

CHAPTER 1

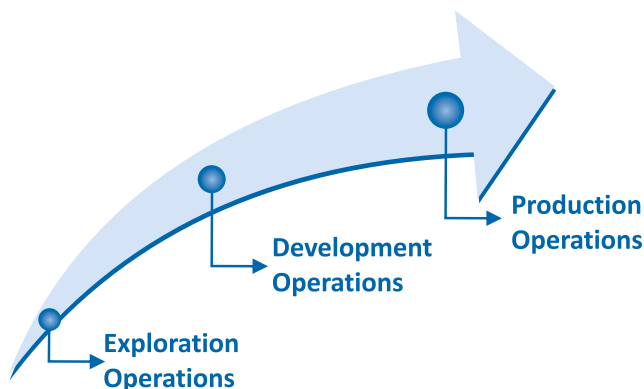
HYDROCARBON EXPLORATION by ONGC - AN INTRODUCTION

1.1 Background

The 'Oil and Natural Gas Corporation Limited' (ONGC) started as a Directorate of Geological Survey of India on 14 August 1956. With the enactment of the Oil and Natural Gas Commission Act, 1959, it became a statutory body called Oil and Natural Gas Commission with effect from 15 October 1959. The Central Government decided to restructure the Commission into a company under the Companies Act, 1956. Accordingly, the Oil and Natural Gas Corporation Limited was incorporated as a Company on 23 June 1993 to carry out exploration and to develop and optimize production of hydrocarbons.

1.2 Exploration Process

Hydrocarbon Exploration and Production (E&P) operations, also referred to as upstream operations, can be broadly grouped into three categories.

