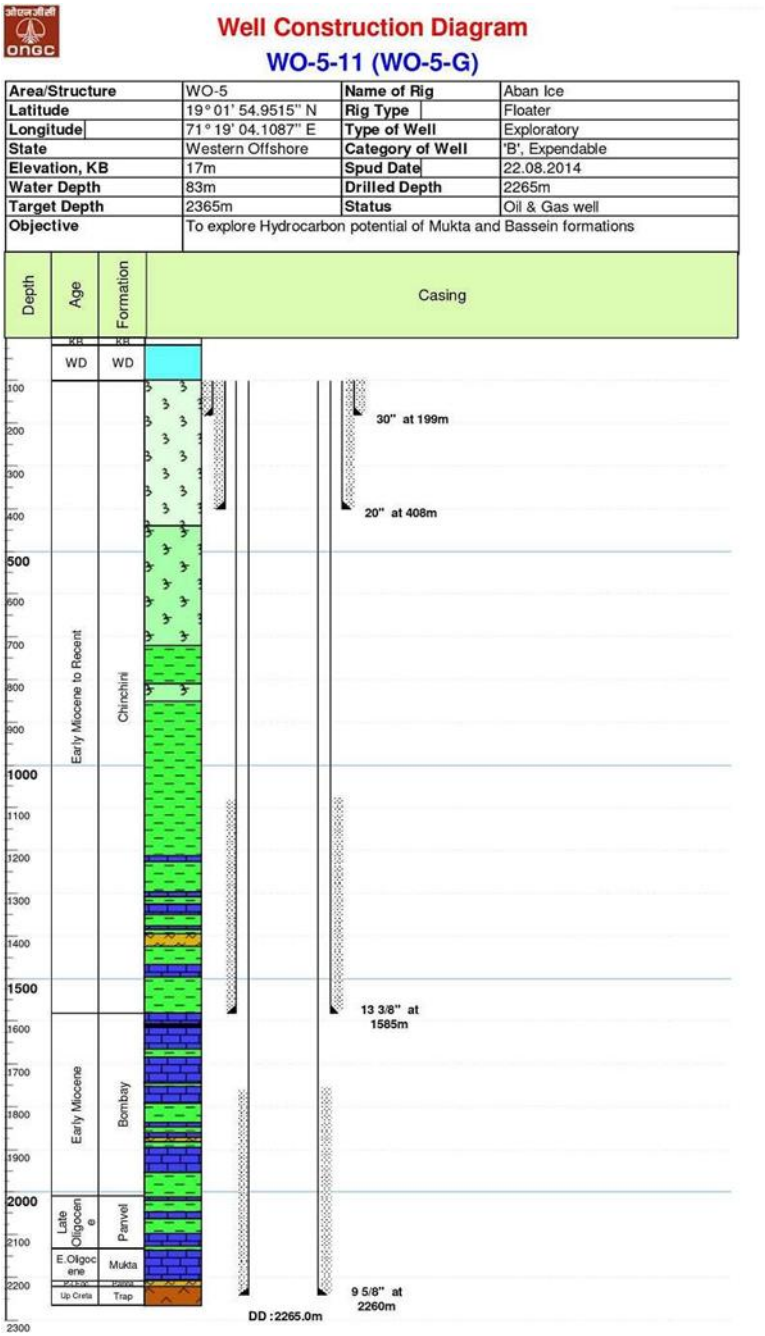
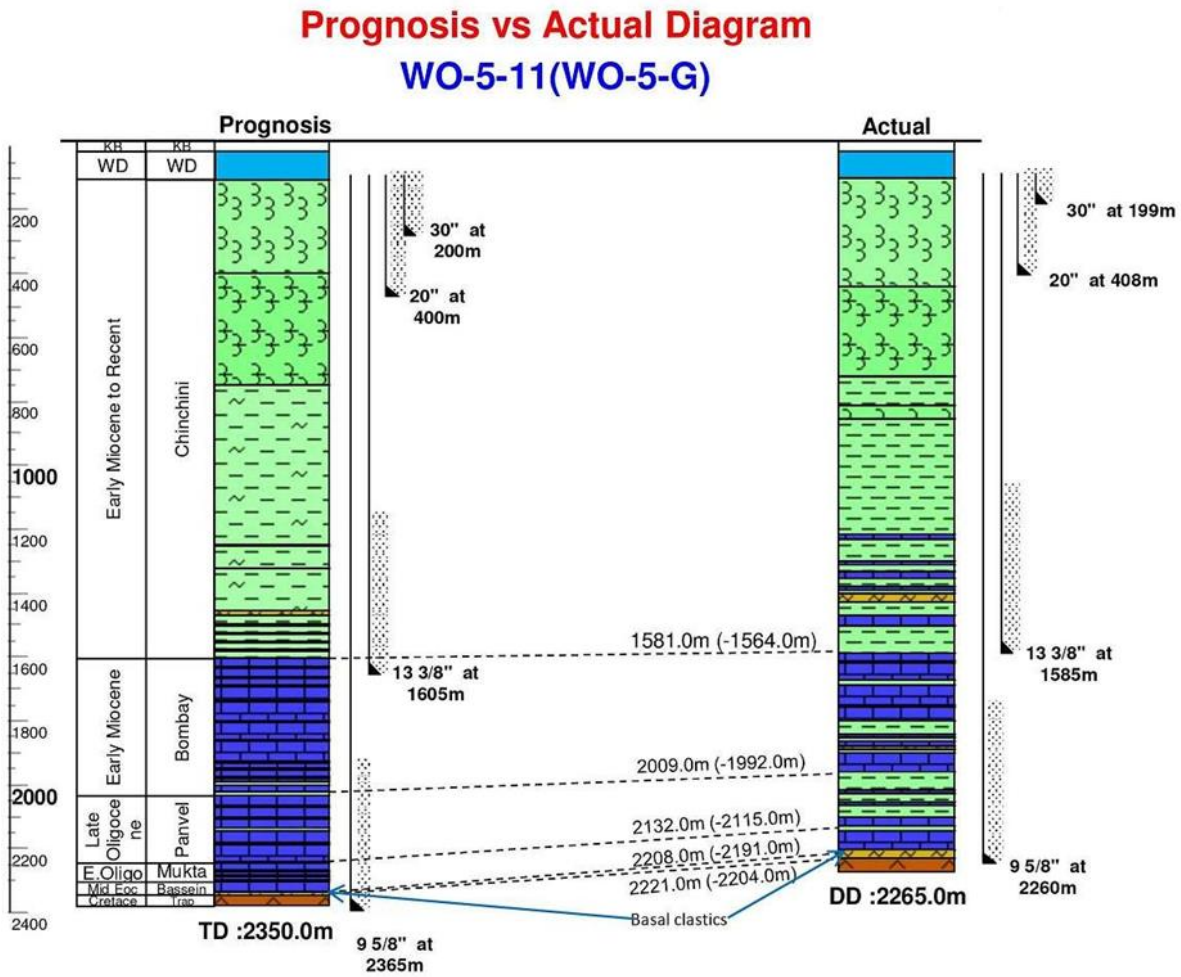


Figure 4-35:. Litho-section information of WO-5-11 :



4.3.2 Well logging and formation evaluation

The well logs of all discovery wells along with some key wells in the contract area have been reviewed. The logs recorded in various open-hole sections along with cased-hole logs and information of conventional and other wireline formation test data are presented in this docket. The availability of key input reports like Well Completion Reports (WCR) and Formation Evaluation Report (FER) have been checked and information given. Reservoir parameters of interesting zones and results of the tested zone(s) have been included in this report. Log motifs of tested /interesting zone of key wells are also appended.

A| Well completion and log evaluation reports availability (WO-5-11) :

WCR/ FER availability	Spud date	KB	Drilled depth
WCR available	22.08.2014	17 m	2265 m

B| Well logs acquired (WO-5-11) :

Table 4-29: .Logs recorded in WO-5-11

SL. NO	HOLE/ CASING SIZE (“)	DATE	INTERVAL (m)	LOGS	REMARKS
1	17 ½	09.09.2014	1590-408	PEX-HRLA-NGT- GR-CAL	Schlumberger Wire-line R_m : 0.098 ohm.m @87^{0}F R_{mf} : 0.081ohm.m @87^{0}F, R_{mc} :0.325 ohm.m@87^{0}F BHT: 190°F
2		09.09.2014-10.09.2014		BHC-SP-GR	
3	12 ½	28.09.2014	2266-1586	PEX-HRLA-NGT	Schlumberger Wire-line R_m : 0.146 ohm.m @74^{0}F R_{mf} : 0.425ohm.m @68^{0}F, R_{mc} :0.114 ohm.m@61^{0}F BHT: 196°F
4		29.09.2014	2266-1585	SS-GR	Schlumberger Wire-line
5		30.09.2014	2260-763.1	VSP	Check shots at 1534.2m, 1171.4m & 1050.4m, 1836.6m, 2078.5m
6		01.10.2014	2219.5-1704	SWC	Attempted-25,Accepted- 12,rejected-13
7		01.10.2014	2266-1586	PEX-HRLA-HNGS	Schlumberger Wire-line R_m : 0.15 ohm.m @73.9^{0}F R_{mf} : 0.425ohm.m @67.6^{0}F, R_{mc} :0.11 ohm.m @66.7^{0}F, BHT: 208°F
8		01.10.2014-03.10.2014	2266-1700	MDT	Pre-test @ total 46 point,Good-4,tight-14,Lost Seal-28
9		04.10.2014	2266-2100	FMI-GR	Schlumberger wireline
10	9 $^5/_8$	09.10.2014	2230-2130	USIT	Schlumberger wireline
11	9 $^5/_8$	09.10.2014-10.10.2014	2235-1737	CBL-VDL-GR-CCL	240°F
12	9 $^5/_8$ “	21.10.214	2115-1700	TCP correlation	Schlumberger wireline

VSP data in WO-5-11:

Sl. No	Hole/ casing size (“)	Date	Interval (m)		Offset/azimuth		Remarks
1	12 ¼”/ 13 3/8”	30.09.2014	2260	763.1	34m	320°	Recorded survey at every 15.1m interval

Conventional Cores:
One conventional core was cut in the interval 2213m -2223m in Panna formation. The core constitutes silty shale/siltstone/very fine grained sandstone in the top part which showed pale yellow to dull yellow fluorescence with mild cut whereas the bottom portion constitutes basalt.

Sidewall Cores:
25 SWC were attempted, out of which 12 were accepted.

Stratigraphy: (Table 4-30 and Table 4-31)

Table 4-30: Stratigraphy AGE	FORMATION	NTERVAL(m) KB- 17m	THICKNESS (m)	LITHOLOGY
Recent to Upper Miocene	Chinchini	Seabed-1581 (Seabed-1564)	1564	Clay stone/ shale with Limestone at bottom.
Early Miocene	Bombay	1581-2009 (1564-1992)	428	Shale with Limestone bands.
Late Oligocene	Panvel (L-V)	2009-2060 (1992-2043)	51	Predominantly Limestone with minor Shale.
Late Oligocene	Panvel (L-VI)	2060-2133 (2043-2116)	73	Predominantly Limestone
Early Oligocene	Mukta	2133-2151 (2116-2134)	18	Limestone with thin Shale alternations.
Middle Eocene	Bassein	2151-2210 (2134-2193)	59	Predominantly Limestone
Paleocene to lower Eocene	Panna	2210-2221 (2193-2204)	11	Sandstone, Siltstone
Upper Cretaceous	Deccan Trap (Basement)	2221-2265+ (2204-2248+)	44	Basalt

(TVD-MSL depths are given in parenthesis)

Stratigraphic Correlation:

The well has been correlated with the nearby wells WO-5-6, BH-27, WO-5-1 and B-43-1. The correlation is given in the following table:

Table 4-31: Stratigraphic Correlation

Age	Formation	WO-5-11	WO-5-6	BH-27	WO-5-1	B-43-1	Structural variance w.r.t. WO-5-11			
		KB:17m	KB:29.56m	KB:30.7m	KB:31.2m	KB:27.2m	WO-5-6	BH-27	WO-5-1	B-43-1
Recent to Upper Miocene	Chinchini	eabed- 1607 (Seabed -1590)	S/bed- 1640 (S/bed- 1610)	S/bed- 1523.7- (S/bed- 1485)	S/bed- 1576 (Seabed- 1548)	S/bed- 1657 (S/bed- 1630)			-	-

Early Miocene	Bombay	1607-2037 (1590-2020)	1640-2157 (1610-2127)	1523.7-1955.7 (1485-1925)	1576-2009 (1545-1978)	1657-2191 (1630-2163)	45m	71m	↓45m	66m
Late Oligocene	Panvel	2037-2147 (2020-2130)	2157-2339 (2127-2309)	1955.7-2040 (1925-2009)	2009-2158.5 (1978-2127)	2191-2352 (2163-2325)	98m	118m	↓42m	140m
Early Oligocene	Mukta (H3A)	2133-2151 (2116-2134)	2339-2409 (2309-2379)	2040-2079 (2009-2048)	2158.5-2185 (2127-2154)	2352-2433 (2325-2406)	193m	66m	11m	210m
Middle Eocene	Bassein (H3B)	2151-2210 (2134-2193)	2409-2492 (2379-2462)	2079-2122 (2048-2091)	2185-2192.5 (2154 - 2161.5)	2433-2474 (2406-2449)	212m	58m	20m	244m
Paleocene to lower Eocene	Basal Clastics / Panna	2210-2221 (2193-2204)	2492-2570 (2462-2540)	2122-2144 (2091-2113)	ND	2474-2492 (2449-2465)	272m	85m	-	253m
Upper Cretaceous	Basement	2221-2265+ (2204-2248+)	2570-2609 (2540-2579)	2144-3143 (2113-3112)	2192.5-2210 (2161 - 2179)	2492-2541.5 (2465-2514)	332m	91m	43m	268m
Drilled Depth		2265	2221-2265+ (2204-	3143	2210	2541.5				

(TVD-MSL depths are given in parenthesis)

C| Well log evaluation and initial test results (WO-5-11):

Interval (mMDRT/mTVDSS)	Formation (+ Zone, if specified)	Gross(m)	Net(m)	Phi	Sw
2207-2221 / 2190-2204	Basal Clastics(2207-2218 mMDRT)	11.0	10.6	0.10-0.26	0.4
	Initial testing results: Tested interval 2208-2215m produced Qoil=1567 BPD, Qgas=11766 m3/d, through ½" choke with FTHP:375 psi				

Well log motifs of WO-5-11 are placed at **Figure 4-36 and Figure 4-37.**

Figure 4-36:. Well log motif of WO-5-11 :

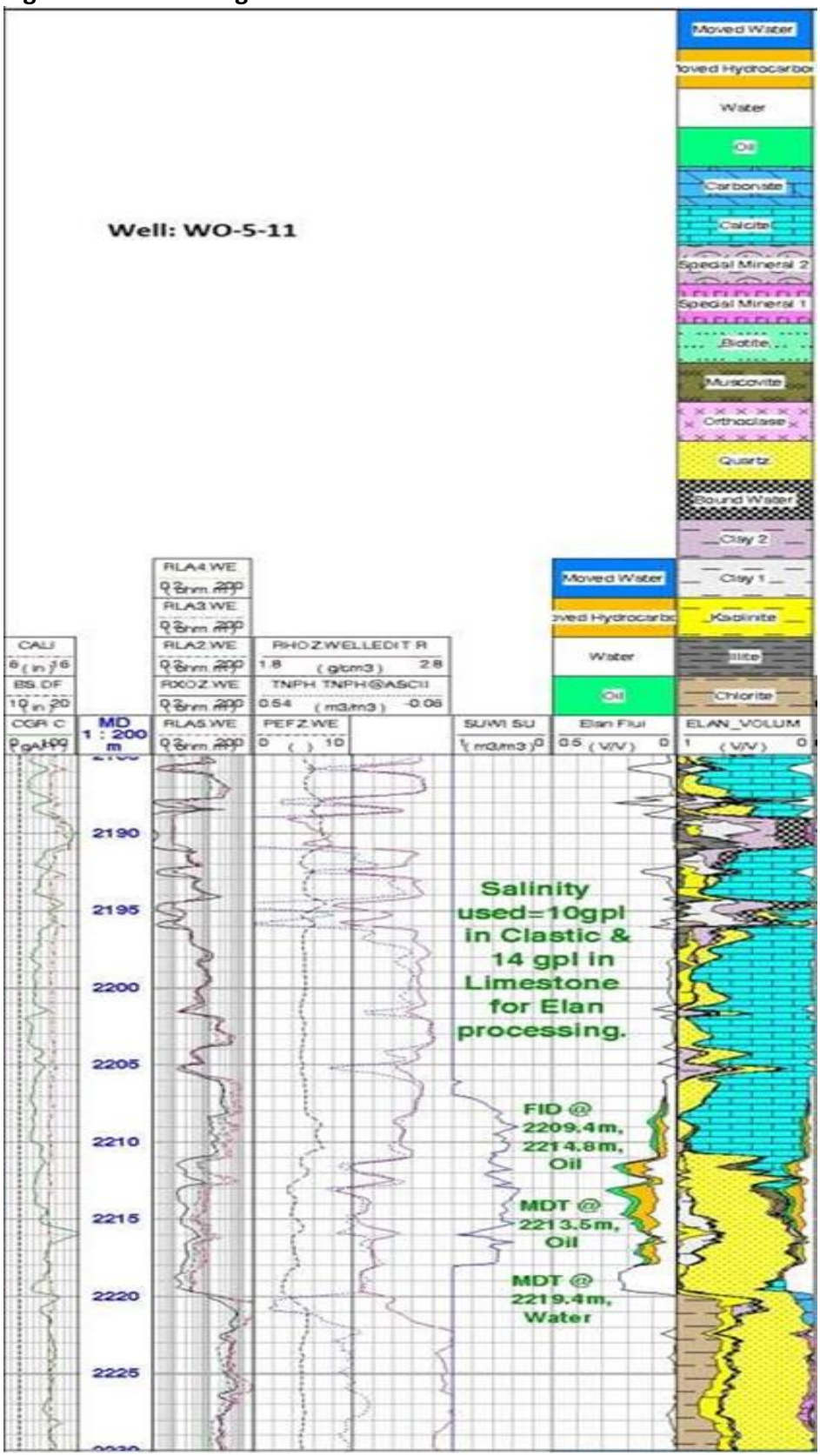
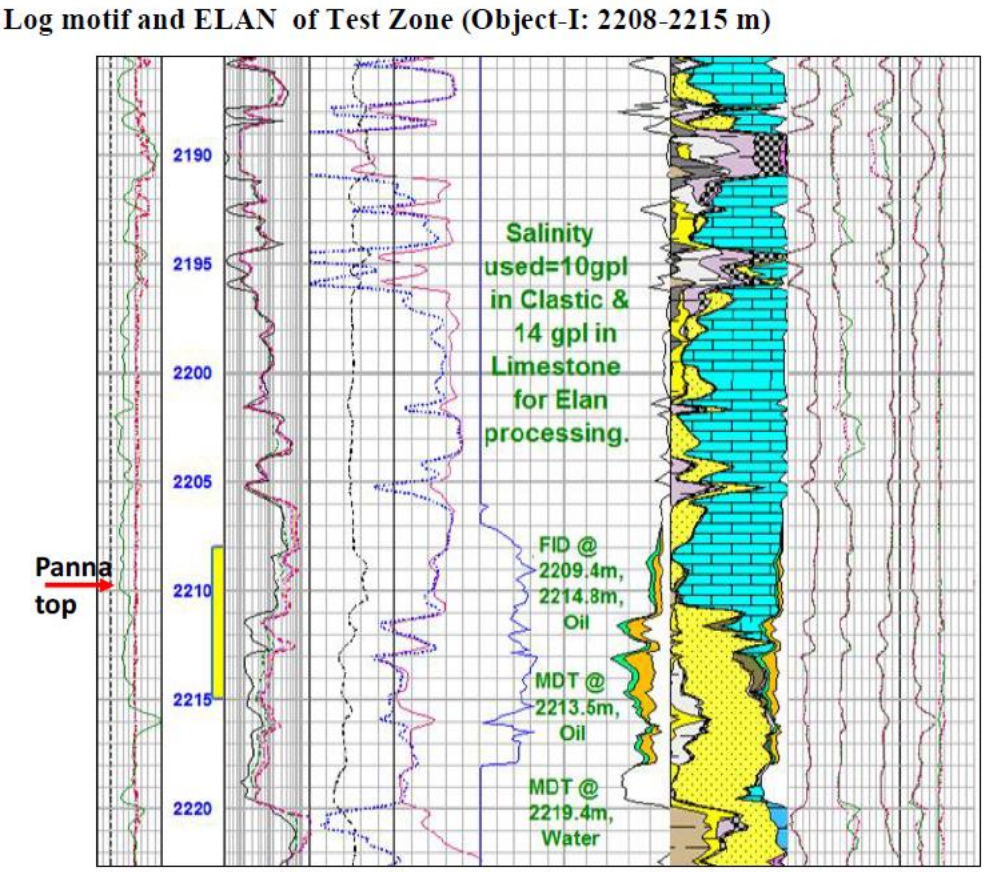


Figure 4-37:.Well log motif of WO-5-11 :Object-I



4.3.3 Well testing and workover history

One object was tested in the interval 2208-2215m in Panna Formation flowed oil @ 1539 BPD (API: 34.07°) and 9974m3/day gas at FTHP 350 psi through ½" choke.

Well WO-5-11 : Details of flow rates during testing are below in **Table 4-32.**

Table 4-32: Production data during testing

Object No	Bean size	Oil BPD	Gas m3/day	FTHP (psi)	FTHT °C	STHP Psi	GOR	Oil API @32degC	Remarks (Flow content etc)
Obj-I 25.10.2014	1/2"	1567	11766	375	34		47.15	39.52	
25.10.2014	CMBUP					925			Bup 6 hrs choke manifold
26.10.2014	1/4"	655	1345	700	30		12.89	38.6	
26.10.2014	3/8"	1196	5781	490	33		30.35	42.8	
26.10.2014	1/2"	1539	9974	350	37		40.69	40.26	
26-27/10/2014	IROV Bup								Bup 30.5 hrs

4.3.4 Reservoir engineering studies and analysis

Key reservoir engineering datasets, wherever available have been collated and presented under various data genres. In a comprehensive data presentation, the results are included from well tests, formation dynamics tests, reservoir pressure build-up study and PVT data/ results.

Formation dynamics tests (WO-5-11)

MDT Pressure Data: 12 ¼" Section

Total 46 pretests were carried out of 4 were good, 14 were tight and 28 were lost seal. The details are tabulated below in **Table 4-33**.

Table 4-33: MDT data available for WO-5-11

Sl. No.	Depth (m)	Drawdown Mobility (MD/CP)	Hyd. Pressure (psi) Before	Hyd. Pressure (psi) After	Formation Pressure (psi)	Temp (°F)	Remarks
1	2213.3	-	3861.92	3861.10	-	224.29	L
2	**2213.5**	**112.61**	**3862.64**	**3858.87**	**3390.95**	**245.32**	**G**
3	**2219.4**	**7.01**	**3868.00**	**3868.05**	**3397.43**	**254.38**	**G**
4	2217.0	-	3862.70	3862.96	-	251.09	T
5	2217.2	-	3862.60	3863.54	-	249.28	T
6	2217.4	-	3863.10	3863.78	-	248.34	L
7	2216.8	-	3861.80	3862.33	-	248.06	L
8	2215.0	-	3858.66	3859.62	-	247.84	T
9	**2214.8**	**3.66**	**3858.55**	**3859.52**	**3392.64**	**252.03**	**G**
10	2208.4	-	3762.15	3846.68	-	247.70	L
11	2208.6	-	3846.53	3847.30	-	246.32	L
12	**2209.4**	**0.18**	**3848.34**	**3848.69**	**3397.22**	**249.72**	**G**
13	2218.0	-	3861.70	3861.90	-	251.75	T
14	2217.5	-	3860.47	3860.95	-	252.23	T
15	2206.0	-	3841.04	3841.61	-	251.82	L
16	2206.1	-	3841.60	3841.73	-	250.26	L
17	2206.2	-	3841.55	3841.98	-	249.58	L
18	2198.6	-	3827.78	3829.02	-	249.12	L
19	2198.6	-	3829.74	3829.28	-	238.16	L
20	2198.8	-	3829.83	3829.62	-	240.06	L

Sl. No.	Depth (m)	Drawdown Mobility (MD/CP)	Hyd. Pressure (psi) Before	Hyd. Pressure (psi) After	Formation Pressure (psi)	Temp (°F)	Remarks
21	2199.4	-	3830.78	3830.85	-	243.73	L
22	2199.1	-	3830.50	3830.32	-	243.93	L
23	2199.6	-	3831.62	3831.32	-	244.25	L
24	2200.0	-	3832.09	3832.19	-	244.66	L
25	2117.5	-	3693.38	3694.45	-	242.41	T
26	2117.3	-	3693.35	3694.16	-	240.91	T
27	2117.0	-	3692.70	3693.43	-	240.53	L
28	1840.0	-	3225.20	3224.77	-	218.86	L
29	1840.2	-	3224.60	3225.13	-	218.64	L
30	1839.8	-	3223.41	3223.85	-	218.88	L
31	1839.6	-	3223.658	3224.275	-	219.19	L
32	1840.4	-	3225.302	3225.689	-	220.33	L
33	1825.0	-	3198.918	3199.339	-	219.98	L
34	1814.6	-	3181.023	3182.025	-	219.81	L
35	1814.8	-	3182.026	3182.032	-	219.27	T
36	1815.0	-	3182.511	3182.444	-	219	T
37	1811.5	-	3175.658	3176.404	-	218.78	L
38	1811.7	-	3176.448	3176.836	-	218.66	L
39	1811.9	-	3176.807	3177.144	-	218.59	L
40	1811.4	-	3176.006	3176.371	-	218.6	L
41	1742.5	-	3058.474	3059.163	-	216.22	T
42	1742.3	-	3059.363	3059.607	-	214.76	L
43	1703.5	-	2992.784	2992.502	-	212.94	T
44	1703.8	-	2992.577	2992.957	-	212.45	T
45	1704.1	-	2993.052	2993.283	-	212.47	T
46	1704.4	-	2993.512	2993.504	-	212.51	L

*G- Good, T- Tight, L- Lost

Pressure build-up study (WO-5-11):

Details of Pressure Build study carried out are as follows**: Figure 4-38 and Figure 4-39**

Formation: Panna| Object: I
Interval(m.): 2208- 2215
Duration of build-up: 8.3 hrs
Static bottom hole pressure: 3206.419 psi
Depth of measurement: 2152.76 m
Initial pressure: 3339.267 psi
Skin: 0.633
Permeability: 57.025 md
Productivity index: 2.284 bbl/day/psi
Average open flow potential (oil): 5824.095 BOPD

Pressure and Temperature Plot during Testing are shown in **Figure 4-38 and Figure 4-39 respectively.**

Figure 4-38:. Pressure plot during testing of WO-5-11

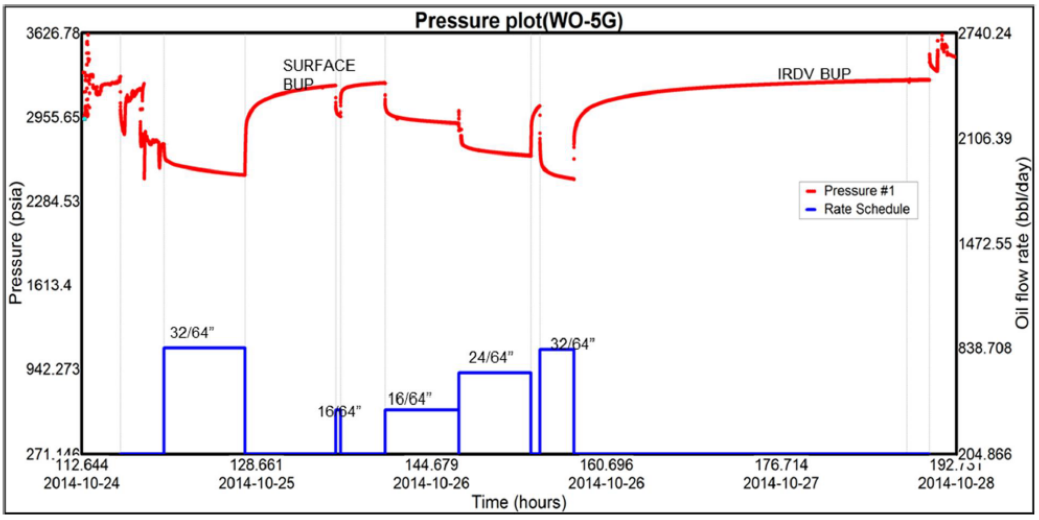
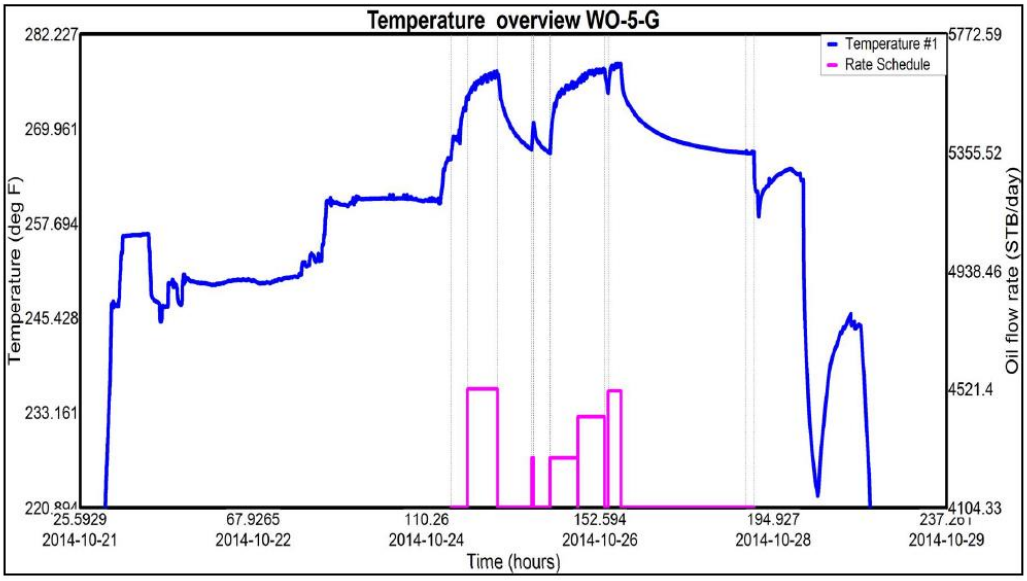


Figure 4-39:.Temperature plot during testing of WO-5-11



Oil composition analysis (WO-5-11)

Physical properties and composition of WO-5-11 oil and gas are given below and in **in Table 4-34, Table 4-35 and Table 4-36**.

Table 4-34: Physical properties and composition of WO-5-11 oil

	Formation: Panna, Object-I Interval(m.): 2208-2215		
Sl No	**Parameter**	**Value**	**Value**
1	Water content (ASTM 4006)	Traces	
2	Density at 15 DegC (g/ml)	0.8332	0.85
3	Specific gravity at 60/60 DegF	0.8336	0.85
4	API gravity at 60 DegC	38.24	34.07
5	Kinematic viscosity at 37.8 DegC (cSt)	4.2	4.67
6	Asphaltene, (%wt)	0.97	0.69
7	Resin, (%wt)	11.0	14.99
8	Wax (%wt)	16.64	9.9
9	Pour Point (DegC)	33	36
10	Bubble point pressure	1116.4 psi	
11	Oil shrinkage factor, v/v	1.3968	

Gas composition analysis (WO-5-11)

Table 4-35: Composition of WO-5-11 Gas samples from MLU and Separator

Object No	Sample No	Type	Source	Date	Time Hrs	TG (%)	C1 (%)	C2 (%)	C3 (%)	Sp gr
Obj-I	1	Gas	MLU				45.7	1.81	0.97	0.59118
	2	Gas	Separator	25.10.14	05:45	52.1	43.27	1.23	1.93	
	3	Gas	Separator	25.10.14	21:00	56.35	49.73	1.36	1.15	
	4	Gas	Separator	26.10.14	05:00	53.9	45.83	2.31	0.95	
	5	Gas	Separator	26.10.14	12:00	52.9	45.7	1.81	0.97	

Table 4-36: Composition of WO-5-11 Gas

		Collected Gas Samples				Composition of WO-5-11 Gas from compositional analysis of DV liberated Gas (sampled at 2213.5 m			
Constituent		Vol %	Vol %	Vol %	Vol %	Vol %	Vol %	Vol %	Vol %
Methane	C1	56.05	46.6	54.77	52.53	61.18	52.05	38.07	5.38
Ethane	C2	12.03	11.47	11.99	12.4	9.08	11.25	12.95	7.9
Propane	C3	18.84	21.9	19.25	20.91	13.97	18.97	25.54	38.04
Iso-butane	iC4	3.41	4.65	3.54	4.08	2.84	4.04	5.68	13.54
N-butane	nC4	3.35	4.93	3.51	4.14	3.11	4.47	6.36	17.58
Iso-pentane	iC5	0.82	1.31	0.87	0.99	0.94	1.27	1.81	5.5
N-pentane	nC5	0.64	1.06	0.68	0.78	0.82	1.09	1.53	4.41
Hexanes +	C6+	0.98	1.81	1.11	1.31	2.51	3.01	3.88	5.91
Carbon dioxide	CO2	0.9	1.25	0.82	1.35	2.35	2.41	2.30	0.68
Nitrogen	N2	2.98	4.98	3.34	1.41	3.2	1.44	1.88	1.06
Helium		BDL	BDL	BDL	BDL				
H_2S (ppm)		BDL	BDL	300	BDL				
Mol. Wt.		27.98	31.37	28.37	29.57				
Sp. Gravity		0.972	1.092	0.986	1.028				
Net Calorific value ($Kcal/m^3$)		12 934	14 136	13 080	13 780				
Gross Calorific value ($Kcal/m^3$)		14 167	15 448	14 324	15 078				
Compressibility factor (Z)	Z	0.993	0.992	0.997	0.992	0.9937	0.9917	0.9886	0.9746

4.3.5 Geology and Reservoir Description of WO-5-11 Field:

The geology of the area has been comprehensively reviewed using correlations, sections and maps. The well correlation, seismic sections, top structure, seismic attribute/amplitude and net sand/pay maps have been used to illustrate the magnitude and distribution of key reservoir properties in and around the discovered oil/gas pools (accumulations). The local tectonic setting and geological section of the area, wherever available, are also given. These maps/sections are sequentially shown field-wise and reservoir unit-wise through figures, appropriately titled and illustrated in the following section.

Geological correlations, sections and maps (WO-5-11 Field):

This location is situated on a paleo high and forms an independent four-way closure. The main objective of the well is to explore the hydrocarbon potential of Bassein and Mukta formations with a prospective area of approximately 8 sq. km.

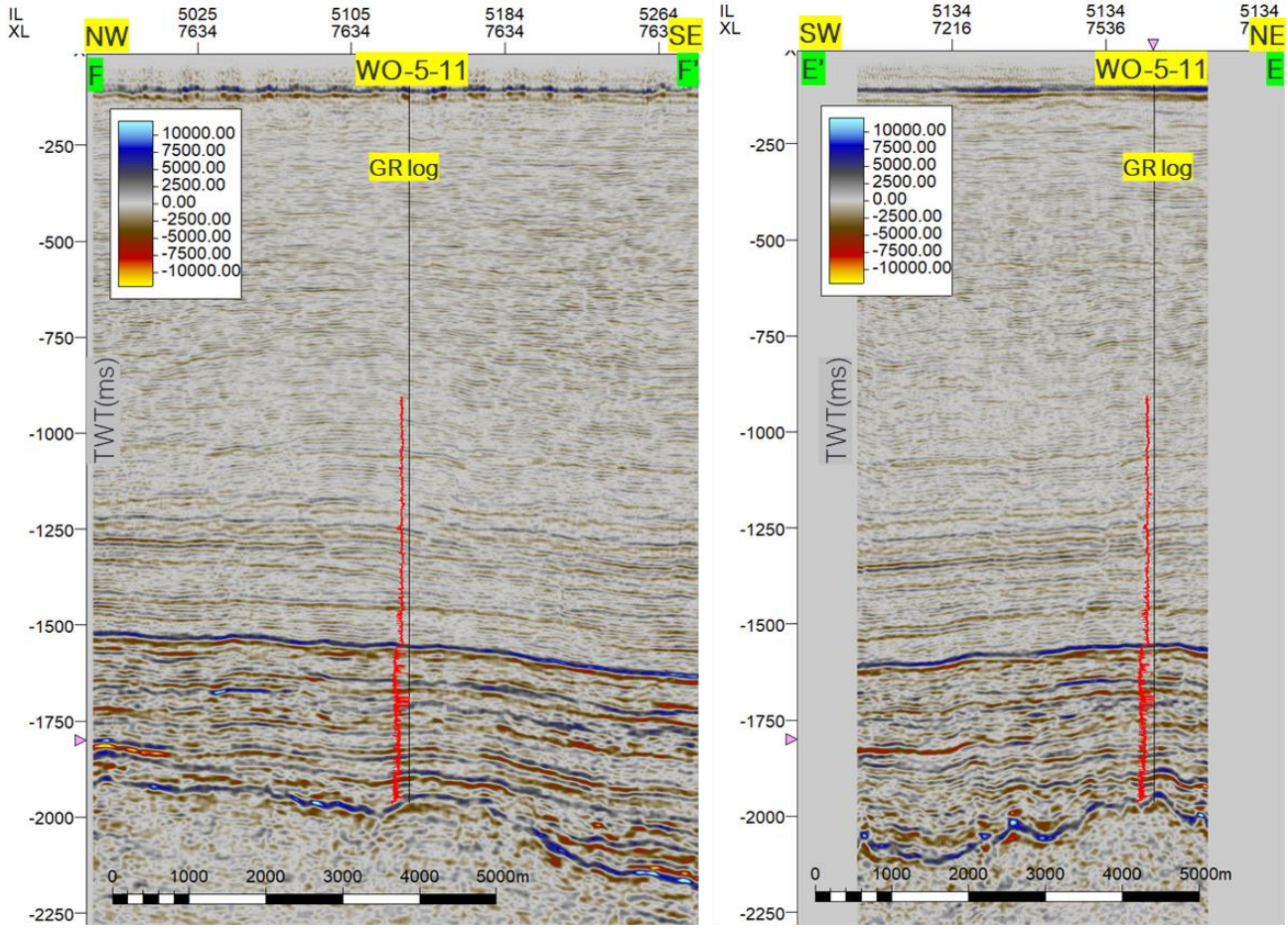
The structure represents an early formed high and favorable facies development was envisaged in carbonate reservoirs of Mukta and Bassein Upper pays (WO-5-1 equivalent). Well WO-5-11 appeared to be structurally shallower than the well WO-5-9 at all stratigraphic levels. The well is also structurally shallower than wells B-43-1 and WO-5-6 in all levels. However, well WO-5-11 is structurally deeper with respect to well BH-27 at all the levels.

Around 6 m gas pay & 16 m Oil pay has been encountered at well location in Panna pay.

Seismic sections along the well WO-5-11: **Figure 4-40**

Depth structure map of BESSEIN in WO-5-11 area: **Figure 4-41**

Figure 4-40:.Seismic sections along the well WO-5-11 :



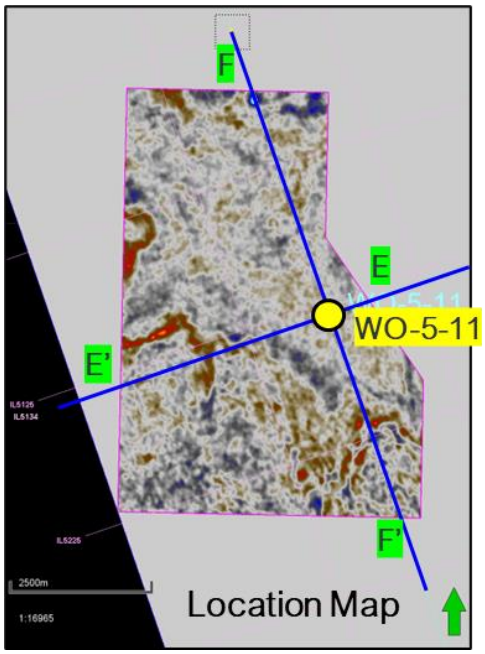
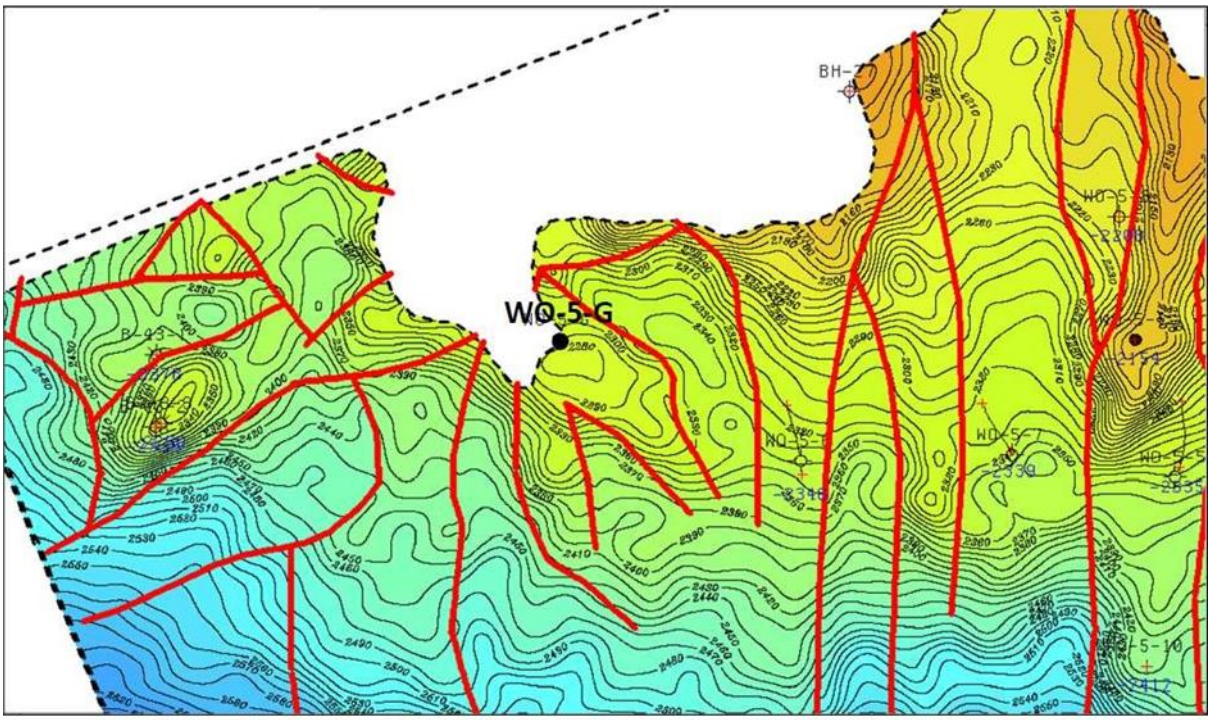


Figure 4-41:.Depth structure map of BESSEIN in WO-5-11 area :



STRUCTURE MAP NEAR H3B (BASSEIN) TOP

4.3.6 Reservoir parameters and hydrocarbon estimates WO-5-11 Field:

The estimates of hydrocarbon in-place have been worked out under various field assumptions, and all inputs, working and results, as available and sourced are presented in the following section.

Petrophysical parameters and hydrocarbon estimates:

The Petrophysical parameters used in volumetrics and In-Place are provided below in **Table 4-37 and Table 4-38.**

Table 4-37: Petrophysical and Fluid parameters of WO-5-11 Field

Reservoir: Basal Clastics (2207-2218)	
Area:	1.3195 SqKm
Thickness:	10.6 m
Porosity:	0.18
Hydrocarbon saturation:	0.6
Formation volume factor:	1.3968
Oil spgr:	0.8336

Table 4-38: Hydrocarbon In-Place estimates (2P)

Field	O+OEG, MMTOE
WO-5-11	**0.94**

Erstwhile Operator-reported estimates on record:

The field, WO-5-11 has reported an oil estimate of **0.76 MMTOE** .

All these hydrocarbon estimates are subject to future assessments based on Operator's own technical insights and additional information/data, which may warrant possible revision of the current reported estimates.

4.3.7 Production Facility for Oil and Gas Evacuation:

SHP/SH platform of Mumbai High Field is 29.70 Km

MUMBAI OFFSHORE BH-68 FIELD

4.4 DESCRIPTION OF MUMBAI OFFSHORE BH-68 FIELD

The well BH-68 (BH-G) was drilled in 2012 with the objective of exploring the hydrocarbon potential of Basement, Basal Clastics, L-VI and L-III formations to a depth of 2110m. The status of the well was declared as Oil and Gas bearing. During the course of drilling, the well had penetrated through Chinchini, Bandra, Tapti, Mahim, Bombay, Panvel, Basal Clastics Formations and it was terminated within Basement at 2110m (Top of Basement at 2005m).

The presence of oil and gas was established in Basal Clastics in this well and exploration objective of the extension of these pays of BH-67 has been established. In view of oil and gas bearing zone of BH-68 and gas bearing zone in well BH-67, it is expected that the basal clastic reservoir downdip of BH-68 may host oil.