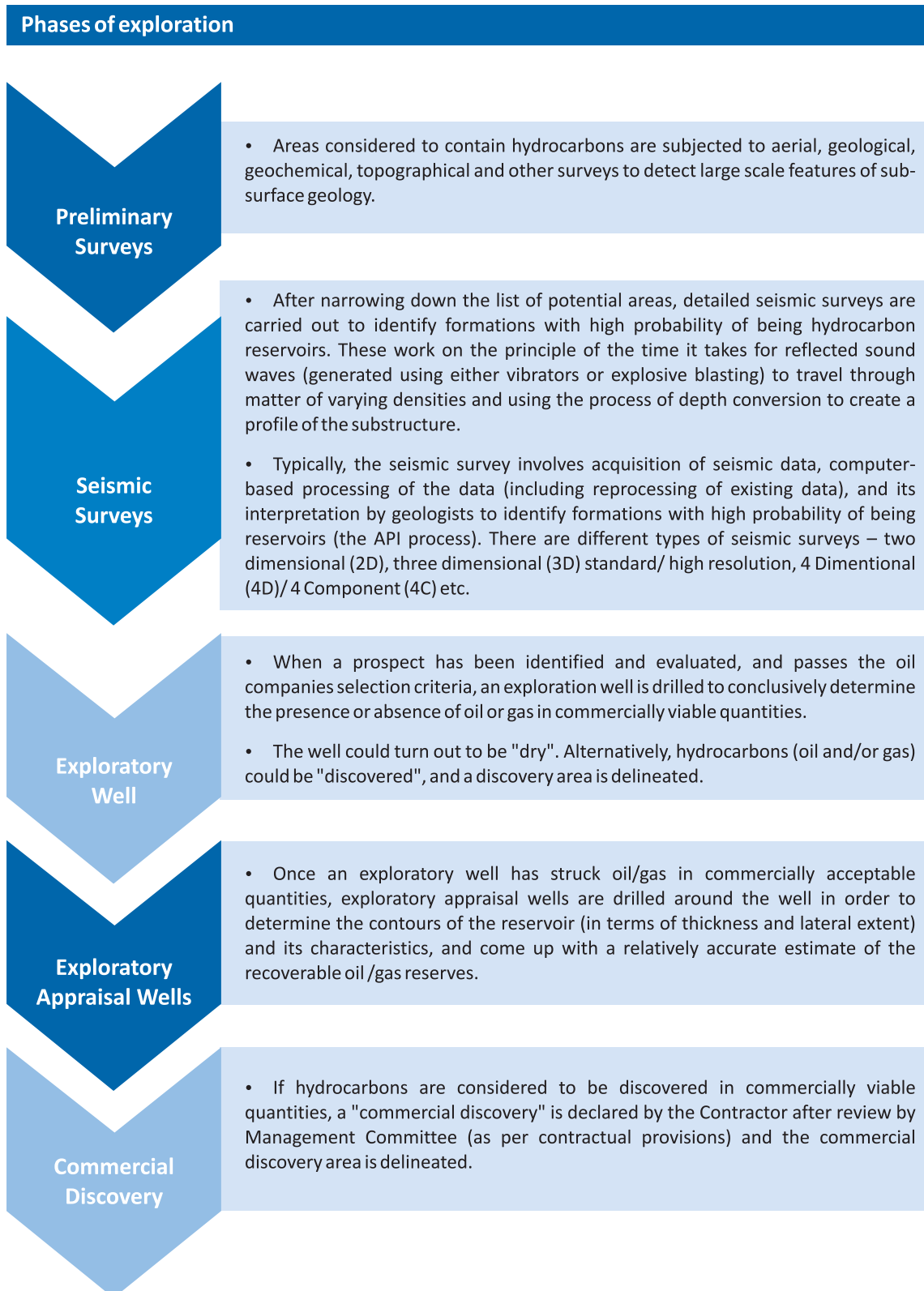


Exploration process

The process of hydrocarbon exploration starts with prognostication and geo-scientific surveys on the identified sedimentary basins. The information collected from these surveys is processed and interpreted to construct a logical model of the basin. The model so constructed, is tested by drilling exploratory wells. If the area proves to be hydrocarbon bearing, delineation wells are drilled to determine the boundaries or the extent of reservoir of the new oil or gas field. This is followed by drilling of development wells, laying oil pipelines and installation of facilities to put the field on regular commercial production.

The first phase in the process for extraction of hydrocarbon is exploration – the search for oil and gas deposits beneath the earth's surface. Such deposits could either be onshore or offshore.

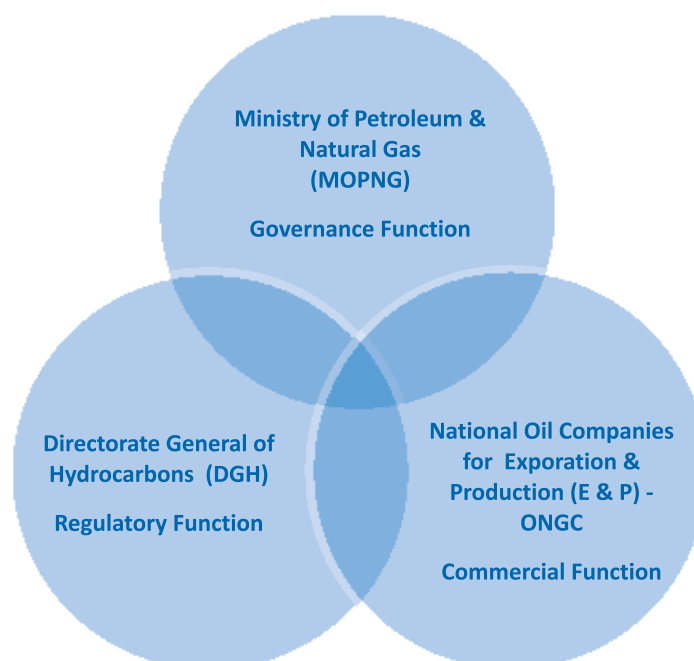
Exploration consists of several sub-phases:



1.3 Institutional Framework for Hydrocarbon Exploration

In India, the Ministry of Petroleum and Natural Gas (MOPNG) is responsible for formulating policies and rules and regulations that govern exploration and production operations in the oil and gas sector.