BH-68 field (**FIGURE 4-42**) covers an area of 310.55 Sq. km. The co-ordinates of the endpoints defining the cluster boundary are tabulated below in **TABLE 4-39.** Location of BH-68 and its surrounding oil and gas fields are shown in **Figure 4-43 and Figure 4-44.**

Table 4-39: Coordinates of BH-68 field

	BH-68 Boundary Points		
	Area: 310.55 sq km		
	Point	**Longitude**	**Latitude**
	A	71°40’0.000” E	19°12’0.000” N
	B	71°40’0.000” E	19°02’0.000” N
	C	71°37’0.000” E	19°02’0.000” N
	D	71°37’0.000” E	19°06’0.000” N
	E	71°24’0.000” E	19°06’0.000” N
	F	71°24’0.000” E	19°11’0.000” N
	G	71°36’0.000” E	19°11’0.000” N
	H	71°36’0.000” E	19°12’0.000” N
	A	71°40’0.000” E	19°12’0.000” N
SL. No.	**Well**	**Longitude**	**Latitude**
1	BH-68	71°26’27.160” E	19°10’22.880” N

Figure 4-42:Contract Area map of BH-68 field

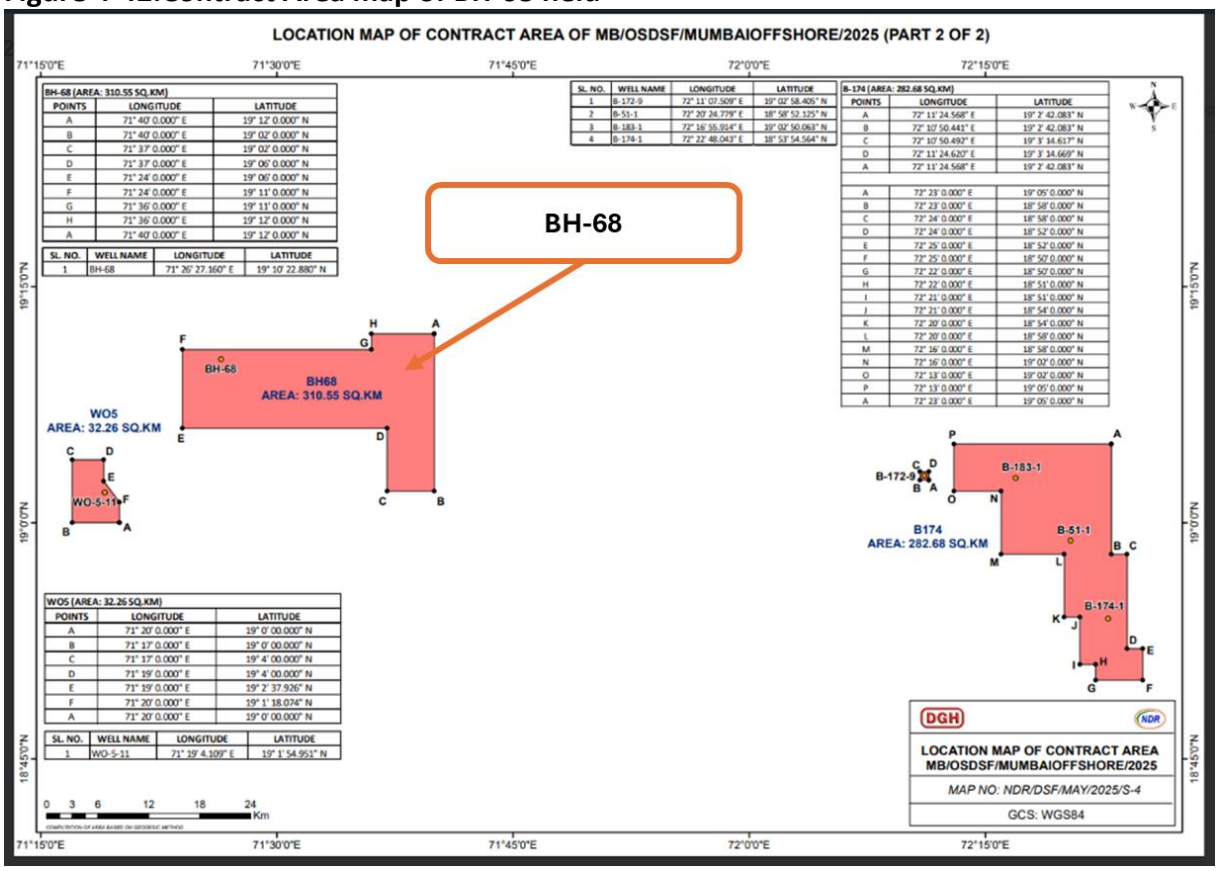


Figure 4-43: Location Map of BH-68

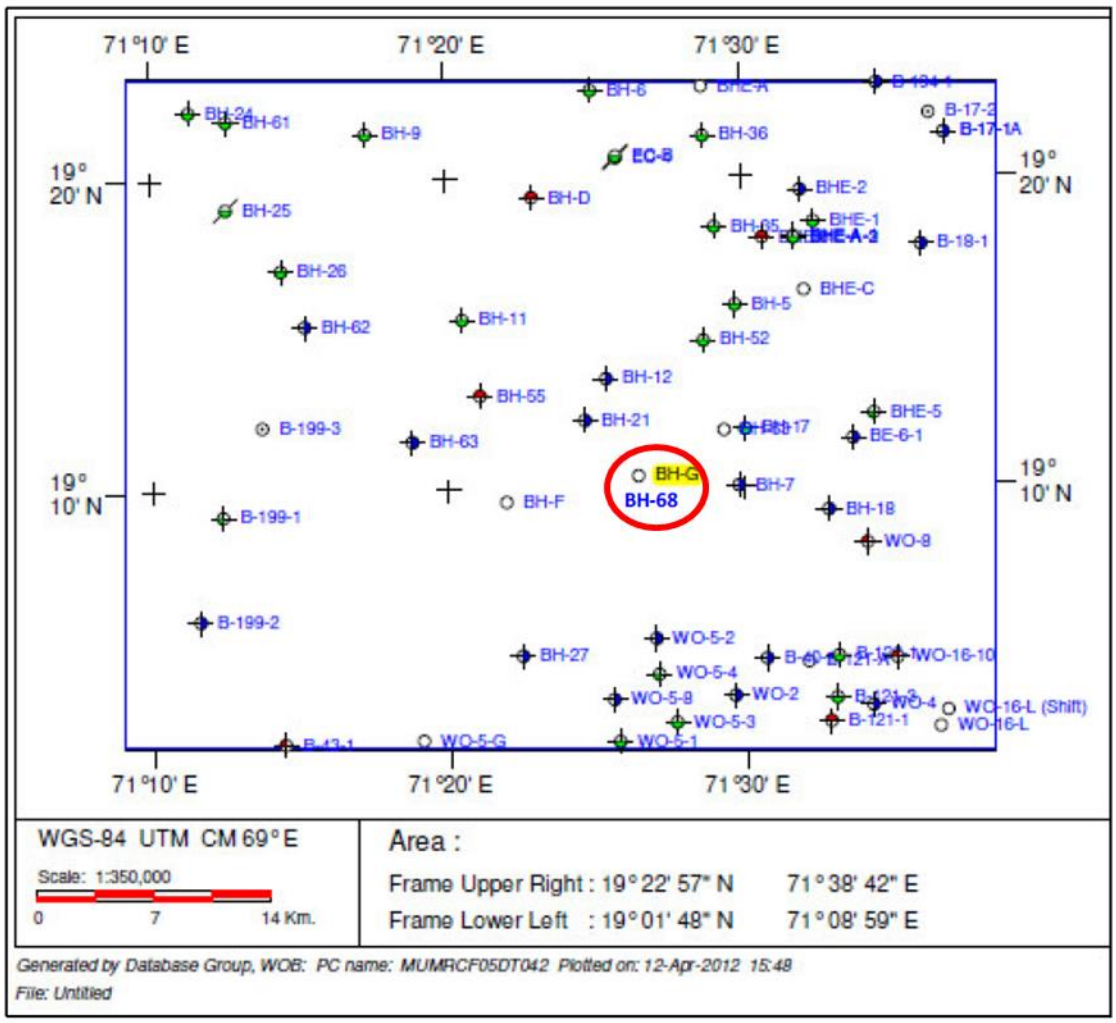
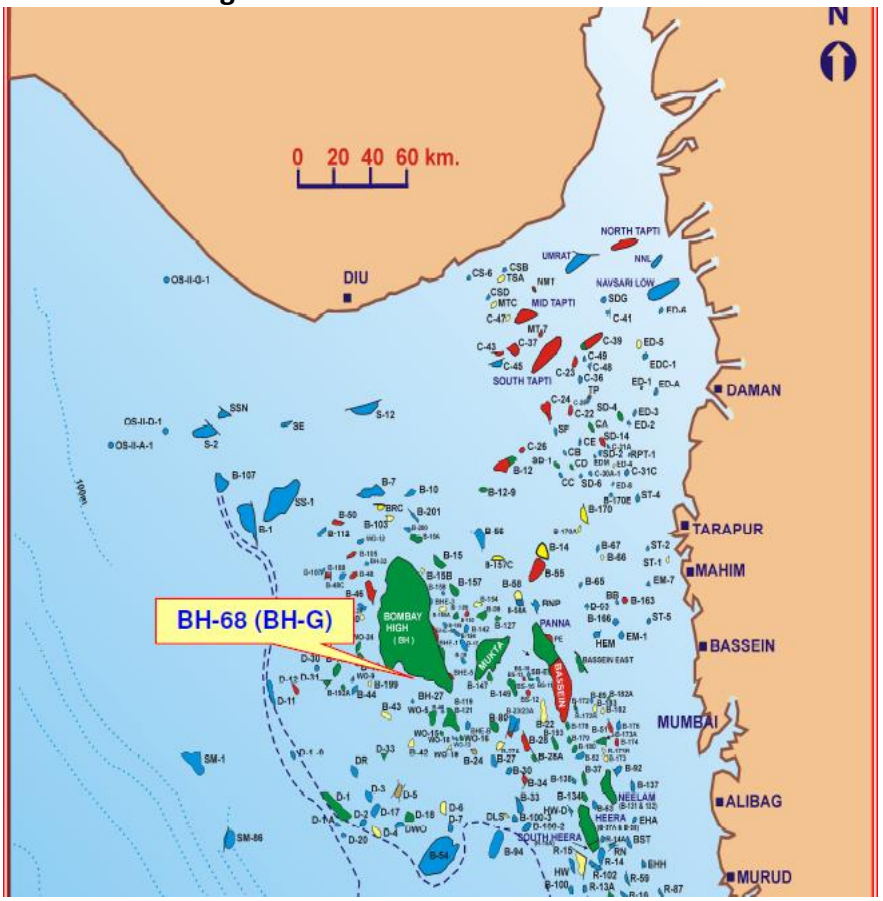


Figure 4-44: Surrounding Oil and Gas Fields of BH-68



4.4.1 Drilling and well completion

Key information of drilled wells have been collated and presented hereunder. The adjoining figures wherever shown illustrate the Well Construction Diagram and the Litho-column Information for key wells. Other well statics like kelly bush reference depth, water depth, drilled and logged depth including well coordinates are made available in Sections through various cross-references.

Well diagram and litho section of BH-68 are placed at **FIGURE 4-45 AND FIGURE 4-46**

Figure 4-45: : Well profile of BH-68 :

Well Completion Report of BH-68(BH-G)

Area/Structure	Mumbai Offshore/BH	**Name of Rig**	Sagar shakti
Latitude	19° 10' 24.05"N	**Rig Type**	Jack Up
Longitude	71° 26' 27.16"E	**Type of Well**	Exploratory, 'B' Cat
Elevation, KB	35.5m	**Spud Date**	01.05.12 (0300Hrs)
Water Depth	73.76m	**Drilling completed o**	09.07.12 (0900Hrs)
Target Depth	2230m /100m Basement	**Testing Started on**	11.07.12 (2000hrs)
Drilled Depth (m)	2110m/ 105m Basement	**Rig Released on**	02.08.12 (0400hrs)
Objective	HC potential of Basement, Basal Clastics, L-VI & L-III		
Status	Oil & Gas Bearing		

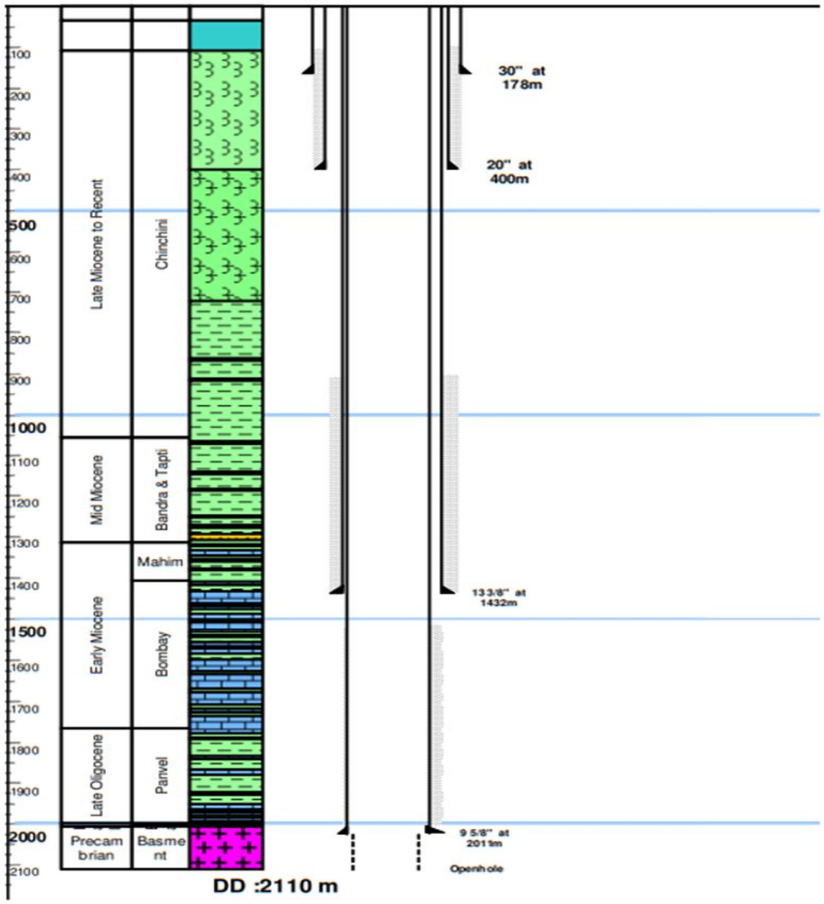


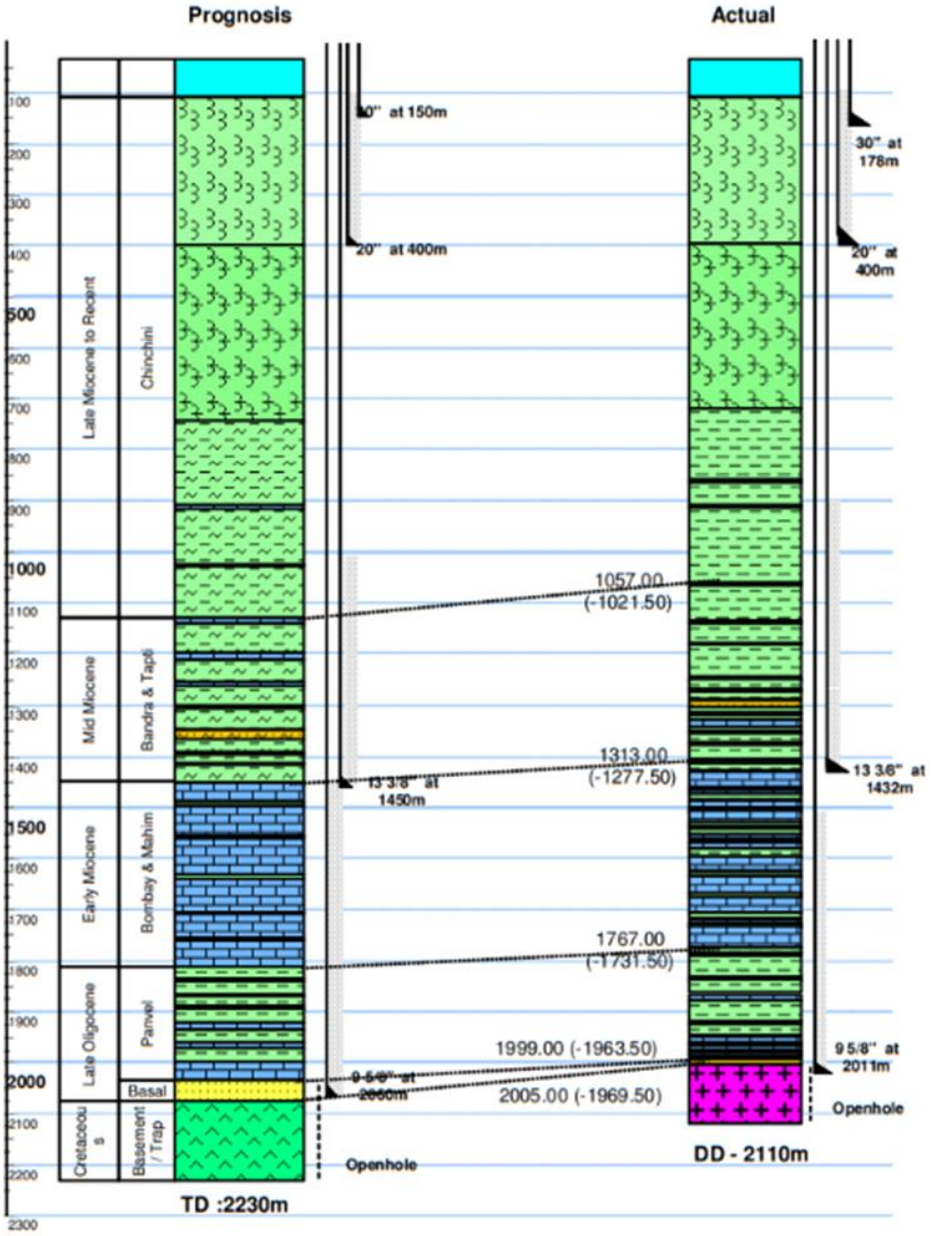
Fig 7: Well Constructor for BH-68

Figure 4-46: : Litho-section information of BH-68:

Well Completion Report of BH-68(BH-G)

Fig. 8

Area/Structure	Mumbai Offshore/BH	**Name of Rig**	Sagar shakti
Latitude	19° 10' 24.05"N	**Rig Type**	Jack Up
Longitude	71° 26' 27.16"E	**Type of Well**	Exploratory, 'B' Cat
Elevation, KB	35.5m	**Spud Date**	01.05.12 (0300Hrs)
Water Depth	73.76m	**Drilling completed on**	09.07.12 (0900Hrs)
Target Depth	2230m /100m Basement	**Testing Started on**	11.07.12 (2000hrs)
Drilled Depth (m)	2110m/ 105m Basement	**Rig Released on**	02.08.12 (0400hrs)
Objective	HC potential of Basement, Basal Clastics, L-VI & L-III		
Status	Oil & Gas Bearing		



4.4.2 Well logging and formation evaluation

The well logs of all discovery wells along with some key wells in the contract area have been reviewed. The logs recorded in various open-hole sections along with cased-hole logs and information of conventional and other wireline formation test data are presented in this docket. The availability of key input reports like Well Completion Reports (WCR) and Formation Evaluation Report (FER) have been checked and information given. Reservoir parameters of interesting zones and results of the tested zone(s) have been included in this report. Log motifs of tested/interesting zone of key wells are also appended.

A| Well completion and log evaluation reports availability (BH-68) :

WCR/ FER availability	Spud date	KB	Drilled depth
Both available	01.05.2012	35.5 m	2110 m

BI Well logs acquired in well BH-68: (Figure 4-45)

Table 4-40: Logs acquired in BH-68

SN	Hole/ Casing Size (")	Date	Interval (M)	Logs Recorded	Remarks
1	17 ½	21.05.12 to 22.05.12	390 – 1430	DLL-MLL-SONIC- GR-SP-CAL	Rm: 0.772 Ohm-m at 82° F Rmf: 0.283 Ohm-m at 77° F Rmc: 0.984 Ohm-m at 77.5° F MAX. BHT :157°F Driller's depth:1440m Loggers' depth:1435m
			390 – 1430	ZDL-CN-GR-CAL	
2	12 ¼	18.06.12 to 19.06.12	1400-2040	DLL-MLL-XMAC- GR-SP-CAL SWC	Rm: 0.179 Ohm-m at 76.5° F Rmf: 0.148 Ohm-m at 58.5° F Rmc: 0.39 Ohm-m at 59.5° F Max Temp :213°F Drilled depth:2045m Loggers depth:2040m
		19.06.12	1429-850	CBL-VDL-GR-CCL	$13^3/_8$"section
		20.06.12 to 22.06.12	2001.5 – 1501.2	RCI	Recorded 51 Pressure Tests & collectedSix Samples. Four Sampleswerecollectedatthe samedepthof 2001.5m.
		22.06.12 to 23.06.12	2000-410	VSP	At 10m intervals. Check Shots @ 500m, 1000m & 1500m.
		24.06.12	2036-1428	STAR-GR	
3	8 1/2	09.07.12	2100-2005	STAR- GR	
		09.07.12 to 10.07.12	2100-2005	DLL-MLL-GR/SL-XMAC-ZDN-CN-SP-CAL	Rm: 0.426 Ohm-m at 75° F Rmf: 0.383 Ohm-m at 75° F Rmc:0.684 Ohm-m at 76° F Max Temp :226°F Drilled depth:2110m Loggers depth:2105m
		10.07.12	1350-2011	CBL-VDL-GR-CCL	Recordedin 9 5/8 casing

C| Well log evaluation and initial test results (BH-68):

- Chinchini, Bandra and Tapti (L-I, L-II and S1) Formations are **not interesting from Hydrocarbon** point of view. No reservoir development is seen.
- In **Mahim Formation**, **marginal hydrocarbon saturation** is found against the interval 1329-1336 m (Limestone, Sw=80-100% and Effect. Porosity: 10-20%).
- Bombay (L-III and L-IV) and Panvel (L-V and L-VI) Formations are **devoid of hydrocarbons**. All the Porous intervals in these formations are Water bearing.
- **Basal Clastics,** in the interval 2000-2002 m, is **hydrocarbon bearing (Sandstone/Siltstone, Sw=40**-50% and Effective Porosity: 10-18%). RCI Fluid Samples collected at 2001.5 m (Basal Clastics) yielded gas and water of salinity 44541 ppm as NaCl. Side Wall Core Samples collected at 2000.5m, 2001.5m and 2003m (Basal Clastics) showed milky white cut. Samples collected from 2001.5m and 2000.5m also showed good visual porosity.
- **Fractured Basement** In Basement, from STAR Image Log, few **fractures** have been found.

Table 4-41: Formation evaluation and initial testing details of BH-68

Interval (mMDRT/mTVDSS)	Formation (+ Zone, if specified)	Gross(m)	Net(m)	Phi	Sw
1999-2005 / 1963-1969	**Basal Clastics** / H4/ Palaeocene to Early Eocene (2000-2002 mMDRT)	2.0	2.0	0.10-0.18	0.40- 0.50
	Initial testing results: Object II was tested in the interval 2000.0-2002.0m and it produced gas @161584 m3/day and oil @ 120 bpd (API: 44.7) GOR: 8466 v/v through 1/2" choke.				
2005-2115 / 1969-2079	**Fractured Basement** (2011-2110 mMDRT)	99.0	0.0	0.02	0.8-1.0
	Initial testing results: Object I tested in the interval 2011.0-2110.0 m and initially knocked out diesel, thereafter no flow. On reverse out, observed influx of diesel mixed mud (4.6 bbls) and water contaminated mud of salinity 75465ppm as NaCl (6.8bbls). As per lab report, reverse out samples show presence of oil (250ml in3 .5L of liquid). Salinity of mud used for testing-99450ppm as NaCl.				

Conventional Core data:

Conventional cores were not taken this well.

Side Wall Core data:

Twenty-five (25) numbers of SWCs were attempted, in 12 ¼" Section, out of which 23 were recovered and two were lost. SWC samples collected at 1449m, 1514m, 1660m, 1664m, 1666m, 2000.5m, 2001.5m, 2003m and 2006m showed milky white cut. Core samples collected at 2000.5m and 2001.5 m have shown good visual porosity.

CBL-VDL Interpretation:

CBL-VDL-GR-CCL Log showed good Cement bond against the testing object (object-II).

BH-68 well log motif is in **FIGURE 4-47 AND FIGURE 4-48.**

Figure 4-47:.: Well log motif of BH-68:

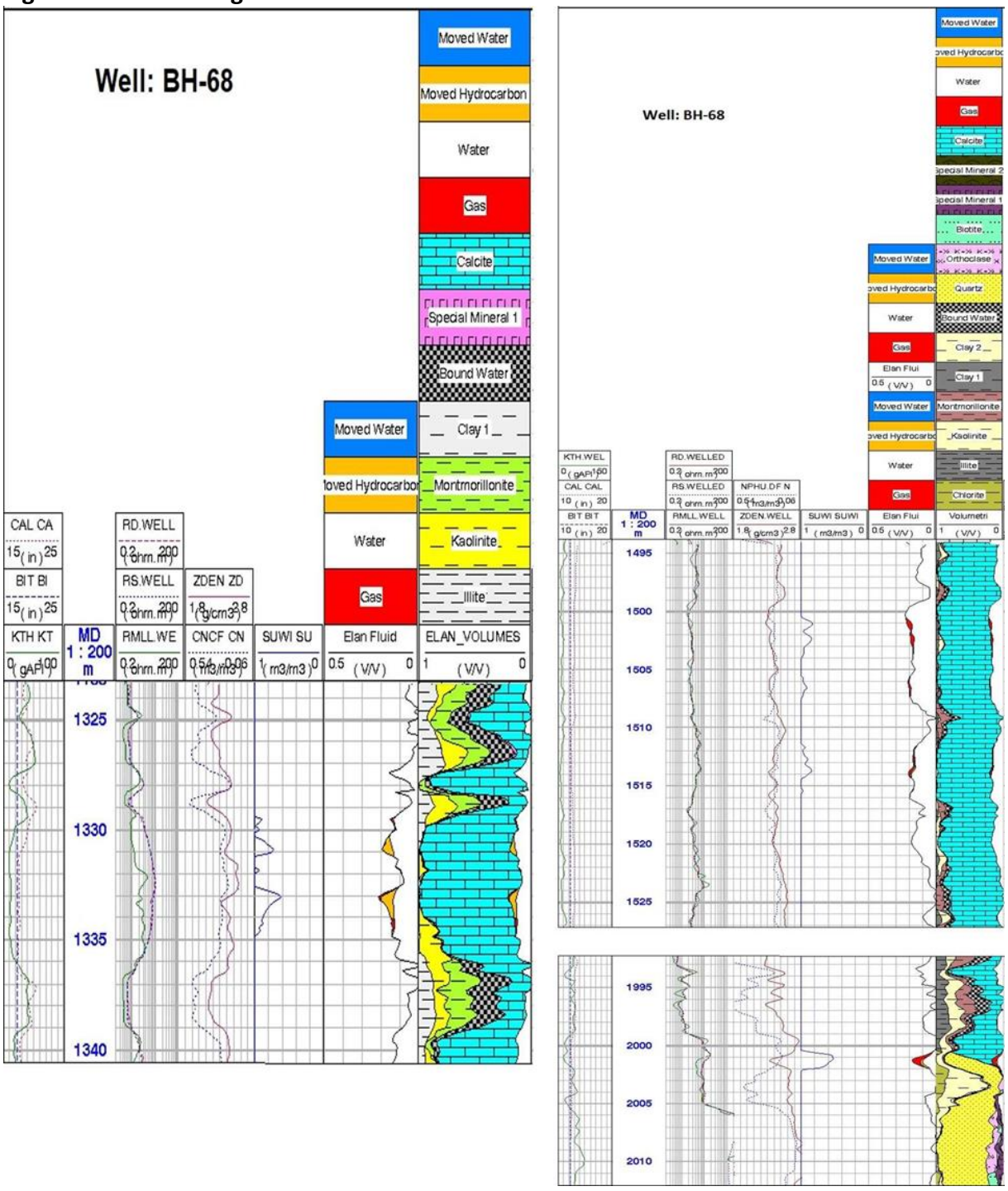
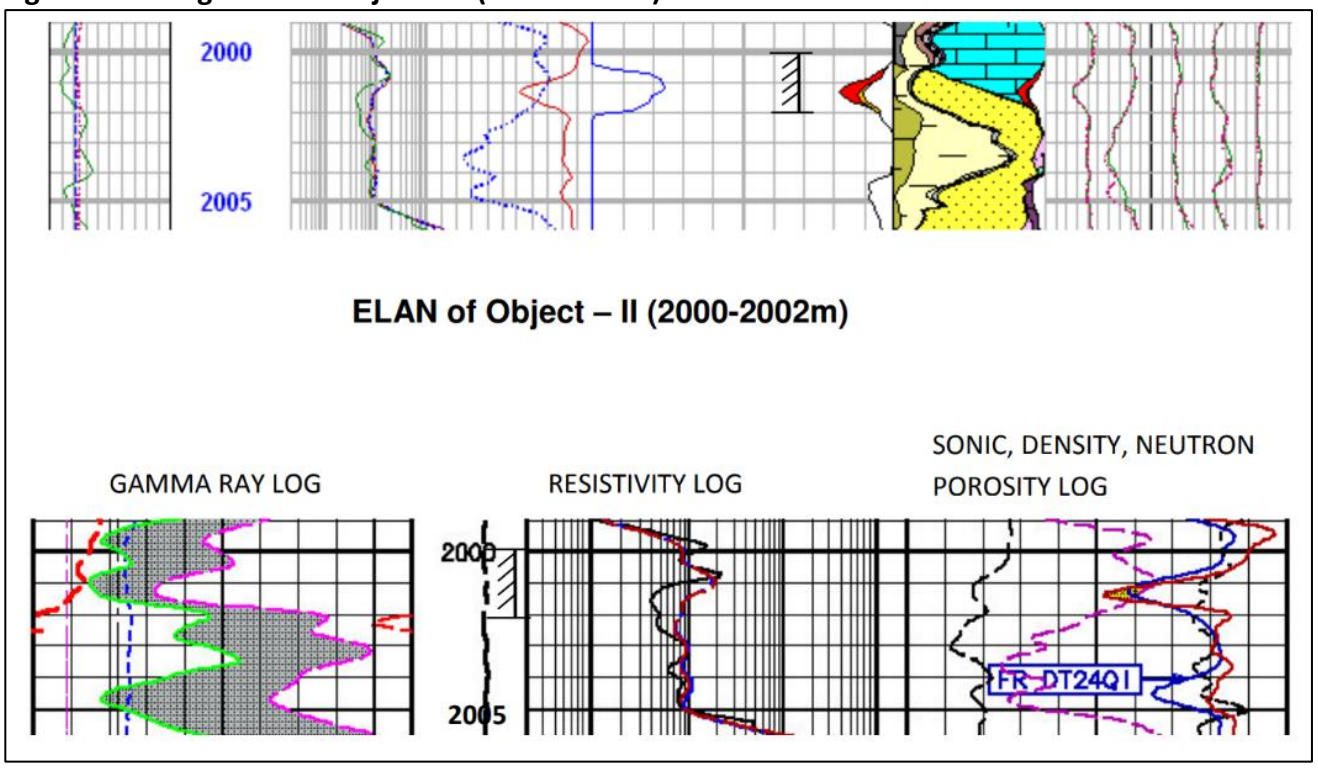


Figure 4-48: Log motif of Object – II (2000-2002m)



4.4.3 Well testing and workover history

Two objects were tested during production testing. Details of testing results are shown in **Table 4-42**.

Object-I in the interval 2011-2110m (Barefoot Testing- Basement/Granite) yielded water contaminated with mud having salinity of 75465ppm as NaCl.

Object-II in the interval 2000- 2002m (Basal Clastics) flowed 161584 m3/day gas and 120 bbl/day oil of 44.71API through 1/2" choke.

Table 4-42: Testing details of well BH-68

.Obj	Interval (m)	Formation	Choke	FTHP (psi)	FBHP (psi)	FTHT (Deg. F)	FBHT (Deg. F)	Gas (m^3/day)	Oil (B/day)	API	GOR m3/m3	Samples
I	2011-2110 DST Barefoot	Basement (Granite)	Initially well knocked out diesel. Thereafter no flow. On reverse out, observed influx of diesel mixed mud (4.6 bbls) and water contaminated mud of salinity 75465ppm as NaCl (6.8 bbls). Salinity of mud used for testing-99450ppm as NaCl.									
II	2000-2002 TCP DST	Basal Clastics	1/8"	2900	2900.74	85	267.14	24579	-	-		Separator Gas
			1/4"	2350	2371.92	100	269.59	80768	132	46.5	3848	Separator Oil & Gas
			3/8"	1800	1825.45	105	260.94	114447	280	43.19	2570	Separator Oil & Gas
			½ "	1250	1365.59	110	251.6	161584	120	44.71	8466	Separator Oil & Gas
			SBHP: 2979.6 psi @1925m									

BHS data:

Object- II: SBHP- 2979.6psi at 1925m.

4.4.4 Reservoir engineering studies and analysis

Key reservoir engineering datasets, wherever available have been collated and presented under various data genres. In a comprehensive data presentation, the results are included from well tests, formation dynamics tests, reservoir pressure build-up study and PVT data/ results.

Formation dynamics tests (BH-68)

Pressure Tests were attempted with RCI Tool at 51 stations including 6 sample points, in 12 ¼" Section. (Good Tests - 20, Tight Tests – 26, Lost Seal Tests – 4 & No Seal Tests-1). In addition to Pressure Tests, Six Fluid Samples were also collected. The details are as follows (**Table 4-43**):

Table 4-43: RCI data available for well BH-68

SN	DEPTH (m)	DRAWDOWN MOBILITY (MD/CP)	HYD. PRESSURE (IMHP) (psi)	HYD. PRESSURE (FMHP) (psi)	TEMP (^{0}F)	FORMATION PRESSURE (psi)	REMARKS
	Basal Clastics						
1	**2001.55**	**64.9**	**3556.92**	**3529.69**	**214.6**	**3080.45**	**Good Test (Four samples)**
2	2003.02		3544.23	3540.33	216.4		Tight Test
3	2002.03		3539.98	3537.99	217.4		Tight Test
4	**2001.03**		**3529.29**	**3534.07**	**218.7**		**Tight Test**
5	**2000.51**		**3533.09**	**3532.82**	**219.2**		**Tight Test**
6	**1936.98**		**3417.39**	**3417.52**			**No Seal**
7	**1936.45**		**3417.09**	**3416.49**	**215.5**		**Tight Test**
8	**1936.77**		**3417.35**	**3418**			**No Seal**
9	1937.18		3418.89	3418.77	212.9		Tight Test
10	1936.18		3416.90	3416.89			No Seal
11	1795.03		3182.69	3177.78	199.8		Tight Test
	Panvel						
12	**1794.40**	**3.27**	**3181.71**	**3172**	**197.7**	**2996.42**	**Good Test**
13	**1794.06**	**3.019**	**3176.50**	**3169**	**197.8**	**2998.33**	**Good Test**
14	**1793.50**		**3170.35**	**3162.93**	**198.5**		**Tight Test**
15	1792.97	4.969	3163.57	3163.26	199.0	2997.73	Good Test
	Bombay						
16	1747.97	6.66	3087.70	3085.32	201.6	2846.75	Good Test
17	1746.48	9.694	3089.71	3081.73	202.5	2843.45	Good Test
18	1745.00	46.979	3085.19	3079.12	203.9	2841.51	Good Test
19	1723.00		3046.12	3038.33	204.6		Tight test
20	1720.99	25.945	3039.67	3035.5	204.9	2827.95	Good Test
21	1720.01		3034.67	3032.48	204.6		Tight Test
22	**1698.50**	**399.677**	**3000.47**	**3007.62**	**205.1**	**2757.87**	**Good Test (Sample)**
23	**1697.00**	**19.92**	**3004.98**	**3000.57**	**205.6**	**2755.65**	**Good Test**
24	1683.00		2974.23	2971.82	207.8		Tight Test
25	1681.98		2970.82	2968.35	208.4		Tight Test
26	1681.09		2967.56	2966.02	207.9		Tight Test

SN	DEPTH (m)	DRAWDOWN MOBILITY (MD/CP)	HYD. PRESSURE (IMHP) (psi)	HYD. PRESSURE (FMHP) (psi)	TEMP (^{0}F)	FORMATION PRESSURE (psi)	REMARKS
27	1666.10		2940.36	2938.69	207.5		Tight Test
28	1666.09	11.332	2940.13	2929.77	206.6	2829.52	Good Test
29	1664.03		2936.41	2934.55	206.4		Tight Test
30	1663.01		2933.81	2932.67	206.3		Tight Test
31	1661.99		2932.48	2930.85	206.1		Tight Test
32	1660.99		2933.37	2929.01	206.2		Tight Test
33	1660.01		2930.26	2928.08			No Seal
34	1647.51		2906.64	2905.96	206.6		Tight Test
35	1647.02		2905.79	2905.84	206.3		Tight Test
36	1633.50	692	2885.23	2882.45	206.7	2665.37	Good Test
37	2001.50	214.811	3536.00	3502.61	246.1	3080.24	Good Test
38	1618.52		2866.28	2859.07	211.8		Tight Test
39	1606.98		2835.88	2828.12	209.7		Tight Test
40	1605.00		2828.70	2825.95	209.1		Tight Test
41	**1513.99**	**9.585**	**2671.53**	**2669.35**	**206.1**	**2398.94**	**Good Test**
42	**1513.01**		**2668.66**	**2665.32**	**203.9**		**Tight Test**
43	**1511.98**	**13.304**	**2666.78**	**2667.47**	**202.9**	**2391.73**	**Good Test (Sample)**
44	1510.98		2671.16	2663.76	203.5		Tight Test
45	1501.01	7.255	2648.94	2647.3	205.2	2375.76	Good Test
46	**1436.98**	**4.384**	**2534.67**	**2535.04**	**197.0**	**2032.65**	**Good Test**
47	**1436.51**	**3.951**	**2539.87**	**2533.49**	**195.9**	**2025.46**	**Good Test**
48	**1435.06**		**2536.00**	**2525.13**	**195.9**		**Tight Test**
49	**1435.93**	**4.5**	**2537.54**	**2529.01**	**195.8**	**2026.91**	**Good Test**
50	1501.01		2660.87	2645.8	200.2		Lost Seal
51	1501.23	7.527	2646.89	2642.8	201.7	2379.92	Good Test

51 Good 20 Tight 26 Lost Seal 1 No Seal 4 Data in bold are sample depths

RCI samples were attempted in the intervals 1434-1437m, 1512- 1514m, 1697-1699m, 1793-1794.5m, 1936.2-1937.2m and 2000-2002m. Four samples were collected at depth 2001.5m. Two samples collected at the depth of 2001.5m in the repeat attempt were not opened on the rig. Details are as follows (**Table 4-44**).

Table 4-44: RCI sample data of well BH-68

SN	Depth (M	Sample Type	Color	Fluid (Vol)	Salinity (PPM as NaCl)	Sample Resistivity (ΩM)	pH	Chamber Opening Pressure at Surface (PSI)	Gas Analysis (%)
1	**2001.5**	**Gas & water**	Dark Brown	300 cc	44541	0.270 @ 75.2º F	9	4000psi	**TG-28, C_1 – 15.838 C_2- 4.347, C_3- 0.602 iC_4 – 0.078, nC_4 -0.053**
2	**2001.5**	**Gas & water**	Dark Brown	250 cc	44541	0.301 @ 85.2º F	9	4000psi	**TG-34, C_1 – 16.554 C_2- 5.695, C_3- 0.914 iC_4 – 0.120, nC_4 -0.110**

3	**2001.5**	-	-	-	-	-	-	**Repeat Samples. Not opened on the rig.**	
4	**2001.5**	-	-	-	-	-	-		
5.	**1698.50**	**Muddy water**	Lt Brown	750cc	52790	0.192 @ 78.5º F	9	Nil	-
6.	**1511.98**	**Muddy water**	Lt Brown	750cc	42892	0.309 @ 82.3º F	9	Nil	-

Resistivity of Mud Filtrate: Rmf: 0.148. Ohm @ 78.5 º F. Salinity of Mud Filtrate during drilling: 45700ppm (as NaCl) and during Final logging 51110ppm (as NaCl).

Bottomhole Temperature:

Depth m	Date	Temp DeGF	Remarks
1435	**21.05.2012**	**157**	Log Header
2045	**19.06.2012**	**213**	Log Header
2110	**09.07.2012**	**227**	Log Header

Pressure build-up study (BH-68)

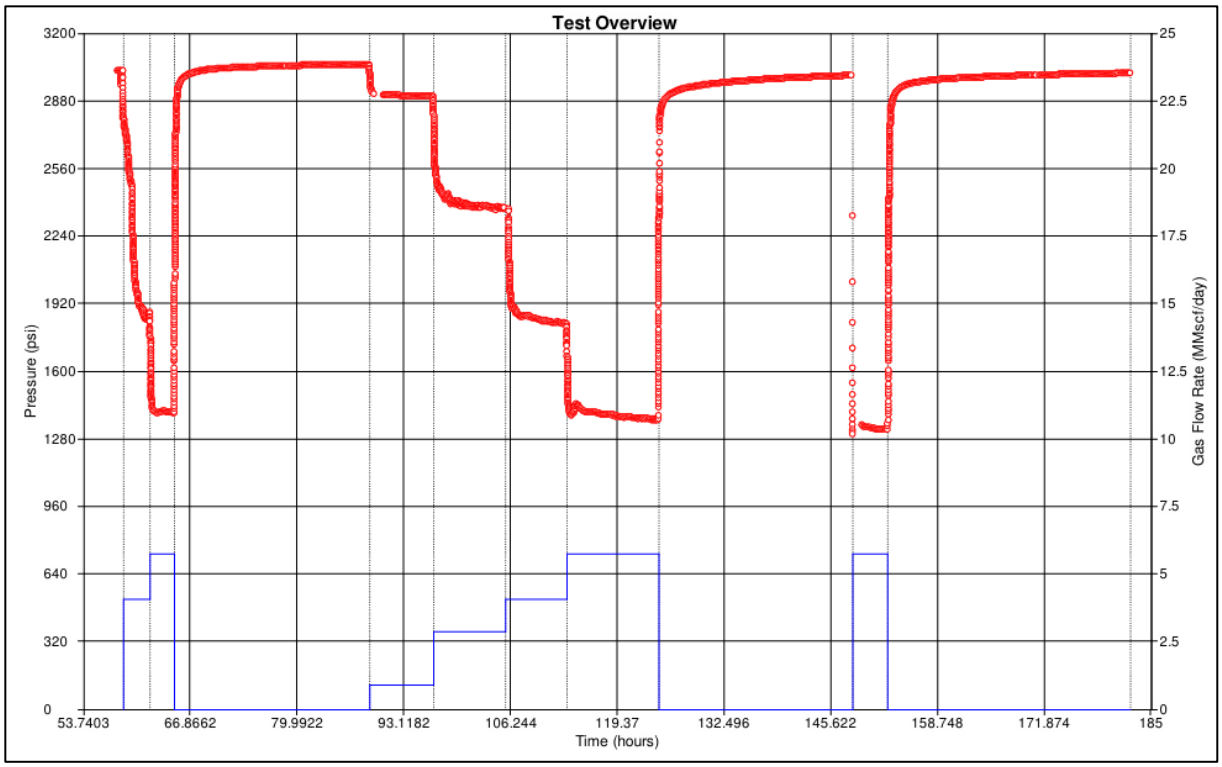
Results of pressure build up study of BH-68 is given in **Table 4-45**.

Table 4-45: Pressure build-up study (BH-68)

Pressure build-up study (BH-6	
Formation: Basal Clastics| Object: II Interval(m.): 2000- 2002	
Depth of measurement: 1961.42 m	Duration of build-up: 24.84 hrs
Static bottom hole pressure: 3050.9 psi	Radial investigation: 900 ft
Skin: 9.83 Pressure differential: 1023.295 psi	No flow boundary 1: 8200 No flow boundary 2: 2132
Permeability: 74.48 md	Wellbore constant: 0.048582 bbl/psi
Capacity (kh): 244.1357 mdft	**Average open flow potential (gas): 0.18215 MMSCFD**.

Rate and Pressure chart during testing is shown in **FIGURE 4-49**

Figure 4-49: Rate-Pressure chart during testing in BH-68



Oil composition analysis (BH-68)

Two RCI oil samples collected and sent to the laboratory for analysis. Results of analysis are in table below (**Table 4-46**). Oil and gas samples analyses are given in **Table 4-47,**

Table 4-46: Physico chemical characteristics of crude oil

Parameters	Results Obj-II: (370/OT/12)	Results Obj-I: R/O Sample (371/OT/12)
Depth	2000 - 2002	2011 - 2010
Formation	**Basal Clastics**	**Basement**
Date of sampling	25.07.2012	17.07.2012
Density at 15°C, g/ml	0.8084	0.8499
Specific gravity, at 60/60°F	**0.8088**	**0.8503**
API gravity at, 60°F	**43.43**	**34.99**
Kinematic Viscosity at 37.8°C, cst	1.15	4.79
Water content, % vol.	Nil	0.4
B S & W, % vol.	0.05	1.6
Asphaltene, % wt.	0.10	0.63
Resin, % wt.	1.0	7.44
Wax, % wt.	3.65	15.87
Pour point, °C	<0	30
Saturates (% by wt)	70.61	n. d.
Aromatics (% by wt)	13.09	n. d.
Saturates/ Aromatics	5.39	n. d.

Remark: Reverse Out sample of Ob: I was analysed after removing of drilling fluid additives and water.
n. d. - Not determined due to contamination

Gas composition analysis (BH-68)

The four gas samples collected from Basal Clastics (Object-II), depth 2000-2002 were analysed on Perkin Elmer clarus 500 using Poropak Q column and programmed 80degC to 210DegC per minute.
The Object-II Gas analysis of samples taken on surface at choke manifold
given in Table 448.

Table 4-47: Gas composition in BH-68 (Object-II)

Constituent		%Vol	%Vol	%Vol	%Vol
Methane	**C1**	84.55	86.09	84.95	81.70
Ethane	**C2**	4.40	4.36	4.41	4.16
Propane	**C3**	1.70	1.61	1.67	1.54
ISO-Butane	**iC4**	0.37	0.29	0.28	0.25
N-Butane	**nC4**	0.51	0.38	0.42	0.36
ISO-Pentane	**iC5**	0.31	0.18	0.22	0.18

N-Pentene	**nC5**	0.32	0.19	0.24	0.19
Hexane+	**C6+**	0.33	0.26	0.23	0.21
Nitrogen	**N2**	1.39	1.37	1.37	6.14
Carbon Dioxide	**CO2**	5.65	5.07	6.21	5.57
Helium		160	160	160	200
Mol. Weight		19.84	19.38	19.74	19.98
Sp. Gravity		0.6881	0.6710	0.6835	0.6918
Net Calorific value (Kcal/m^3)		8593	8368	8522	7951
K-VALUE		0.70	0.76	0.67	0.69
Z-VALUE		1.22	1.50	1.44	1.55
C_3+		4.01	7.27	7.47	6.89
C_1/C_2		19.30	19.75	19.26	19.63

4.4.5 Geology and Reservoir Description of BH-68 Field:

The geology of the area has been comprehensively reviewed using correlations, sections and maps. The well correlation, seismic sections, top structure, seismic attribute/amplitude and net sand/pay maps have been used to illustrate the magnitude and distribution of key reservoir properties in and around the discovered oil/gas pools (accumulations). The local tectonic setting and geological section of the area, wherever available are also given. These maps/sections are sequentially shown field-wise and reservoir unit-wise through figures, appropriately titled and illustrated in the following section.

Geological correlations, sections and maps (BH-68 Field):

The well was drilled to test the independent four-way closure to the SSW of the main Mumbai High. It falls on the crossing of inline 2576 and trace 2772 and is an elongated 4 way structural closure bound to the east, west and north by faults separating it from steep lows. Areal extent of the lead is around 15 sq.km.

BH-68 has been mapped as an independent fault bounded closure at H5, Basal clastics, L-VI and L-III levels extending in the NNE-SSW direction.

Around 0.76 m gas pay has been encountered at well location in Lower clastic pay.

Stratigraphy

Table 4-48Table 4-49Stratigraphy

Table 4-48: Stratigraphic sequences in BH-68

Age	Formation	Layers/ Markers	Depth (M)	Lithology
Recent to Late Miocene	Chinchini		Sea bed - 1057	Clay, Clay Stone with thin Limestone bands.
Middle Miocene	Bandra and Tapti	L-I	1057-1139	Predominantly Shale, with minor Clay Stone & thin Limestone streaks
		L-II	1139-1291	Mostly Llimestone with thin Shale layers
		S1	1291-1313	Siltstone, SiltyShale and Shale
Early Miocene	Mahim	H1C	1313-1407	Limestone with Shale bands, grading to predominantly Shale towards the bottom
	Bombay	L-III	1407-1576	Limestone with Shale bands, grading to predominantly shale towards the bottom
		L-IV	1576-1767	
Late Oligocene	Panvel	H3CGG	1767-1999	Shale and Limestone alternations.
		L-V	1767-1921	Limestone with thin Shale alternations
		L-VI	1921-1999	
Palaeocene to Early Eocene	Basal Clastics	H4	1999-2005	Sandstone, Siltstone, Shale
Achaean	Basement	H5	2005-2110+	Granite/ Granite gneiss

All depths are in KB

Stratigraphic Correlation

The well BH-68 has been correlated with nearby wells BH-67, BH-21, BH-7 and BH- 17. The correlation is given below in **TABLE 4-49** and **FIGURE 4-50:**.

Table 4-49: Stratigraphic Correlation of BH-68 with nearby wells

Age	Formation	Seismic Marker	BH-67	BH-21	BH-68 (BH-G)	BH-7	BH-17
			KB:34.07m	KB:17.5m	KB: 35.50m	KB:11m	KB:24.08m
Recent to Late Miocene	Chinchini		Seabed – 1107	Seabed-	Sea bed - 1057	Seabed – 1012	Seabed – 1008
Middle Miocene	Bandra and Tapti	L-I	1107 (1073)	-	1057 (1021)	1012 (1001)	1008 (984)
		L-II	1177 (1143)	1108 (1090)	1139 (1103)	1079 (1068)	1088 (1064)
		S1	1326 (1292)	1266 (1248)	1291 (1255)	1227 (1216)	1229 (1205)
Early Miocene	Mahim	H1C	1349 (1315)	1291 (1273)	1313 (1277)	1251 (1240)	1250 (1226)
Early Miocene	Bombay	L-III	1455 (1421)	1399 (1381)	1407 (1371)	1365 (1354)	1357 (1333)
		L-IV	1625 (1591)	1565 (1547)	1576 1540)	1538 (1527)	1530 (1506)
Late Oligocene	Panvel	H3CGG	1810.5 (1776.5)	1745 (1727)	1767 (1731)	1692 (1681)	1686 (1662)
		L-V	1877 (1843)	1807 (1789)	1767 (1731)	1757 (1746)	1748 (1724)
		L-VI	1941 (1907)	1865 (1847)	1921 (1885)	1809 (1798)	1818 (1794)
Early Oligocene	Heera	H3G	---		--	--	1906 (1882)
Palaeocene to Early Eocene	Basal Clastics	H4	2059 (2025)	1982 (1964)	1999 (1963)	1867 (1856)	--
Cretaceous/ Archaean	Basement (Basaltic/ Granitic)	H5	2066 (2032)	--	2005 (1969)	1873 (1862)	1917 (1893)
Drilled Depth	-	-	2120	2043	2110	1886.7	1943

Depths within parentheses are in MSL

Maps given below:
Seismic sections along the wells BH-68 & BH-7: **Figure 4-51**
Time Relief map of BASAL CLASTIC: **Figure 4-52**
Time Relief map of BASEMENT: **Figure 4-53**
Time Relief map of L-VI: **Figure 4-54**

Figure 4-50:.: Well log correlation of BH-68 with nearby wells:

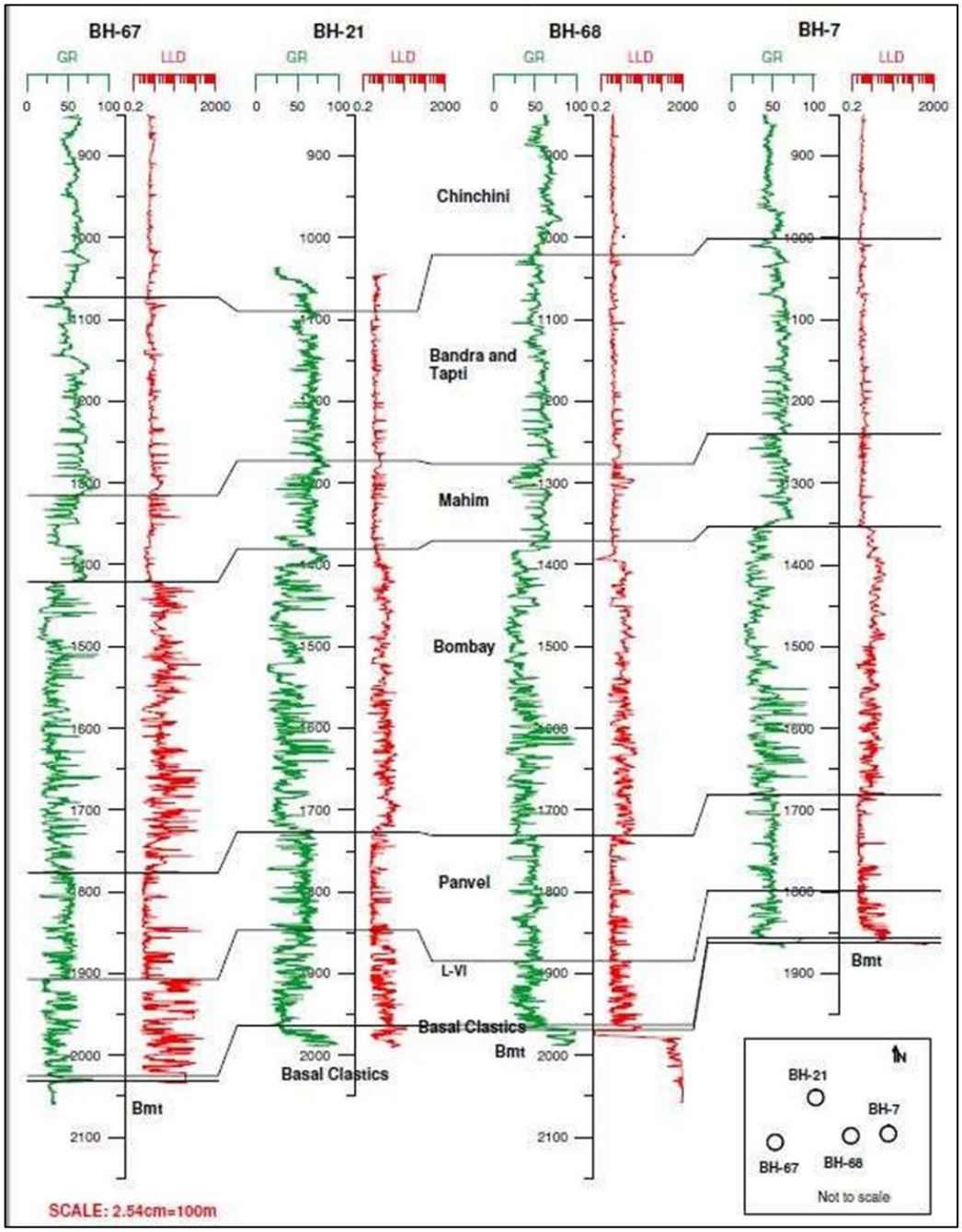
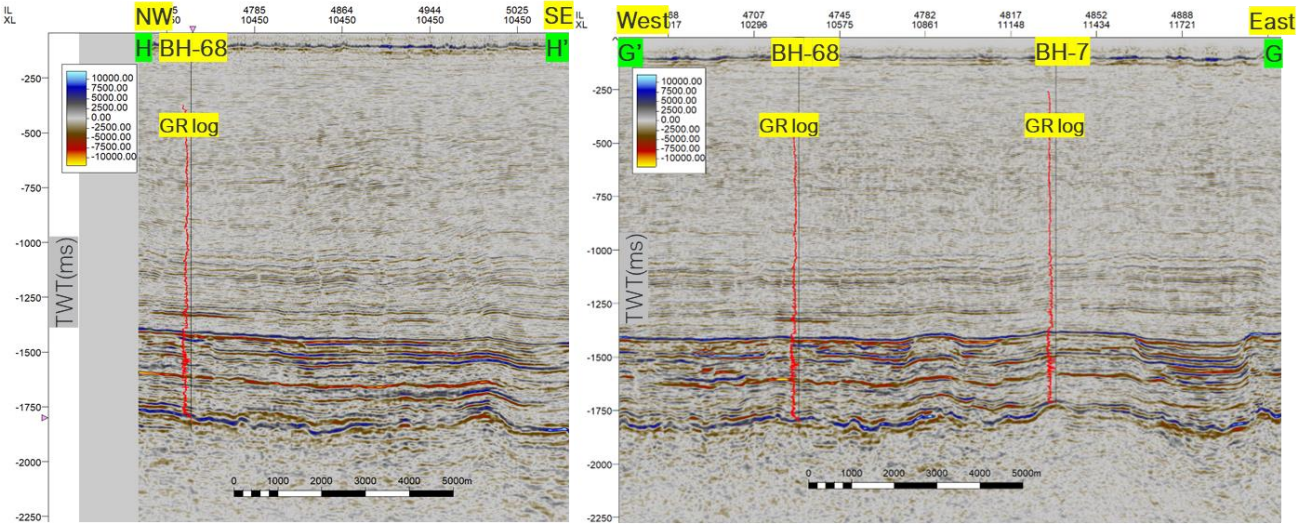


Figure 4-51:.: Seismic sections along the wells BH-68 & BH-7:



Vertical exaggeration: 5x
Seismic volume: 00001.SSW_OF_MUMBAI_HIGH_AND_EXT_BROADBAND_FINAL_PSTM_STACK_

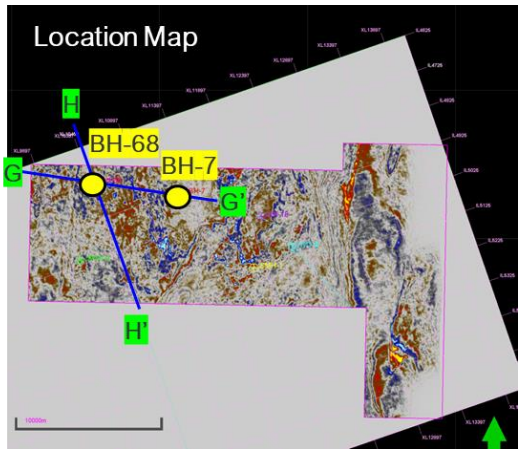


Figure 4-52:.: Time Structure map of BASAL CLASTIC :

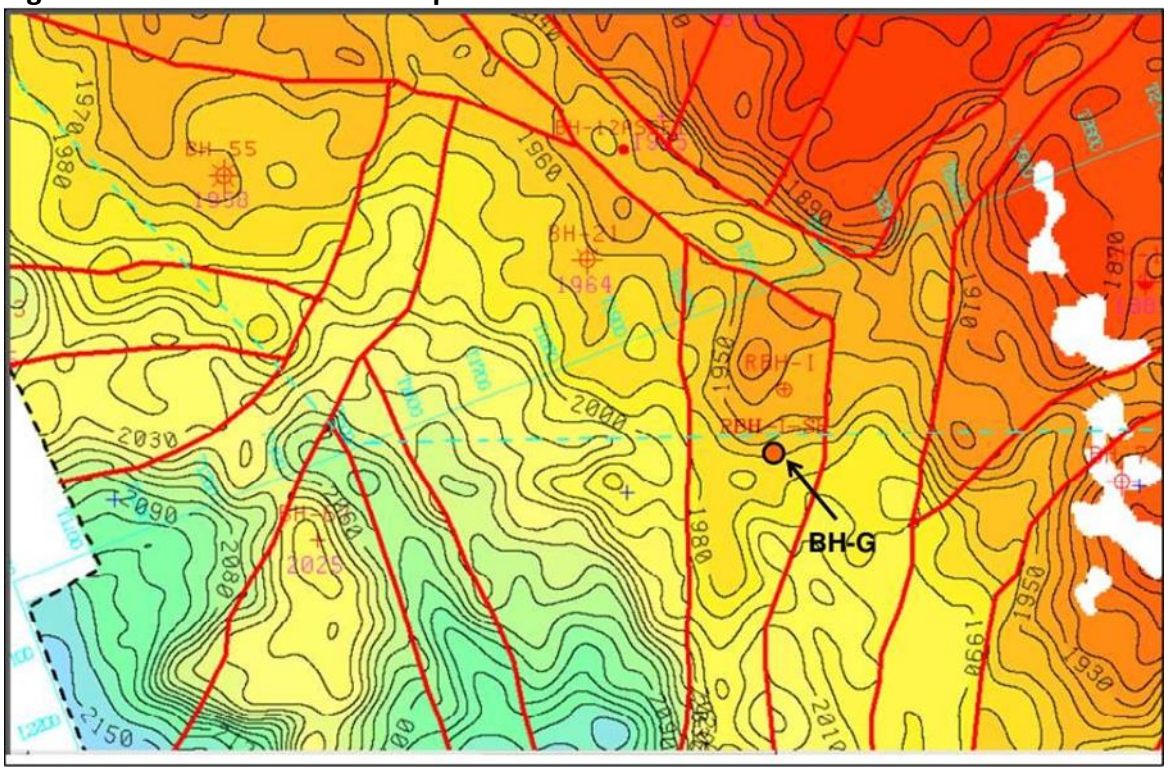


Figure 4-53:.: Time Relief map of BASEMENT :

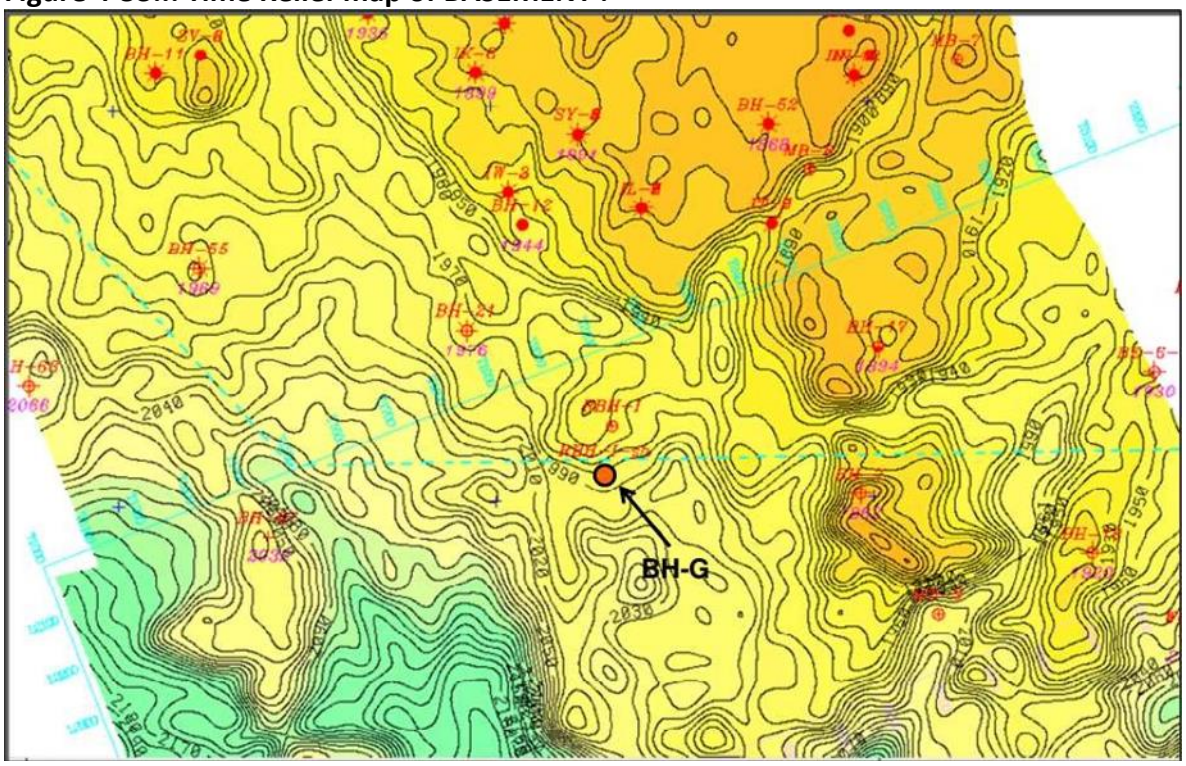
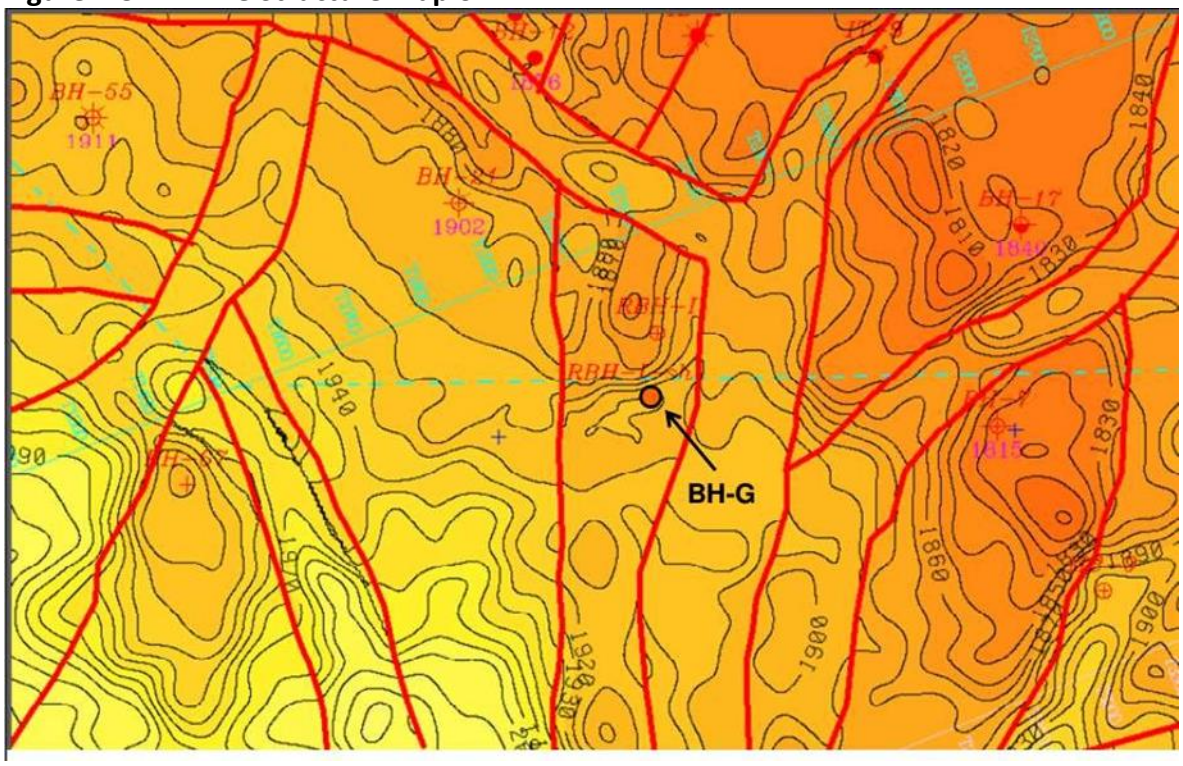


Figure 4-54:.: Time Structure map of L-VI :



4.4.6 Reservoir parameters and hydrocarbon estimation BH-68 Field:

The estimates of hydrocarbon in-place have been worked out under various field assumptions, and all inputs, working and results, as available and sourced are presented in the following section.

Petrophysical parameters and hydrocarbon estimates:

The Petrophysical parameters used in volumetrics and In-Place are provided below in **Table 4-50 and Table 4-51.**

Table 4-50: Petrophysical and Fluid parameters of BH-68

Reservoir: Basal Clastics / H4/ Palaeocene to Early Eocene (2000-2002)
Area: 1.3246 sqKm Thickness: 2 m Porosity: 0.14 Hydrocarbon saturation: 0.55 Sp gr oil: 0.80889 Formation volume factor: 0.004 v/v CGR: 250 m3/MMm3

Table 4-51: Hydrocarbon In-Place estimates (2P)

Field	O+OEG, MMTOE
BH-68	**0.06**

Erstwhile Operator-reported estimates on record:

The field, BH-68 has a reported oil estimate of **0.05 MMTOE**.

All these hydrocarbon estimates are subject to future assessments based on Operator's own technical insights and additional information/data, which may warrant possible revision of the currently reported estimates.

4.4.7 Production Facility for Oil and Gas Evacuation:

Distance from SHP/SH platform of Mumbai High South Field is 12 KM.

MUMBAI OFFSHORE B-174 Contract Area

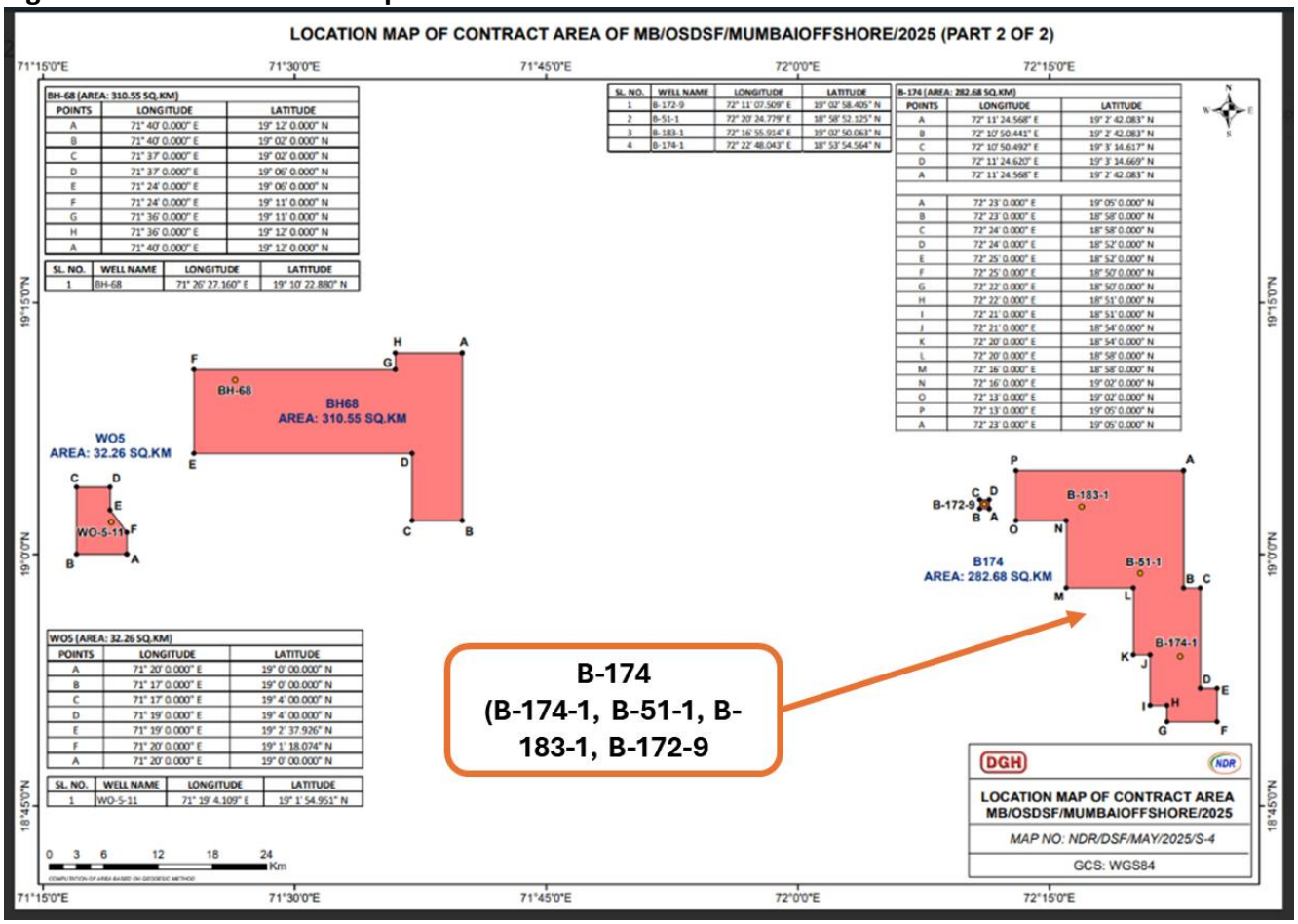
4.5 DESCRIPTION OF MUMBAI OFFSHORE B-174-Contract Area

Mumbai Offshore B-174 block (**Figure 4-55**) consists of four discovery wells i.e. B-174-1, B-183-1, B-51-1 and B-172-9 and 8 additional wells covering an area of **282.68 Sq. Km .** The co-ordinates of the endpoints defining the cluster boundary are tabulated below in **Table 4-52**. Details of all the four discovery wells are given in the subsequent Chapters.

Table 4-52: Coordinates of B-174 field

	B-174 Boundary Points		
	Area: 282.68 sq km		
	POINTS	**LONGITUDE**	**LATITUDE**
	A	72°11'24.568" E	19°2'42.083" N
	B	72°10'50.441" E	19°2'42.083" N
	C	72°10'50.492" E	19°3'14.617" N
	D	72°11'24.620" E	19°3'14.669" N
	A	72°11'24.568" E	19°2'42.083" N
	A	72°23'0.000" E	19°05'0.000" N
	B	72°23'0.000" E	18°58'0.000" N
	C	72°24'0.000" E	18°58'0.000" N
	D	72°24'0.000" E	18°52'0.000" N
	E	72°25'0.000" E	18°52'0.000" N
	F	72°25'0.000" E	18°50'0.000" N
	G	72°22'0.000" E	18°50'0.000" N
	H	72°22'0.000" E	18°51'0.000" N
	I	72°21'0.000" E	18°51'0.000" N
	J	72°21'0.000" E	18°54'0.000" N
	K	72°20'0.000" E	18°54'0.000" N
	L	72°20'0.000" E	18°58'0.000" N
	M	72°16'0.000" E	18°58'0.000" N
	N	72°16'0.000" E	19°02'0.000" N
	O	72°13'0.000" E	19°02'0.000" N
	P	72°13'0.000" E	19°05'0.000" N
	A	72°23'0.000" E	19°05'0.000" N
SL. No.	**Well Name**	**Longitude**	**Latitude**
1	B-174-1	72°22'48.043 E	18°53'54.564 N
2	B-183-1	72°16'55.914 E	19°02'50.063 N
3	B-51-1	72°20'24.779 E	18°58'52.125 N
4	B-172-9	72°11'07.509 E	19°02'58.405 N

Figure 4-55:Contract Area map of B-174

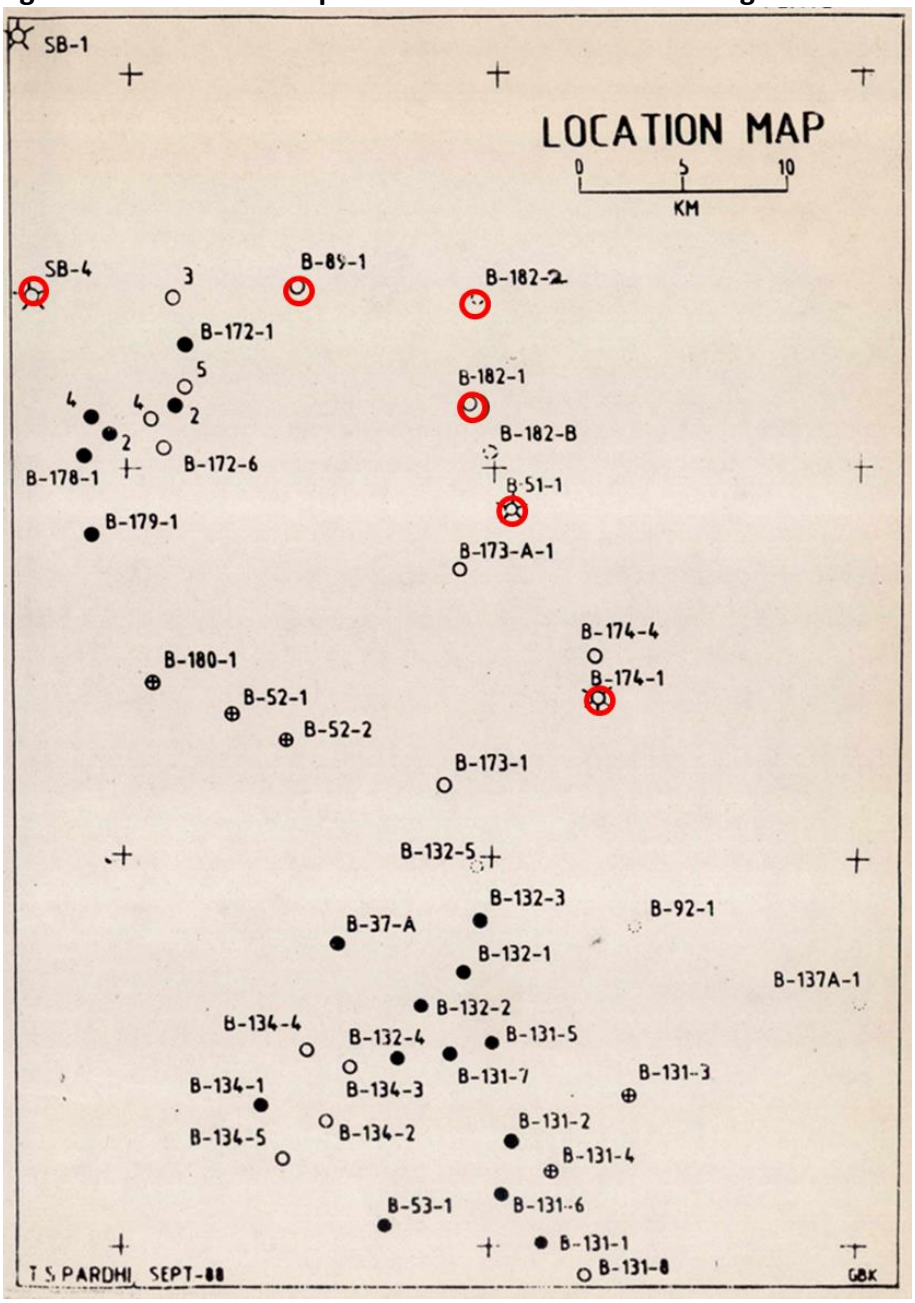


MUMBAI OFFSHORE B-174-1 FIELD

4.6 DESCRIPTION OF MUMBAI OFFSHORE B-174-1 FIELD

The well B-174-1 was drilled in 1985 with an objective to assess the hydrocarbon potential in Miocene Bassein pay and to look for any prospective hydrocarbon bearing zone between Bassein pay and upto the top of the basement. The well B-174-1 is the first exploration well drilled on B-174 structure which is located 10.5 Km South-East of B-51 structure. B-174 structure is situated in the Eastern homoclinic tectonic block and is about 10 km SE from B-51 structure. It is a prominent structural high, trending N-S direction at the level of H-4. It is structurally highest in the SSB area. The well produced gas. Location of B-174-1 is shown in **Figure 4-56.**

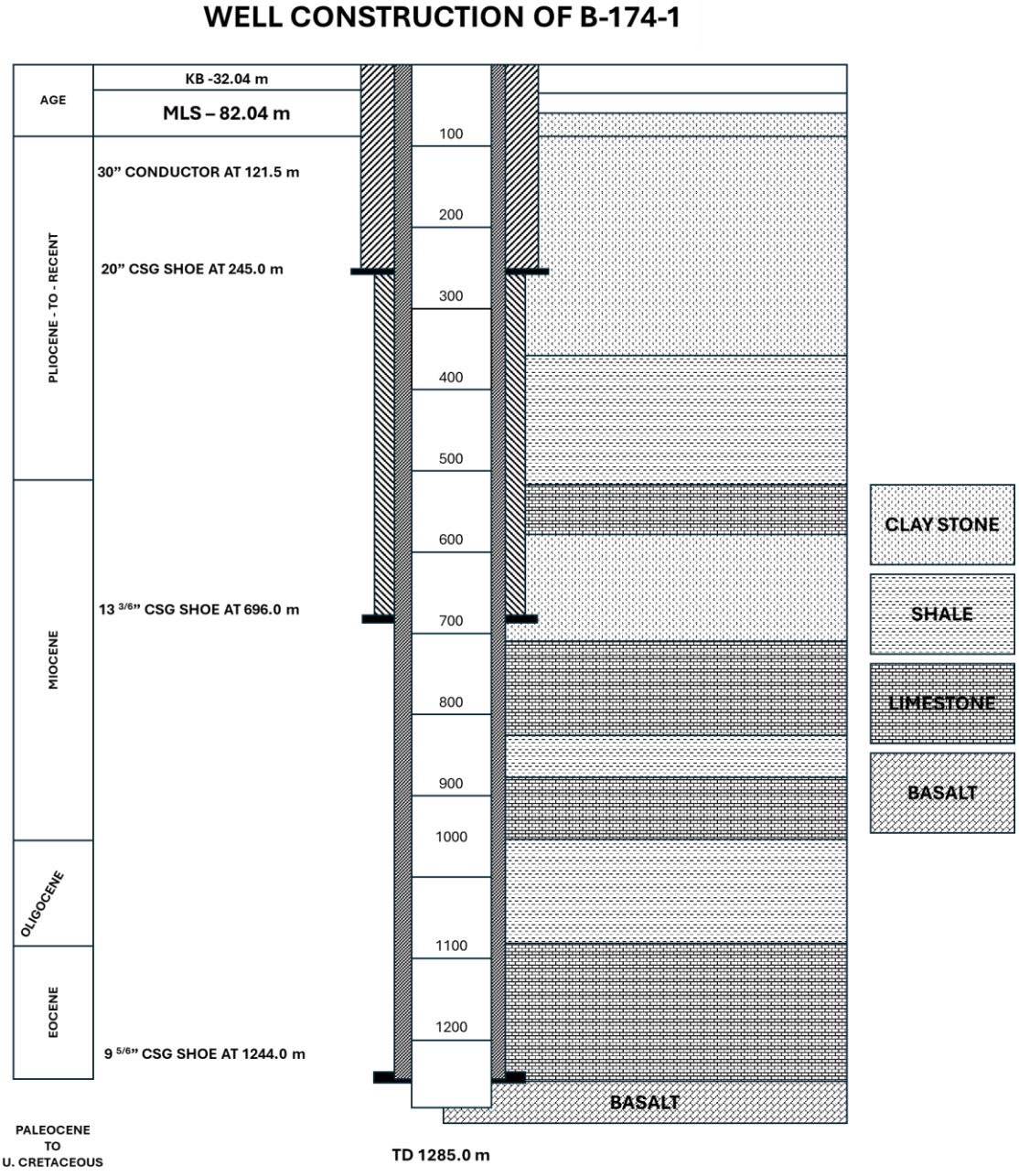
Figure 4-56:Location Map of B-174-1 with its surrounding wells



4.6.1 Drilling and well completion

Key information of drilled wells have been collated and presented hereunder. The adjoining figures wherever shown illustrate the Well Construction Diagram (**Figure 4-57**)) and the Litho-column Information for key wells. Other well statics like kelly bush reference depth, water depth, drilled and logged depth including well coordinates are made available in Sections through various cross-references.

Figure 4-57:. Well profile of B-174-1:



4.6.2 Well logging and formation evaluation

The well logs of all discovery wells along with some key wells in the contract area have been reviewed. The logs recorded in various open-hole sections along with cased-hole logs and information of conventional and other wireline formation test data are presented in this docket. The availability of key input reports like Well Completion Reports (WCR) and Formation Evaluation Report (FER) have been checked and information given. Reservoir parameters of interesting zones and results of the tested zone(s) have been included in this report. Log motifs of tested/ interesting zone of key wells are also appended.

A| Well completion and log evaluation reports availability (B-174-1) :

WCR/ FER availability	Spud date	KB	Drilled depth
Both available	14.04.1985	32.04 m	1286.5 m

B| Well logs acquired (B-174-1) :

The suite of logs recorded , their evaluation and initial testing in B-174-1 are presented in table-**Table 4-53** and **Table 4-56** below

Table 4-53: Logs recorded in B-174-1

Drill hole size (inch) and well logs recorded
17.5 | DLL-GR-CAL-BHC(Soinc) (701-245), recorded during 18.4.85 Remarks: DLL tool in first attempt did not get past 331m
12.25 | DLL-MSFL-CAL-NGL-LDL-CNL-BHC- Sonic-CST-RFT (1285-698), recorded during 27.4.85
9.625 | CBL-VDL-GR (1205-700), recorded during 30.4.85

In general, the quality of logs is good.

Stratigraphy

The entire lithological sequence is divided into VIII rock units based on electro-log response and lithological characteristics of the rocks (**Table 4-54**).

Table 4-54:: Lithological sequence and Rock units in B-174 area

Age	Rock Units	Interval	Thick ness	Lithology
RECENT TO PLIOCENE	I	1) 50-250		No samples
	I	2) 250-330	80m	Clay: Light to med grey, soft sticky, occ. containing shell fragments.
	I	3) 330-350	20m	Claystone

	I	4) 350-410	60m	Shale: Grey to brownish grey, soft to mod hard, highly calc. and fossiliferous.
	I	5)410-516	106m	Shale, claystone and clay.
MICEONE	II	6) 516-550	34	Leningrad/Petrograd, pale pink, imperf., pair, unused without gum. Slight thin and small tear at top. Light brown spot-on reverse. Very fine appearance.
MICEONE	III	550-705	155	Clay with traces of black and white paint. Dimensions: 13.5 cm x 11.5 cm x 4.5 cm. Slightly damaged on one side.
MICEONE	IV	705-800	115	Limestone with traces of white paint on one side.
	IV	800-906	116	Interval without finds / Clay and limestone, very small fragments.
OLIGOCENE	V	926-1067	131	Shell: Red, to dark grey, occasionally light, mostly small fragments. Occasional complete specimens. Oyster, mussel, and worm species identified.
	VI	1067-1084	17	Limestone/Shell: White to pale grey, dot-shaped, small complete specimens. Mostly mussel species identified.
EOCENE	VII	1084-1241	157	Shell: Medium to dark grey, occasionally white. Large fragments. Mostly mussel species, some oyster. Occasional clay fragments.
	VIII	1241-1244 1244-CD	3 41	Fine! Very hard. Very fine crystalline-granular calcite. Irregularities of color, mostly quartz common.
PALAO-CENE TO CRETACEOUS		TD-1285		

Stratigraphy Correlation

At the level of A-zone of Bassein pay, this well is structurally up in comparison with B-51-1 (nearest well). The well B-174-1 correlated with other nearby wells SB-2, B-51-1 and B-37-1 correlation is given in **Table 4-55** below.

Table 4-55:: Correlation of B-174-1 with other nearby wells

SUBSURFACE CORRELATION																
HORIZON	**B-172-1**	**B-172-2**	**B-89-1**	**B-182-1**	**B-182-2**	**B-183.1**	**SB-2**	**SB-4**	**B-178-1**	**B-51-1**	**B-52-1**	**B-37-1**	**B-174-1**	**B-174-4**	**B-176-1**	**B-176-2**
	KB: 27.3 m	**KB: 27.1 m**	**KB: 33.46 m**	**KB: 31.5 m**	**KB: 30.5 m**	**KB: 33.0 m**	**KB: 33.46 m**	**KB: 29.2 m**	**KB: 32.9 m**	**KB= 28.96 m**	**KB: 26.37 m**	**KB: 30 m**	**KB: 33.0 m**	**KB: 33.44 m**	**KB: 29.2 m**	**KB: 35.51 m**
H1A	755.5	766		--	--	--		833	--		785		516	501	493	539
	-720.2	-748.9			--			-803.7	--		-758.63		-484	-467.56	-463.8	-503.49
H2B	1169	1191	1091	--		1023		--	1278	816	1112.5		705	679	703	711
	-1141.7	1163.9	-1057.5		1245	-990		--	-1245	-787	-1086		-672	645.56	-673.8	-675.49
H3A	1610	NOT DRILLED	1450	1301	-1214.5	1356	1632	1680	1698	1231	1545	1477	1067 m	1087	1080	1147
	-1582.7		-1416.5	-1269.5	-1263.5	-1323	-1619	-1650.7	-1665.1	-1202	-1518.6	-1447	(1035')	-1053.58	-1051.3	-1111.49
H3B	1683		1515.5	1360	1351	1398	1680	1725	1750	1265.5	1580	1502	1084 m	1103.5	1101.5	1168
	-1655.7		-1482	-1328.5	-1320.5	-1365	-1667	-1695.7	-1717.1	-1236.5	-1553.6	1472	(1052')	-1070.06	-1072.3	-1132.49
H4	2199			1788	--	1945		2251	2168	--	1990		--	--	1465	--
	-2171.7			-1756.5	--	-1912		-2221.7	-2135.1	--	-1963.6		--	--	-1435.8	--
BASEMENT	2318			1839	1931.5	2048	2208	2279	2257	1826	2063.5	2058	1244	1330	1469	1381.5
	-2290.7			-1806.5	-1901	2015	-2195	-2249.7	-2224.1	1797	-2037.1	-2028	(1212') Trap	-1297.06	-1439.8	-1346
NOTE: DEPTHS WITH "-" (NEGATIVE SIGN) INDICATES MSL DEPTHS.																

Well No.	B-174-1 Horizon	SB-2	B-51-1	B-37-1
H1-A	516 m Miocene (484') Limestone	809	565	731
		-796	-536	-701
'A' Zone top	1067 m	1632	1231	1477
	(1035')	-1619	-1202	-1447
Hard Streak	1080 m	1666	1260	1497
	(1048')	-1653	-1231	-1467
'B' Zone Top	1084 m	1680	1265	1502
	(1052')	-1667	-1236	-1472
Basement	1244	2208	1826	2058
	(1212') Trap	-2195	-1797	-2028
		Archaean	Trap	

C| Well log evaluation and initial test results (B-174-1):

Table 4-56: Log evaluation and initial testing of B-174-1

Interval (mMDRT/mTVDSS)	Formation (+ Zone, if specified)	Gross(m)	Net(m)	Phi	Sw
1067-1244 / 1035-1212	Oligocene-Eocene/Bassein (1084-1097 mMDRT)	13.0	5.5	0.15-0.35	0.55-0.85
	Initial testing results: Object I was tested in the range 1085.0-1095.0m and flowed gas @ 170828m3/day and 28.8 BPD of condensate through 1/2" choke.				
	Oligocene-Eocene/Bassein (1067-1080 mMDRT)	13.0	8.5	0.12-0.20	0.55-0.80
	Initial testing results: Object II was tested in 1074.0-1079.0m and flowed 150656 m3/day of gas through 1/2" choke (after acidization)				
516-1067 / 484-1035	H1A/ Miocene limestone (1030-1032 mMDRT)	2.0	2.0	0.15-0.25	0.55-0.80

Conventional Cores:

Three conventional cores were taken in this well in the interval 1092-1132 M.

Side Wall Cores:

A total of 30 side wall cores were attempted, of which 28 were recovered and 2 were empty. Out of the 28 cores 4 were rejected and 24 were accepted. (**Table 4-57**)

Table 4-57: Sidewall cores

S.L. No.	Depth (m)	Rec. (inches)	Lithology	Fluorescence	Cut
1.	1275	Nil			
2.	1255	1.5	Weathered Trap: Ash grey to greenish grey, clayey; secondary mineralization of zeolite, calcite common.	NF	NC
3.	1253	2	- As above -	NF	NC
4.	1245	nil	-		
5.	1241	1	Limestone intercalated with Trapwash, LST: dull white, mod hard mainly mudstone, trap-wash; brownish grey, soft.	NF	NC
6.	1238	0.75	Wackestone: Dull white, light brown, partly chalky, recrystallized, fossiliferous and fairly porous.	NF	NC

Oil & Gas Shows:

Good gas shows were encountered in Bassein A and B zones. Conventional core taken from 1093-1094.80 m showed GIF and good +ve cut. Gas shows encountered during drilling are given in **Table 4-58** below:

Table 4-58: Oil & Gas Shows in B-174-1

Depth	Lithology (cutting)	Gas (%)	Fluo. presence	CCl cut
835m	70% Limestone 30% Clay/Shale	0.5%	NF	NC
1006m	90% Shale 10% Limestone	1.5% C1: 1%, C2: 0.1% C3: traces	NF	NC
1037m	100% shale	5% C1: 4%, C2:0.3% C3: 0.09%	NF	NC
1060m	100% shale	2.3% C1: 1.6%, C2: 0.17% C3: 0.07%	NF	NC
1069-72	Shale with Limestone	2.0-2.5%	NF	NO
1075m	75% shale 25% Lst.	9.5% C1: 6%, C2: 0.56% C3: 0.17%	specky	Faint +ve
1085m	80% Limestone 20" Shale	6% C1: 4.6%, C2: 0.35% C3: 0.14%	NF	NO
1090m	80% Limestone 20" Shale	11% C1: 9.5%, C2: 0.77% C3: 0.24%	NF	NO
1164m	100% Limestone	0.6% C1: 0.65%, C2: 0.06% C3: Traces.	NF	NO
1176m	100% Limestone	0.6% C1: 0.6% C2: 05%	NF	NO
1215m	100% Limestone	1.5% C1: 1.2%,C2: 09%, C3: Traces	NF	NO

Mud Loss and Other Complications:

1) Observed mud loss at 841 m while drilling through chalky Limestone/clay section. Rate of loss 50 bbl/hr. Drilled down to 874 m with partial loss of 40 bbl/hr. Pumped 60 bbl of 40 ppb LCM pill. 20 to shoe and waited on LCM pill. Loss reduced and then ceased. Cumulative loss - 300 bbl
2) Observed loss at 909 m. Drilled down to 943 m with partial loss. Total mud loss 140 bbls. Cumulative mud loss was 440 bbls.

Log motif and Composite Microfacies Log of B-174-1 are shown in **Figure 4-58 and Figure 4-59.**

Figure 4-58:. Well log motif of B-174-1:

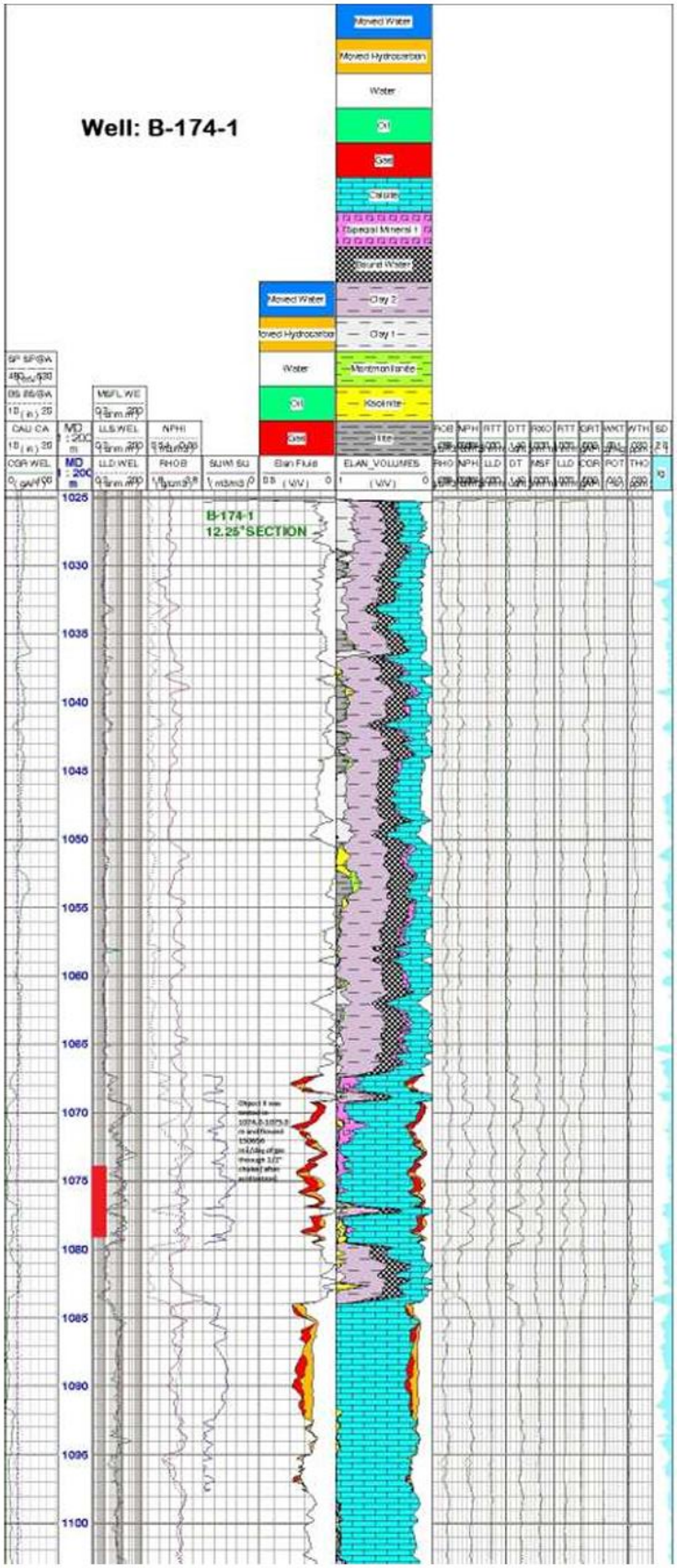
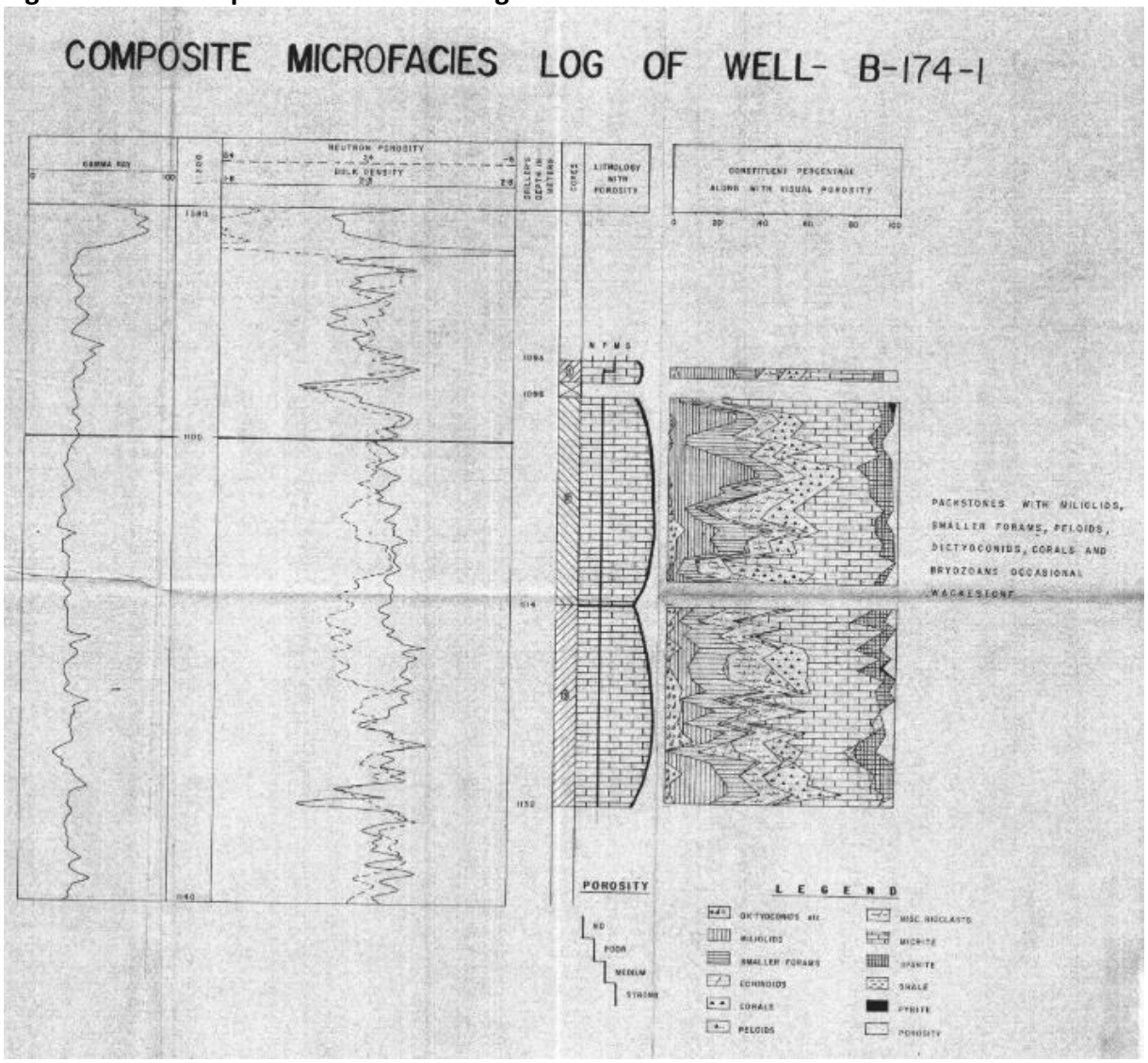


Figure 4-59:. Composite Microfacies Log of B-174-1



4.6.3 Well testing and workover history

Two objects in Bassein pay were tested. Object-I was tested in the range 1085.0-1095.0m and flowed gas 170,828m3/day and 28.8 BPD of condensate through 1/2" choke. Object-II was tested in 1074.0-1079.0m and flowed 150656 m3/day of gas through 1/2" choke (after acidization).

Well B-174-1 :

Table 4-59: Testing details of B-174-1

Formation & Object	Bean Size (1/64 inch)	Flow Period (hrs)	Depth of measurement	
Formation: Bassein Lst. Object: I **Interval(m.): 1085-1095**	16	4	1070m	FTHP: 1340 psi| STHP: 1380 psi FBHP: 1511.45 psi| SBHP: 1557.5 psi Qgas: 8379 scmd| SBHT: 158 DegF
	24	6	1070m	FTHP: 1240 psi| STHP: 1380 psi| FBHP: 1427.87 psi| SBHP: 1557.5 psi Qgas: 91186 scmd| SBHT: 158 DegF
	32	3	1070m	FTHP: 1040 psi| STHP: 1380 psi FBHP: 1273.2 psi| SBHP: 1557.5 psi Qcond: 28.8 bcpd| Qgas: 170828 scmd CGR: 2.680381E-05 v/v| SBHT: 158 DegF| FBHT: 170 DegF.
Formation: Bassein Lst. Object: II **Interval(m.): 1074-1079|**	32	6	1050m	FTHP: 274 psi| STHP: 1370 psi| SBHP: 1529.4 psi| Qgas: 42433 scmd| Remarks: BAJ.
	24	3	1050m	FTHP: 1190 psi| STHP: 1370 psi| FBHP: 1356 psi| SBHP: 1529.4 psi Qcond: 6 bcpd| Qgas: 38142 scmd CGR: 2.500984E-05 v/v| Remarks: AAJ.
	32	4	1050m	FTHP: 990 psi| STHP: 1370 psi FBHP: 1182.6 psi| SBHP: 1529.4 psi Qcond: 19.2 bcpd| Qgas: 150656 scmd CGR: 2.02618E-05 v/v| FBHT: 172 DegF Remarks: AAJ.

4.6.4 Reservoir engineering studies and analysis

Key reservoir engineering datasets, wherever available have been collated and presented under various data genres. In a comprehensive data presentation, the results are included from well tests, formation dynamics tests, reservoir pressure build-up study and PVT data/ results.

RFT data available for B-174, Pressure build-up study, Open Flow Potential of Object-I study and Gas composition analysis are given in **Table 4-60Table 4-61, Table 4-62 and Table 4-63**.