Institutional Framework



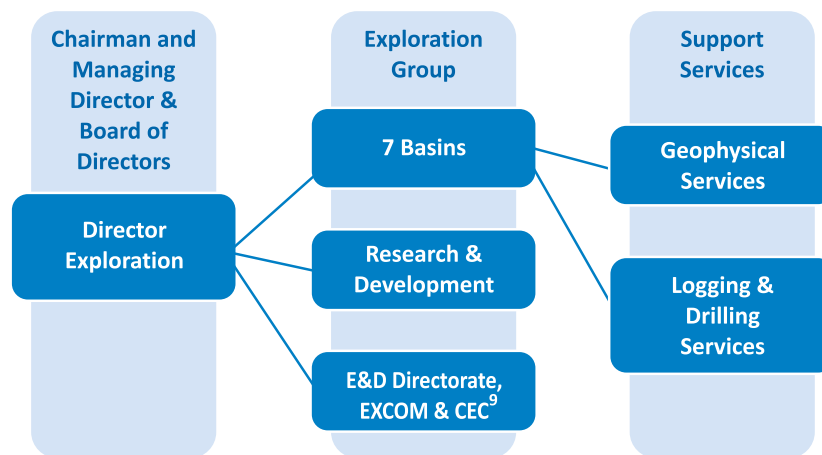
The Directorate General of Hydrocarbons (DGH) operates under the supervision of MOPNG and is responsible for regulation and oversight of upstream activities in the petroleum and natural gas sector in India. DGH is also the technical arm of the MOPNG in matters related to exploration and production of hydrocarbons. ONGC is one of the two national oil companies (NOCs) that are engaged in commercial activities related to exploration and production of hydrocarbons. MOPNG with the assistance of DGH regulates the hydrocarbon exploration of ONGC and other E&P companies under the provisions of Oilfields (Regulation and Development) Act, 1948 and Petroleum and Natural Gas Rules, 1959. MOPNG is also responsible for issue of licenses to the NOCs and the private operators for the offshore areas and concerned State Governments issue licenses for onshore E&P activities on the recommendation of MOPNG.

In the year 2000, MOPNG formulated a 'Hydrocarbon Vision 2025' to lay down the framework which would guide the policies relating to the hydrocarbon sector for the next few years. One of the main areas of the Hydrocarbon Vision is to focus on oil security through intensification of exploration efforts and achievement of 100 *per cent* coverage of unexplored basins in a time bound manner to enhance domestic availability of oil and gas. ONGC has formulated its strategy based on the Hydrocarbon Vision 2025.

1.4 Performance Accountability Arrangements for Exploration: MOU between MOPNG and ONGC

The performance accountability arrangements for hydrocarbon exploration are enforced through the annual Memorandum of Understanding (MOU) signed between MOPNG and ONGC. The guidelines for MOU between ONGC as a Central Public Sector Enterprise (CPSE) and MOPNG as the administrative Ministry are prescribed by the Department of Public Enterprises (DPE). On the basis of the performance against the targets set in the MOU, the CPSE is ranked on a five point scale: 'Excellent', 'Very Good', 'Good', 'Fair', 'Poor'. ONGC achieved an overall grading of 'Very Good' for all the four years ended March 2010-11.

Organisational arrangements for Hydrocarbon Exploration in ONGC



Hydrocarbon exploration of ONGC is spread over seven sedimentary basins⁸ located in onshore as well as offshore areas. The Basins are involved in the actual exploration of the blocks. The Director (Exploration) heads the exploration activities and the organizational chart is as shown above. The institutes of ONGC viz. GEOPIC, KDMIPE, IRS, IDT and the SPIC/RGLs⁹ carry out research and development work for exploration. The exploration group is also supported by

- Geophysical Services for acquisitions and processing of seismic surveys;
- Drilling Services for drilling of Exploratory and Appraisal Wells; and
- Logging¹⁰ Services for logging of the wells.

⁸ Western Offshore Basin (WOB), Western Onshore Basin (WON), Krishna Godavari – Pranahita Godavari (KG-PG) Basin, Mahanadi-Bengal –Andaman (MBA) Basin, Assam & Assam Arakan (A&AA) Basin, Cauvery Basin, Frontier Basin (FB).

⁹ Refer list of abbreviations.

¹⁰ Logging – recording of rock and fluid properties to find hydrocarbon zones in the geological formations intersected by a borehole.