Formation dynamics tests (B-174-1)

Table 4-60: RFT data available in B-174-1

RFT: carried out as per depths below					
Sl. No.	**Depth (m)**	**Hydrostatic, pressure**	**Formation pressure**	**Flowing time**	**Recovery**
1	1075.2	1698 psi (119.41 kg/cm2)	1563 psi (110 kg/cm2)	10 min V.poor flow	0.15 ft3 of gas and 300 cc of muddy water of PH 7 and salinity 28,116 ppm N/f. V Faint cut.
2.	1075.2	1706 psi (119.97 kg/cm²)	1567 psi (110.19)		
3.	1136.6	1802 psi (126.72 kg/cm²)	Tight Could not record		
4.	1137.0	1803 psi (126.79 kg/cm²)	Tight Could not record		
5.	1164.0	1844 psi (129.67 kg/cm²)	1668 psi (117.3 kg/cm2)	14/15 min. Poor Flow.	1700 cc of muddy water of salinity 55,303 ppm, N/F, N/C
6.	1176.0	1864 psi (131 kg/cm²)	-	Seal failure	
7.	1089.8	1727 psi (121.45 kg/cm²)	1569 psi (110.33 kg/cm2)	13-14 min. Very Good Flow.	14 ft3 of gas and 2000 cc of muddy water of PH 7 and salinity 49,203 ppm. Mild Fluor and mild cut strong smell of hydrocarbon.
Remarks: Total 3 samples were collected by BHT.					

RFT: carried out as per depths below					
Sl. No.	**Depth (m)**	**Hydrostatic, pressure**	**Formation pressure**	**Flowing time**	**Recovery**
1	1075.2	1698 psi (119.41 kg/cm2)	1563 psi (110 kg/cm2)	10 min V.poor flow	0.15 ft3 of gas and 300 cc of muddy water of PH 7 and salinity 28,116 ppm N/f. V Faint cut.
Salinity of mud filtrate 24,600 ppm.					

Pressure build-up study (B-174-1)

Table 4-61: Pressure build-up study (B-174-1)

Formation: BASSEIN Object: I Interval(m.): 1085-1095	Depth of measurement: 1070 m	Static bottom hole pressure: 1557.5 psi Pressure*: 1559.4 psi| Skin: 45.04 Pressure differential, skin: 244.9 psi Permeability: 118.05 md Capacity (kh): 3872.7 mdft Productivity index: 3770.54 bbl/day/psi Average open flow potential (gas): 13.42 MMSCFD (0.38 MMm3/d).
Formation: BASSEIN| Object: II| Interval(m.): 1074-1079|	Depth of measurement: 1050 m	Static bottom hole pressure: 1529.4 psi Static bottom hole temperature: 172 DegF | Pressure*: 1573 psi Skin: -1.63 Permeability: 15.53 md Capacity (kh): 254.76 mdft Productivity index: 2435.46 bbl/day/psi.

Table 4-62: Open Flow Potential of Object-I

Open Flow Potential of Object-I | Interval(m.): 1085-1095			
Bean Size inches	**Qg M3/d**	**Pws Psi**	**Pwf Psi**
16/64	48379	1572.2	1526.15
24/64	91186	1572.2	1442.57
32/64	170828	1572.2	1287.9
Open Flow Potential: 380,000 m3/d			

Gas Composition:

Table 4-63: Gas composition analysis (B-174-1)

Gas composition analysis (B-174-1)	
Formation: Bassein Lst.| Object: I	
Type: Separator	
Interval(m.): 1085-1095	
C1	80.78%
C2	7.49%
C3	4.77%
iC4	0.92%
nC4	1.20%
iC5	0.33%
nC5	0.33%
iC6	0.44%
Carbon-dioxide	2.33%
Nitrogen	1.41%
Sp.Gr.	0.721

Annexure to Reservoir Engineering studies/analysis:

Annexure to Reservoir Enginnering studies/analysis:

B-174-1

1.Testing: Both objects (Object-I: 1085-1095m & Object-II: 1074-1079m) tested in this well have flowed hydrocarbon. Object-I flowed gas at the rate 170828 m^3/d through 1/2" choke at FTHP of 1040 psi with little condensate (Qc: 28.8 bpd). Object-II flowed gas at the rate 150656 m^3/d through 1/2" choke at FTHP of 990 psi with little condensate (Qc: 19.2 bpd) after acidization. RFT pressures recorded within Object-I (1089.8m) and Object-II (1075.2m & 1075.5m) indicated hydrostatic pressures within Reservoir zone. Summary of multi bean study carried out for both objects are placed as Annexure.

2.Core: Three conventional cores were cut in this well. Out of which, one core (CC-1: 1093-1096m) lies partly against Object-I. Core analysis is available in the well completion report.

3.PVT: Gas composition analysis for Object-I gas was carried out and the data is placed as Annexure. Gas gravity was found to be in the range of 0.722.

4.Reservoir study: Build-up study was analyzed for both objects. For Object-I, Reservoir permeability is around 118.05 md. AOFP estimated using C & n analysis is 0.38 MMSCMD. Results of the pressure transient study are as below:

Object-I (1085-1095 m) Date: 2/3-5-85

1.	Measured Depth	-	1070 m
2.	Perforated interval	-	1085 - 1095 m
3.	Choke Size	-	½"
4.	Quantity of condensate	-	28.8 B/D
5.	Quantity of Gas	-	170828 M^3/d
6.	FTHP	-	1040 Psi
7.	FBHP	-	1273.2 psi
8.	P^*	-	1559.4 psi
9.	STHP	-	1385 psi
10.	Kh	-	3872.7 m d -ft.
11.	K	-	118.05 md
12.	S	-	+ 45.04
13.	ΔP(Skin)	-	244.90 psi
14.	ΔP	-	284.3 psi
15.	P I Act	-	3770.54 B/D/DST
16.	Effective Porosity	-	14.4%
17.	SbHP	-	1557.5 psi
18.	FBHT	-	170°F

For Object-II, Reservoir permeability is around 15.53 md. SBHP of 1529.4 psi was recorded at 1050m. Results of the pressure transient study are as below:

Object-II

1.	Well No.	-	B-174-1
2.	ObjectII (perforated Interval 1074 - 1079 m)		
3.	Measured Depth	-	1050 m
4.	Choke Size	-	½"
5.	Qty. of Gas	-	150656 m^3/d
6.	Qty. of condensate	-	19.8 B/d
7.	P_1 hr	-	1462 psi
8.	P*	-	1573
9.	Kh	-	254.76 md-ft
10.	K	-	15.53 md
11.	S	-	-1.63
12.	Yi	-	1276 ft(389m)
13.	STHP	-	1370 psi
14.	FBHP	-	1182.6 psi
15.	FTHP	-	990 psi
16.	PI Actual	-	2435.46 B/d/ psi
17.	SBHT	-	172°F
18.	SBHP	-	1529.4 psi

Static Pressure Gradient

Object-I (1085 - 1095 m)

Depth(m)	Pressure P S I	Pressure Kg/cm^2
1070	1557.5	109.4
1000	1546.3	108.7
800	1516.61	106.5
600	1488.5	104.6
400	1459.1	102.5

Gradient : 0.105 $Kg/cm^2/10m$

Static Temperature Gradient Survey

Object-I (1085 - 1095 m)

Depth	Temperature °F
1070	158.7
900	149.4
700	140.3
500	126.7
300	122.5

Gradient 0.056 °F/m

Static Pressure Gradient Survey

Object-II (1074 - 1079 m)

Depth (m)	Pressure before Acidisation psi	Kg/cm^2	Pressure after Acidisation Psi	Kg/cm^2
1050	1560.6	109.7	1526.4	107.2
1000	1554.9	109.3	1519.4	106.7
800	1525.5	107.2	1491.1	104.8
600	1497.2	105.2	1463.0	102.8
400	1468.8	103.2	1437.7	100.8

Gradient before Acidization : 0.1 $Kg/cm^2/10m$

Gradient after Acidization : 0.098 $Kg/cm^2/10m$

Static Temperature Gradient

Object-II (1074 - 1079 m)

Depth	Temperature °F
1050	147.6
850	140.6
650	130.4
450	117.8
250	104.5

Gradient 0.057 °F/m

4.6.5 Geology and Reservoir Description of B-174-1 Field:

The geology of the area has been comprehensively reviewed using correlations, sections and maps. The well correlation, seismic sections, top structure, seismic attribute/amplitude and net sand/pay maps have been used to illustrate the magnitude and distribution of key reservoir properties in and around the discovered oil/gas pools (accumulations). The local tectonic setting and geological section of the area, wherever available are also given. These maps/sections are sequentially shown field-wise and reservoir unit-wise through figures, appropriately titled and illustrated in the following section.

Geological correlations, sections and maps (B-174-1 Field):

It is prominent structural high, trending N-S direction at the level of H-4. It is structurally highest in the SSE area. The main objective of drilling the well was to assess the hydrocarbon potential in Neocene Limestone, the Bassein Pay and also to look for any prospective hydrocarbon bearing zones between Bassein Pay and upto the top of basement.

B-174 structure is situated in the Eastern Homocline tectonic block and is about 10 Km SE from B-51 structure. It is prominent structural high, trending N-S direction at the level of H-4. It is structurally highest in the SSE area. The main objective of drilling the well was to assess the hydrocarbon potential in Neocene Limestone, the Bassein Pay and also to look for any prospective hydrocarbon bearing zones between Bassein Pay and upto the top of basement. At the level of A zone of Bassein pay, this well is 167 m structurally up in comparison with B-51-1(nearest well) The well B-174-1 correlated with SB-2, B-51-1 and B-37-1 wells.

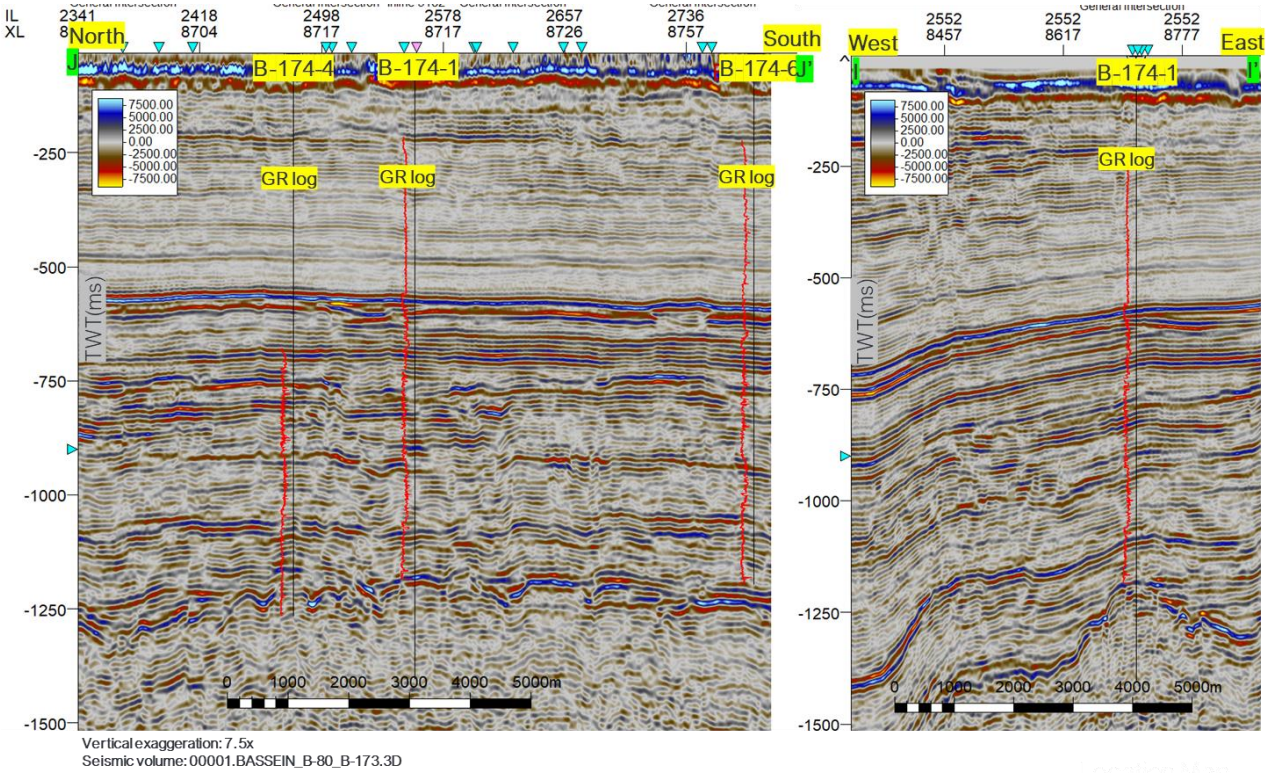
Around 8 m Gas pay has been encountered at well location in Bassein pay. Around 10 m gas pay has been encountered at well location in Mukta pay.

Seismic section in wells B-174-1/B-174-4/B-174-6 are given in **Figure 4-60 .**

Maps given below:

Time Relief map of HORIZON-3A: **Figure 4-61**
Time Relief map of BASSEIN (LKG AT 1075M) **Figure 4-62**
Time Relief map of MUKTA TOP (LKG AT 1065M): **Figure 4-63**
Depth structure map of BASSEIN (LKG AT 1075M) **Figure 4-64**
Depth structure map of MUKTA TOP (LKG AT 1065M: **Figure 4-65**
Seismic amplitude map/section of BASSEIN (LKG AT 1075M): **Figure 4-66**
Seismic amplitude map/section of MUKTA TOP (LKG AT 1065M): **Figure 4-67**
Net sand/pay map BASSEIN (LKG AT 1075M): **Figure 4-68**
Net sand/pay map MUKTA TOP (LKG AT 1065M): **Figure 4-69**

Figure 4-60:. Seismic sections along the wells B-174-1/B-174-4/B-174-6:



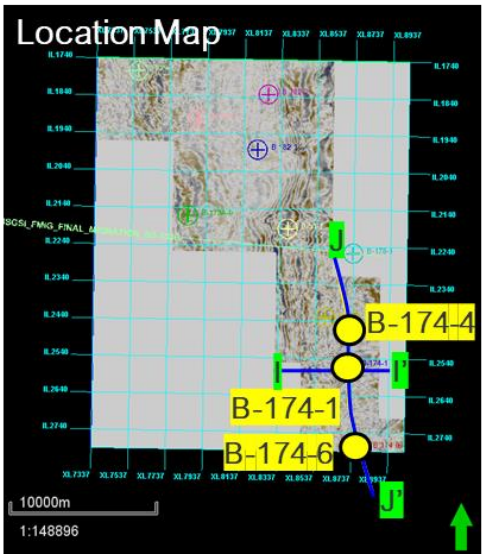


Figure 4-61:. Time Relief map of HORIZON-3A:

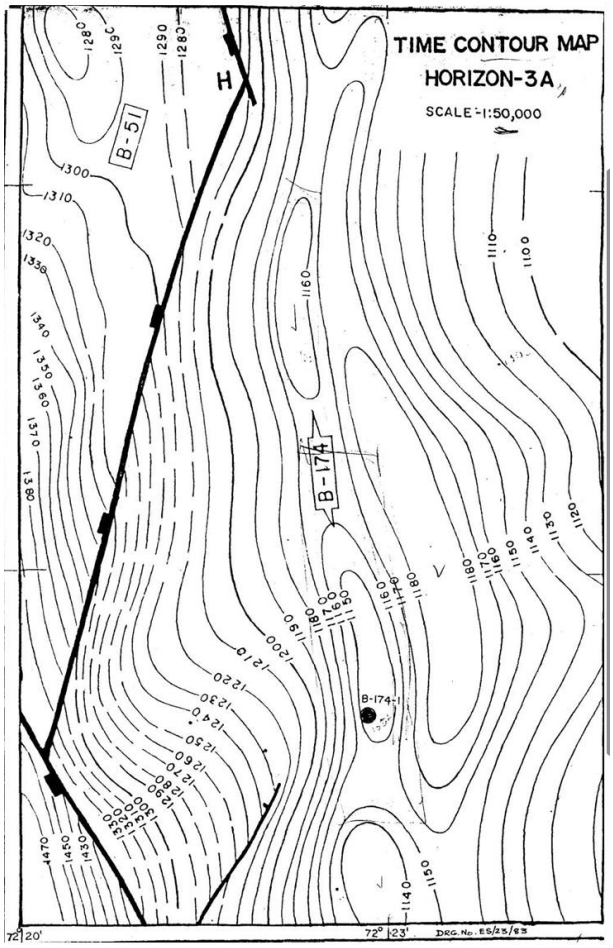


Figure 4-62:. Time Relief map of BASSEIN (LKG AT 1075M):

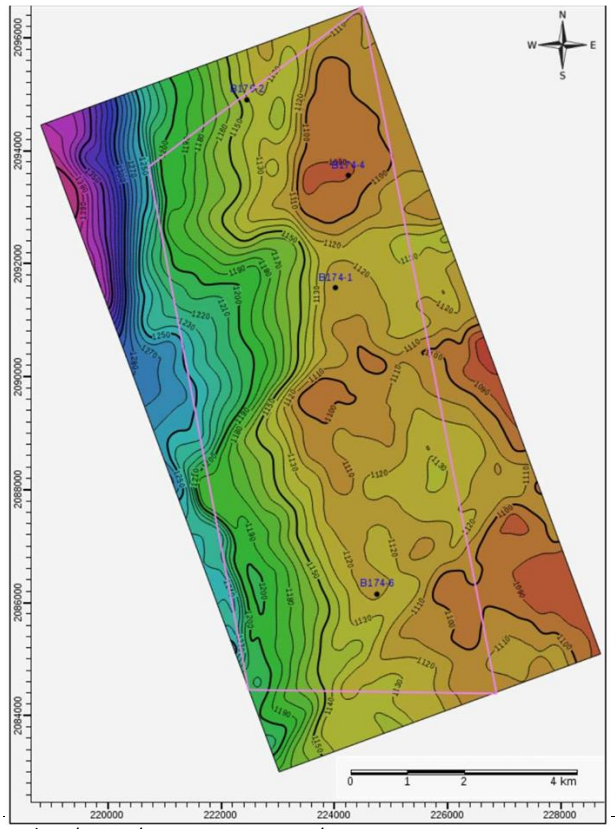


Figure 4-63:. Time Relief map of MUKTA TOP (LKG AT 1065M) :

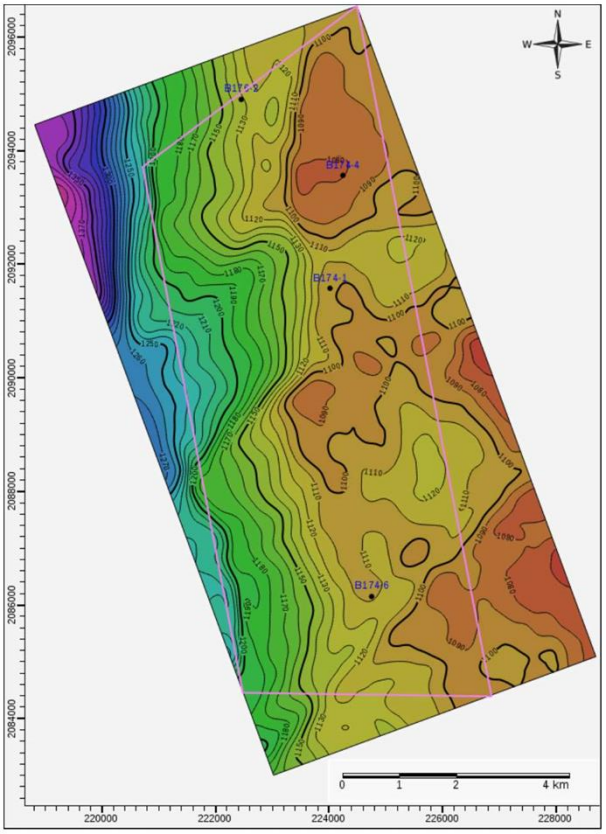


Figure 4-64:. Depth structure map of BASSEIN (LKG AT 1075M) :

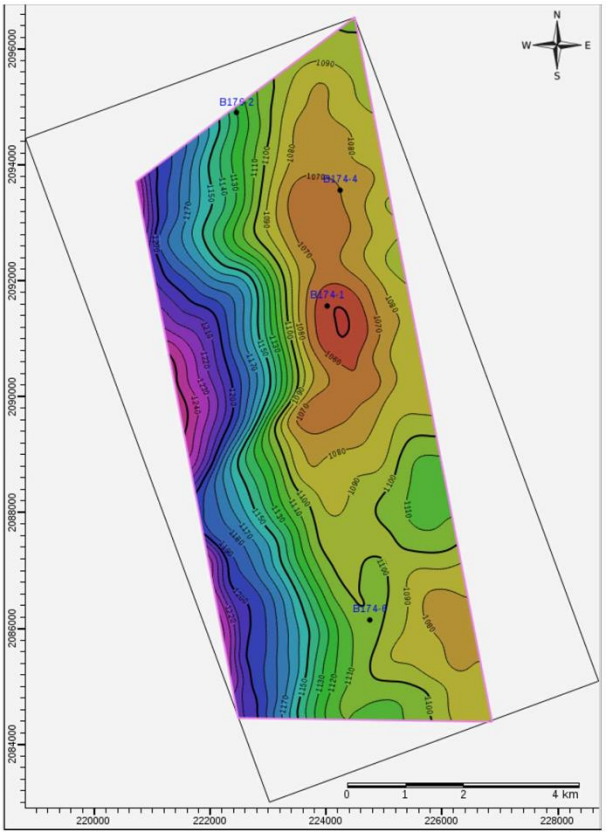


Figure 4-65:. Depth structure map of MUKTA TOP (LKG AT 1065M) :

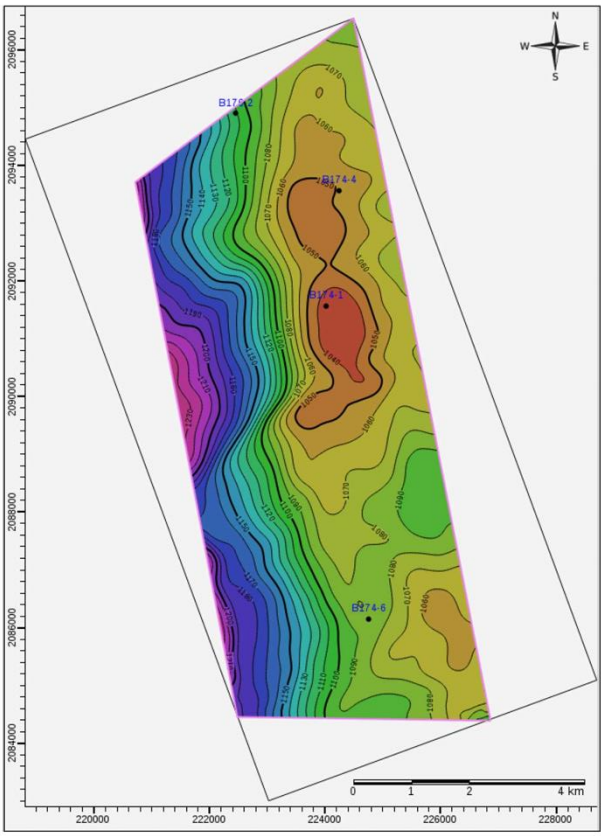


Figure 4-66:. Seismic amplitude map/section of BASSEIN (LKG AT 1075M) :

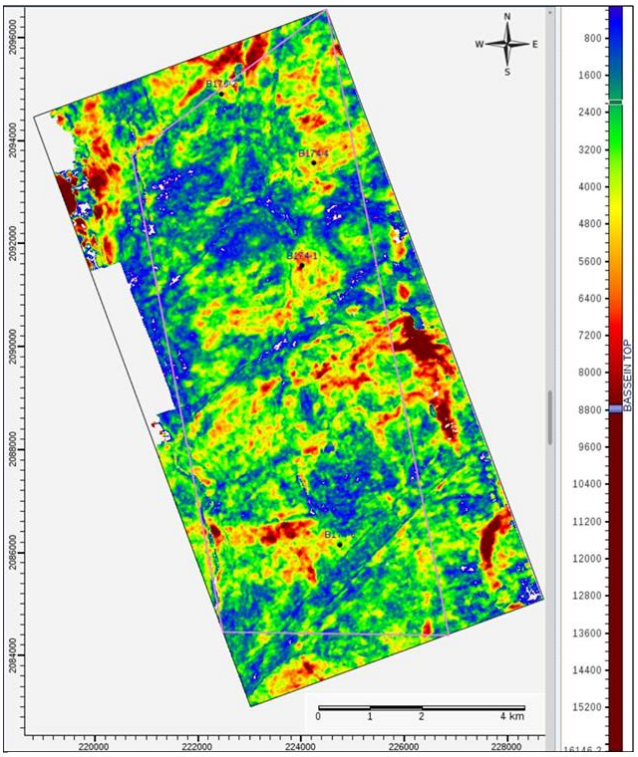


Figure 4-67:. Seismic amplitude map/section of MUKTA TOP (LKG AT 1065M) :

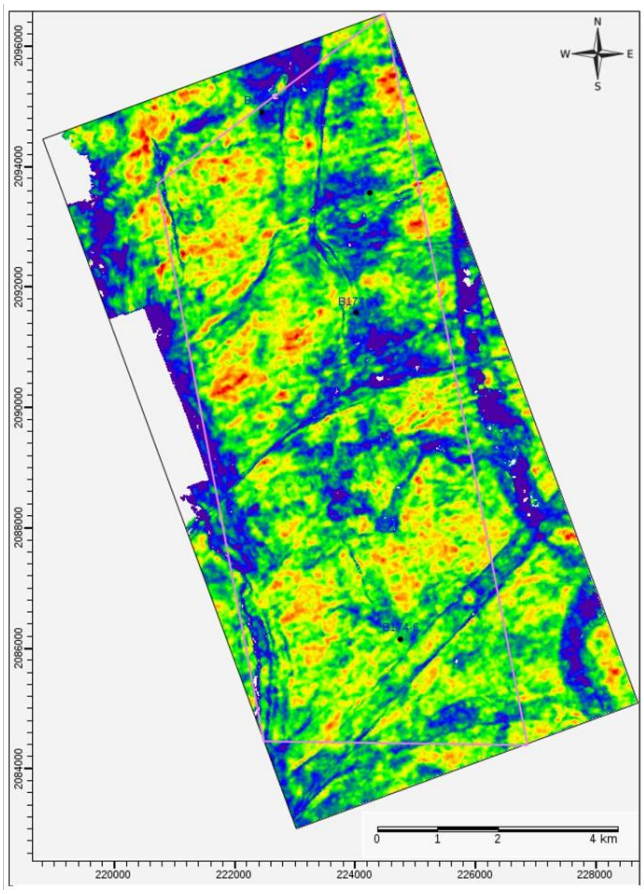
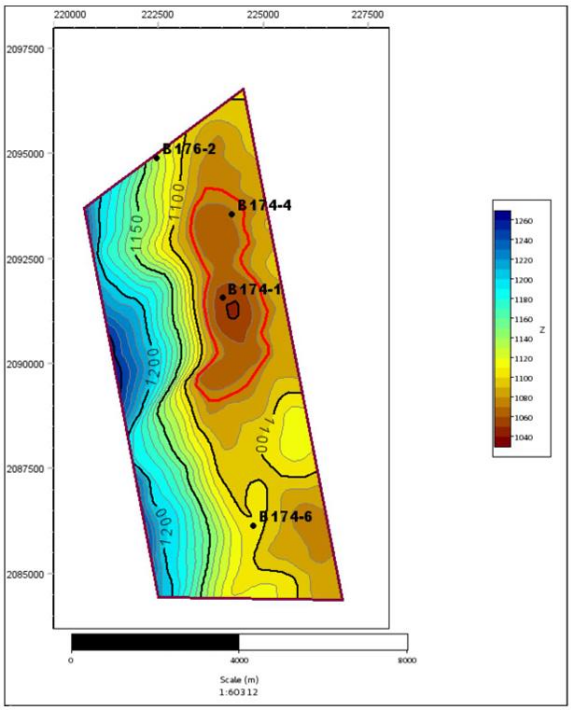


Figure 4-68:. Net sand/pay and Gas IsoPay map BASSEIN (LKG AT 1075M) :



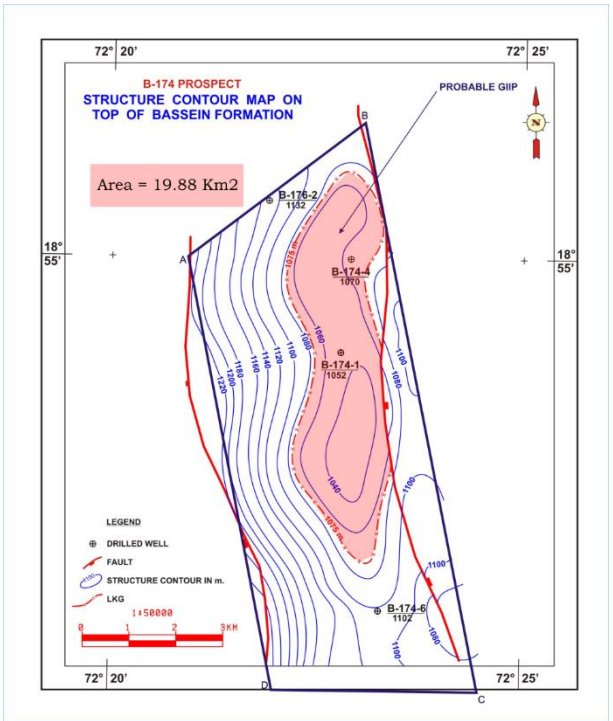
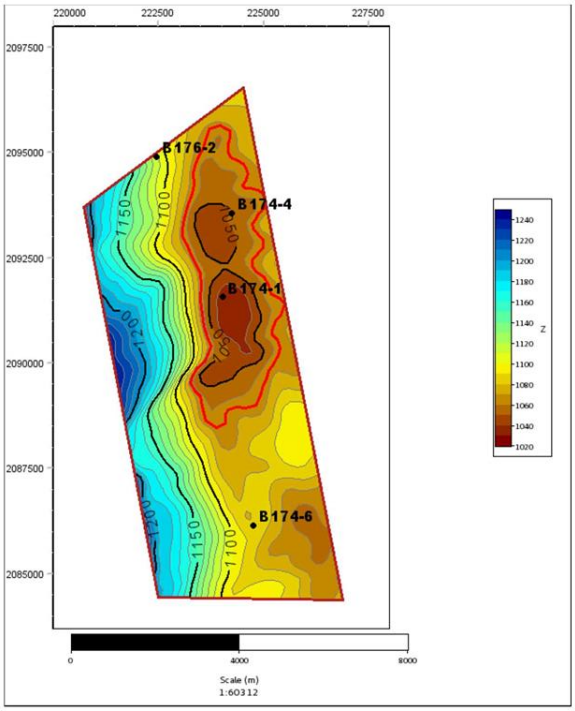
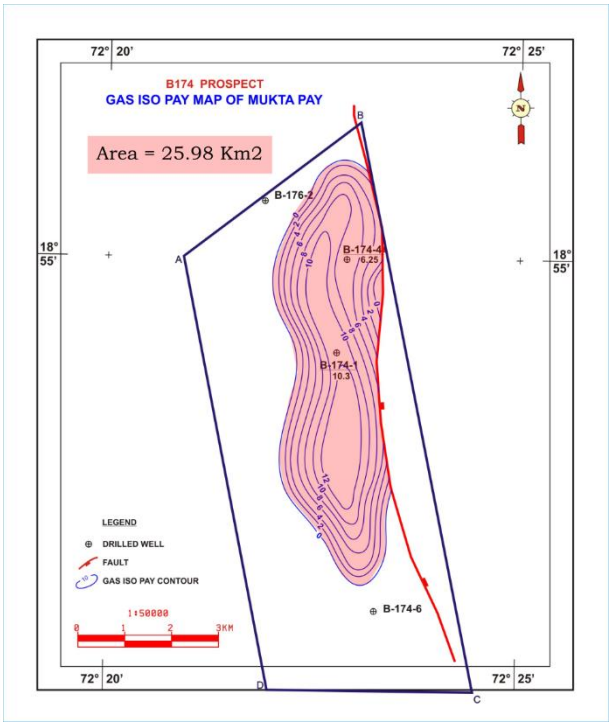


Figure 4-69:. Net sand/pay map MUKTA TOP (LKG AT 1065M) :





4.6.6 Reservoir parameters and hydrocarbon estimates B-174-1 Field:

The estimates of hydrocarbon in-place have been worked out under various field assumptions, and all inputs, working and results, as available and sourced are presented in the following section.

Petrophysical parameters and hydrocarbon estimates:

The Petrophysical parameters used in volumetrics and In-Place are provided in **Table 4-64 and Table 4-65.**

Table 4-64: Petrophysical and Fluid parameters of B-174-1

Reservoir: Oligocene-Eocene/Bassein	**Reservoir: Oligocene-Eocene/Bassein**	**Reservoir: H1A/ Miocene limestone Mukta**
(1084-1097)	(1067-1080)	(1030-1032)
Area: 19.88 sq.km Thickness: 5.5 m Porosity: 0.25 Hydrocarbon saturation: 0.3 Formation volume factor: 0.009 .	Area: 19.88 sq.km Thickness: 8.5 m| Porosity: 0.16 Hydrocarbon saturation: 0.32 Formation volume factor: 0.009	Area: 25.98 sq.km Thickness: 2 m Porosity: 0.2 Hydrocarbon saturation: 0.32 Formation volume factor: 0.009 .
GIIP: 911 MMm3	GIIP: 961 MMm3	Gas Volume: 370 MMm3

Table 4-65: Hydrocarbon In-Place estimates (2P)

Field	**O+OEG, MMTOE**
B-174-1	**2.24**

Erstwhile Operator-reported estimates on record:

The field, B-174-1, has a reported gas estimate of **1.48 MMTOE.**

All these hydrocarbon estimates are subject to future assessments based on Operator's own technical insights and additional information/data, which may warrant possible revision of the currently reported estimates.

4.6.7 Production Facility for Oil and Gas Evacuation:

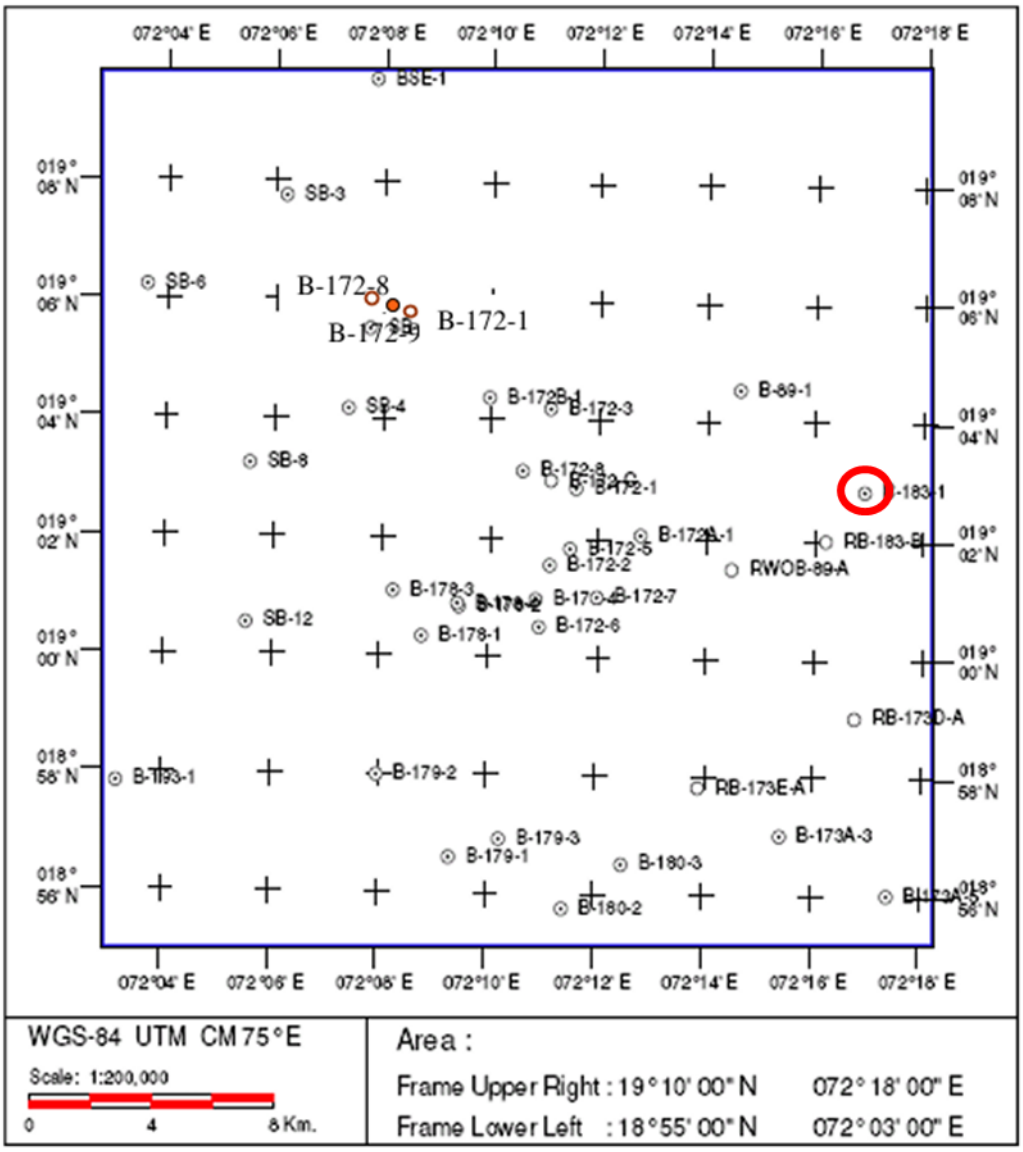
SHP/SH platform of Mumbai High South Field is at a distance of 29.70 KM.

MUMBAI OFFSHORE B-183-1 FIELD

4.7 DESCRIPTION OF MUMBAI OFFSHORE B-183-1 FIELD

The well B-183-1 was drilled in 1990 to explore the hydrocarbon potential of H2B limestone, equivalent of B-172-2 pay zone limestone, Bassein limestone A and B zones. The well B-183-1 on drilling showed the presence of hydrocarbon in non-commercial quantities in H2B limestone . Also the H2B limestone in B-183-1 is located structurally higher with respect to the nearby wells B-172-1 and B89-1. The Bassein limestone prospects proved to be dry as these limestones are too tight. The structure is located towards east of the Central graben. In Heera-Panna-Bassein Block the Central graben is the major generative depression. H2B equivalent of B-172-2 pay zone, Bassein limestone A and B are the main objectives of this well. The well B-183-1 is the first one on the structure proposed on the southern part of the closure. The well is 10 km from B-172-1 which is proved to be hydrocarbon bearing in Bassein (H3B) limestone sections. At H2B level this structure covers 5 sq.km. area. Location of B-183 is shown in **Figure 4-70.**

Figure 4-70:Location Map of B-183-1 with its surrounding wells



4.7.1 Drilling and well completion

Key information of drilled wells have been collated and presented hereunder. The adjoining figures wherever shown illustrate the Well Construction Diagram (**Figure 4-71**) and the Litho-column (**Figure 4-72**) Information for key wells. Other well statics like kelly bush reference depth, water depth, drilled and logged depth including well coordinates are made available in Sections through various cross-references.

Figure 4-71:. Well profile of B-183-1:

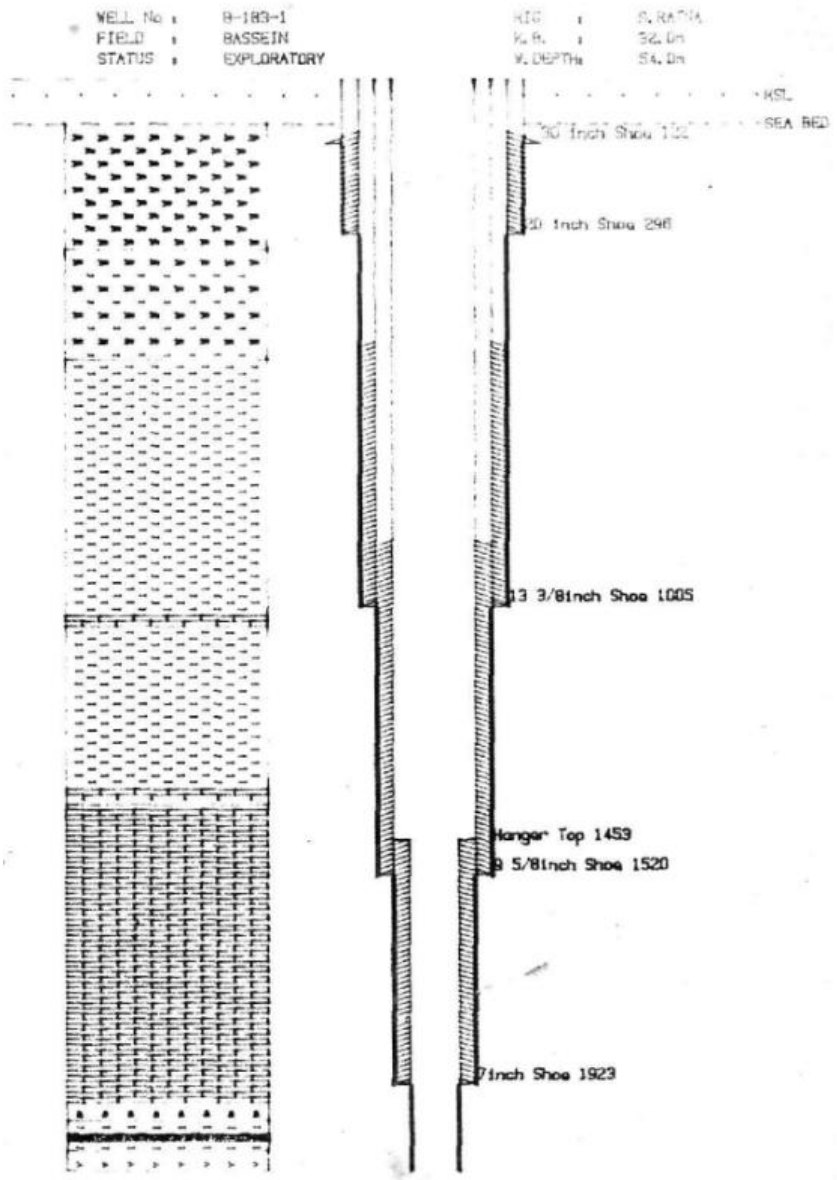
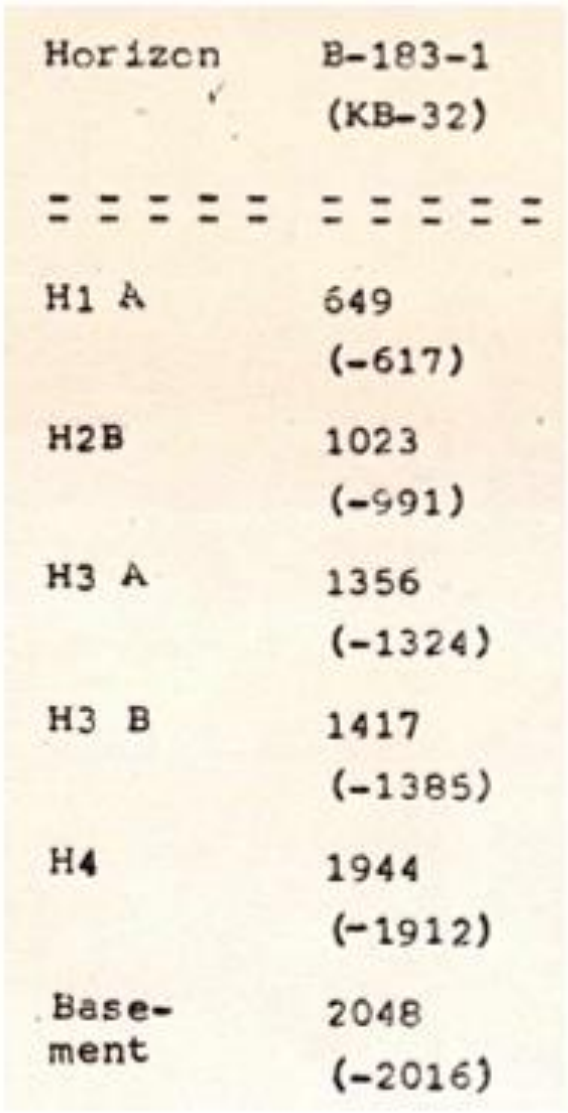


Figure 4-72:. Litho-section information of B-183-1 :



Horizon	B-183-1 (KB-32)
H1 A	649 (-617)
H2B	1023 (-991)
H3 A	1356 (-1324)
H3 B	1417 (-1385)
H4	1944 (-1912)
Base-ment	2048 (-2016)

4.7.2 Well logging and formation evaluation

The well logs of all discovery wells along with some key wells in the contract area have been reviewed. The logs recorded in various open-hole sections along with cased-hole logs and information of conventional and other wireline formation test data are presented in this docket. The availability of key input reports like Well Completion Reports (WCR) and Formation Evaluation Report (FER) have been checked and information given. Reservoir parameters of interesting zones and results of the tested zone(s) have been included in this report. Log motifs of tested/ interesting zone of key wells are also appended.

A| Well completion and log evaluation reports availability (B-183-1) :

WCR/ FER availability	Spud date	KB	Drilled depth
Both available	23.09.1990	32 m	2085 m

B| Well logs acquired (B-183-1) :

Logs recorded , their evaluation results and initial testing details of B-183-1 are given in **Table 4-66 and Table 4-68.**

Table 4-66: Logs recorded in B-183-1

Drill hole size (inch) and well logs recorded
17.5 | DLL-GR, Sonic (999-296), recorded during 30.9.90 Remarks: Logging tool could not go beyond 343m.wiper trip
12.25 | LDL-CNL-DLL-MSFL- SIS-GR (1521.5-1006), recorded during 15.10.90-16.10.90 Remarks: Intermediate logging carried cut casing short landed
9.625 | CBL-VDL (1449-950), recorded during 11.11.90 Remarks: (95/8 "CSG).
8 | DLL-MSFL-GR-LDL- CNL-NGS-BHC-GR (2086.8-1923.5), recorded during 8.11.90-9.11.90 Remarks: 8" hole 7" liver
SP-SIS-NGS-LDL-CNL (1924-1520), recorded during 25.10.90-26.10.90 Remarks: Before lowering on 7” liner

Conventional Core:

One conventional core (CC-1: 1032-1041m) was cut in this well. Core analysis is not available though.

Stratigraphic Correlation

The logs of B-183-1 correlated with nearby wells B-172-1 , 3-172-2 and B-182-1 (**Table 4-67**) show that the well B-183-1 is deeper at all levels as compared to B-182-1 and is shallower at all levels as compared to B-172-1. The well B-172-2 was not drilled beyond 1642 due drilling complications. Though the wells with which the well B-183-1 logs have been correlated are in proximity, but they belong to different seismic closures.

Table 4-67:: Correlation of B-183-1 with nearby wells

SUBSURFACE CORRELATION				
HORIZON	**B-172-1**	**B-172-2**	**B-182-1**	**B-183.1**
	KB:27.3 m	**KB:27.1 m**	**KB:31. m**	**KB:33.0 m**
H1A	755.5	766.0	--	--
	-720.2	-748.9		
H2B	1169.0	1191.0	--	1023.0
	-1141.7	1163.9		-990.0
H3A	1610.0	NOT DRILLED	1301.0	1356.0
	-1582.7		-1269.5	-1323.0
H3B	1683.0		1360.0	1398.0
	-1655.7		-1328.5	-1365.0
H4	2199.0		1788.0	1945.0
	-2171.7		-1756.5	-1912.0
BASEMENT	2318.0		1839.0	2048.0
	-2290.7		-1806.5	2015.0
NOTE: DEPTHS WITH "-" (NEGATIVE SIGN) INDICATES MSL DEPTHS.				

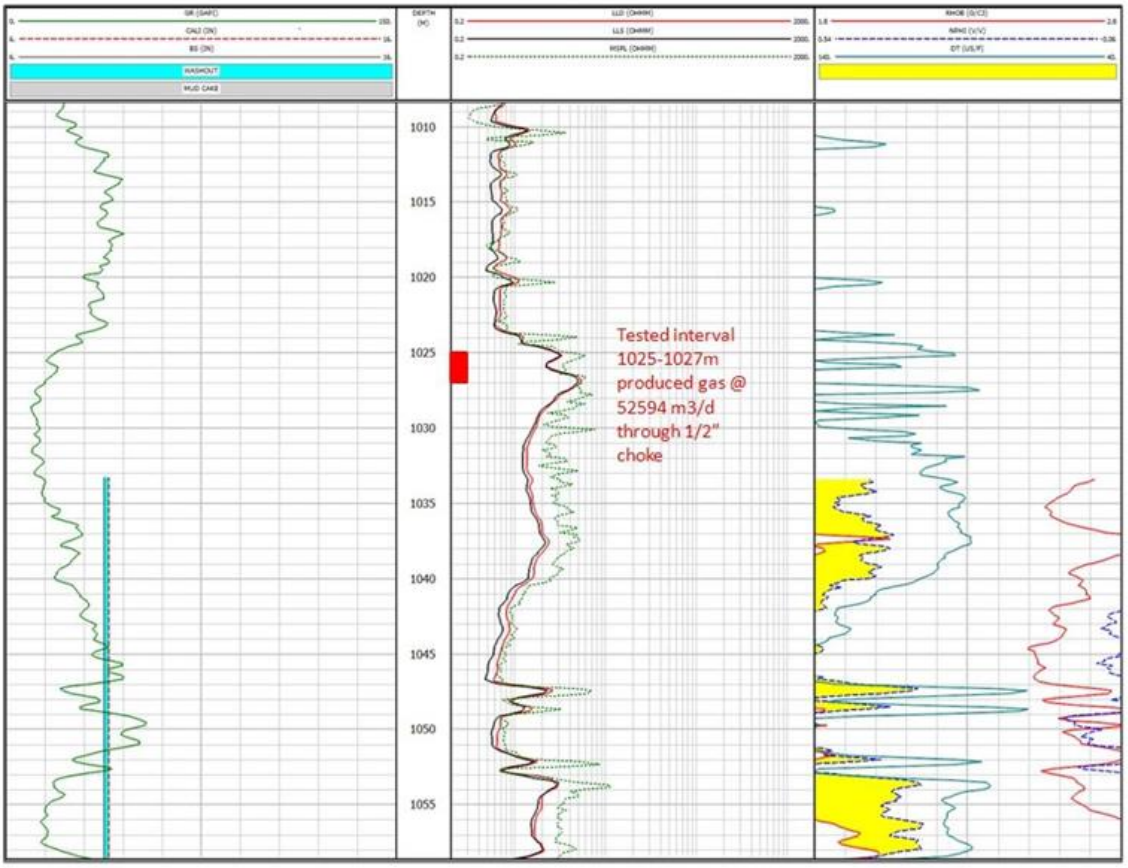
C| Well log evaluation and initial test results (B-183-1):

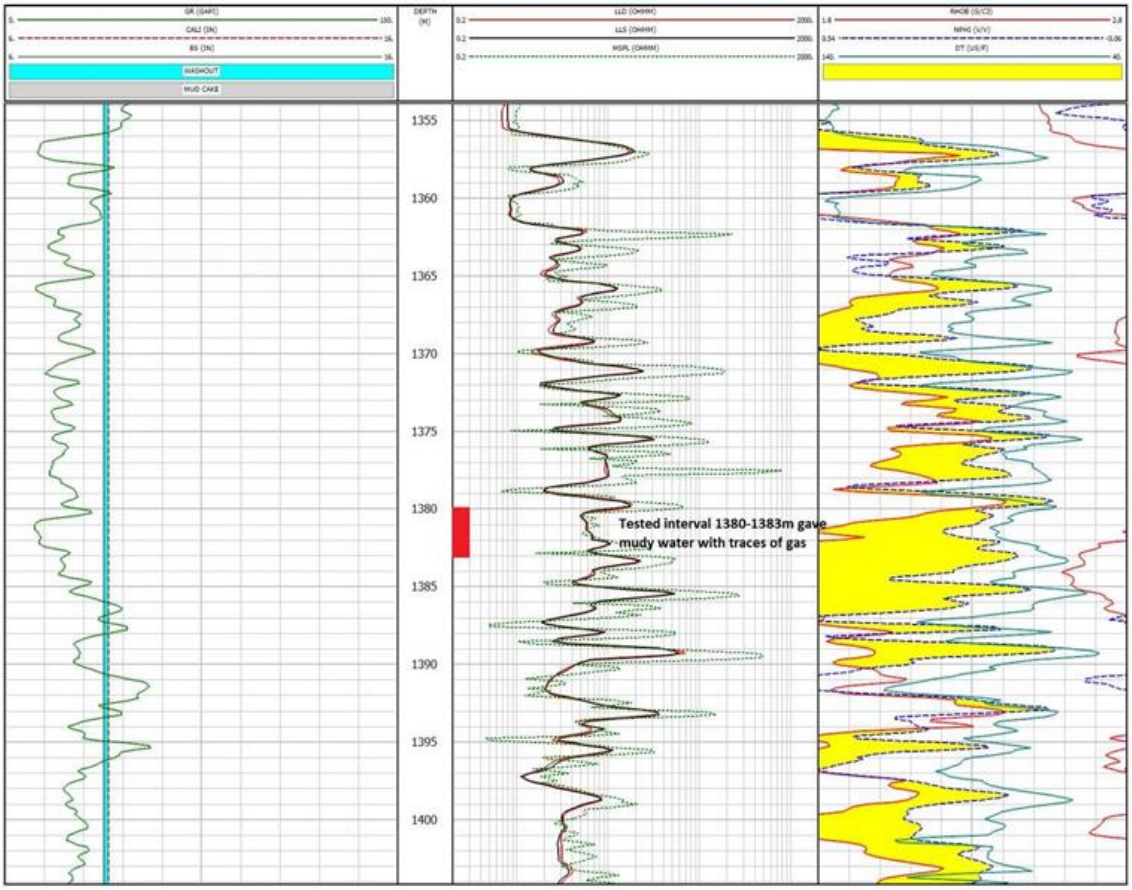
Table 4-68: Log evaluation and initial testing details of B-183-1

Interval (mMDRT/mTVDSS)	Formation (+ Zone, if specified)	Gross(m)	Net(m)	Phi	Sw
1356-1417 / 1323-1384	Middle-Oligocene/Bassein (H3A) (1356-1398 mMDRT)	42	6.5	0.06-0.21	0.72-0.96
	Initial testing results: Object I was tested in the range 1380.0-1383.0 m and flowed muddy water with traces of gas				
1023-1356 / 990-1323	Miocene (H2B)(1023-1092 mMDRT	69.0	36.5	0.20-0.28	0.55-0.77
	Initial testing results: Object II was tested in the range 1025.0-1027.0 m and flowed gas 52594 m/day and 1219BPD of liquid through 1/2" choke.				

Log motif of B-183-1 is placed at **Figure 4-73.**

Figure 4-73:. Well log motif of B-183-1 :


Tested interval
1025-1027m
produced gas @
52594 m3/d
through 1/2"
choke


Tested interval 1380-1383m gave
mudy water with traces of gas

4.7.3 Well testing and workover history

Two objects were tested. Results given in **Table 4-69.**

Object-II was tested in Miocene (H2B) Formation in the range 1025.0-1027.0 m and flowed gas 52574 m/day and 1219 BPD of liquid through 1/2" choke.

Object-I was tested in the range 1380.0-1383.0 m in Bassein (H3A) formation and flowed muddy water with traces of gas.

Table 4-69: Production testing details of B-183-1

Formation: H3A| Bassein **Object: I|** **Interval(m.): 1380-1383|**	Flowed muddy water with traces of gas. Remarks: Dry
Formation: H2B| Miocene **Object: II|** **Interval(m.): 1025-1027|**	Bean (1/64 inch): 32| FTHP: 940 psi| STHP: 1460 psi| FBHP: 1442 psi| SBHP: 1562 psi| Qliq: 1219 blpd| Qoil: 182.85 bopd| Qgas: 52574 scmd| Qwat(bwpd): 1036| Water cut(%): 85| GOR: 1808.477 v/v| GLR: 271 v/v| FTHT: 119 DegF.| API: 43.98 deg.

4.7.4 Reservoir engineering studies and analysis

Key reservoir engineering datasets, wherever available have been collated and presented under various data genres. In a comprehensive data presentation, the results are included from well tests, formation dynamics tests, reservoir pressure build-up study and PVT data/ results.

Formation dynamics tests (B-183-1)

No MDT/RDT/RFT done in this well

Pressure Build-up

Formation: H2B| Object: II| Interval(m.): 1025-1027| Static bottom hole pressure: 1565 psi Pressure Gradient: 0.123 psi/m

Reservoir studies - PVT

Formation: H2B| Object: II| Interval(m.): 1025-1027| Stock tank API gravity: 43.98.

Oil composition analysis (B-183-1)

Formation: H2B| Object: II| Interval(m.): 1025-1027| Sp.Gr.: 43.98 at 60 degF.

Gas composition analysis (B-183-1)

Formation: H2B| Object: II| Type: Separator| Interval(m.): 1025-1027|

C1: 72.93 %| C2: 15.33 %| C3: 7.18 %| iC4: 0.27 %| nC4: 0.13 %| iC5: 0.01 %| nC5: 0.02 %| iC6: 0.01 %| Carbon-dioxide: 1.62 %| Nitrogen: 2.5 %| Sp.Gr.: 0.7323

4.7.5 Geology and Reservoir Description of B-183-1 Field:

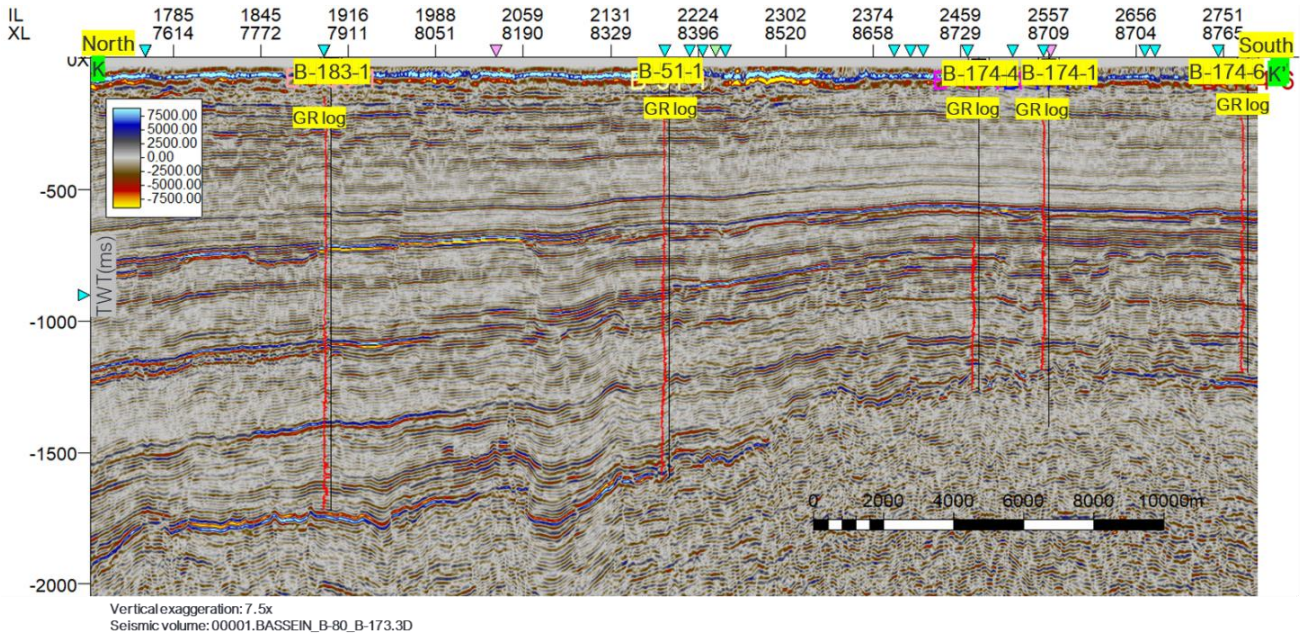
The geology of the area has been comprehensively reviewed using correlations, sections and maps. The well correlation, seismic sections, top structure, seismic attribute/amplitude and net sand/pay maps have been used to illustrate the magnitude and distribution of key reservoir properties in and around the discovered oil/gas pools (accumulations). The local tectonic setting and geological section of the area, wherever available, are also given. These maps/sections are sequentially shown field-wise and reservoir unit-wise through figures, appropriately titled and illustrated in the following section.

Geological correlations, sections and maps (B-183-1 Field):

The B-183 area lies on the rising flank of the Eastern Homocline. The NNW – SSE longitudinal fault system which traverses Eastern Homocline, segments it into different fault blocks, with a series of down to Basement faults. A second set of NE – SW trending obliterating strike slip faults bisect the area, though these are more evident on the structural highs.

Seismic sections along the wells B-183-1/B-51-1/B-174-1/B-174-4/B-174-6: are shown in **Figure 4-74.**
Maps given as per below.
Time Relief map of BOMBAY RESERVOIR (LKG AT 996): **Figure 4-75**
Depth Relief map of BOMBAY RESERVOIR (LKG AT 996): **Figure 4-76**
Seismic amplitude map/section of BOMBAY RESERVOIR (LKG AT 996): **Figure 4-77**
Net sand/pay map BOMBAY RESERVOIR (LKG AT 996): **Figure 4-78**

Figure 4-74:. Seismic sections along the wells B-183-1/B-51-1/B-174-1/B-174-4/B-174-6:



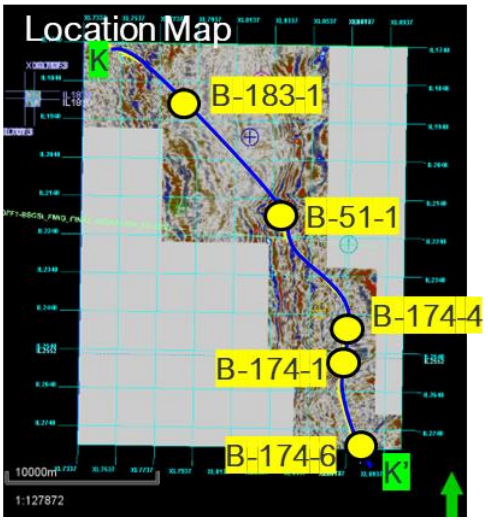


Figure 4-75:. Time Relief map of BOMBAY RESERVOIR (LKG AT 996) :

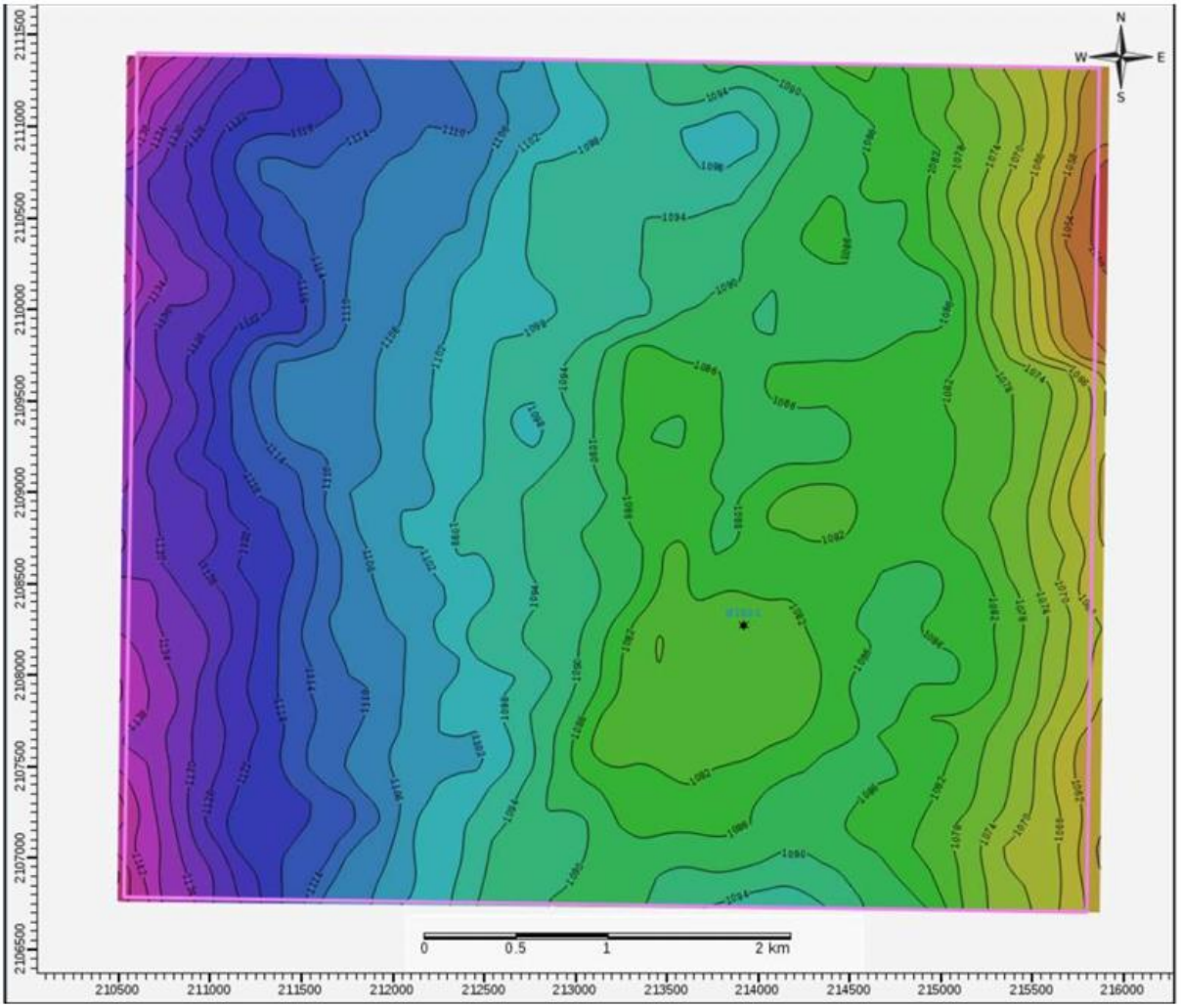


Figure 4-76:. Depth Relief map of BOMBAY RESERVOIR (LKG AT 996) :

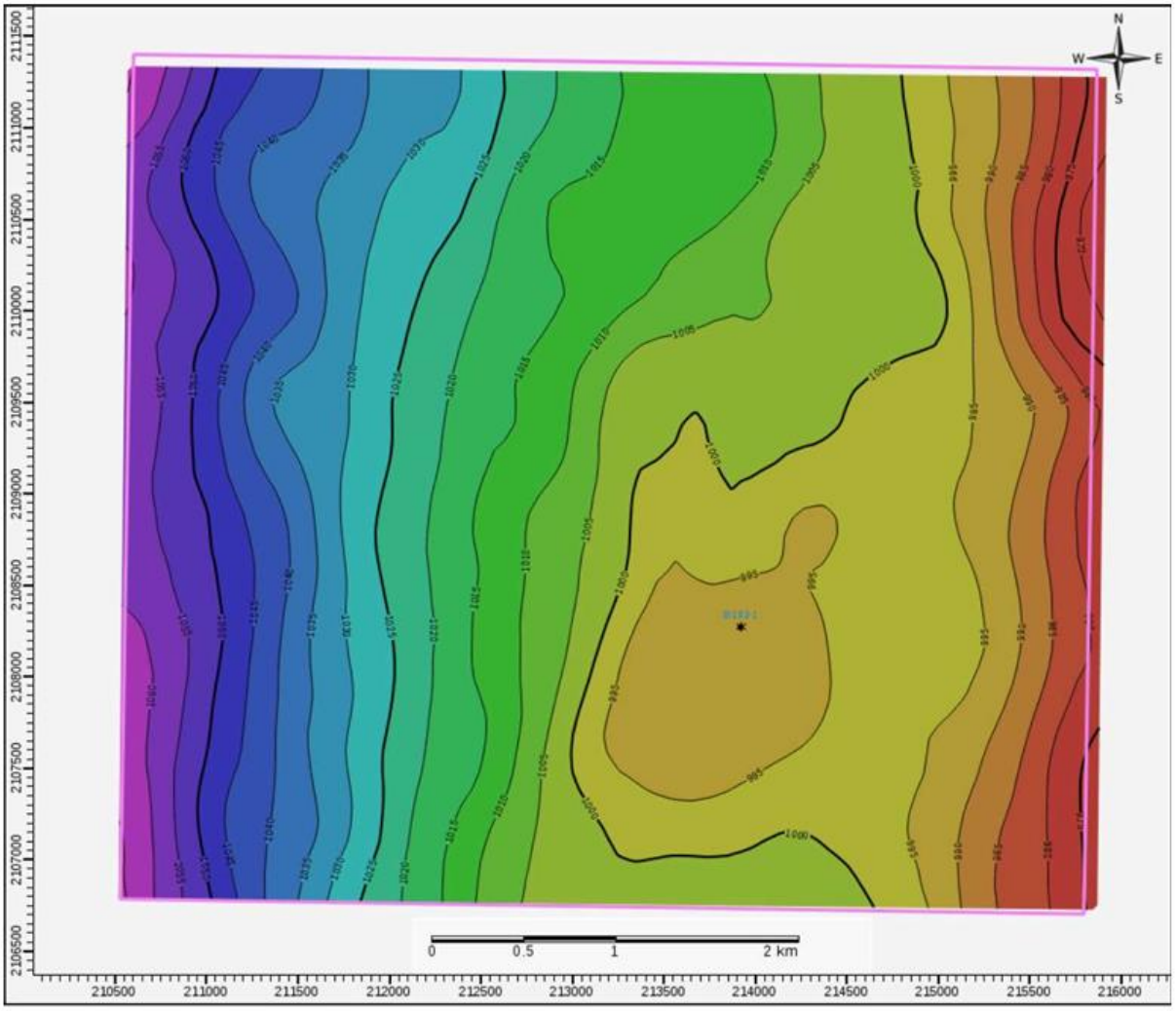


Figure 4-77:. Seismic amplitude map/section of BOMBAY RESERVOIR (LKG AT 996) :

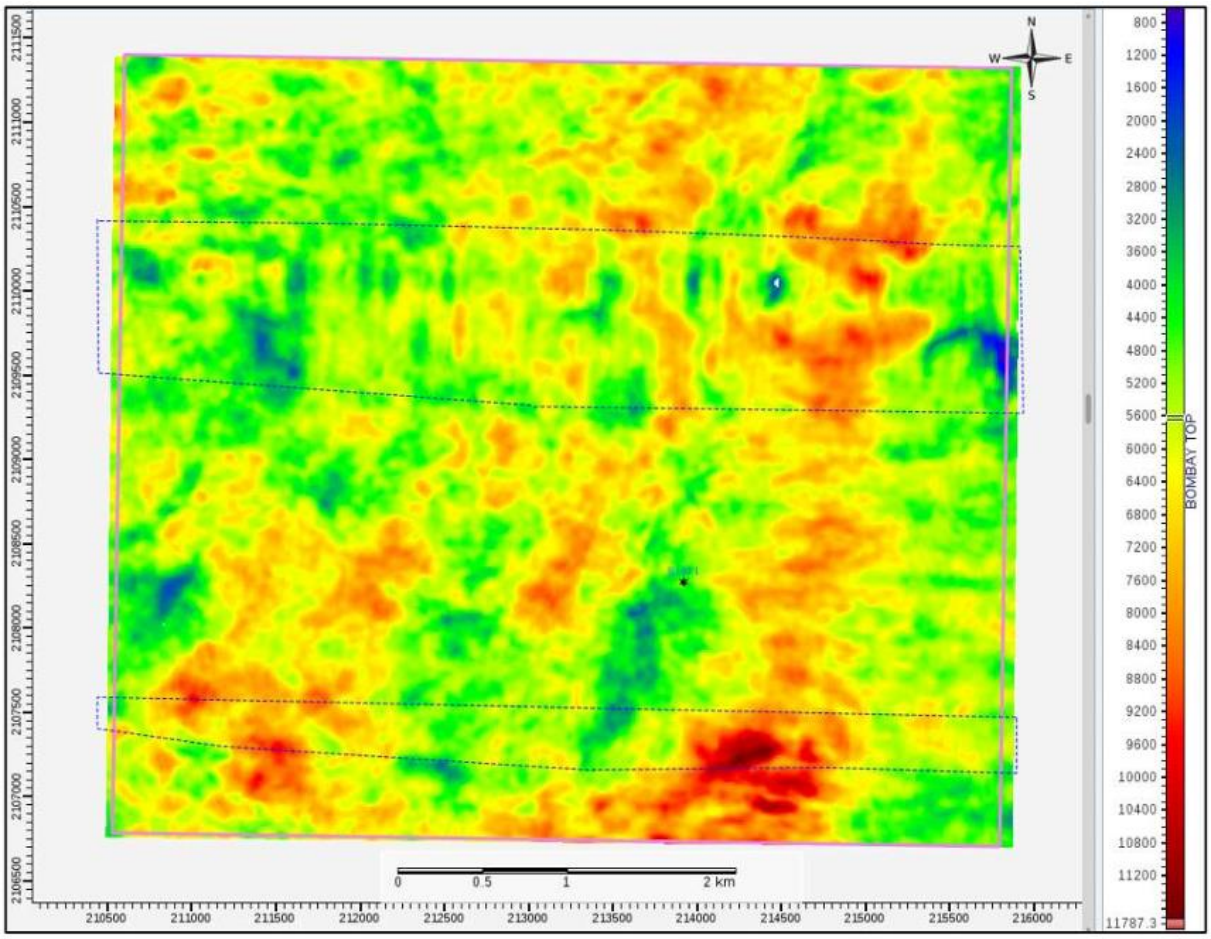
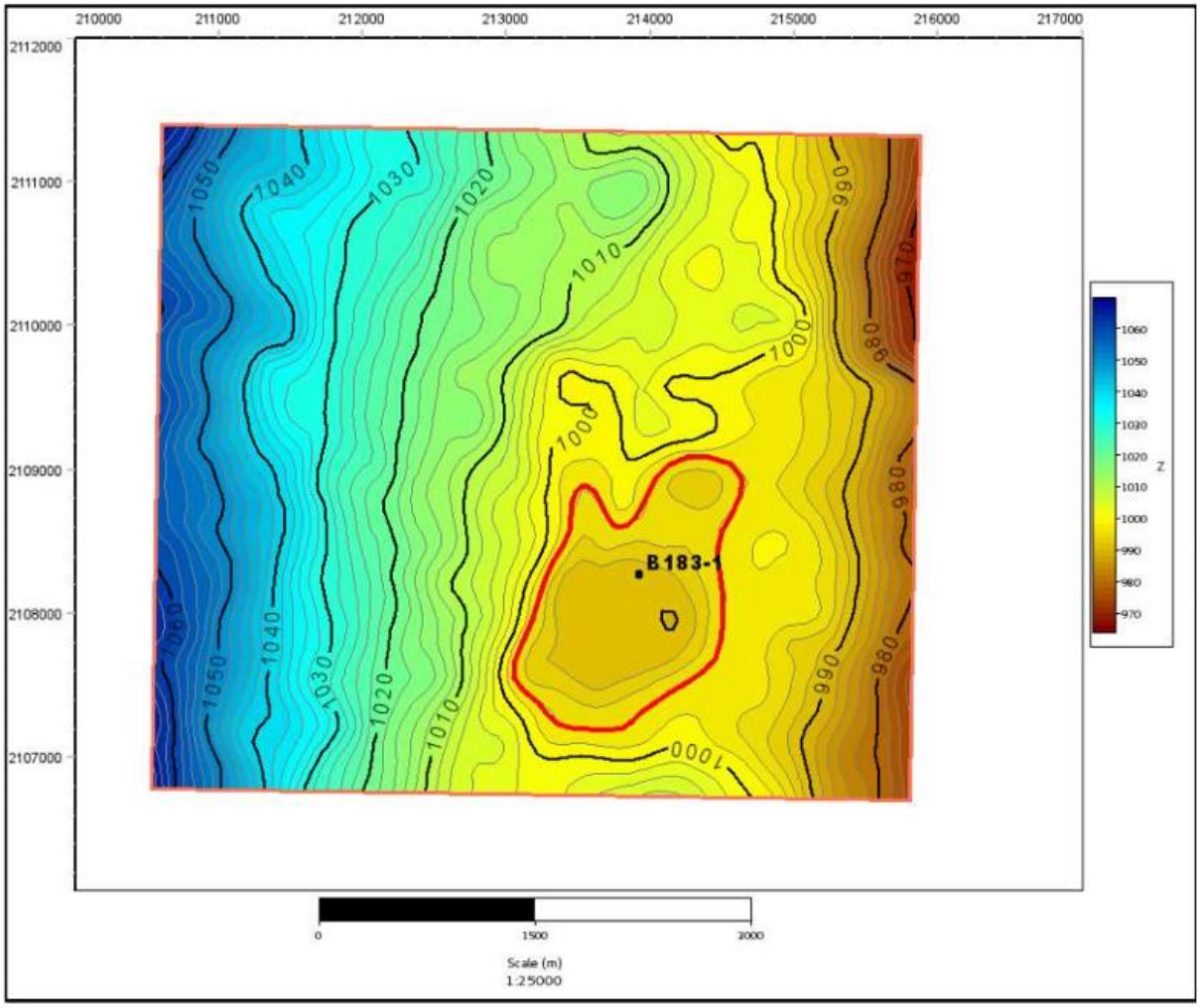


Figure 4-78:. Net sand/pay map BOMBAY RESERVOIR (LKG AT 996) ::



4.7.6 Reservoir parameters and hydrocarbon estimates B-183-1 Field:

The estimates of hydrocarbon in-place have been worked out under various field assumptions, and all inputs, working and results, as available and sourced are presented in the following section.

Petrophysical parameters and hydrocarbon estimates:

The Petrophysical parameters used in volumetrics and In-Place are provided in **Table 4-70 and Table 4-71.**

Table 4-70: Petrophysical and Fluid parameters of B-183-1

Reservoir: Middle-Oligocene/Bassein (H3A) (1356-1398)	Area: 1.958 sq.km Thickness: 6.5 m Porosity: 0.14 Hydrocarbon saturation: 0.13 Formation volume factor: 0.009 DRY
Reservoir: Miocene (H2B) (1023-1092)	Area: 1.958 sq.km Thickness: 36.5 m Porosity: 0.24 Hydrocarbon saturation: 0.34 Formation volume factor: 0.009 Sp gr cond: 0.80636 CGR: 550 m3/MMm3

Table 4-71: Hydrocarbon In-Place estimates (2P)

Field	O+OEG, MMTOE
B-183-1	**0.94**

Erstwhile Operator-reported estimates on record:

The field, B-183-1, has a reported gas estimate of **0.07 MMTOE** .

All these hydrocarbon estimates are subject to future assessments based on Operator's own technical insights and additional information/data, which may warrant possible revision of the currently reported estimates.

4.7.7 Production Facility for Oil and Gas Evacuation:

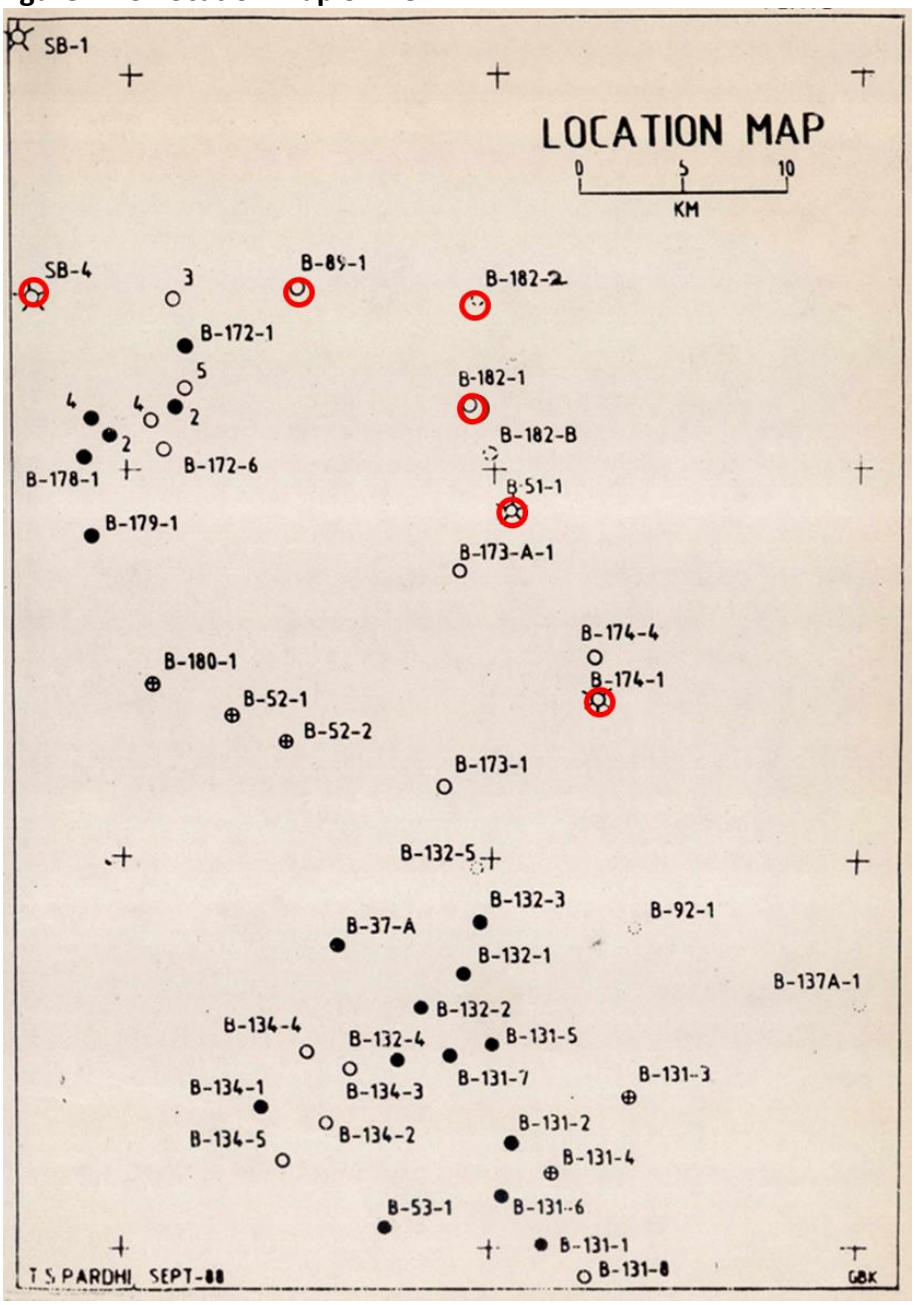
NLP process platform 35.7 KM

MUMBAI OFFSHORE B-51-1 FIELD

4.8 DESCRIPTION OF MUMBAI OFFSHORE B-51-1 FIELD

The well B-51 was drilled in 1978 to explore the hydrocarbon potential of Bassein pay and of the section between Bassein pay upto the top of the basement. The well is located in an independent structure. The reason for absence of commercial hydrocarbons in this well is because of tight and shaly limestone in Bassein pay , where the major structure has developed. B-51 structure is a fault closure having an aerial extent of approx. 16 sq km on the down thrown side of the fault. The thickness of the sedimentary sequence between H3A and the basement are expected to vary on the downthrown side. Location of B-51-1 is shown in **Figure 4-79.**

Figure 4-79:Location map of B-51-1



4.8.1 Drilling and well completion

Key information of drilled wells have been collated and presented hereunder. The adjoining figures wherever shown illustrate the Well Construction Diagram (**Figure 4-80**) and the Litho-column

Table 4-72) Information for key wells. Other well statics like kelly bush reference depth, water depth, drilled and logged depth including well coordinates are made available in Sections through various cross-references.

Figure 4-80:. Well profile of B-51-1 :

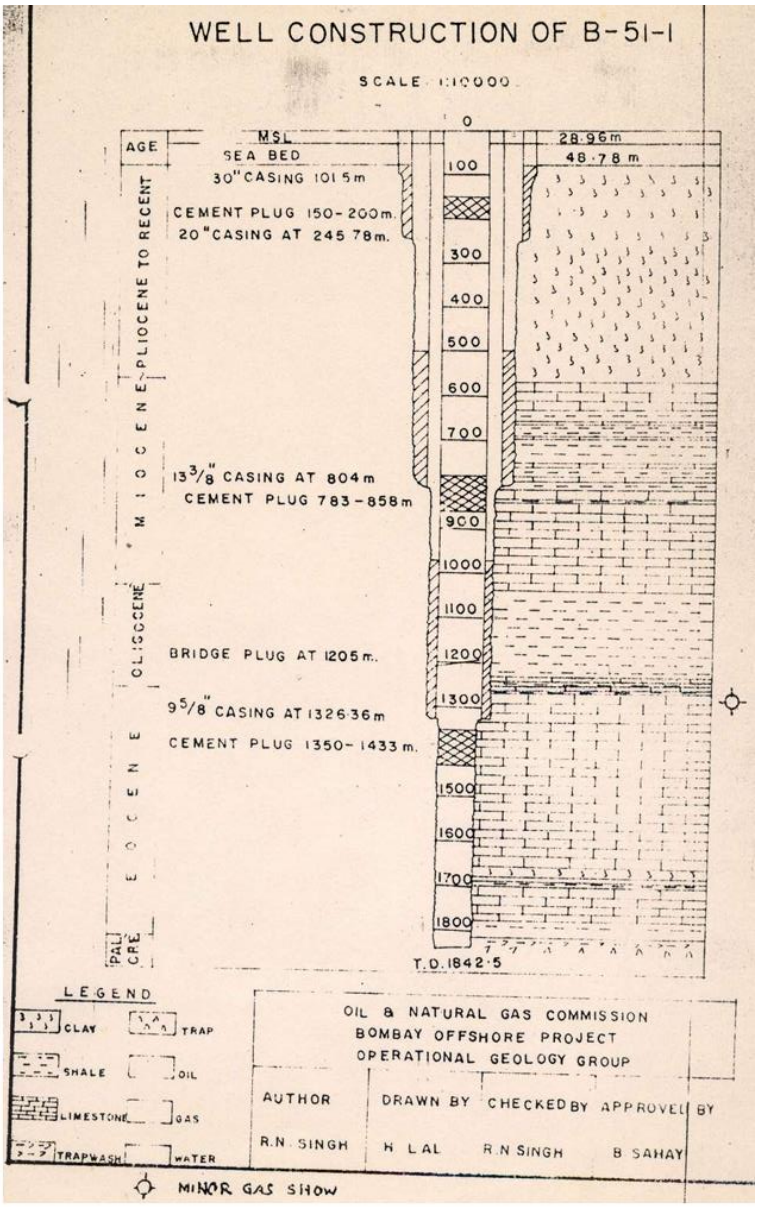


Table 4-72: Litho-section information of B-51-1 :

Formation Tops : Surface Picks(Interpreted) Data for UWI M-B-51-1

SURFACE_NAME	MD
MIOCENE	565
H1A	565
TAPTI_FORMATION_TOP	629
MAHIM_FORMATION_TOP	718
H1C	718
BOMBAY_FORMATION_TOP	860.5
H2	860.5
ALIBAG_FORMATION_TOP	1041
H3CGG	1041
HEERA_FORMATION_TOP	1179
H3	1179
OLIGOCENE	1195
MUKTA_FORMATION_TOP	1232
H3A	1232
BASSEIN_FORMATION_TOP	1265
EOCENE	1265
H3B	1265
PANNA_FORMATION_TOP	1775
H4	1775
PALEOCENE	1823
DECCAN_TRAP_TOP	1823
H5	1823

4.8.2 Well logging and formation evaluation

The well logs of all discovery wells along with some key wells in the contract area have been reviewed. The logs recorded in various open-hole sections along with cased-hole logs and information of conventional and other wireline formation test data are presented in this docket. The availability of key input reports like Well Completion Reports (WCR) and Formation Evaluation Report (FER) have been checked and information given. Reservoir parameters of interesting zones and results of the tested zone(s) have been included in this report. Log motifs of tested/ interesting zone of key wells are also appended.

A| Well completion and log evaluation reports availability (B-51-1) :

WCR/ FER availability	Spud date	KB	Drilled depth
Both available	06.10.1978	28.96 m	1842.5 m

B| Well logs acquired (B-51-1) :

Log recorded and their evaluation results alongwith initial testing details for B-51-5 are given in **Table 4-73 and Table 4-74.**

Table 4-73: Well logs recorded in B-51-1

Date	Hole size (inch)	Type of logs	Interval in meters	Remarks
7.10.78	26	GR/SP/DLL	90-254	
14.10.78	17 ½”	GR/SP/MSFL/DLL	810-247	The caliper tool did not work; so, caliper could not be recorded.
16.10.78		Thermolog	100-778	Top of cement rise behind 13 3/8" @ 435 m
23/24.10.78	12 ¼”	DLL/MSFL/GR/FDC/CAL/GR/CAL	1360-805	
29.10.78		DLL/SP-CALIPER/PDL-CNL-GR/CALIPER SONIC	1839.5-805.5, 1841.0-1358, 1838-805.5	
2.11.78	9 5/8"	CSL/CCL/GR	1297-1000	Poor cement bond
2.11.78		Perforation squeeze job	1260-1261	4 shots
3.11.78		Perforation	1250.5-1242, 1240-1238, 1236.5-1235.5	
		Setting of Model 'D' 9 5/8" packer	1230	
9.11.78		Baker bridge plug 9 5/8"	1205	

Conventional Cores in B-51-5:

Five conventional cores were cut in this well. Core analysis is available in the well completion report. Cored intervals are 260-1250m, 1510-1840m at 5m intervals and 1250-1510 at 3m intervals.

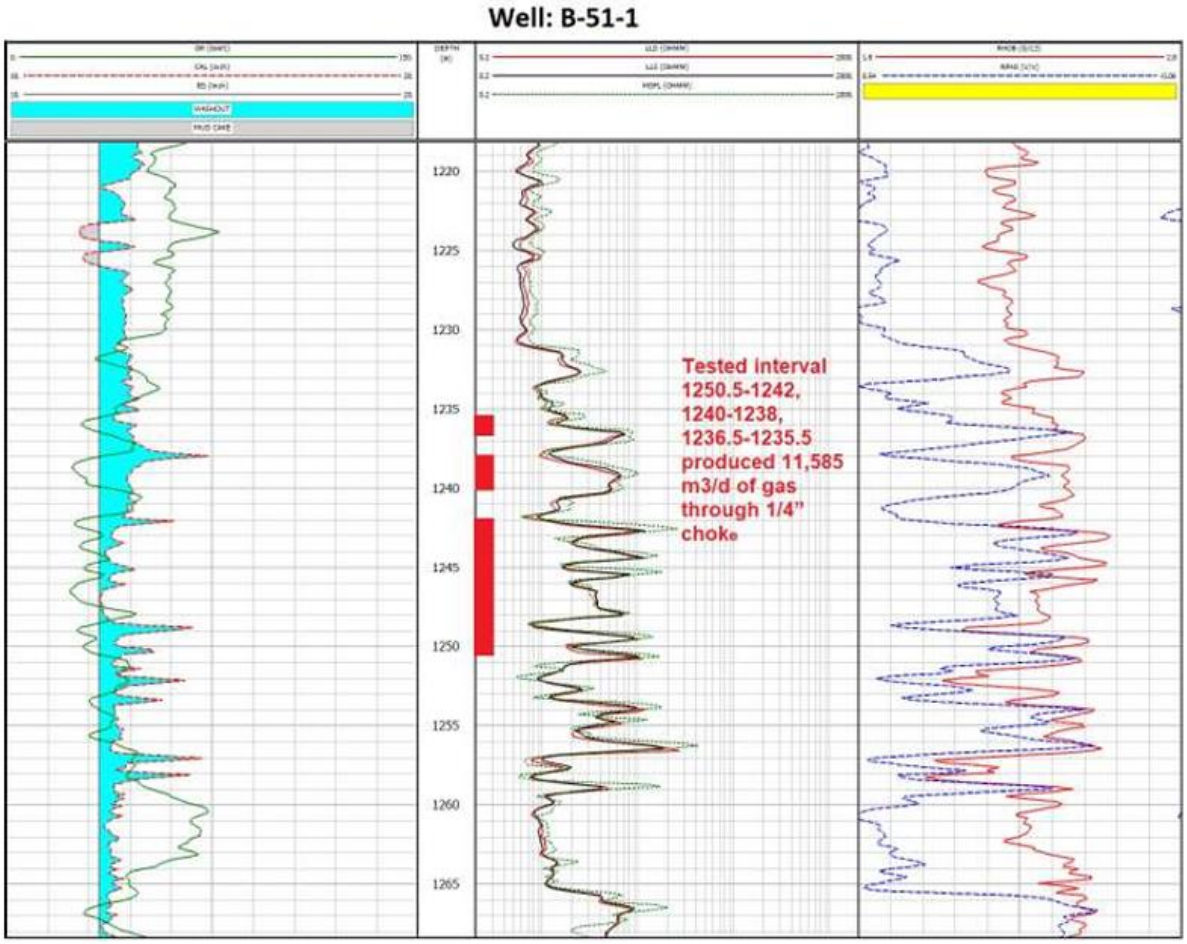
C| Well log evaluation and initial test results (B-51-1):

Table 4-74: Well log evaluation and initial test results (B-51-1)

Interval (mMDRT/mTVDSS)	Formation (+ Zone, if specified)	Gross(m)	Net(m)	Phi	Sw
1230-1824 / 1201-1795	Eocene/Bassein (1235-1292 mMDRT)	57	7.5	0.10-0.12	0.60-0.80
	Initial testing results: Object I was tested in 1236.5-1235.5m , 1238-1240m , 1242-1250.5m and flowed 12000 m3/day of gas after acidization				

Log motif of B-51-1 is placed at **Figure 4-81.**

Figure 4-81:. Well log motif of B-51-1:



4.8.3 Well testing and workover history

Only one object (**Object-I: 1235.5-1236.5m,1238-1240m,1242-1250.5m**) in Alternations above Bassein pay in B-51-1 was tested which flowed hydrocarbon. Details are given in **Table 4-75**

Object-I yielded dry gas at the rate 11297 m^3/d through 1/4" choke at FTHP of 320psi after acidization. Multi bean study was also not carried out. RFT pressure (121.84 Kg/cm^2) recorded at 1246m (within Object-I) indicated hydrostatic pressure of Reservoir zone.

Table 4-75: Testing Results in B-51-1

Time in hours	FTHP psi	PA psi	Separator temp F°	Separator pr.psi	Diffe-rential pr.of water	Gas temp F°	Gas prod. M^3/d
12.45	320	325	95	55	68	65	10461.32
13.15	320	325	90	58	69	68	11368.40
13.30	325	325	92	58	70	68	11428.86
14.00	320	325	92	60	70	68	11584.906
14.30	320	325	94	60	70	68	11584.906
15.00	320	325	94	60	68	68	11418.78
15.30	320	325	91	58	68	68	11264.86
16.00	330	325	94	58	68	68	11264.86

Details about Bottom hole studies are in **Table 4-76** as follows:

Table 4-76: Bottom hole studies in B-51-1

Choke	Extra-pola-ted SBHP	FBHP ΔP	Q avg M^3/d, P_2	Remarks
$7^{4"}$	64.8 after 35 min shut-in only	344 psi = 24.2 kg/m	11,297	Build up recorded only for 35 min. Shut in pressure after 35 min was 922 psi i.e. 64.8 kg/cm^2 (B.U. study discontinued due to cyclone warning)

4.8.4 Reservoir engineering studies and analysis

Key reservoir engineering datasets, wherever available have been collated and presented under various data genres. In a comprehensive data presentation, the results are included from well tests, formation dynamics tests, reservoir pressure build-up study and PVT data/ results.

Formation dynamics tests (B-51-1)

Details of RFT recorded in well B-51-1 are given in **Table 4-77.**

Table 4-77: Results of RFT tests carried out in B-51-1

RFT RESULTS					
Depth (m)	**Hydrostatic pressure (psi)**	**Final shut-in pressure (psi)**	**Sample flowing pressure (psi)**	**Chamber pressure (psi)**	**Recovery and salinity etc.**
1313.5	2232	No flow was observed.			
1313					
1379					
1380					
1369.5					
874.5	1484	260	118	100	260 cc water salinity 29.8 gm/lit
1239	2089	432	0	--	
1246	2104	1733	172	120	1.6 cu. feet of gas; 20 litre water salinity 29.8 gm/lit
1279.5	2168	-	0		
1288	2160	1863	110	0	90 cc water salinity 29.8 gm/litre
1619	2732	2303	124	100	1.2 litre water salinity 29.8 gm/litre
Remarks: Mud filtrate salinity: 3104 gm/litre.					

Pressure build-up study (B-51-1)

Reservoir study: Build-up study was closed after 35 mins due to severe cyclone forecast. Build-up study could not be carried out due to incomplete data. SBHP of 922 psi (64.8 Kg/cm^2) was recorded at 1220m after 35 minutes of well closure.

Formation: Alternations, Object: I Test Date 8/9.11.78
Perforations Interval: 1250.5-1242 m : 1240-1238 m 1236.5-1235 m (total: 11.5 m)
Duration of build up: 0.583 hrs
Static bottom hole pressure: 922 psi.
Guage Amerada No: RPG-4/40414 ,
Measurement Depth: 1220 m. Range : 0-3000 PSI
Np = 5648.5 M^3
Qo = 11,297 M^3/day
(Bean = 16/64")
T = 12.00 hours.

Shut-in Time(t) (hrs)	T+Δt/ Δt	BHP(Psig)
0	-	343.7
0.0833	145.	430.1
0.1667	72.9	666.3
0.256	49.0	816.2
0.333	37.0	873.4
0.4167	27.8	892.4
0.50	25.0	909.3
0.58	21.7	922.0

Gas composition analysis (B-51-1)

Formation: Alternation| Object: I| Interval(m.): 1235.5-1236.5, 1238-1240, 1242-1250.5|
C1: 70.7 %| C2: 15.6 %| C3: 11.9 %| iC4: 0.5 %| nC4: 0.2 %| Carbon-dioxide: 0.4 %| Nitrogen: 0.6 %.

4.8.5 Geology and Reservoir Description of B-51-1 Field:

The geology of the area has been comprehensively reviewed using correlations, sections and maps. The well correlation, seismic sections, top structure, seismic attribute/amplitude and net sand/pay maps have been used to illustrate the magnitude and distribution of key reservoir properties in and around the discovered oil/gas pools (accumulations). The local tectonic setting and geological section of the area, wherever available, are also given. These maps/sections are sequentially shown field-wise and reservoir unit-wise through figures, appropriately titled and illustrated in the following section.

Geological correlations, sections and maps (B-51-1 Field):

Seismic inline 52 and trace 1700 passing through B-51-1 clearly indicate the eastward rising trend and reversals at Panna (H4), Bassein (H3B) and Mukta levels (H3A).

The B-51 field is situated in the Eastern Homocline tectonic set up and to the north of B-173A field. B-51 structure is fault closure on the downthrown side of the fault. Structure contour maps on top of Mukta and at the top of Bassein Formation indicate a NW-SE trending small closure bounded by two faults in the north and east.