The exploration Basins, Assets, Plants and offices of ONGC in India are shown in the map given below:

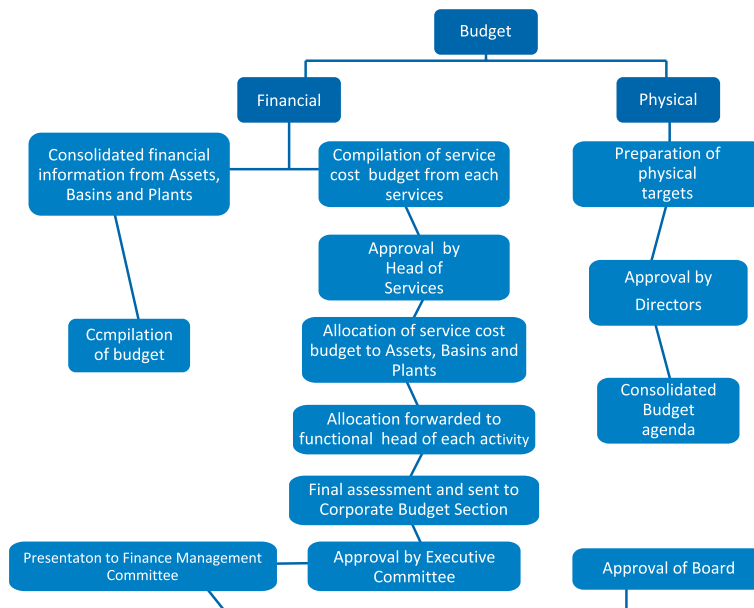
Basins, Assets, Plants and Offices of ONGC



1.5 Financial Arrangements for Exploration

Process of approvals for decisions related to each phase of exploration is depicted in the flowchart below:

Process of approvals for budget



1.6 ONGC's Exploration Blocks

As on 1 April 2011, ONGC held a portfolio of 40 Nomination¹¹ blocks (73,839 Sq. Km) and 82 New Exploration Licence Policy (NELP) blocks (428,591 Sq. Km) in onshore, offshore shallow water and deepwater areas.

1.6.1 Nomination Blocks

The year-wise details of onshore, offshore-shallow water (SW) and deepwater (DW) nomination blocks with ONGC along with the acreages held for the four years from 2007-08 to 2010-11 is as follows:

Nomination blocks with ONGC										
Areas	Nomination blocks as on									
	1-4-2007		1-4-2008		1-4-2009		1-4-2010		1-4-2011	
	No.	Area (sq.km)	No.	Area (sq.km)	No.	Area (sq.km)	No.	Area (sq.km)	No.	Area (sq.km)
Onshore	80	43106	67	39358	58	32418	45	22876	26	21655
Offshore-SW	20	37205	18	32422	15	23449	12	22663	10	17946
Offshore-DW	8	48131	7	43643	6	43524	5	35024	4	34238
Total	108	128442	92	115423	79	99391	62	80563	40	73839

Source: ONGC's Annual Corporate Plan Performance Reports for 2007-10 and data furnished by ONGC for 2010-11

1.6.2 NELP blocks

The year-wise details of onshore, offshore, shallow water and deepwater NELP¹² blocks along with the acreages held by ONGC for the four years from 2007-08 to 2010-11 is as follows:

NELP Blocks of ONGC										
Areas	NELP blocks as on									
	1-4-2007		1-4-2008		1-4-2009		1-4-2010		1-4-2011	
	No.	Area (sq.km)	No.	Area (sq.km)	No.	Area (sq.km)	No.	Area (sq.km)	No.	Area (sq.km)
Onshore	13	34022	21	55761	29	39227	30	53759	33	54734
Offshore-SW	10	66619	9	63735	14	75440	9	37828	13	29122
Offshore-DW	16	202003	28	308795	30	337428	31	330983	36	344735
Total	39	302644	58	428291	73	452095	70	422570	82	428591

Source: ONGC's Annual Corporate Plan Performance Reports for 2007-10 and data furnished by ONGC for 2010-11.

¹¹ Nomination blocks- Before introduction of NELP, the National Oil Companies (NOCs) viz. ONGC and OIL were awarded blocks for exploration on nomination basis and are known as 'Nomination Blocks'.

¹² NELP blocks: With the introduction of NELP in 1997, MOPNG awarded exploration blocks through a competitive bidding process to NOCs and private sector companies and are known as NELP blocks.