Around 6 m oil pay has been encountered at well location in Mukta pay

Seismic sections along the wells B-183-1/B-51-1/B-174-1/B-174-4/B-174-6 are shown in**. Figure 4-82.**

Some maps are given as per below.
Time Relief map of MUKTA GAS PAY: **Figure 4-83**
Time Relief map of BASSEIN TOP: **Figure 4-84**
Depth-Structure map of MUKTA TOP: **Figure 4-85**
Depth-Structure map of BASSEIN TOP: **Figure 4-86**
Net sand/pay map of MUKTA PAY: **Figure 4-87**
Net sand/pay map of BASSEIN PAY: **Figure 4-88**

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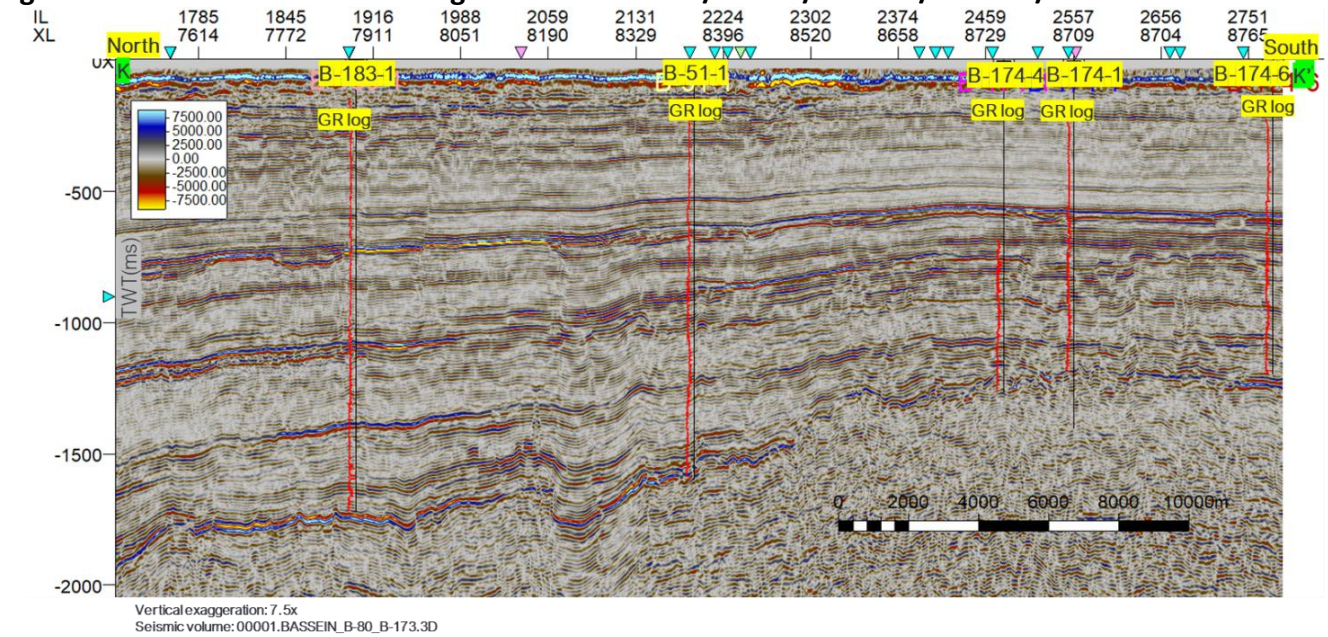
Figure 4-82:. Seismic sections along the wells B-183-1/B-51-1/B-174-1/B-174-4/B-174-6:



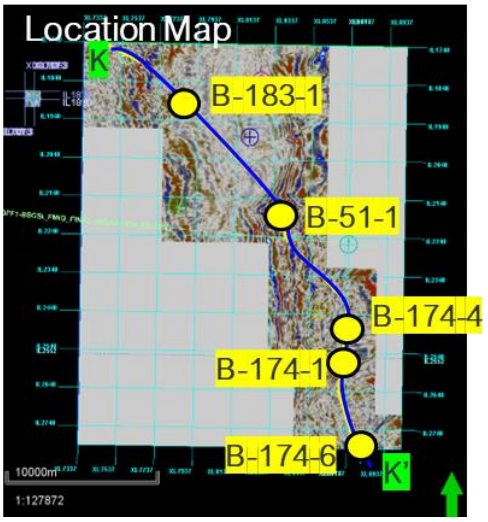


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Figure 4-83:. Time Relief map of MUKTA GAS PAY:

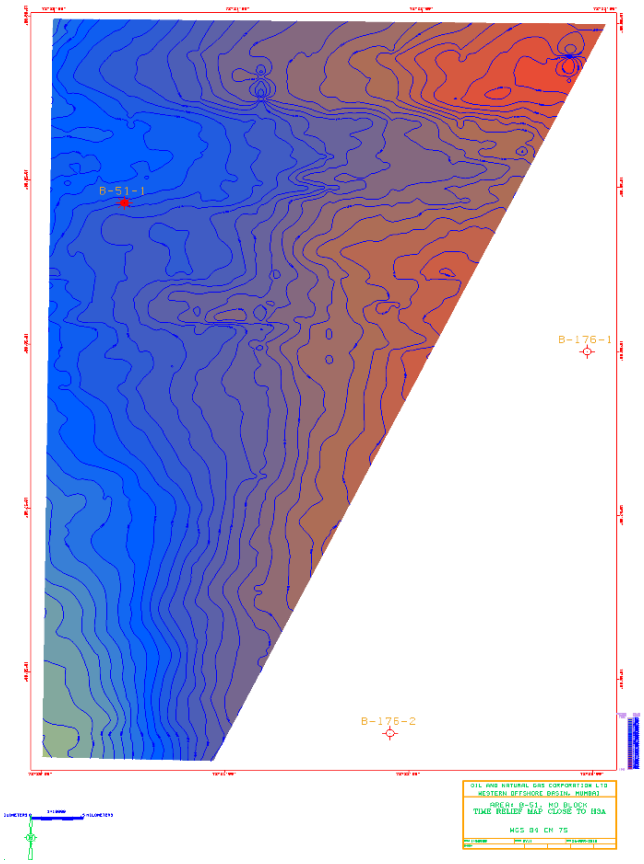


Figure 4-84:. Time Relief map of BASSEIN TOP :

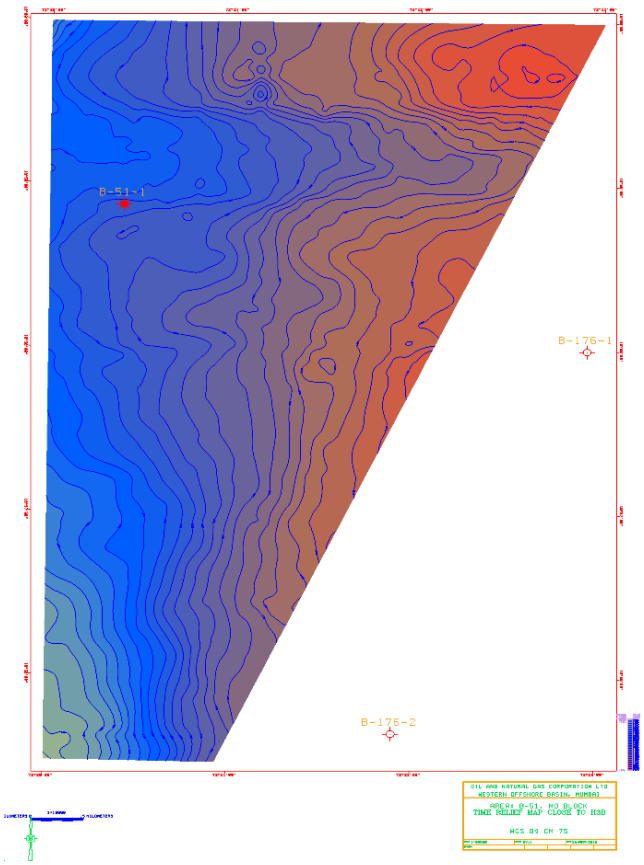


Figure 4-85:. Depth-Structure map of MUKTA TOP :

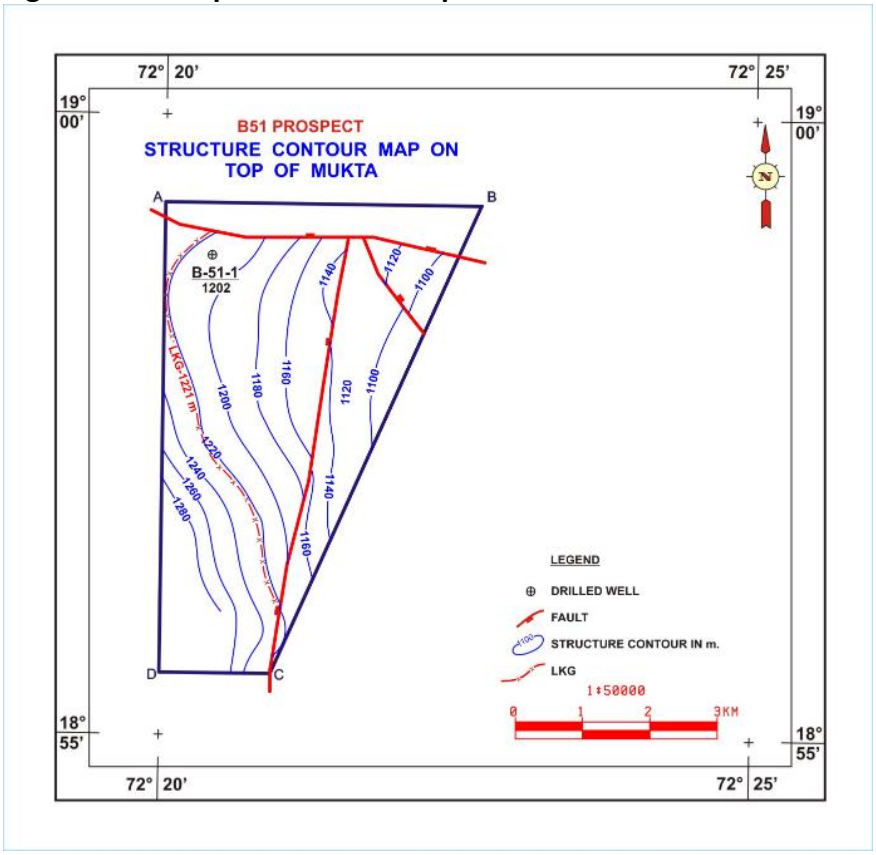


Figure 4-86:. Depth-Structure map of BASSEIN TOP :

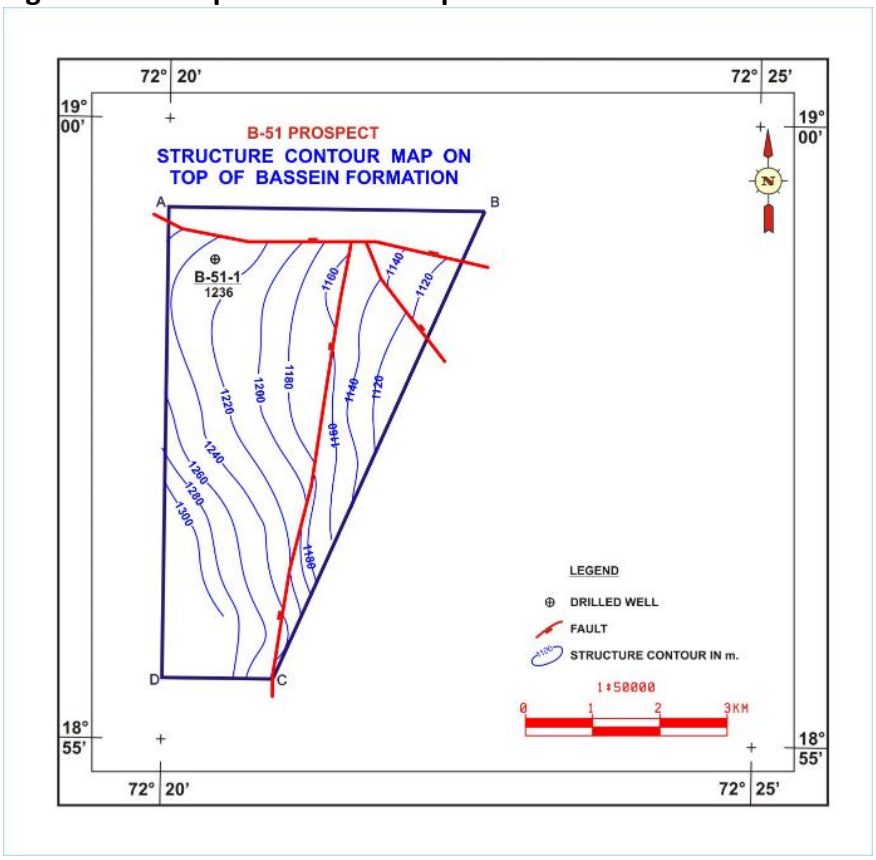


Figure 4-87:. Net sand/pay map of MUKTA PAY:

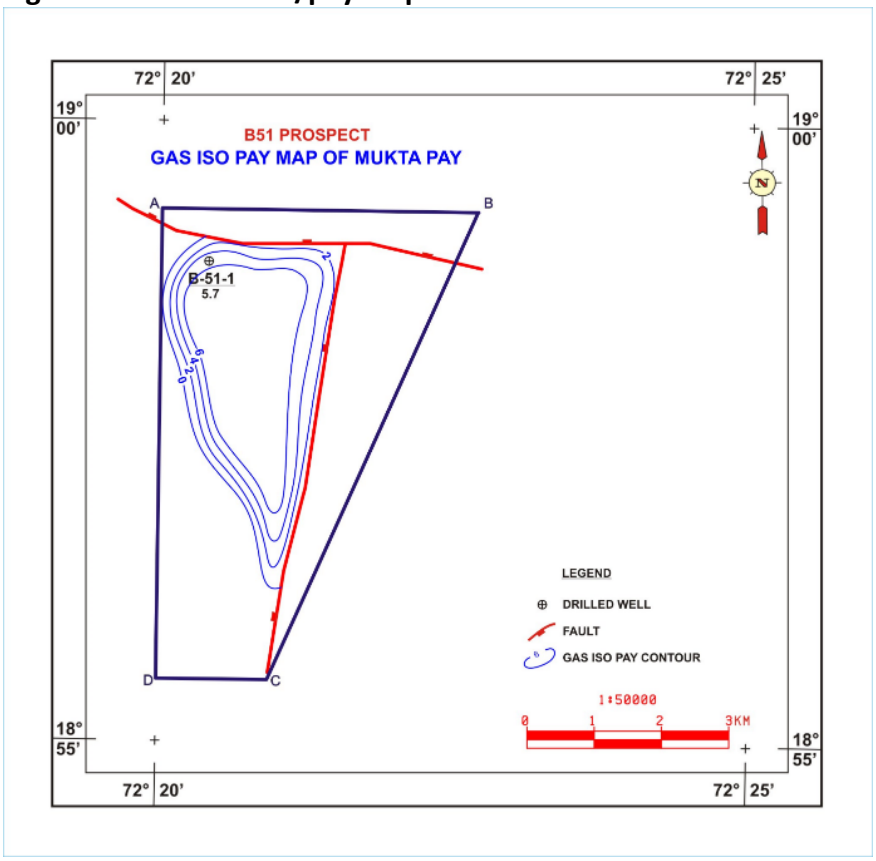
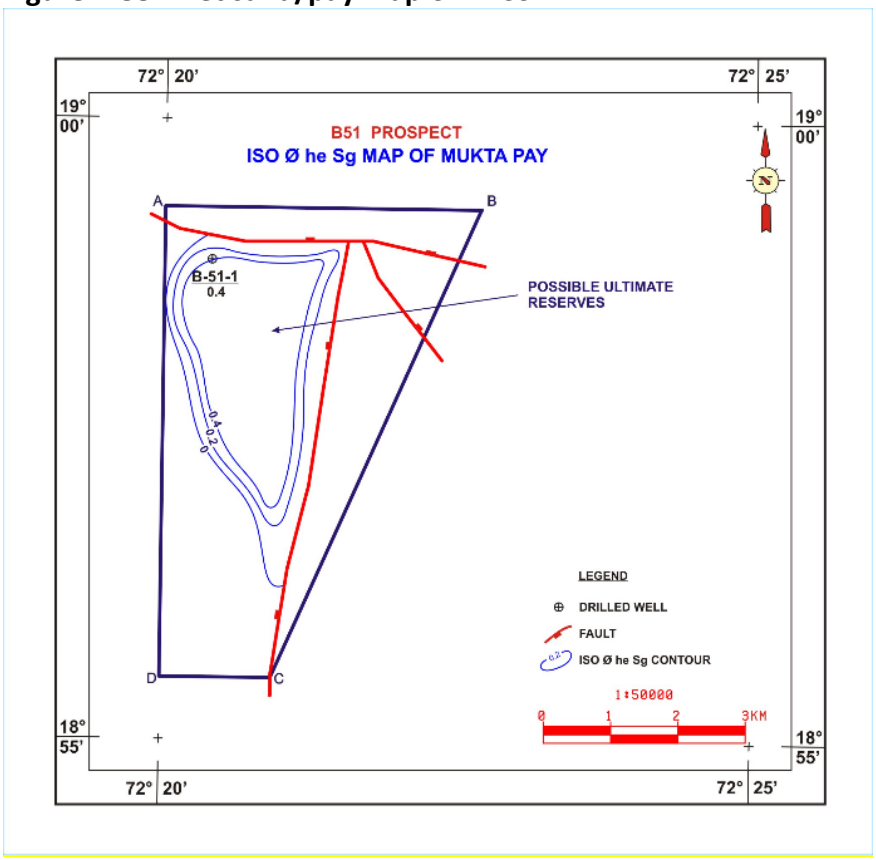


Figure 4-88:. Net sand/pay map of BASSEIN PAY:



4.8.6 Reservoir parameters and hydrocarbon estimates B-51-1 Field:

The estimates of hydrocarbon in-place have been worked out under various field assumptions, and all inputs, working and results, as available and sourced are presented in the following section.

Petrophysical parameters and hydrocarbon estimates:

The Petrophysical parameters used in volumetrics and In-Place are provided below in **Table 4-78 and Table 4-79.**

Table 4-78: Petrophysical parameters and wellbore estimates (B-51-1)

Reservoir: Eocene/Bassein
(1235-1292)
Area: 8.548 SqKm Thickness: 11.5 m Porosity: 0.11 Hydrocarbon saturation: 0.3 Formation volume factor(Bg): 0.0037
GIIP: 877 MMm3

Table 4-79: Hydrocarbon In-Place estimates (2P)

Field	O+OEG, MMTOE
B-51-1	**0.88**

Erstwhile Operator-reported estimates on record:

The field, B-51-1, has a reported gas estimate of **0.68 MMTOE**.

All these hydrocarbon estimates are subject to future assessments based on Operator's own technical insights and additional information/data, which may warrant possible revision of the currently reported estimates.

4.8.7 Production Facility for Oil and Gas Evacuation:

NLP process platform 30 KM

MUMBAI OFFSHORE B-172-9 FIELD

4.9 DESCRIPTION OF MUMBAI OFFSHORE B-172-9 FIELD

Well B-172-9 (location RB-172-G: **Figure 4-89**) was drilled in 2007 to a depth of 2354m (loggers depth : 2355m) with an objective to test the extension of the pay sands of Panna Formation of the well B-172-8. For the first time hydrocarbon produced from Panna Formation in B-172- structure has given a lead for exploration of Panna sands in this area. The interesting feature of this zone is that even though the thickness of reservoir exposed in the well is only 2 meters, the inflow has been very high. This suggests that the well has penetrated the edge of a thicker reservoir extension.

B-172 structure is located to the southeast of Bassein Field. Hydrocarbons reserves have been established from Bombay and Alibagh Formations in B-172 structure (**Figure 4-90**). Well 172-7 has established commercial oil from Mukta Formation. The morphology of sinkholes in the karst topography area has shown effective reservoir development with very high permeabilities and well B-172-8 has shown presence of hydrocarbon in Panna Formation. The extent of the hydrocarbon pools are guided by the relief of the reservoir top limited by the LKO (1640m) and the longitudinal (N-S) faults on either side of the structure.

Drilling of well B-172-7 has given information on the morphology and reservoir development in sinkholes in karst topography area as evident from high rate of drilling fluid loss (static and dynamic) and production of oil from Mukta Formation (flowed oil @ 1460 bopd).

Based on available data, the Lowest Known Hydrocarbon (LKO) was placed at 1640m, the top of the tight zone separating Mukta from underlying Bassein Formation. A study of seismic attributes indicates karst topography in the area at Mukta and Upper Bassein Formation levels. It was established that the karstified zones form effective reservoirs in this structure with very high permeabilities (close to sinkholes). Vertical capping is provided by the overlying Late Oligocene shales in the area. The lateral extent of the possible hydrocarbon pools is guided by the relief of the reservoir top limited by the LKO and the longitudinal (N-S) faults on either side of the structure.

B-172-8 drilled in the northern part of the structure; also provided information on the morphology and reservoir development in sinkholes at Mukta and Bassein Formations. The top pay zones of these formations were encountered at deeper levels with respect to LKO (1640m) and found to be dry/water bearing, located in a sinkhole. In the light of drilling result of well B-172-8 seismic data, new relief maps have been restudied and prepared at the top of Mukta and Bassein Formations. The mapping of relief at the top of Mukta and Bassein Formations shows that within the sinkholes the top of these formations show small but deep lows with very steep flanks (figure 3). It is likely that oil would be found at locations outside the sinkhole, where the top of Mukta / Bassein pays would be shallower than 1640 m.

Based on the new relief map's location B-172-9 (RB-172-G) was proposed for drilling at Inline 3200 and trace 2425 where Mukta Formation is shallower than the LKO. Besides exploring the prospectivity of the Mukta and Bassein formations in the northern part of the B-172 structure, the location was also to be used to test the extension of the pay sands of Panna Formation of the well B-172-8.

Production of hydrocarbons within Panna Formation on the eastern side of Bassein Field has given up a larger area for exploration. The presence of oil in Bassein Formation and hydrocarbon accumulation in Mukta Formation in the northern part of B-172 structure is mainly controlled by the karst topography. Testing results indicate the possibility of finding oil in locations outside the sinkholes in the northern part of B- 172 structure. Therefore, eastern side of Bassein Field and northern part of B-172 structure appears to be promising and potential areas are to be delineated by integrated geoscientific data.

Figure 4-89: Location Map of B-172-9 with its surrounding wells

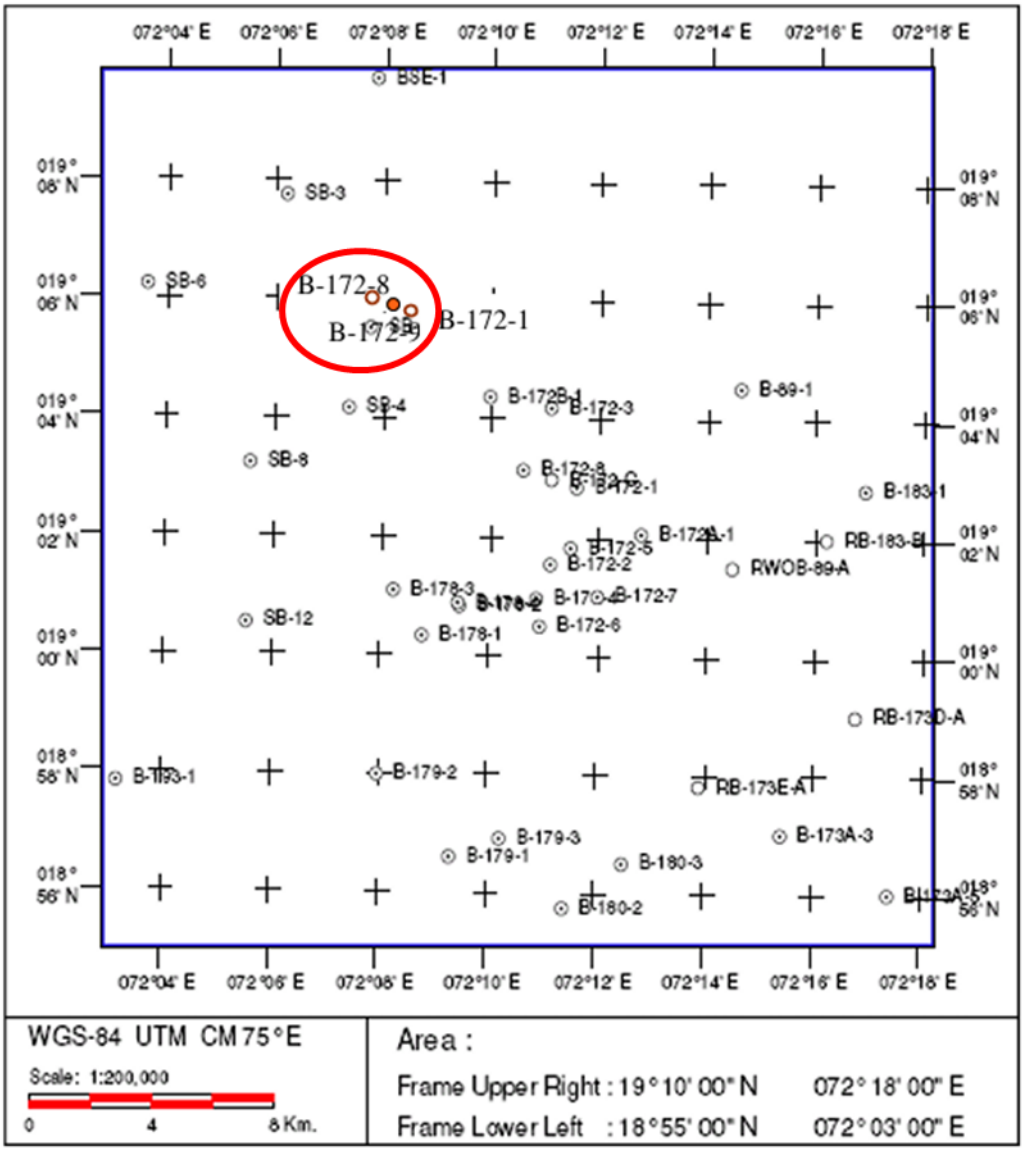
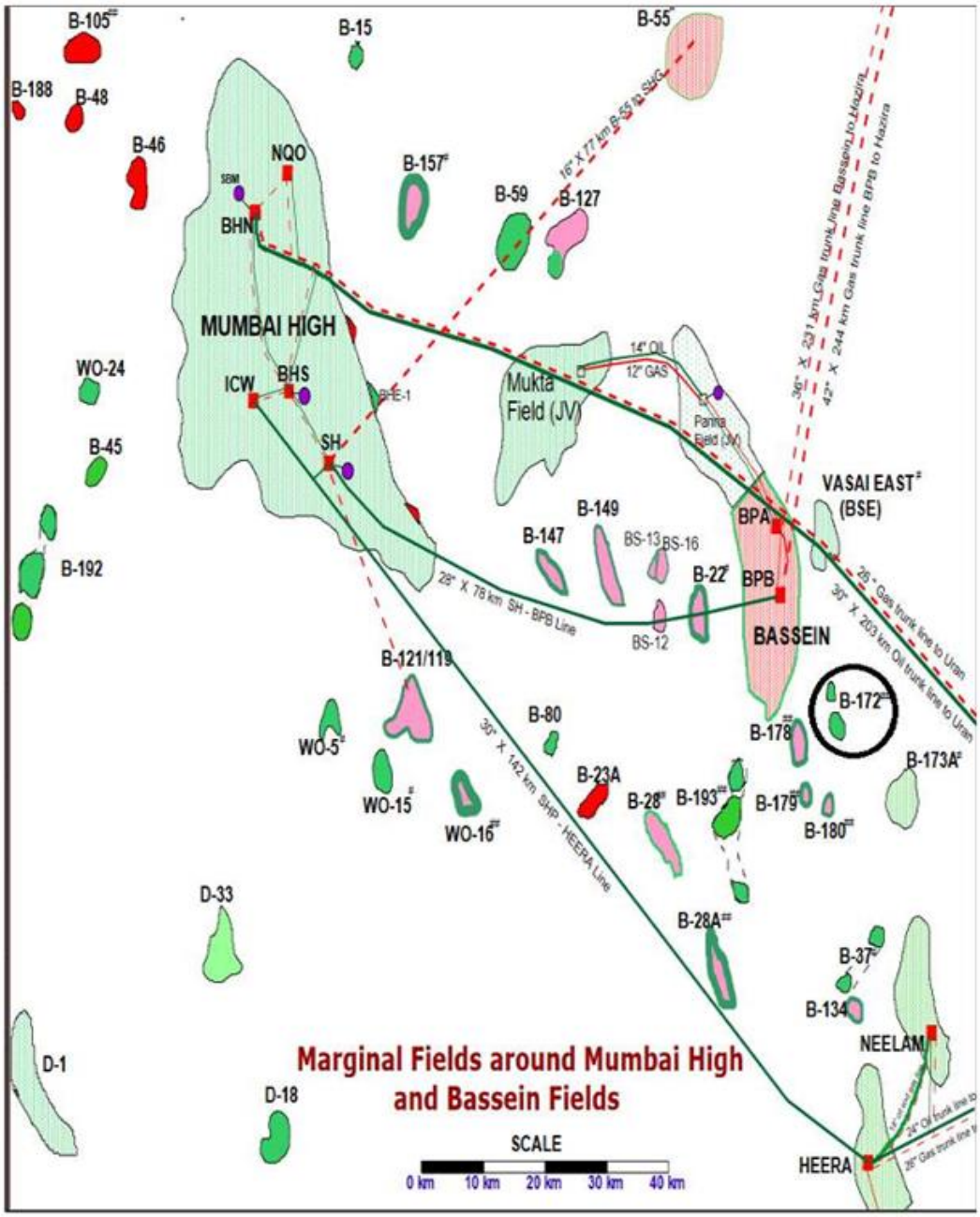


Figure 4-90:. Surrounding oil and gas fields:



4.9.1 Drilling and well completion

Key information of drilled wells have been collated and presented hereunder. The adjoining figures wherever shown illustrate the Well Construction Diagram (**Figure 4-91**) and the Litho-column (**Figure 4-92**) Information for key wells. Other well statics like kelly bush reference depth, water depth, drilled and logged depth including well coordinates are made available in Sections through various cross-references.

Figure 4-91:Well profile of B-172-9 :

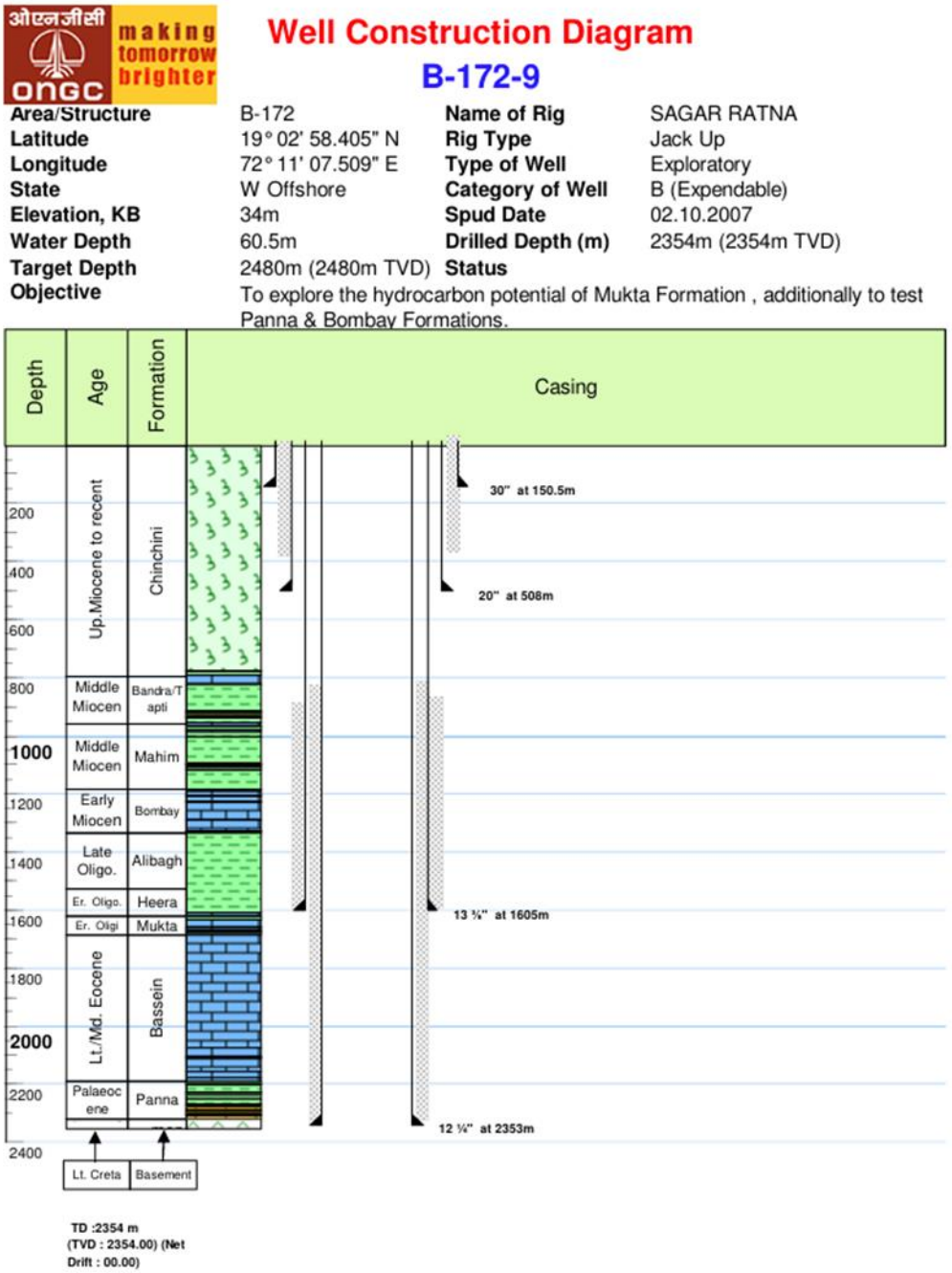
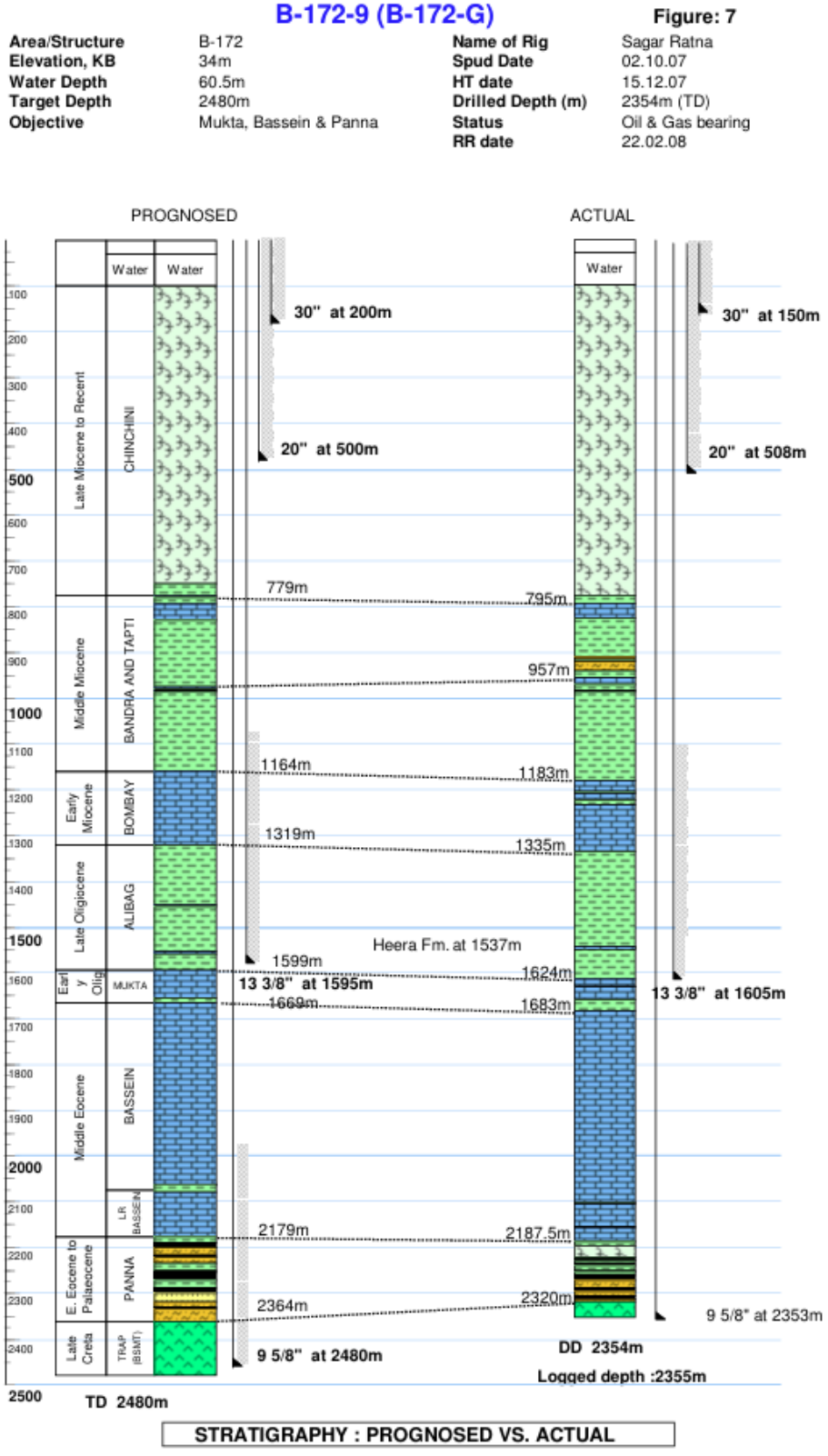


Figure 4-92:.Litho section of B-172-9 (Actual vs. Prognosed) :



4.9.2 Well logging and formation evaluation

The well logs of all discovery wells along with some key wells in the contract area have been reviewed. The logs recorded in various open-hole sections along with cased-hole logs and information of conventional and other wireline formation test data are presented in this docket. The availability of key input reports like Well Completion Reports (WCR) and Formation Evaluation Report(FER) have been checked and information given. Reservoir parameters of interesting zones and results of the tested zone(s) have been included in this report. Log motifs of tested/ interesting zone of key wells are also appended.

A| Well completion and log evaluation reports availability (B-172-9) :

WCR/ FER availability	Spud date	KB	Drilled depth
Both available	2.10.2007	34.0 m	2354 m

Logs recorded, their evaluation and initial testing details in B-172-9 are given in **Table 4-80 and Table 4-83.**

B| Well logs acquired (B-172-9) :

Table 4-80: Log recorded in B172-9:

Drill hole size (inch) and well logs recorded
17.5 | SWC Remarks: 25 depth points. Attempted: 25, Recovered:17 (Misfired:4, Lost:1, Empty:3)
DLL-MLL-ZDL-CN-DAL-GR-CAL-SP (Grand slam) (1612 -485) Remarks: BHT=172°F
12.25 | CBL-VDL-GR-CCL (2326-1053) Remarks: CCL data quality not satisfactory
RCI Sampling Remarks: Collected 1 sample at2244.5m
SWC Remarks: 2 runs of 25 depth points each. Attempted 25 and rec. 03 nos in 1st run; attempted 25 and rec. 18 nos. in 2nd run
RCI Remarks: While attempting to go below2200m tight pull at2188m was obsd
RCI Sampling Remarks: 2 samples collected at1685.5m and 1689m
RCI Pressure test Remarks: Attempted 75 depth points; observed held up below2200m12 ¼"
VSP (Zero off-set) (2345- 700) Remarks: Every 10m interval; check shots at 1000m, 1500m and 2000m
CBL-VDL-GR (1630-1185)
DLL-MLL-ZDL-CN-DAL-GR-CAL-SP (Grand slam) (2355-2150) Remarks: Final logging, BHT=216°F

DLL-MLL-ZDL-CN-DAL-GR-CAL-SP (Grand slam) (2241.5-1595) Remarks: Intermediate logging; BHT=212°F

CBL/ VDL ANALYSIS:-

Total four objects have been identified for production testing. Three objects are in Panna, Mukta and Heera (9 5/8"casing) and one is in Bombay formation (13 3/8" casing). Cementation job was carried out, the CBL/ VDL log is recorded in the interval 1200 -1625m and 1053-2300m. In the bottom interval log is recorded at 0 as well as 700 PSI.

The quality of cement is satisfactory and little improvement shown in pressurized pass. Cementation against the object-I ((2245.5-2243.5m) in Panna formation seems to be good in pressurized pass and properly isolated form upper zone.

Object II (1660-1636m) CBL- VDL quality seems to be satisfactory

Object III (1623-1614 m) CBL- VDL quality seems to be satisfactory

Object IV (1210.5-1207.5m) is in double casing and bond seems to be satisfactory in 13 3/8".

Stratigraphy and Stratigraphic Correlation

Stratigraphic sequences of information B172-9 and its correlation with nearby wells are given in **Table 4-81 , Table 4-82 and Figure 4-93.**

Table 4-81: Stratigraphic sequences information of B172-9 :

The stratigraphic sequence encountered in this well has been tabulated below.

Age	Formation	Interval (m) (K.B = 34.0m)	Thickness (m)	Gross Lithology
Upper Miocene to Recent	Chinchini	Sea bed -795 (Seabed -761)	701	Clay, Claystone with minor shale at bottom
Mid. Miocene	Bandra and Tapti	795-957 (761-963)	162	Predominantly shale with minor claystone and thin limestone streaks
Mid. Miocene	Mahim	957-1183 (761-1149)	226	Predominantly shale with thin limestone streaks
Lower Miocene	Bombay	1183-1335 (1149-1301)	152	Predominantly limestone with shale bands
Upper Oligocene	Alibag	1335-1537 (1301-1503)	202	Predominantly shale with minor limestone and siltstone.
Lower Oligocene	Heera	1537-1624 (1503-1590)	87	Predominantly shale with thin limestone bands.
	Mukta	1624-1683 (1590-1649)	59	Predominantly limestone with thin shale alterations
Lower to Mid. Eocene	Bassein	1683-2187.5 (1649-2153.5)	504.5	Predominantly limestone with minor shale
Palaeocene	Panna	2187.5-2320 (2153.5-2286)	132.5	Predominantly shale with occassional siltstone , sandstone and coal bands
Lower Cretaceous	Basement	2320-2354 + (2286-2320+)	34+	Basalt / weathered basalt

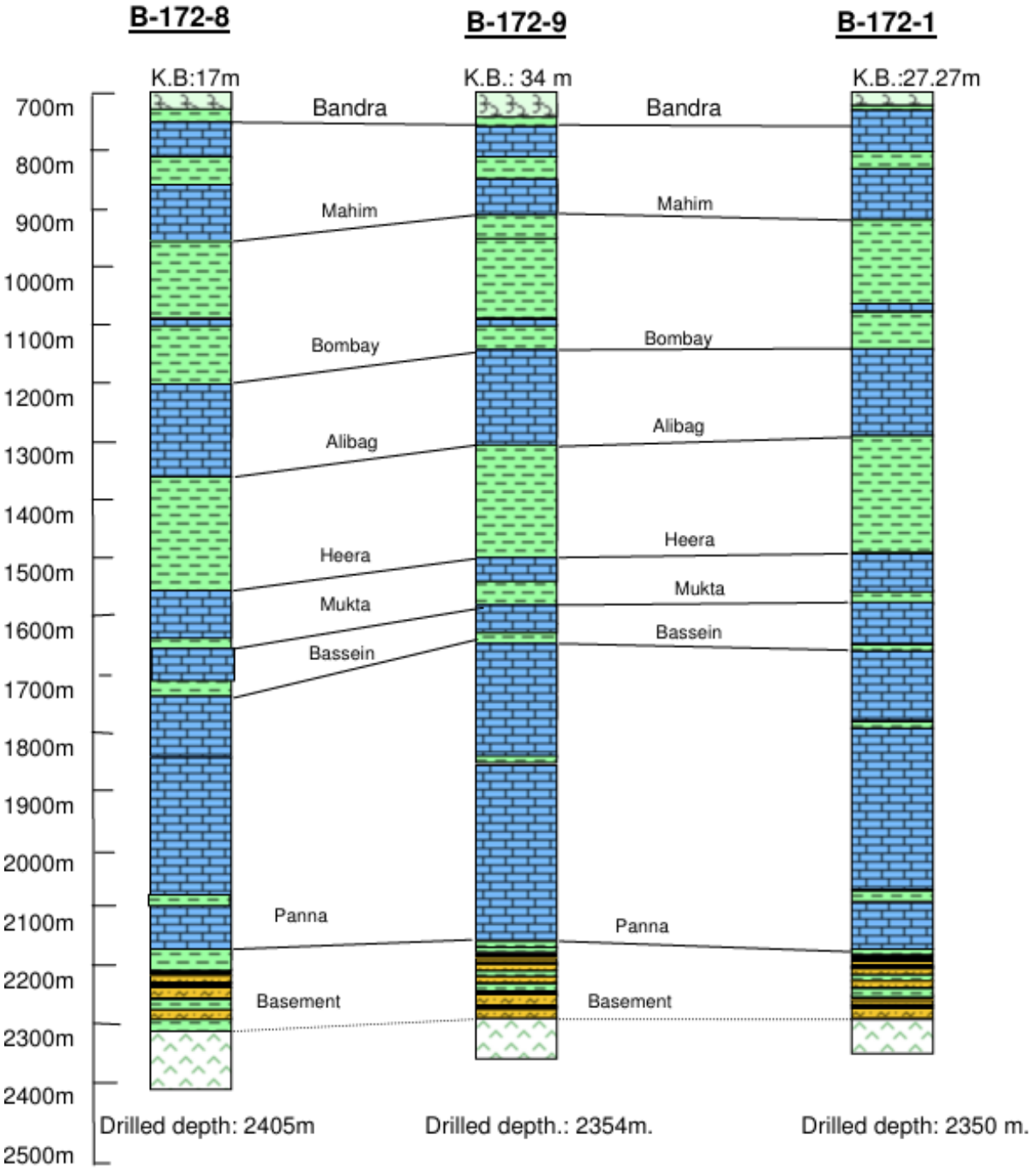
(Depths within brackets are MSL depths)

Table 4-82: Stratigraphic sequences information of B172-9 :

AGE		MARKER	FORMATION	DEPTH TO FORMATION TOP				
				B-172-9 (K.B.:34 m)		B-172-7	B-172-8	B-172-1
				PROGN-OSED (msl)	ACTUAL	KB:15m	KB : 17m	KB: 27.27m
Pliocene to Recent		-	Chinchini	-	SEABED	SEABED	SEABED	SEABED
Miocene	Late							
	Middle	H1A	Bandra & Tapti	745	795 (761)	797 (782)	773 (756)	756 (728.73)
	Early	H1C	Mahim	-	957(923)	-	975 (958)	947 (919.73)
		H2B	Bombay	1130	1183 (1149)	1171 (1156)	1219 (1202)	1169 (1141.73)
Oligocene	Late	H3CGG	Alibag	1285	1335 (1301)	1286 (1271)	1372 (1355)	1320 (1292.73)
	Early	H3G	Heera	-	1537 (1503)		1566 (1549)	1521 (1493.73)
		H3A	Mukta	1565	1624 (1590)	1591 (1576)	1685 (1668)	1610 (1582.73)
Eocene	Middle	H3B	Bassein	1635	1683 (1649)	1664 (1649)	1751 (1734)	1682 (1655.73)
	Early	H4	Panna	2145	2187.5 (2153.5)	2144 (2129)	2196 (2179)	2203 (2175.73)
Pale0 - cene	Late							
	Early							
Late Cretaceous		H5	Basement	2330	2320 (2286)	Not drilled	2365 (2348)	2318 (2290.73)
-		-	-	2480	Drilled Depth: 2354 (2320)	Drilled Depth: 2862 (2261 tvdss)	Drilled Depth: 2405 (2388)	Drilled Depth: 2350 (2322.73)

(Figures within brackets are MSL depths)

Figure 4-93:. Stratigraphic Correlation of B172-9 with nearby wells:



C| Well log evaluation and initial test results (B-172-9):

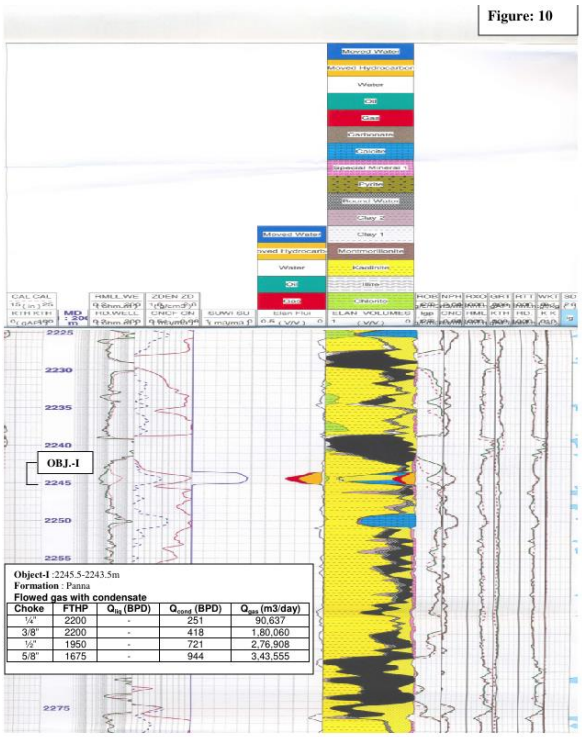
Log evaluation results of B-172-9 are given in **Table 4-83**.

Table 4-83: Log Evaluation and Initial Testing results of B-172-9

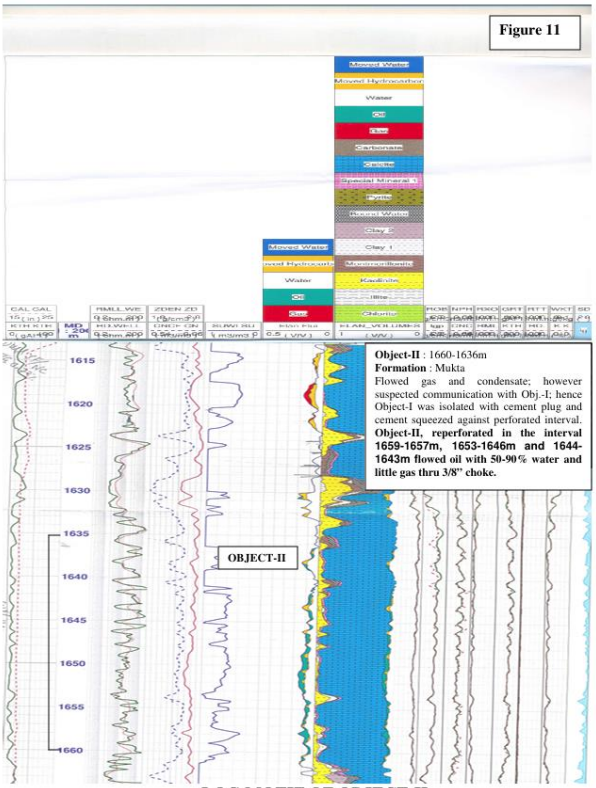
Interval (mMDRT/mTVDSS)	Formation (+ Zone, if specified)	Gross(m)	Net(m)	Phi	Sw
1183-1335 / 1149-1301	Bombay/Lower Miocene (1207.5-1210.5 mMDRT)	3	1.5	0.20-0.28	0.6
	Initial testing results: Object-IV: 1210.5-1207.5m Flowed little oil and gas with 70-80% water through ¼" and ½" choke.				
1537-1624 / 1503-1590	Heera/ Lower Oligocene (1614-1623 mMDRT)	9.0	3.0	0.12--0.2	0.4-0.6
	Initial testing results: Object III: 1623-1614m Flowed cushion diesel followed by water, feeble gas and liquid hydrocarbon with API gravity 49.3. Water shut off job was done by squeezing cement against Obj.-III interval and Object-III was reperforated in the interval 1623 -1620.5m, 1620-1617m, 1615-1614m. Reperforated Object-III flowed gas @ 222025 m3/day and condensate with 20-30% water through 5/8" choke.				
1624-1683 / 1590-1649	Mukta/ Lower Oligocene (1636-1660 mMDRT)	24.0	20.5	0.2	0.4-0.7
	Initial testing results: Object-II: 1660-1636m Flowed gas and condensate; however suspected communication with Obj.-I; hence Object-I was isolated with cement plug and cement squeezed against perforated interval. Object-II, reperforated in the interval1659-1657m, 1653-1646m and 1644-1643m flowed oil with 50-90% water and little gas thru 3/8" choke.				
2187.5-2320 / 2153.5-2286	Panna (2243.5-2245.5 mMDRT)	2.0	2.0	0.12-0.25	0.4-0.76
	Initial testing results: Object-I tested in the interval 2243.5-2245.5m and flowed gas with condensate. Flowed gas @ 3,43,555 m3/day and condensate @ 944 bpd through 5/8" choke.				

Log motifs for B-172-9 are placed at **Figure 4-94 and Figure 4-95.**

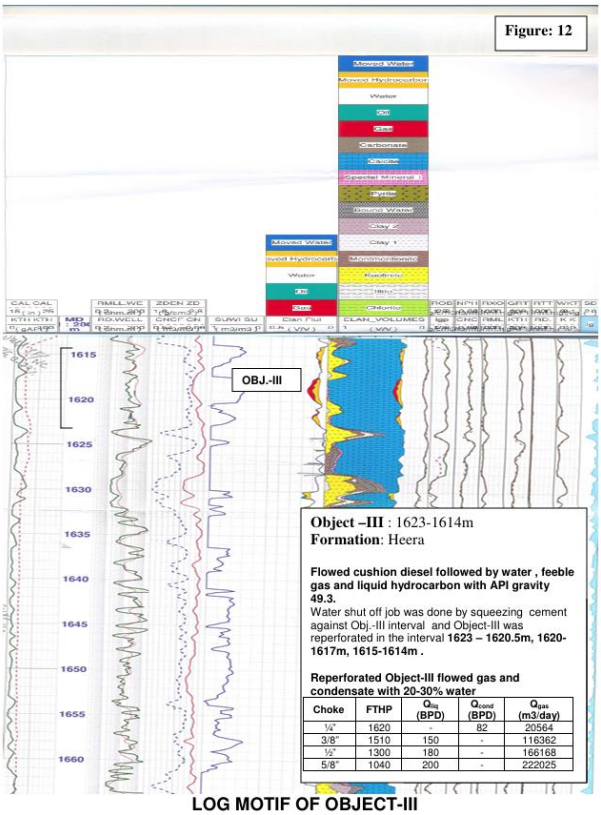
Figure 4-94:Well log motif of B-172-9 tested Objects I, II, III and IV:



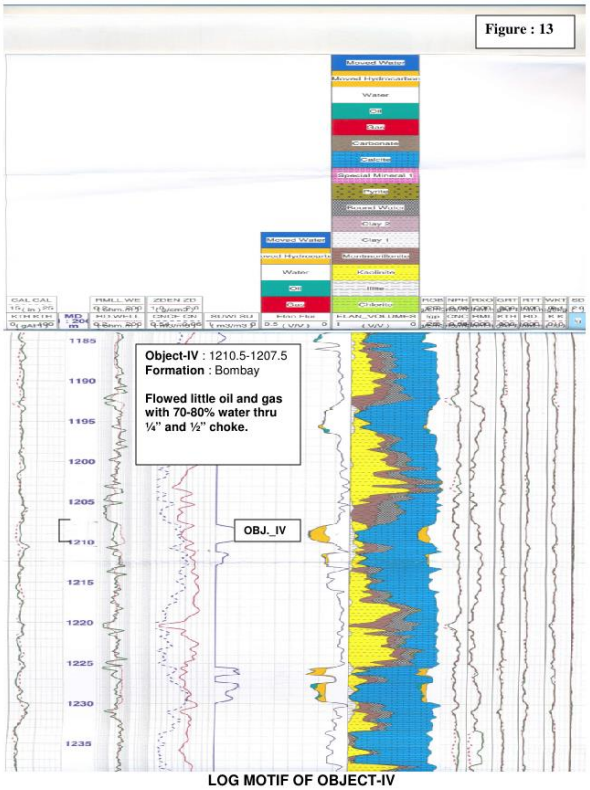
LOG MOTIF OF OBJECT-I



LOG MOTIF OF OBJECT-II

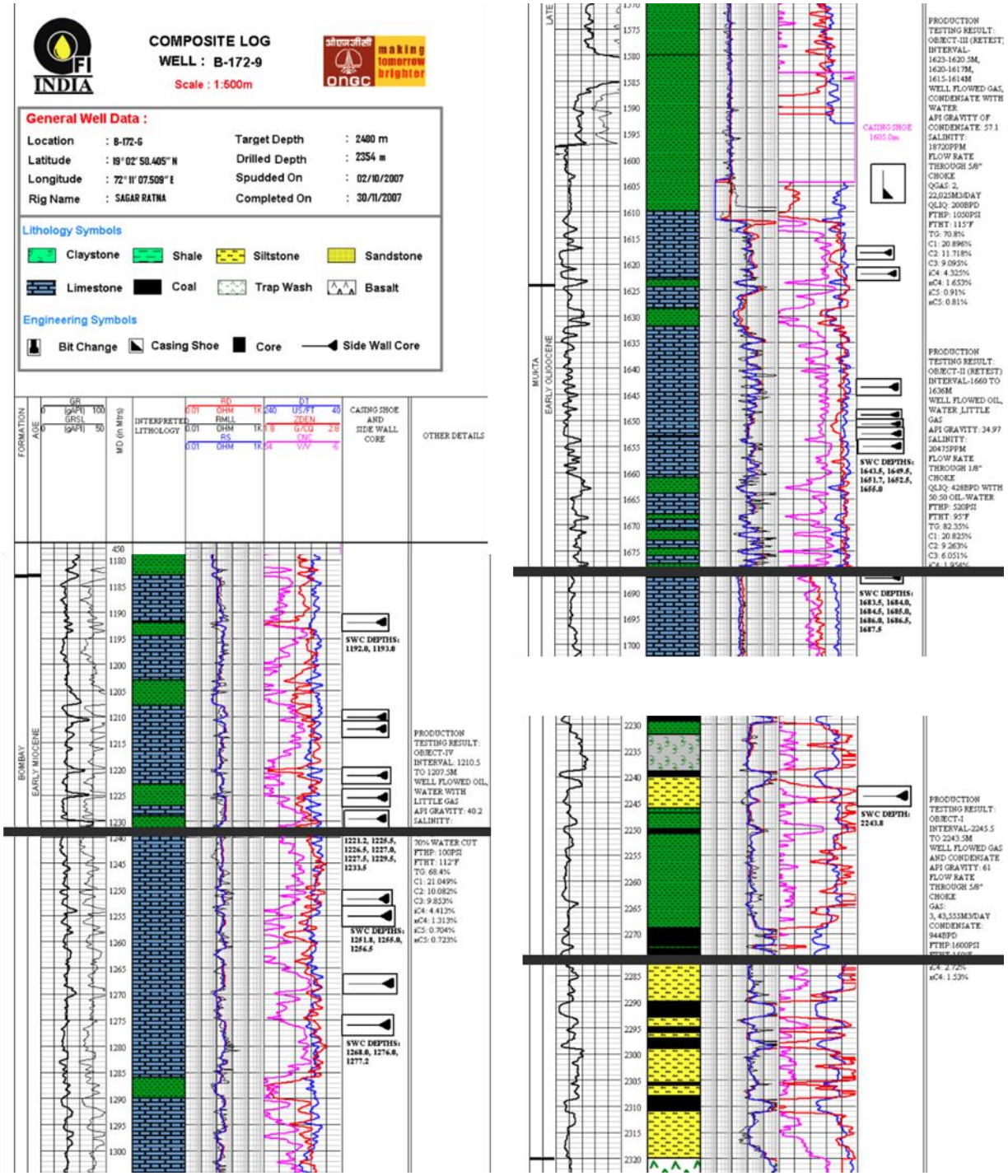


LOG MOTIF OF OBJECT-III



LOG MOTIF OF OBJECT-IV

Figure 4-95:Well log motif of B-172-9 tested Objects I, II, III and IV:



4.9.3 Well testing and workover history

Four objects were tested in the well, details given in **Table 4-84**.

Object–I in the interval 2245–2243.5m in Panna Formation flowed gas @ 276908m3/d with 721 bpd condensate through ½" choke.

Object – II in the interval 1660m-1636m in Mukta Formation flowed oil with 50-90% water and little gas.

Object -III in the interval 1623-1614 m in Heera Formation flowed water, feeble gas and oil with API gravity 49.3. Water shut off job was done by squeezing cement against Obj.-III interval and Object-III was re-perforated in the interval 1623 – 1620.5m, 1620-1617m, 1615-1614m.

Object –III flowed gas and condensate with 20-30% water.

It is interpreted that the reservoir development has gas overlying thin oil rim which also has bottom water. Thus, this system is a different system hydrodynamically separate from the main Mukta zone tested as object-II.

Object –IV in Bombay Formation in the interval 1210.5-1207.5 m flowed little oil and gas with 70-80% water. This is similar to the results of equivalent zones in the area.

Table 4-84: Testing details of B-172-9:

Object/interval (m)	Choke size	FTHP	Q gas m3 /d	Q cond BPD	Q liq BPD	API	Remarks
Object-I Panna (2245.5-2243.5m)	¼ "	2200	90,637	251	-		Flowed gas with condensate.
	3/8"	2200	1,80,060	418	-		
	½ "	1950	2,76,908	721	-		
	5/8"	1675	3,43,555	944	-		
Object-II Mukta (1660-1636m)	½ "	1450	2,06,740	583.2	-		Communication with Obj.-I. B /Plug dislocated**.** Placed a cmt. plug to isolate Obj.-I and carried out retesting of Obj**.-**II.
Object-II Mukta Reperforated. (1659-1657, 1653-1646, 1644-1643m)	½ "			Feeble gas			Object-II Retest (Before acid job)
	3/8"	550		**Well flowed oil with 50-90% water cut and little gas**			After acid job
Object-III Heera (1623-1614 m)	½ "	70		Well knocked out diesel with water & gas.			Water shut off job c/o and reperforated Object-III
Object-III, Heera Reperforated (1623-1620.5, 1620-1617, 1615-1614m)	½ "	0		Well flowed feeble gas with cushion diesel			Before acid job
	¼ "	1620	20,564	82		65-57	Acid job was done to improve influx. Well flowed Water (content varying from 20-30%), condensate & gas
	3/8"	1510	1,16,362	-	150	57.1	
	½ "	1300	1,66,168	-	180	57.1	
	5/8"	1040	2,22,025	-	200	57.1	
						57.1	
Obj-IV	½ "	180-				282	Well flowed with little oil and

Bombay (1210.5-1207.5m)		200				w/c:40%	gas with 40-50% w/c. Salinity 18,135ppm
	¼"	100				580 w/c:70%	Well flowed with little oil and gas with 70-80% w/c.. Salinity 18,135ppm

4.9.4 Reservoir engineering studies and analysis

Key reservoir engineering datasets, wherever available have been collated and presented under various data genres. In a comprehensive data presentation, the results are included from well tests, formation dynamics tests, reservoir pressure build-up study and PVT data/ results.

Formation dynamics tests (B-172-9

RCI/MDT Pressure Data

RCI pressure tests were carried out in 12 ¼" hole and pressure tests could not be done beyond 2200m due to repeated held up of tool. RCI samples were collected, details given below in **Table 4-85**.

Table 4-85: Fluid Sample Results for B-172-9

Sl No	Depth	Nature of Fluid Quantity (Approx)	Fluid Resistivity at Temp / salinity (ppm as NaCl)	Mud Filtrate resistivity At temp/ Salinity of (ppm as NaCl)
1	1685.5	Water500ml with Oil 100ml	0.325**(ohm m)** at 83°F /14625ppn	0.27**(ohm m)** 20945ppm
2	1689	Water850ml with traces of oil	0.325**(ohm m)** at 83°F /14625ppn	0.27**(ohm m)** 20945ppm

Pressure tests are attempted at Heera, Mukta and Bassein formation, majority of the success full test are against the Bassein in the interval 1680 – 1740m.

Total 99 pressure tests and 2 samples have been carried out in the interval 1600 -1720m covering Heera Mukta and Bassein formation to know the type of fluid.

In Heera formation, total 17 pressure tests were attempted in interval 1614-1622 m. Few of the pressure tests were supercharged and some are repeat test, and some tests read low pressure due to poor stabilization, only 9 tests were good.

In Mukta formation, a total of 31 pressure tests were attempted in interval 1625-1660m. Few of the pressure tests were supercharged and some tests read low pressure due to poor stabilization, only 9 tests were successful.

Against Heera and Mukta formation (In both the section 12 ¼") pressure data is not useable.

In Bassein formation, 37 tests were successful whereas 14 were not successful pressure tests.

Two samples collected at depth 1685.5 and 1689 m, Recovered water (500ml) with oil (100ml) and water (850ml) with traces of oil respectively. The Salinity of water is 20945 ppm as Nacl.

The MDT result indicates in Bassein reservoir quality is good, pressure test result and log interpretation all are in agreement.

MDT Pressure data in and pressure build-up study in B-172-9 are tabulated **in Table 4-86 and Table 4-87.** Oil and gas composition of fluid from B-172-9 are given in **Table 4-88, Table 4-89 and Table 4-90.**

Table 4-86: MDT Pressure data in 12 ¼" hole of B-172-9

Sl No	Depth (m)	Hydrostatic Pressure (psi)	Formation Pressure (psi)	Drawdown Mobility (md/cp)	Remarks
1	1614.0	2999.86	2999.28	5985	No Seal
2	1614.6	3000.58	2181.43	12.15	Good Test
3	1614.6	3000.58	2181.43	14.48	Repeat Test
4	1615.1	2999.63	2181.73	16.47	Good Test
5	1615.1	2999.63	2181.63	16.89	Repeat Test
6	1615.5	3000.23	2182.13	17.90	Good Test
7	1615.5	3000.23	2182.13	16.84	Repeat Test
8	1617	3003.07	0.00	501.9	Tight Test
9	1617.5	3003.07	0.00	198.1	Tight Test
10	1618	3003.82	2121.60	19.57	Good Test
11	1618	3003.82	2120.59	13.46	Repeat Test
12	1618.6	3003.61	2124.69	23.22	Good Test
13	1618.6	3003.61	2123.82	14.37	Repeat Test
14	1619	3004.03	2127.95	11.78	Good Test
15	1619.4	3003.96	2126.72	15.77	Good Test
16	1621.5	3007.33	0.00	413.2	Tight Test
17	1622.0	3008.39	0.00	123.6	Tight Test
18	1627	3016.75	0.00	112.1	Tight Test
19	1638.0	3037.10	0.00	N/A	Tight Test
20	1642.0	3044.41	0.00	9.514	-
21	1642.7	3044.43	0.00	320.4	Tight Test
22	1643.3	3046.10	0.00	11.00	-
23	1643.8	3046.25	0.00	230.2	Tight Test
24	1646.0	3049.96	N/A	N/A	-
25	1647.0	3051.04	0.00	73.33	Tight Test
26	1648.5	3050.23	0.00	166.2	Tight Test
27	1648.8	3054.18	0.00	7.716	-
28	1649.5	3054.10	0.00	59.94	Good Test
29	1649.8	3054.29	2227.37	4.542	
30	1650.6	3054.76	2217.02	12.73	
31	1650.8	3054.48	2221.28	13.67	Good Test
32	1651.0	3053.51	2216.53	10.75	Good Test
33	1651.2	3052.62	2213.14	12.17	Good Test
34	1651.6	3053.04	2212.11	10.89	Good Test
35	1651.8	3052.32	2212.57	12.77	Good Test
36	1651.8	3052.32	2213.59	7.392	Repeat Test
37	1652.0	3052.07	2217.01	11.78	Good Test
38	1652.5	3053.21	0.00	105.6	Still Building
39	1654.6	3056.68	0.00	270.3	Tight Test
40	1655.0	3057.62	0.00	181.2	Tight Test
41	1655.5	3058.13	0.00	324.9	Tight Test

42	1656.0	3058.81	0.00	238.6	Tight Test
43	1656.4	3059.10	0.00	479.4	Tight Test
44	1656.7	3059.40	0.00	63.89	Still Building
45	1656.8	3058.20	0.00	102.2	Still Building
46	1657.5	3058.80	0.0	3.760	Still Building
47	1658.5	3059.49	2486.96	8.430	Good Test
48	1660.3	3062.79	0.0	95.55	Tight Test
49	1683.6	3106.48	2099.82	4.670	Good Test
50	1683.6	3106.48	2099.24	5.107	Repeat Test
51	1684.5	3104.21	2099.05	5.928	Good Test
52	1684.5	3104.21	2098.81	8.827	Repeat Test
53	1685	3104.34	2097.73	3.028	Good Test
54	1685	3104.34	2097.53	3.073	Repeat Test
55	1685.5	3103.86	2098.38	5.067	Good Test
56	1685.5	3103.86	2097.90	6.378	Repeat Test
57	1686	3099.14	2095.34	36.19	Good Test
58	1687.5	3101.65	2098.31	39.07	Good Test
59	1688	3101.72	2104.23	54.91	Good Test
60	1688.5	3102.11	0.0	18.11	Lost Seal
61	1689	3102.11	2101.03	43.93	Good Test
62	1689.5	3103.36	0.0	-	Tight Test
63	1690	3103.90	2101.65	32.86	Good Test
64	1691.2	3105.63	2104.35	55.98	Good Test
65	1692.5	3107.88	0.0	98.71	Tight Test
66	1693.3	3108.83	2105.83	29.75	Good Test
67	1694.3	3110.09	2106.13	33.55	Good Test
68	1694.9	3110.63	2107.73	83.30	Good Test
69	1695.5	3111.64	0.0	314.9	Still Building
70	1696.0	3110.95	0.0		Tight Test
71	1697.2	3113.16	2111.44	73.77	Good Test
72	1698.2	3114.36	0.0		Tight Test
73	1699.2	3116.13	2114.38	79.51	Good Test
74	1700.0	3117.47	2116.56	57.75	Good Test
75	1703.0	3122.21	2119.95	56.15	Good Test
76	1703.0	3122.21	2119.75	42.48	Repeat Test
77	1704.2	3124.18	0.0	198.2	Tight Test
78	1705.5	3126.35	0.0		Tight Test
79	1707.7	3129.94	2125.89	61.12	Good Test
80	1707.7	3129.94	2125.96	39.07	Repeat Test
81	1708.0	3130.42	2126.84	64.49	Good Test
82	1708.0	3130.42	2126.47	33.33	Repeat Test
83	1709.0	3131.77	2126.97	52.10	Good Test
84	1710.8	3134.55	0.0		Tight Test
85	1712.0	3136.09	0.0		Tight Test
86	1713.5	3138.42	0.0		Tight Test
87	1715.5	3141.89	0.0	68.14	Still Building

88	1717.5	3145.00	0.0		Tight Test
89	1718.0	3147.83	2140.62	46.41	Good Test
90	1719.5	3147.82	0.0		Still Building
91	1720.1	3148.19	2147.94	67.07	Good Test
92	1721	3149.60	2146.61	47.06	Good Test
93	1722.0	3151.06	2147.39	48.92	Good Test
94	1724.0	3154.21	2151.18	52.30	Good Test
95	1725.6	3156.88	2166.64	53.82	Good Test
96	1725.6	3157.75	2154.42	49.29	Good Test
97	1727.5	3200.57	2155.44	46.34	Good Test
98	1689.0	3141.58	2195.56	24.88	Good Test
99	1688.1	3138.81	2198.51	27.15	Good Test

Pressure build-up study (B-172-9)

Build up studies were carried out in Objects I, II, and III and result summary is given below. Reservoir study report is available for these analyses

Table 4-87: Pressure build-up study (B-172-9)

Formation: Panna **Object: I** **Interval(m.): 2245.5- 2243.5**	**Formation:** **Mukta/ limestone** **Object: II** **Interval(m.): 1659- 1657, 1653-1646, 1644- 1643**	**Formation: Heera/Limestone** **Object: III** **Interval(m.): 1623- 1620.5, 1620-1617, 1615- 1614**
• Duration of build-up: 16.2 hrs • Pressure*: 3307.16 psi| • Skin: -3.2486 • Pressure differential, skin: -156.7449 psi • Permeability: 101.2289 md • Capacity (kh): 664.0613 mdft • Flow efficiency: 1.7623 %| • Radial investigation: 1147.41 ft • No flow boundary 1: 196.4823 • Wellbore constant: 0.0506 bbl/psi • Average open flow potential (gas): 0.476 MMSCFD.	• Duration of build-up: 35.6 hrs • Pressure*: 2094.011 psi| • Initial pressure: 2261.05 psi • Skin: -2.9778 • Pressure differential, skin: -28.9975 psi • Permeability: 63.2782 md • Capacity (kh): 4982.522 mdft • Productivity index: 2261.049 bbl/day/psi • Flow efficiency: 1.5683 %| • Radial investigation: 857.4213 ft • No flow boundary 1: 830.1811 • Wellbore constant: 0.0457 bbl/psi.	• Duration of build-up: 37 hrs • Pressure*: 1934.093 psi • Initial pressure: 2073.324 psi • Skin: 2.0746 • Pressure differential, skin: 77.8638 psi • Permeability: 2.5345 md • Capacity (kh): 74.8252 mdft • Radial investigation: 284.2287 ft • No flow boundary 1: 21.81659 • Wellbore constant: 0.004 bbl/psi • **Average open flow potential (gas): 0.410237 MMSCFD.**

Figure 4-96: MDT data plots for B-172-9

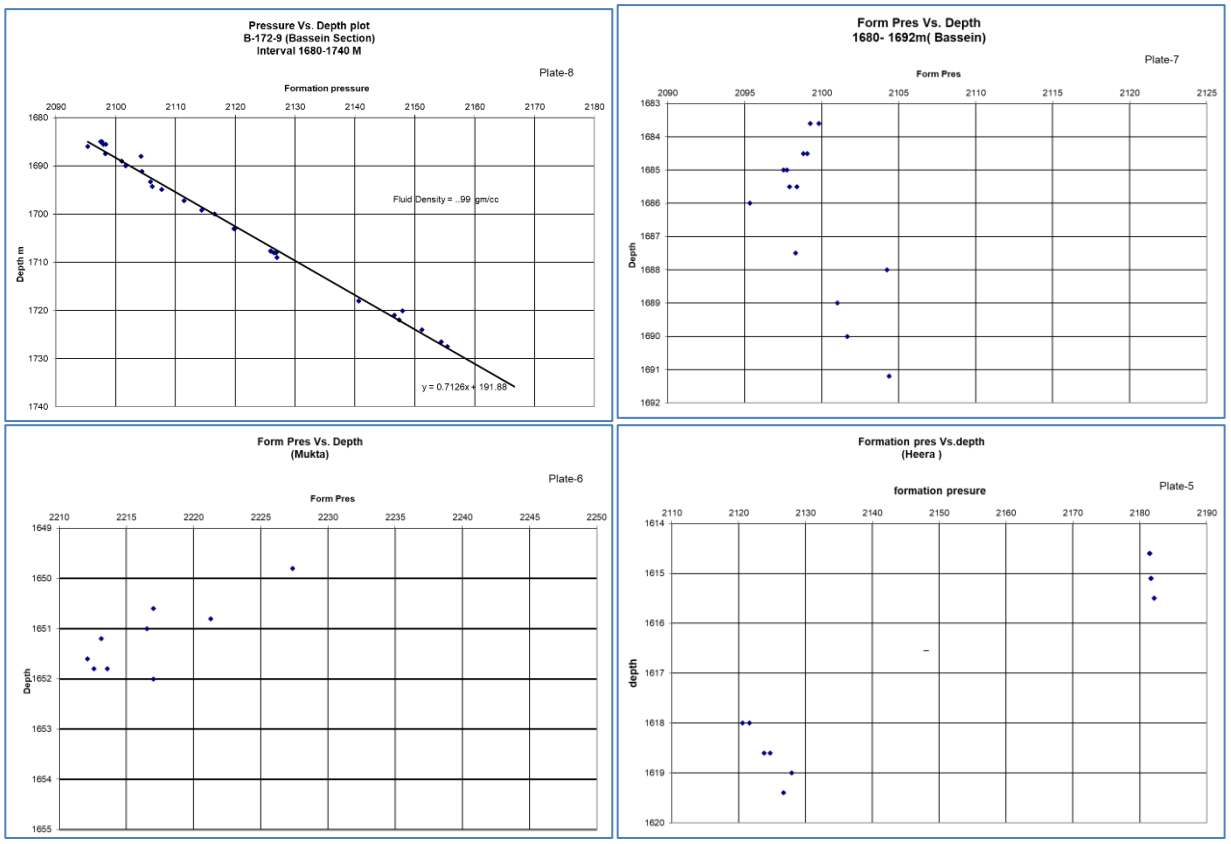


Figure 4-97:Pressure and Temperature profile B-172-9:

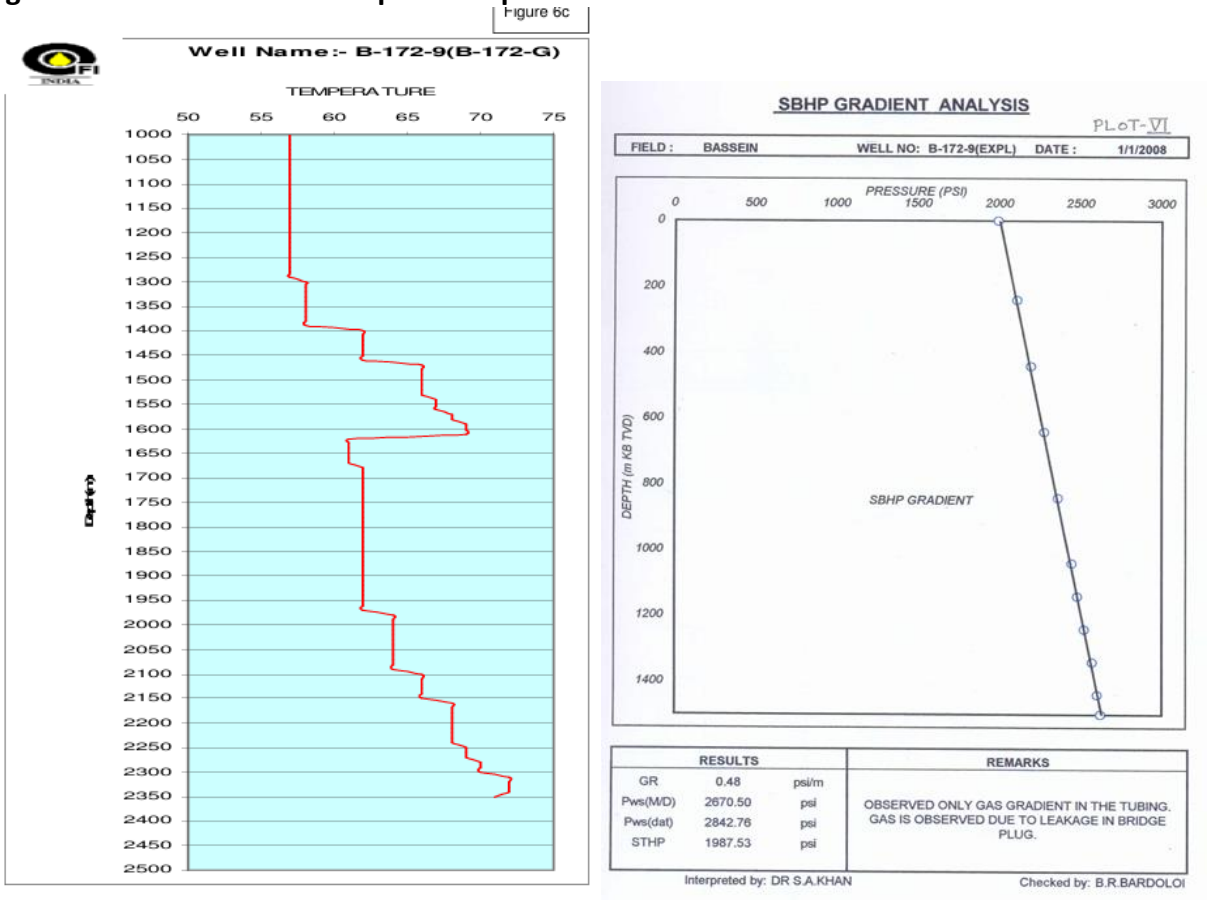
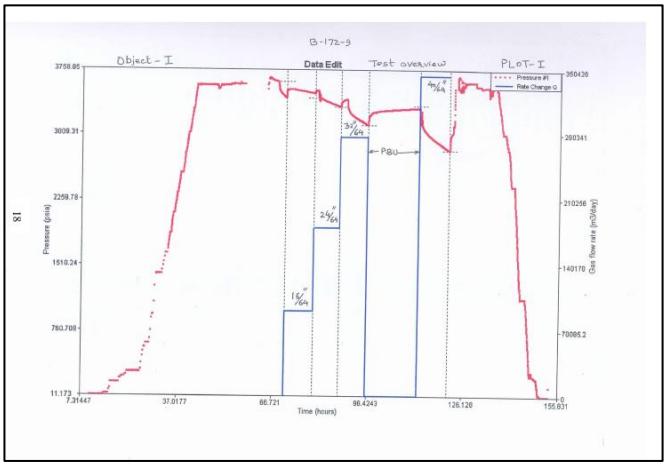
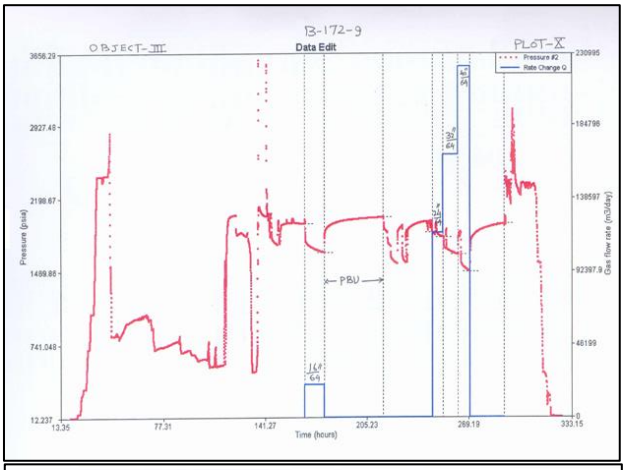
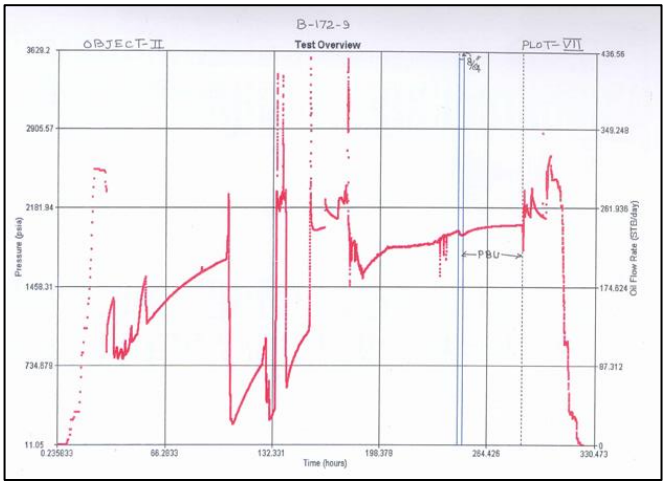
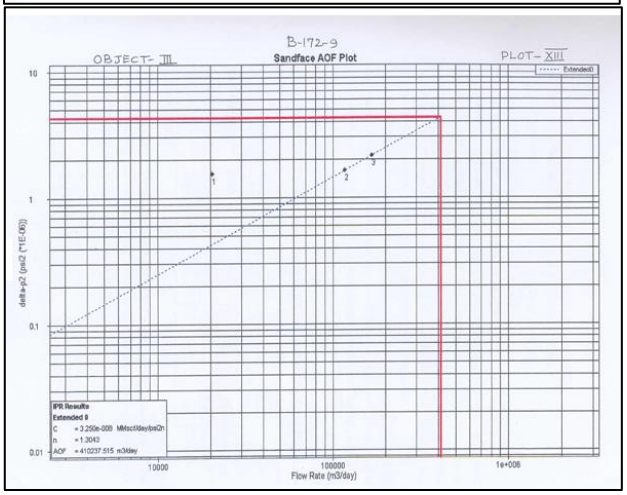


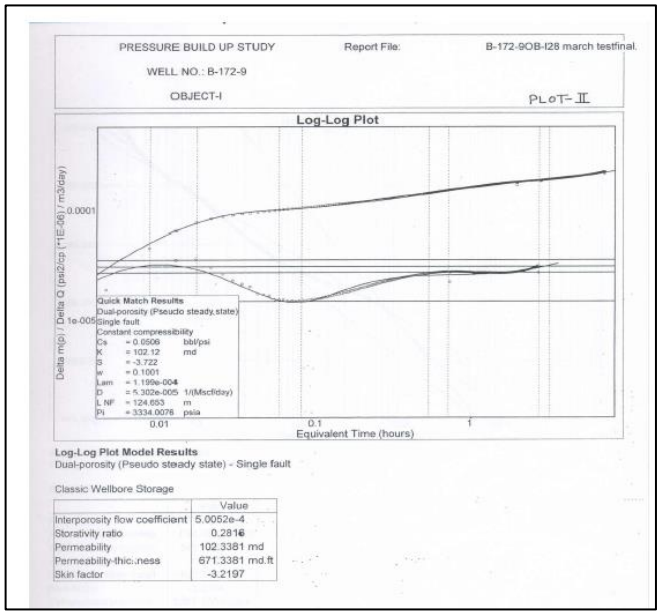
Figure 4-98:Plots for testing and its analysis:



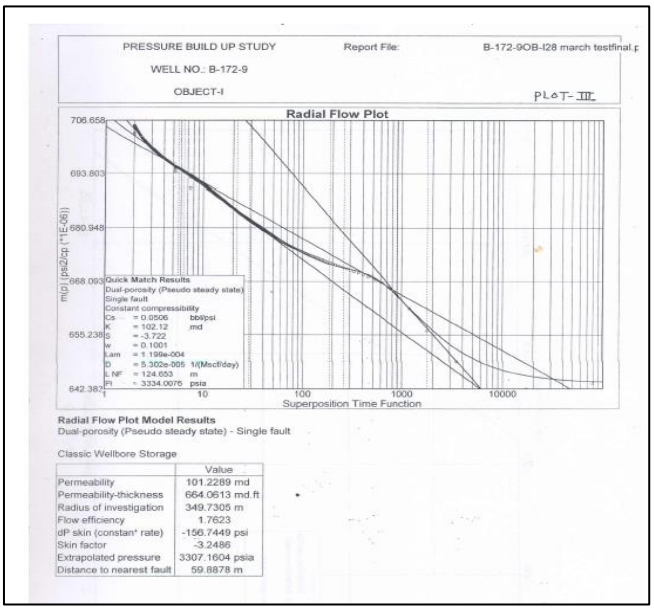








	Value
Interporosity flow coefficient	5.0052e-4
Storativity ratio	0.2816
Permeability	102.3381 md
Permeability-thickness	671.3381 md.ft
Skin factor	-3.2197



	Value
Permeability	101.2289 md
Permeability-thickness	664.0613 md.ft
Radius of investigation	349.7305 m
Flow efficiency	1.7623
dP skin (constant* rate)	-156.7449 psi
Skin factor	-3.2486
Extrapolated pressure	3307.1604 psia
Distance to nearest fault	59.8878 m

Oil composition analysis (B-172-9)

Following table tabulates the results of oil composition analysis.

Table 4-88: Oil composition analysis (B-172-9)

Characteristics of the Crude Oil of B-172-9			
Formation:	**Panna**	**Mukta/ limestone**	**Heera/Limestone**
Object:	**Object: I**	**Object: II**	**Object: III**
Interval(m.):	**2245.5- 2243.5**	**1659- 1657, 1653- 1646, 1644- 1643**	**1623- 1620.5, 1620-1617, 1615- 1614**
Sample No.:	**Sample No.: 612/OT**	**Sample No.: 551/OT**	**Sample No.: 594/OT**
Density at 15 degC, gm/ml	0.725	0.815	0.814
Sp.Gr. at 60 degF	0.7389	0.8269	0.826
API at 60 degF	60.03	39.62	39.82
Kinematic viscosity: at 37.8 DegC (cSt)	0.713	3.04	2.2
Water content: %vol	nil	0.5	nil
Asphaltene: %wt	0.016	0.024	0.03
Resin: %wt	0.32	6.16	1.6
Wax: %wt	1	14.8	4.5
Pour point: DegC.	<0	33	<0

Gas composition analysis (B-172-9)

Following two tables tabulates the results of analysis of all the gas samples taken from B-172-9.

Table 4-89: Gas composition analysis (B-172-9 Object-II)

Gas Analysis: B-172-9		
Formation	**Mukta Lst.**	**Mukta Lst.**
Object	**II**	**II**
Type	**Production Testing- choke manifold**	**Production Testing- choke manifold|**
Interval(m.)	**1600- 1636**	**1600- 1636**
Sample No.	**623/OT**	**626/OT**
Choke (1/64 inch)	24 inch.	40 inch.
C1	5.27%	38.59%
C2	5.54%	5.55%
C3	24.95%	7.71%
iC4	15.29%	2.32%
nC4	13.79%	1.77%
iC5	7.91%	0.68%
nC5	5.17%	0.41%
C6+	1.64%	0.08%

Carbon-dioxide	20.15%	42.15%
Nitrogen	0.31%	0.76%
Sp.Gr.	1.7699	1.1537
Mol wt	50.21%	
Net calorific value	19537.3 Kcal/m3	7042.99 Kcal/m3
Remarks	As these samples contains low methane & High CO2 concentration, the same may not be representative..	As these samples contains low methane & High CO2 concentration, the same may not be representative..

Table 4-90: Gas composition analysis (B-172-9 Object-I toIV)

B-172-9 Object-I															
Sample No.	**Type**	**Source**	**Date**	**Total Gas (%)**	**C1 (%)**	**C2 (%)**	**C3 (%)**	**iC4 (%)**	**nC4 (%)**	**iC5 (%)**	**nC5 (%)**	**API Gravity**	**FTHP, psi**	**FTHT, DegF**	**Salinity ppm**
1	Gas	¼" Choke (separator)	22.12.07	60.12	12.12	5.21	7.01	1.21							
2	Gas	Flowline (½" Choke)	22.12.07	81.14	16.97	7.02	7.35	2.72	1.4						
3	Gas	Flowline (3/8" choke)	22.12.07	81.27	17.26	7.29	6.97	2.68	1.52						
4	Gas	5/8" Choke (Flowline)	24.12.07	86.01	19.31	8.01	7.1	2.72	1.53						
1	Gas	Production Testing-choke manifold 16/64"	24.12.2007	60.12	12.2	5.21	7.01	1.21	–			62.6			
2	Gas	Production Testing-choke manifold 24/64"	24.12.2007	81.27	17.26	7.29	6.97	2.68	1.52			60.9			
3	Gas	Production Testing-choke manifold 32/64"	24.12.2007	81.27	17.26	7.29	6.97	2.68	1.52			61			
B-172-9 Object-II															
Sample No.	**Type**	**Source**	**Date**	**Total Gas (%)**	**C1 (%)**	**C2 (%)**	**C3 (%)**	**iC4 (%)**	**nC4 (%)**	**iC5 (%)**	**nC5 (%)**	**API Gravity (°)**	**FTHP, psi**	**FTHT, DegF**	**Salinity ppm**
1	Gas	Flowline (3/8" choke)	13.01.08	88.147	17.01	8.271	6.457	3.08	1.22	0.818	0.862				
2	Gas	Flowline (1/8" choke)	14.01.08	74.267	20.058	9.847	5.566	1.479	0.425	0.23	0.209				
3	Gas	Separator	15.01.07	82.35	20.825	9.263	6.051	1.954	0.582	0.307	0.28				
1	Gas	Production Testing-choke manifold	18.01.2008	79.81	20.21	10.02	5.92	2.47	0.75	0.41	0.35	–			
2	Gas	Production Testing-choke manifold	18.01.2008	88.147	17.01	8.271	6.457	3.08	1.22	0.818	0.862	34.97			
3	Gas	Production Testing-choke manifold	18.01.2008	74.267	20.058	9.847	5.566	1.479	0.425	0.23	0.209	36.95			
B-172-9 Object-III															
Sample No.	**Type**	**Source**	**Date**	**TG (%)**	**C1 (%)**	**C2 (%)**	**C3 (%)**	**iC4 (%)**	**nC4 (%)**	**iC5 (%)**	**nC5 (%)**	**API Gravity (°)**	**FTHP, psi**	**FTHT, DegF**	**Salinity ppm**
1	Gas	Flowline (1/4" choke)	05.02.08	71.2	20.115	17.845	7.553	2.695	1.149	2.036	2.24				
2	Gas	Flowline (3/8" choke)	09.02.08	69.81	22.178	12.626	7.025	2.147	0.767	0.96	0.904				
3	Gas	Flowline (1/2" choke)	09.02.08	70.2	21.102	12.585	7.85	2.601	0.944	0.96	0.933				
4	Gas	Flowline (5/8" choke)	10.02.08	70.8	20.896	11.718	9.095	4.325	1.653	0.91	0.81				
1	Gas	Production Testing-choke manifold	11.02.08	63.8	24.58	11.024	2.49	0.264	0.099	0.257	0.287				
2	Gas	Production Testing-choke manifold	11.02.08	86.73	24.384	14.693	6.544	2.542	0.871	0.076	0.113				
3	Gas	Production Testing-choke manifold	11.02.08	87.9	23.02	12.432	6.235	2.1	0.811	0.685	0.367				
4	Gas	Production Testing-choke manifold	11.02.08	91.2	23.148	11.648	6.049	2.599	1.028	1.14	1.129				
5	Gas	Production Testing-choke manifold	11.02.08	89.4	23.76	13.063	7.247	2.625	0.962	0.655	0.761				
6	Gas	Production Testing-choke manifold	11.02.08	89.5	23.836	13.294	7.705	2.629	0.539	0.76	0.601				
7	Gas	Production Testing-choke manifold	11.02.08	63.51	21.136	12.939	8.092	2.772	0.981	0.694	0.659				
1	Gas	32/64" choke manifold	12.02.2008	30.2	13.43	2.62	1	0.22	0.065	0.009	0.009		100	86	20590
2	Gas	32/64" choke manifold	12.02.2008	88.6	20.146	11.134	5.9991	2.314	0.866	0.779	0.861		80–70	87	18720
B-172-9 Object-IV															
Sample No.	**Type**	**Source**	**Date**	**TG (%)**	**C1 (%)**	**C2 (%)**	**C3 (%)**	**iC4 (%)**	**nC4 (%)**	**iC5 (%)**	**nC5 (%)**	**API Gravity (°)**	**FTHP, psi**	**FTHT, DegF**	**Salinity ppm**
1	Gas	Separator	18.02.08	68.9	22.29	12.093	9.663	5.104	1.681	1.106	1.125				
2	Gas	Flowline	18.02.08	68.4	21.049	10.082	9.853	4.413	1.313	0.704	0.723				
1	Gas	RCI sample at 1685.2m in 12 ¼" hole	05.12.07	3.54	0.646	1.367	0.57	0.095	0.075						
2	Gas	RCI sample at 1689.5 in 12 ¼" hole	05.12.07	0.88	0.321	0.112	0.071	0.005	0						

4.9.5 Geology and Reservoir Description of B-172-9 Field:

The geology of the area has been comprehensively reviewed using correlations, sections and maps. The well correlation, seismic sections, top structure, seismic attribute/amplitude and net sand/pay maps have been used to illustrate the magnitude and distribution of key reservoir properties in and around the discovered oil/gas pools (accumulations). The local tectonic setting and geological section of the area, wherever available, are also given. These maps/sections are sequentially shown field-wise and reservoir unit-wise through figures, appropriately titled and illustrated in the following section.

Geological correlations, sections and maps (B-172-9 field):

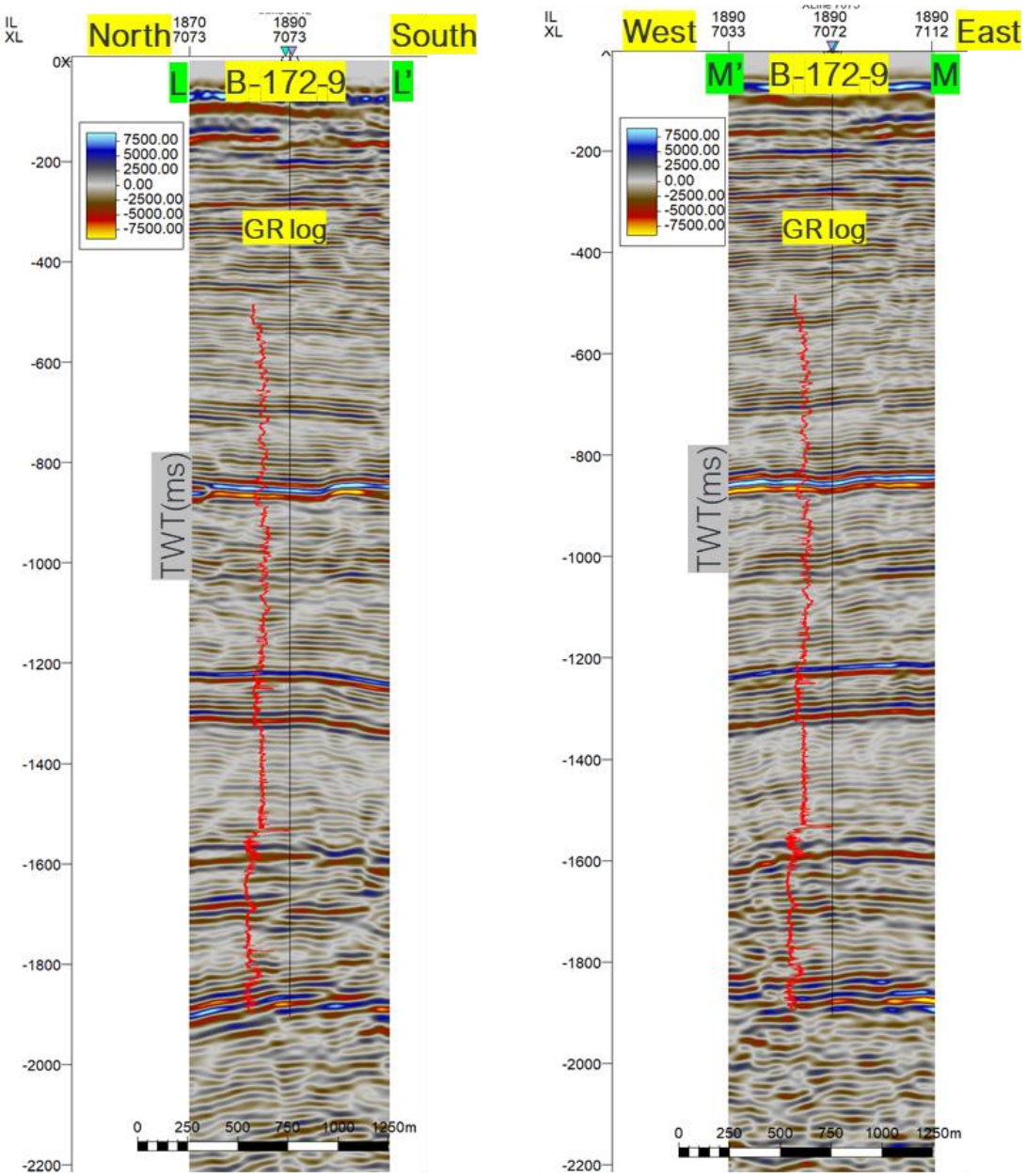
Seismic inversion studies indicate that the entire structure lies between two longitudinal (N-S) faults on either side, it has favorable porosity development at the level of the pay zones. The lateral extent of the possible hydrocarbon pools is guided by the relief of the reservoir top limited by the LKO and the longitudinal faults.

B-172 structure is located to the southeast of Bassein Field and South of Bassein East. It's an independent structure bounded by 2 NNW-SSE trending faults.

Around 6 m Gas & 18 m oil pay have been encountered at a well location in Mukta Formation.

Seismic sections along well B-172-9: **Figure 4-99**
Depth structure map of BASSEIN: **Figure 4-100**
Net sand/pay map MUKTA: **Figure 4-101**
Oil Isopay map of MUKTA: **Figure 4-102**

Figure 4-99:Seismic sections along well B-172-9:



Vertical exaggeration: 2.5x
Seismic volume: 00002.BASSEIN_B-80_B-173.3D

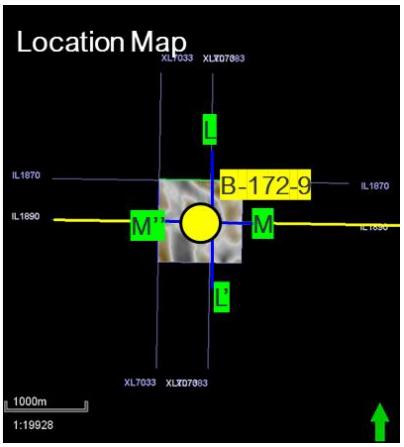


Figure 4-100:. Depth structure map of BASSEIN :

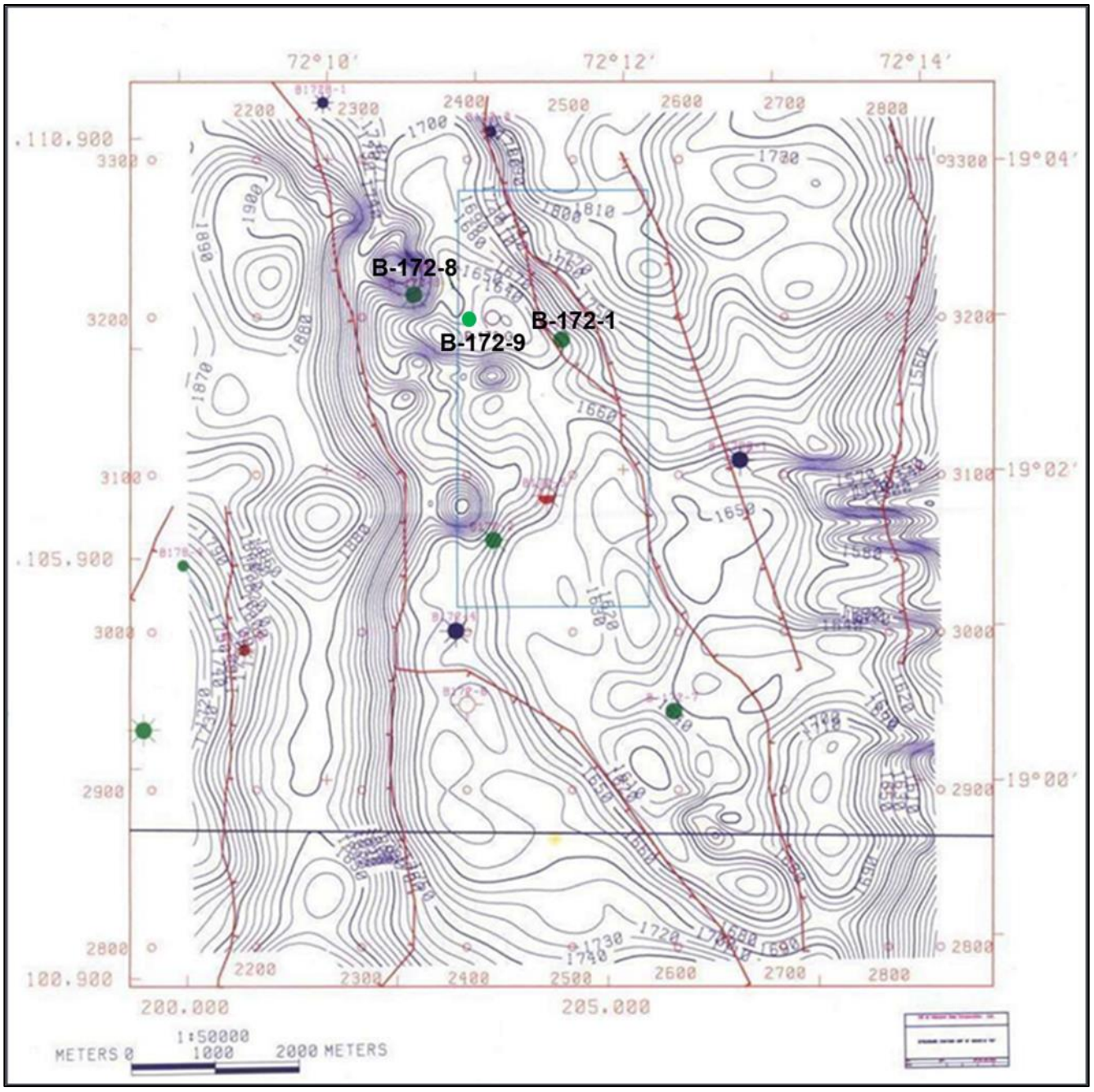
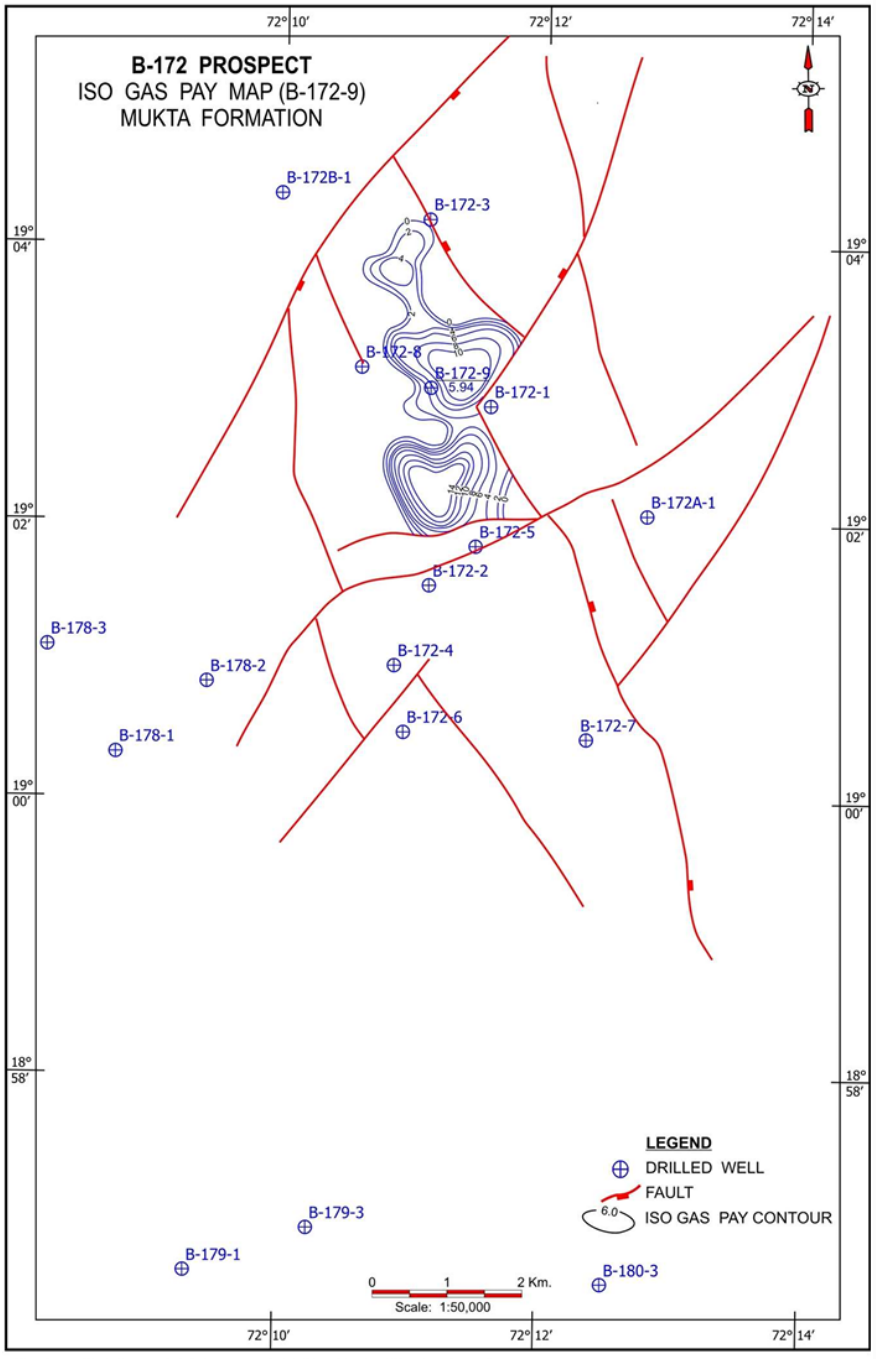
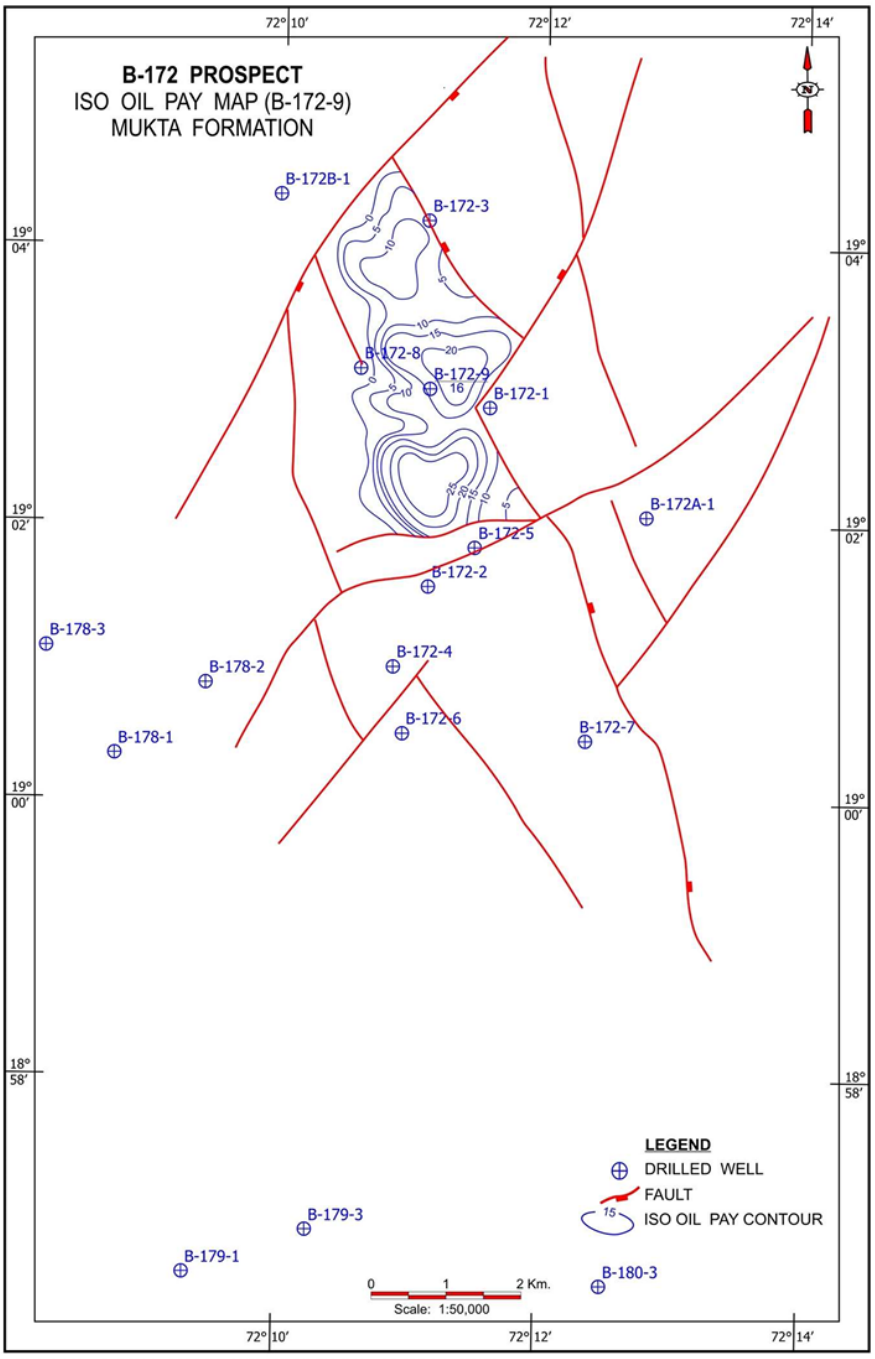


Figure 4-101:. Net sand/pay map MUKTA: :



ENCLOSURE TO RESERVE ESTIMATE AS ON 01-04-2008

Figure 4-102:. Oil IsoPay map MUKTA :



ENCLOSURE TO RESERVE ESTIMATE AS ON 01-04-2008

4.9.6 Reservoir parameters and hydrocarbon estimates B-172-9 Field:

The estimates of hydrocarbon in-place have been worked out under various field assumptions, and all inputs, working and results, as available and sourced are presented in the following section.

Petrophysical parameters and hydrocarbon estimates:

Four objects were tested in the well.

Object–I in the interval 2245–2243.5m in Panna Formation flowed gas @ 276908m3/d with 721 bpd condensate through ½" choke.

Object – II in the interval 1660m-1636m in Mukta Formation flowed oil with 50-90% water and little gas.

Object -III was tested in the interval 1623 –1620.5m, 1620-1617m, 1615-1614m in Heera Formation, flowed gas and condensate with 20-30% water. It is interpreted that the reservoir development has gas overlying thin oil rim which also has bottom water. Thus, this system is a different system hydrodynamically separate from the main Mukta zone tested as object-II.

Object –IV in Bombay Formation in the interval 1210.5-1207.5 m flowed little oil and gas with 70-80% water. This is similar to the results of equivalent zones in the area.

For the first time hydrocarbon produced from Panna Formation in B-172-structure has given a lead for exploration of Panna sands in this area. The interesting feature of this zone is that even though the thickness of reservoir exposed in the well is only 2 meters, the inflow has been very high. This suggests that well has penetrated edge of a thicker reservoir having extension.

The Petrophysical parameters used in volumetrics and In-Place are provided in **Table 4-91 and Table 4-92.**

Table 4-91: Petrophysical parameters and wellbore estimates for B-172-9

Reservoir	Bombay/Lower Miocene (1208-1211)	Heera/ Lower Oligocene (1614-1623)	Mukta/ Lower Oligocene (1636-1660)	Panna (2244-2246)
Fluid	**Oil & Gas**	**Gas & Cond**	**Oil & Gas**	**Gas & Cond**
Area:	0.7854 sqKM	0.7854 sqKM	1.177 sqKM	0.7854 sqKM
Thickness:	1.5m	3.0m	20.5m	2.0m
Porosity:	0.24	-	0.2	0.19
Hydrocarbon saturation:	0.4	0.5	0.45	0.42
Formation volume factor:	1.037	0.005312	1.037	0.004797
Oil sp gr			0.8269 (39.62 API)	
GOR, m3/m3			50	
O+OEG, MMTOE	0	0.06	1.84	0.03

Table 4-92: Hydrocarbon In-Place estimates (2P)

Field	O+OEG, MMTOE
B-172-9	**1.93**

Erstwhile Operator-reported estimates on record:

The B-172-9 field has a reported oil estimate of. **0.07 MMTOE**

All these hydrocarbon estimates are subject to future assessments based on Operator's own technical insights and additional information/data, which may warrant possible revision of the currently reported estimates.

4.9.7 Production Facility for Oil and Gas Evacuation:

NLP process platform 30 KM

4.10 STATUS OF ADDITIONAL WELLS IN MB/OSDSF/MUMBAI OFFSHORE/2025 CONTRACT AREA

The contract area is having five boundaries with 8 discoveries/fields (C-23-9, C-39-14, WO-5-11. BH-68, B-172-9, B-183-1, B-51-1 and B-174-1) and 18 additional wells. The status of the additional well(s) has been described field-wise in the following section. Where reports/information were not available/accessible at the time of writing this report, the same may be enquired with NDR later.

Sl.No		C-23-9 Field
1	**C-23-3**	The well C-23-3 drilled down to the depth of 2730m terminating in Mahuva formation. All thrre objects tested in Daman formation. Object-I (2417-22m) and Object-II (2407-2410m) produced **gas and condensate**, and Object-III (2289-2293m) found to be **water bearing**.
2	**C-23-6**	The well C-23-6 drilled down to the depth of 2610 m and encountered Chinchini/Tapti, Daman and Mahuva formations. **Object-I** (2555-2557m) in Mahuva formation **produced gas and little condensate**. **Object-II** (2344-2348.5m) and **Object-III** (2125-2130 m) found to be **dry.** Well C-23-6 is rated as a gas producer with little condensate from Mahuva Formation.
3	**C-23-8**	The well C-23-8 drilled down to the depth of 2810 m. Object-I (2528-2530 m) and **Object-1A** (2546-2548m) and **Object-II** (2468.5- 2473.5m) in Mahuva formations **produced gas.** Object-III (2373-2376 m and 2368-2370m) in Daman formation found to be **water bearing.**
4	**C-23-P2**	The well C-23P-2 drilled down to the depth of 3026 m as development conventional inclined well. Tested in Daman pay sand (2926-30m, 2953.5-59m, 2965-71m), Initially well could not be activated. After activation through N2, **Water & feeble gas** observed in return. Continued well under observation, salinity of water varies from 9900ppm to 2145ppm. Well did not get activated with CT. Re-perforation and water block treatment were carried out. Again, recompleted with 3 ½" string to 2863m and stabbed in seals into PBR. Well kept closed.
		C-39-14 field
5	**NNL-1**	Well NNL-1. could be drilled up to depth 2910 m. The well has been logged in three stages 17 H", 12 %" and 8 YE". Full set of logs has been recorded in this well. A total of 60 SWC were attempted in 12 14" hole out which recovered 55 cores and attempted 30 SWC in 8 Vs" hole and recovered 18 cores. MDT pressure test and sample was attempted total 60 pressure test carried out of which 35 volumetric and remaining dry and lost. And two samples attempted at depth 1954 m. Collected sample consisted of 10.48 Its. of formation water having salinity 4686 ppm as NaCI and second sample collected at 1848 m. Contained formation water of salinity 15229 ppm as NaCI. From the results of log analysis it has been interpreted no interval in the logged well section has hydrocarbon at movable saturation with in

		Mahuva and Daman and post Daman formations. MDT data also fully corroborates log analysis against intervals covered by MDT survey and sampling. However, two intervals 2013-2008 m and 19471942.5 m, with in Mahuva were tested conventionally as object-ll and object-Ill and two interval 1845.5-1841.5 m, and 1816-1813 m with Daman were tested conventionally as object-IV and object-V and gave formation water on reverse out. One interval 2298-,5-2296 m. and 2293,5-2291.5 m with in Belapur formation was tested as object-l conventionally and gave immeasurably low gas along with diesel on reverse out. Log analysis shows that residual gas saturation. Thus, test results also corroborate with interpretation from log analysis fully in this well. The status of well **was dry and abandoned**.
		B-68 field
6	**BH-18**	The well BH-18 drilled down to the depth of 1960m. No HC shows during drilling were observed. One object in the interval 1233.5-1237.5m was tested which showed only water and traces of gas. The well was declared dry.
7	**BH-7**	The well BH-7 was drilled down to the depth of 1886.75m at water depth 78.5m. Minor gas and oil shows were observed during drilling. DST in the intervals 1367- 1370m, 1374-1377.5m and 1382-1388.5m gave 6.4 barrels of water cut. No flow at surface. The well is declared as "Dry and Abandoned".
8	**SMH-1**	MDT samples were taken in the well and gas samples were taken at 2106.20m.
9	**WO-8**	The well WO-8 drilled down to the depth of 2115m and terminated in basement. Three objects were tested in the well. Object-I within basement barefoot tested which flowed gas with surges of oil of API 35-36 and BS&W 1%. The flow was not measurable. Object-II in the interval 2048.5-2054.5m and 2057.5-2063.5m tested and flowed oil and water along with gas. API of produced oil 25.48deg. BS&W 20% and salinity of water 15000 ppm as NaCl. Object-III in the interval 1675-1677.5m and 1689-1695 m within L-IV gave influx of water on reverse circulation. Salinity of water 39245 ppm as NaCl.
10	**SMH-2**	The Interval 2062.5-2065.0m was tested as object II in Basal Clastics Formation. Computed water saturation & Effective Porosity is ranging between 40-50% & 18- 20% respectively. On testing, the object flowed Oil and Gas through ½" choke Qoil: 204 BPD, Qgas: 77514 m3/day, FTHP: 430 psi, API: 34^{o}, GOR: 2389, BS&W: Nil. The status of the well is "oil and gas producer in Basal Clastics".
		WO-5-11 field:
		No Additional well
		B-174 Area (B-174-1, B-51-1, B-172-9 and B-183-1):
11	**B-174-4**	The well B-174-4 drilled down to the depth of 1342m against the target depth 1300m at water depth 49.25m to explore the hydrocarbon potential of Miocene and Bassein formation. Based on drilling shows and other relevant G&G data, two objects tested in this well within Bassein fm. Object-I (1108-1105m) in B Zone produced gas

		@ 51240 m3/d and liquid at 105 bpd with 15% oil through 1/2" choke. Object-II (1096-1092m) within A zone tested and flowed gas @ 60830 m3/d and liquid at 40bpd with 70% water through 1/2" choke. Based on testing results, well **declared as "gas bearing".**
12	**B-174-6**	The well B-174-6 drilled down to the depth of 1427.5m against the target depth 1300m/basement at water depth 47.8m to delineate Bassein pay (H3B) zone. On the basis of drilling shows and other relevant G&G data, no zone identified from HC point of view. Production testing was not carried out in this well. Well status is "**dry well".**
13	**B-176-1**	The well B-176-1 drilled down to the depth of 1505m against the target depth 1380m at water depth 45.73m to explore the hydrocarbon potential of Bassein limestone and basal clastics. The sub-surface G&G data on detailed analysis showed that there were no zones of HC interest present. Hence the production casing was not lowered, and no testing could be carried out. The well status is "**Dry and abandoned".**
14	**B-176-2**	The well B-176-2 drilled down to the depth of 1481m against the target depth 1480m at water depth 49.45m to explore the hydrocarbon potential of Bassein limestone and basal clastics. The sub-surface G&G data on detailed analysis showed that there were no zones of HC interest present. Hence, no production testing was carried out in this well. The well status is "**Dry and abandoned".**
15	**B-173A-9**	The well B-173A-9 drilled down to the depth of 1480m against the target depth 2050m/Basement at water depth 57.7m to explore the hydrocarbon potential of the Mukta and Bassein formation and terminated within trap. Based on drilling shows and other relevant G&G data, three objects tested this well. Object-I (1461.5m-1462m) within Bassein/Limestone tested through Straddle packer and yielded water. Tested object-II (1441m-1434m & 1431m-1427m) within Mukta/Limestone and produced 171 bpd oil and 60849 m3/d gas through 1/2" choke post acid frac job. Object-III (1404m-1407m & 1411m-1412.5m) within Mukta/Limestone did not produce any HC. Based on testing results well declared as "**Oil bearing in Mukta** formation".
16	**B-182-1**	The well B-182-1 drilled down to the depth of 1880m against the target depth 2030m/Basement at water depth 49.0m to explore the hydrocarbon potential of Bassein limestone and basement and terminated within basement. On the basis of drilling shows and other relevant data five objects tested in this well. Object-I (1863-1858m, 1849-1840m) and object-II (1827-1832.5m) within basement tested and flowed little viscous oil and gas in surges. Oil API 36.9-36.7deg. Object-III (1731-1743m) tested and recovered 25 bbl oil and 20 bbl water of salinity 50895. No self-flow inspite of doing acid job and N2 job. Object-IV (1711-1719m) did not yield any hydrocarbon on testing. Object-V (1303-1310m) flowed oil with 50% water content through 1/2" choke. Oil API 38 deg and water salinity 26950ppm as NaCl. On

		the basis of testing results well status is "**Oil and gas (Non-commercial)".**
17	**B-182-2**	The well B-182-2 drilled down to the depth of 2019m against the target depth 1900m/100m with basement at water depth 44.5m to explore the hydrocarbon potential of Bassein limestone (A and B) and Basement and terminated within basement. On the basis of sub-surface G&G data and drilling shows three objects tested in this well. Object-I (1923-2021m) within basement tested and flowed diesel with feeble gas at 0-18psi. Object-II within Bassein limestone in interval 1352-1355m resulted mud only in reverse out after testing. Object-III (1295-1300m) tested which tricked diesel and water of salinity 25186ppm as NaCl in reverse out. On the basis of testing results well status is **"Dry".**
18	**B-89-1**	The well B-89-1 drilled down to the depth of 2112m against the target 2180m at water depth 55.03m to explore the HC potential of Bassein fm and basal clastics. After examining the logs and other relevant data the possibility of HC presence is negligible and no production testing had been carried out in the well. Hence it was decided to abandon the well and the status of well is **"Dry and abandoned".**

5. DATA PACKAGE INFORMATION

This information docket for the contract area, titled, MB/OSDSF/MUMBAI OFFSHORE /2025 is available with Data Package, which includes seismic data, well data and well completion and other reports. Apart from seismic and well data, the contract area has 20 reports. Given below is the detail of datasets that are available in the Data Package.

5.1 Well, Seismic Data and Reports Availability

5.1.1 Well Data:

SL. No.	Well name	Longitude	Latitude	CRS
1	C-23-9	72°08’52.952” E	20°32’18.427” N	WGS84 UTM 43N
2	C-39-14	72°32’29.470” E	20°55’1.900” N	WGS84 UTM 43N
3	WO-5-11	71°19’4.109” E	19°1’54.951” N	WGS84 UTM 43N
4	BH-68	71°26’27.160” E	19°10’22.880” N	WGS84 UTM 43N
4	B-174-1	72°22'48.043 E	18°53'54.564 N	WGS84 UTM 43N
6	B-183-1	72°16'55.914 E	19°02'50.063 N	WGS84 UTM 43N
7	B-51-1	72°20'24.779 E	18°58'52.125 N	WGS84 UTM 43N
8	B-172-9	72°11'07.509 E	19°02'58.405 N	WGS84 UTM 43N

5.1.2 Seismic 2D data:

MUMBAI OFFSHORE fields:

DSF-IV CONTRACT AREA	Line segment name	Processing type	FSP/CDP	LSP/CDP	Length (Km)	CRS
MB/OSDSF/MUMBAI OFFSHORE/2025	BO-179	FINAL_STACK	2	12770	9.4034	WGS84 UTM 43N
	RBO-05	FINAL_STACK	105	19787	13.579	WGS84 UTM 43N
	BS-741	FINAL_MIGRATION	1	3056	6.4498	WGS84 UTM 43N
	BS-733A	FINAL_MIGRATION	1	2624	13.271	WGS84 UTM 43N
	BS-398	FINAL_MIGRATION	107	2232	19.719	WGS84 UTM 43N
	BS-396A	FINAL_MIGRATION	687	1693	11.528	WGS84 UTM 43N
	BS-396	FINAL_MIGRATION	107	998	11.147	WGS84 UTM 43N
	BS-392	FINAL_MIGRATION	1479	4120	5.658	WGS84 UTM 43N
	BS-386A	FINAL_MIGRATION	107	2138	15.032	WGS84 UTM 43N
	BS-386	FINAL_MIGRATION	107	1132	9.4405	WGS84 UTM 43N
	BS-384B	FINAL_MIGRATION	107	1042	9.2444	WGS84 UTM 43N
	BS-382A	FINAL_MIGRATION	107	1740	13.158	WGS84 UTM 43N
	BS-380B	FINAL_MIGRATION	107	1846	10.672	WGS84 UTM 43N
	BS-378	FINAL_MIGRATION	107	2596	19.484	WGS84 UTM 43N
	BS-376	FINAL_MIGRATION	107	2180	14.999	WGS84 UTM 43N
	BS-371A	FINAL_MIGRATION	107	2322	13.764	WGS84 UTM 43N
	BS-369	FINAL_MIGRATION	107	4822	17.798	WGS84 UTM 43N
	BS-367B	FINAL_MIGRATION	347	1402	8.445	WGS84 UTM 43N
	BS-367	FINAL_MIGRATION	1107	2582	12.922	WGS84 UTM 43N
	BS-365C	FINAL_MIGRATION	107	1602	14.626	WGS84 UTM 43N
	BS-363A	FINAL_MIGRATION	3985	5254	10.355	WGS84 UTM 43N
	BS-361	FINAL_MIGRATION	119	5080	12.388	WGS84 UTM 43N
	BS-359	FINAL_MIGRATION	105	5189	12.381	WGS84 UTM 43N
	BS-357	FINAL_MIGRATION	2501	5144	12.353	WGS84 UTM 43N
	BS-355A	FINAL_MIGRATION	3387	4652	11.078	WGS84 UTM 43N
	BS-353B	FINAL_MIGRATION	3827	5116	13.397	WGS84 UTM 43N
	BS-349	FINAL_MIGRATION	107	2640	7.0231	WGS84 UTM 43N
	BS-347	FINAL_MIGRATION	107	1470	7.0189	WGS84 UTM 43N
	BS-345	FINAL_MIGRATION	107	1002	7.0219	WGS84 UTM 43N
	BS-343	FINAL_MIGRATION	107	3906	7.0167	WGS84 UTM 43N
	BS-341	FINAL_MIGRATION	107	3920	5.2873	WGS84 UTM 43N
	BS-339A	FINAL_MIGRATION	847	3803	5.2971	WGS84 UTM 43N
	BS-337	FINAL_MIGRATION	107	3884	5.3115	WGS84 UTM 43N
	BS-335	FINAL_MIGRATION	107	2981	7.053	WGS84 UTM 43N
	BS-220C	FINAL_MIGRATION	1767	2766	5.6546	WGS84 UTM 43N
	BS-218	FINAL_MIGRATION	107	2702	8.2563	WGS84 UTM 43N
	BS-216A	FINAL_MIGRATION	107	2684	13.119	WGS84 UTM 43N
	BS-388	FINAL_STACK	427	1754	8.8981	WGS84 UTM 43N
	BS-373A	FINAL_STACK	105	6311	5.8104	WGS84 UTM 43N
	BR-456E	FINAL_STACK	1	1369	4.5533	WGS84 UTM 43N
	BR-456E	FINAL_STACK	1	1369	6.7981	WGS84 UTM 43N
	BR-847A	FINAL_MIGRATION	1	1296	12.283	WGS84 UTM 43N
	BR-843A	FINAL_MIGRATION	1	2226	5.6123	WGS84 UTM 43N
	BR-841	FINAL_MIGRATION	1	3256	7.518	WGS84 UTM 43N
	BR-839	FINAL_MIGRATION	1	2216	7.3317	WGS84 UTM 43N
	BR-835	FINAL_MIGRATION	1	1296	2.5984	WGS84 UTM 43N
	BR-833A	FINAL_MIGRATION	1	2376	5.6092	WGS84 UTM 43N
	BR-458B	FINAL_MIGRATION	1	1576	5.6472	WGS84 UTM 43N
	BR-454D	FINAL_MIGRATION	1	6816	13.927	WGS84 UTM 43N
	BR-454D	FINAL_MIGRATION	1	6816	12.617	WGS84 UTM 43N
	BR-452D	FINAL_MIGRATION	2	3817	18.618	WGS84 UTM 43N
	BR-450B	FINAL_MIGRATION	1	4055	20.64	WGS84 UTM 43N
	BR-448C	FINAL_MIGRATION	2	6057	8.8247	WGS84 UTM 43N
	BR-446B	FINAL_MIGRATION	1	2592	2.9963	WGS84 UTM 43N
	BR-452A	FINAL_MIGRATION	1	2098	8.8557	WGS84 UTM 43N
	BR-452	FINAL_MIGRATION	1	540	5.5736	WGS84 UTM 43N
	BS-73	FINAL_STACK	1	528	5.6393	WGS84 UTM 43N
	BS-49	FINAL_STACK	1	1099	9.0586	WGS84 UTM 43N
	BS-47	FINAL_STACK	1	943	1.2802	WGS84 UTM 43N

MUMBAI OFFSHORE fields:

DSF-IV CONTRACT AREA	Line segment name	Processing type	FSP/CDP	LSP/CDP	Length (Km)	CRS
MB/OSDSF/MUMBAI OFFSHORE/2025	BS-42	FINAL_STACK	1	3145	14.016	WGS84 UTM 43N
	BS-42	FINAL_STACK	1	3145	13.925	WGS84 UTM 43N
	BS-21E	FINAL_STACK	1	2187	5.711	WGS84 UTM 43N
	BS-15E	FINAL_STACK	1	2025	13.237	WGS84 UTM 43N
	BS-13E	FINAL_STACK	1	2125	14.917	WGS84 UTM 43N
	BS-827A	FINAL_MIGRATION	104	2119	1.0896	WGS84 UTM 43N
	BS-741	FINAL_MIGRATION	1	3056	1.0746	WGS84 UTM 43N
	BO-72B	FINAL_STACK	105	2056	8.0168	WGS84 UTM 42N
	BO-37	FINAL_STACK	1	15049	17.586	WGS84 UTM 42N
	BO-35	FINAL_STACK	5	14498	5.7042	WGS84 UTM 42N
	BO-33	FINAL_STACK	1	3072	1.5162	WGS84 UTM 42N
	BO-211	FINAL_STACK	1	7692	15.456	WGS84 UTM 42N
	BO-209A	FINAL_STACK	48	7639	3.8009	WGS84 UTM 42N
	RBO-08	FINAL_MIGRATION	102	7477	5.1718	WGS84 UTM 42N
	B-161A	REPROCESSED_FINAL_STACK	308	1172	19.85	WGS84 UTM 42N
	B-153A	REPROCESSED_FINAL_STACK	308	511	3.703	WGS84 UTM 42N
	B-101	REPROCESSED_FINAL_STACK	1	888	22.395	WGS84 UTM 42N
	B-093	REPROCESSED_FINAL_STACK	53	420	7.7472	WGS84 UTM 42N
	B-091	REPROCESSED_FINAL_STACK	1	888	7.5198	WGS84 UTM 42N
	B-040	REPROCESSED_FINAL_STACK	1	2369	10.029	WGS84 UTM 42N
	B-164A	REPROCESSED_FINAL_PSTM_STACK	947	4514	2.8959	WGS84 UTM 42N
	B-163	REPROCESSED_FINAL_PSTM_STACK	948	4256	1.1416	WGS84 UTM 42N
	B-161	REPROCESSED_FINAL_PSTM_STACK	952	2425	3.7689	WGS84 UTM 42N
	B-159	REPROCESSED_FINAL_PSTM_STACK	9945	12057	3.7623	WGS84 UTM 42N
	B-159	REPROCESSED_FINAL_PSTM_STACK	9945	12057	16.325	WGS84 UTM 42N
	B-157	REPROCESSED_FINAL_PSTM_STACK	9948	12035	4.3399	WGS84 UTM 42N
	B-157	REPROCESSED_FINAL_PSTM_STACK	9948	12035	10.846	WGS84 UTM 42N
	B-155	REPROCESSED_FINAL_PSTM_STACK	948	5055	5.4618	WGS84 UTM 42N
	B-153	REPROCESSED_FINAL_PSTM_STACK	9948	11615	2.6473	WGS84 UTM 42N
	B-149	REPROCESSED_FINAL_PSTM_STACK	948	3155	2.9927	WGS84 UTM 42N
	B-145	REPROCESSED_FINAL_PSTM_STACK	948	2641	1.8516	WGS84 UTM 42N
	B-128	REPROCESSED_FINAL_PSTM_STACK	948	1834	1.5368	WGS84 UTM 42N
	B-126	REPROCESSED_FINAL_PSTM_STACK	947	2459	8.0311	WGS84 UTM 42N
	B-116	REPROCESSED_FINAL_PSTM_STACK	948	2595	5.526	WGS84 UTM 42N
	B-114	REPROCESSED_FINAL_PSTM_STACK	948	2395	9.9997	WGS84 UTM 42N
	B-112	REPROCESSED_FINAL_PSTM_STACK	948	2384	9.9679	WGS84 UTM 42N
	B-110	REPROCESSED_FINAL_PSTM_STACK	9948	11195	8.1671	WGS84 UTM 42N
	B-108	REPROCESSED_FINAL_PSTM_STACK	948	2175	7.0198	WGS84 UTM 42N
	B-106	REPROCESSED_FINAL_PSTM_STACK	948	2075	7.0584	WGS84 UTM 42N
	B-104	REPROCESSED_FINAL_PSTM_STACK	949	2024	4.8058	WGS84 UTM 42N
	B-102	REPROCESSED_FINAL_PSTM_STACK	950	2236	7.9566	WGS84 UTM 42N
	B-100	REPROCESSED_FINAL_PSTM_STACK	948	1713	10.1	WGS84 UTM 42N
	SBS-353	RAW_STACK	114	3798	12.55	WGS84 UTM 42N
	SBS-329	RAW_STACK	104	3745	10.147	WGS84 UTM 42N
	SBS-307	RAW_STACK	104	4037	5.6477	WGS84 UTM 42N
	SBS-359A	FINAL_MIGRATION	104	3449	1.6193	WGS84 UTM 42N
	SBS-359A	FINAL_MIGRATION	104	3449	4.1874	WGS84 UTM 42N
	SBS-355	FINAL_MIGRATION	104	1959	3.2892	WGS84 UTM 42N
	SBS-355	FINAL_MIGRATION	104	1959	4.7604	WGS84 UTM 42N
	SBS-349	FINAL_MIGRATION	107	3891	13.111	WGS84 UTM 42N
	SBS-347A	FINAL_MIGRATION	106	2899	14.439	WGS84 UTM 42N
	SBS-345	FINAL_MIGRATION	106	2025	12.792	WGS84 UTM 42N
	SBS-343A	FINAL_MIGRATION	104	1439	13.303	WGS84 UTM 42N
	SBS-343	FINAL_MIGRATION	982	2815	1.086	WGS84 UTM 42N
	SBS-341	FINAL_MIGRATION	104	3799	12.303	WGS84 UTM 42N
	SBS-339	FINAL_MIGRATION	104	3790	12.028	WGS84 UTM 42N
	SBS-337	FINAL_MIGRATION	106	4209	13.69	WGS84 UTM 42N
	SBS-335	FINAL_MIGRATION	104	2319	10.061	WGS84 UTM 42N
	SBS-327	FINAL_MIGRATION	104	3639	8.3701	WGS84 UTM 42N

MUMBAI OFFSHORE fields:

DSF-IV CONTRACT AREA	Line segment name	Processing type	FSP/CDP	LSP/CDP	Length (Km)	CRS
MB/OSDSF/MUMBAI OFFSHORE/2025	SBS-317	FINAL_MIGRATION	104	4157	5.658	WGS84 UTM 42N
	SBS-313	FINAL_MIGRATION	104	2279	5.6507	WGS84 UTM 42N
	SBS-311A	FINAL_MIGRATION	104	1918	5.6473	WGS84 UTM 42N
	SBS-309	FINAL_MIGRATION	104	4279	5.6432	WGS84 UTM 42N
	SBS-303A	FINAL_MIGRATION	130	1799	5.637	WGS84 UTM 42N
	SBS-301	FINAL_MIGRATION	105	4199	5.6316	WGS84 UTM 42N
	SBS-299A	FINAL_MIGRATION	104	3957	4.4214	WGS84 UTM 42N
	SBS-297	FINAL_MIGRATION	104	3990	2.6386	WGS84 UTM 42N
	SBS-295	FINAL_MIGRATION	104	4079	1.1991	WGS84 UTM 42N
	SBS-172	FINAL_MIGRATION	104	1039	7.8397	WGS84 UTM 42N
	SBS-170	FINAL_MIGRATION	104	2719	9.8925	WGS84 UTM 42N
	SBS-170	FINAL_MIGRATION	104	2719	5.9523	WGS84 UTM 42N
	SBS-168	FINAL_MIGRATION	104	3639	17.841	WGS84 UTM 42N
	SBS-166	FINAL_MIGRATION	104	3205	16.371	WGS84 UTM 42N
	SBS-164	FINAL_MIGRATION	104	3299	10.333	WGS84 UTM 42N
	SBS-162A	FINAL_MIGRATION	104	1139	4.4539	WGS84 UTM 42N
	SBS-160	FINAL_MIGRATION	104	3239	1.6926	WGS84 UTM 42N
	SBS-363	FINAL_STACK	104	1697	1.1305	WGS84 UTM 42N
	SBS-357	FINAL_STACK	104	4159	6.0161	WGS84 UTM 42N
	SBS-357	FINAL_STACK	104	4159	3.2368	WGS84 UTM 42N
	SBS-351	FINAL_STACK	113	4089	14.252	WGS84 UTM 42N
	SBS-333	FINAL_STACK	104	1559	12.54	WGS84 UTM 42N
	SBS-331	FINAL_STACK	104	3937	11.99	WGS84 UTM 42N
	SBS-325	FINAL_STACK	104	3799	6.1118	WGS84 UTM 42N
	SBS-323	FINAL_STACK	112	959	5.6954	WGS84 UTM 42N
	SBS-321	FINAL_STACK	104	4132	5.6651	WGS84 UTM 42N
	SBS-319	FINAL_STACK	104	1993	5.6632	WGS84 UTM 42N
	SBS-315	FINAL_STACK	104	4359	5.6574	WGS84 UTM 42N
	SBS-305	FINAL_STACK	104	4119	5.6399	WGS84 UTM 42N
	BS-521	FINAL_MIGRATION	1	1697	10.005	WGS84 UTM 42N
	BS-208	FINAL_MIGRATION	107	2402	4.586	WGS84 UTM 42N
	B-095	FINAL_MIGRATION	1	888	14.157	WGS84 UTM 42N
	B-089	FINAL_MIGRATION	1	888	4.3763	WGS84 UTM 42N
	B-024	FINAL_MIGRATION	1	1417	8.4277	WGS84 UTM 42N
	BS-533	FINAL_STACK	10	1702	13.585	WGS84 UTM 42N
	BS-531	FINAL_STACK	20	1650	12.574	WGS84 UTM 42N
	BS-529	FINAL_STACK	10	2017	13.181	WGS84 UTM 42N
	BS-525A	FINAL_STACK	1	1008	4.5534	WGS84 UTM 42N
	BS-375	FINAL_STACK	1	1008	4.2894	WGS84 UTM 42N
	BS-374	FINAL_STACK	307	3324	9.886	WGS84 UTM 42N
	BS-368A	FINAL_STACK	307	3610	17.818	WGS84 UTM 42N
	BS-366	FINAL_STACK	107	3699	18.147	WGS84 UTM 42N
	BS-362	FINAL_STACK	107	6847	7.5669	WGS84 UTM 42N
	BS-360A	FINAL_STACK	1	1104	1.5469	WGS84 UTM 42N
	BS-316	FINAL_STACK	1	984	2.788	WGS84 UTM 42N
	BS-36	FINAL_STACK	1	551	2.9607	WGS84 UTM 42N
	BS-34	FINAL_STACK	1	3043	1.0176	WGS84 UTM 42N
	CG-34	FINAL_PSTM_STACK	1	1847	2.5402	WGS84 UTM 43N
	GC-99A	FINAL_PSTM_STACK	1	4222	7.5049	WGS84 UTM 43N
	GC-99	FINAL_PSTM_STACK	1	4222	7.5713	WGS84 UTM 43N
	GC-95	FINAL_PSTM_STACK	1	4370	1.1427	WGS84 UTM 43N
	GC-42A	RAW_STACK	1	2946	5.0296	WGS84 UTM 43N
	GC-101	RAW_STACK	1	3773	1.3301	WGS84 UTM 43N
	GC-101	RAW_STACK	1	3773	7.569	WGS84 UTM 43N
	CB00-200	REPROCESSED_FINAL_MIGRATION	4803	10555	4.156	WGS84 UTM 43N
	CB00-198	REPROCESSED_FINAL_MIGRATION	5000	10436	4.1096	WGS84 UTM 43N
	CG-28	FINAL_PSTM_STACK	1	3547	21.506	WGS84 UTM 43N
	GC-339A	FINAL_PSTM_STACK	1	1012	3.5255	WGS84 UTM 43N
	GC-357A	FINAL_STACK	1	525	6.571	WGS84 UTM 43N
	GC-349	FINAL_STACK	2	1154	5.0082	WGS84 UTM 43N
	GC-210A	FINAL_STACK	1	3012	18.934	WGS84 UTM 43N
	GC-371	FINAL_MIGRATION	1	935	7.3393	WGS84 UTM 43N
	GC-369	FINAL_MIGRATION	1	1146	11.805	WGS84 UTM 43N
	GC-367	FINAL_MIGRATION	1	916	8.5994	WGS84 UTM 43N
	GC-365A	FINAL_MIGRATION	1	434	5.4407	WGS84 UTM 43N
	GC-363	FINAL_MIGRATION	1	1090	9.0306	WGS84 UTM 43N
	GC-361	FINAL_MIGRATION	1	1222	8.4655	WGS84 UTM 43N
	GC-359	FINAL_MIGRATION	1	1366	9.9755	WGS84 UTM 43N
	GC-355	FINAL_MIGRATION	1	1302	6.4299	WGS84 UTM 43N
	GC-353	FINAL_MIGRATION	1	1266	7.74	WGS84 UTM 43N
	GC-351	FINAL_MIGRATION	1	1316	9.0015	WGS84 UTM 43N
	GC-347	FINAL_MIGRATION	1	1496	6.8452	WGS84 UTM 43N
	GC-345	FINAL_MIGRATION	1	1476	7.1985	WGS84 UTM 43N
	GC-343	FINAL_MIGRATION	1	1046	7.2103	WGS84 UTM 43N
	GC-341	FINAL_MIGRATION	1	1370	7.2059	WGS84 UTM 43N
	GC-216A	FINAL_MIGRATION	1	2374	20.564	WGS84 UTM 43N
	GC-214C	FINAL_MIGRATION	1	1058	11.354	WGS84 UTM 43N
	GC-214B	FINAL_MIGRATION	1	2584	13.648	WGS84 UTM 43N
	GC-212	FINAL_MIGRATION	1	2164	21.087	WGS84 UTM 43N
	GC-208A	FINAL_MIGRATION	1	3174	12.211	WGS84 UTM 43N
					1702.3104	

5.1.3 Seismic 3D Data:

MB/OSDSF/MUMBAI OFFSHORE /2025 contract area:

3D bin centre corner points - all traces : 00001.BASSEIN_B-80_B-173.3D_FINAL_MIGRATION.SGY 2571

Point	Inline	Crossline	Easting	Northing
1	1740	7337	207113.00	2112373.00
2	2789	7337	206695.88	2086165.75
3	2789	9025	227782.00	2085829.00
4	1740	9025	228200.33	2112033.50

3D bin centre corner points - all traces : 00002.BASSEIN_B-80_B-173.3D_FINAL_MIGRATION.SGY 2571

Point	Inline	Crossline	Easting	Northing
1	1870	7033	203263.00	2109185.00
2	1909	7033	203247.00	2108211.00
3	1909	7113	204246.00	2108195.00
4	1870	7113	204262.00	2109169.00

00002.3D03-BOOS-C23_PSTM_FINAL_PSTM_STACK_.sgy
3D bin centre corner points - all traces

3D bin centre corner points - all traces : 00002.3D03-BOOS-C23_PSTM_FINAL_PSTM_STACK_.sgy

Point	Inline	Crossline	Easting	Northing
1	416	101	194875.70	2272254.75
2	977	101	199876.97	2267340.50
3	977	1010	207840.45	2275443.50
4	416	1010	202839.64	2280359.00

00001.SSW_OF_MUMBAI_HIGH_AND_EXT_BROADBAND_FINAL_PSTM_STACK_.sgy
3D bin centre corner points - all traces

3D bin centre corner points - all traces : 00001.SSW_OF_MUMBAI_HIGH_AND_EXT_BROADBAND_FINAL_PSTM_STACK_.sgy

Point	Inline	Crossline	Easting	Northing
1	4625	6897	735078.44	2116191.00
2	5629	6897	744073.19	2092758.88
3	5629	14131	786283.12	2108960.75
4	4625	14131	777287.62	2132393.75

5.2 Data Package Cost

The Data Package contains seismic (2D and/or 3D) and well data along with reports. The cost of the Data Package of this Information Docket (MB/OSDSF/MUMBAI OFFSHORE /2025 contract area) comes to be USD 13,300. This cost is as per the current data policy of NDR at the time of writing this report and subject to changes if data rates or policy framework are revised.

COST OF DATA PACKAGE FOR DSF-IV BLOCKS								
S.No.	Contract Area on offer	AREA (SQ KM)	NIO Map reference no.	Total Wells	2D Seismic (LKM)	3D Seismic (SKM)	No. of Reports	FINAL COST in USD($)
1	MB/OSDSF/MUMBAI OFFSHORE/2025	864.31	S-3	26	1702.31	829.01	61	**13330**

6. CONTRACT AREA SUMMARY

Contract area name: **MB/OSDSF/MUMBAI OFFSHORE /2025**

NIO map reference no.: **S-3**

Geographical area: **MUMBAI OFFSHORE**

Number of field(s)/discoveries: **8**

Number of well(s): **26**

Total area: **864.31** Sq. Km.

Seismic 2D data: **1702.31** Line Km.

Seismic 3D data: **829.01** Sq. Km.

Report(s) available: 6 1

Hydrocarbon In-Place (2P), O+OEG: **15.77 MMTOE**

(As per Erstwhile Operator/s – **9.81** MMTOE)

Data package cost: **USD 13,330**

7. CONCLUSIONS

The information docket has been prepared from the geoscientific and engineering data sets, made available by NOCs and Private/JV Operators along with earlier offered DSF acreage. The work has been primarily with all requisite data/information pre-processed using various in-house interpretation software. Desktop publishing applications of documents, spreadsheets and images including Google maps have also been extensively used.

The 8 discoveries, which are lying unpursued and holding contingent resources/ reserves are potential to be further developed/commercially produced. This booklet will be an useful supplement to the Data Package of the corresponding Contract Area. Such data represent 2D/3D seismic, well logs and reports on key information from various field operations pertaining to drilling, logging, testing and production. The total data package on offer under this bid round includes 1702.31 LKM 2D seismic, 829.01 SKM 3D seismic, 26 well data. The Data Package will be hosted in Data rooms for viewing and for sale from National Data Repository (NDR) to the interested investors/ bidders.

Though, the docket mentions estimated hydrocarbon, it is to indicate extent and order of hydrocarbon pool size. DGH strongly recommends that bidders must have their own understanding and independent assessment of resource base to support any forward bidding decision.

पेट्रोलियम एवं
प्राकृतिक गैस मंत्रालय
MINISTRY OF
PETROLEUM AND NATURAL GAS

सत्यमेव जयते

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