

THE LEGISLATIVE AND REGULATORY FRAMEWORK OF OIL AND NATURAL GAS SECTOR OF INDIA: AN ENVIRO-LEGAL ANALYSIS



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DECLARATION

I, MANAKHI MECH, pursuing Master of Laws (LL.M.) from National Law University and Judicial Academy, Assam, do hereby declare that the dissertation titled “THE LEGISLATIVE AND REGULATORY FRAMWEWORK OIL AND NATURAL GAS SECTOR OF INDIA- AN ENVIRO-LEGAL ANALYSIS” is an original research work and has not been submitted either in part or full anywhere else for any purpose, academic or otherwise, to the best of my knowledge.



Date 15-07-2021

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PREFACE

Oil and Natural gas is a major source of energy globally. Oil & Natural gas production and exploration industries have been growth due to development of modern science and technology. The exploitation of oil and gas reserves has also leads some ecological side effects. Therefore in international level Rio declaration focused world attention on the close links that exist between the environment and economic development.

India is a country major producer of oil and natural gas and contributed economic growth from this sector. Last three decades India faced time to time certain disasters relating to oil and natural gas sectors. There is a growing consensus that issues of disasters and its adverse affects on environment reflected not for just public attitude, but also in legislative actions. The judiciary has been playing crucial role for protection of environment.

The researcher therefore, in this paper seeks to analyses the legislative and regulatory framework for the regulation and development of onshore exploration and production.

TABLE OF CASES

A. P. Pollution Control Board v. Prof. M.V. Nayadu

Bonai Kakkar v. Oil India Limited

Balakrishnan Nambiar v. State of Karnataka

In Goa Foundation vs. Union of India in Goa

M.C.Mehta v. Kamal Nath and Others

M.C. Mehta v. Union of India

Mridu Paban Phukan & Anr v. Union of India &Ors

In Rural Litigation and Entitlement Kendra v. State of UP

K. Balakrishnan Nambiar v. State of Karnataka

Kamaljeet Singh Ahluwalia v. State of Bihar

Ryland v. Fletcher

T.N. Godavarman v. Union of India

T.N. Godavarman Thirumpalad v. Union of India

T.N. Godavarman Thirumalpad v. Union of India

T.N. Godavarman Thirumpalad v. Union of India

Union Carbide Corporation v. Union of India

In Vellore Citizen's Welfare Forum v. Union

Wildlife and Environment Conservation Organisation v. Union of India

In Indian council for Enviro-Legal Action v. Union of India

Fertilizers and Chemical Travancore Ltd, Employee Assn, v. Law Society of India

TABLE OF STATUTES

- 1934- The Petroleum Act
- 1948- The Oilfield Regulation and Development Act
- 1959- The Petroleum and Natural Gas Rules
- 1952- The Mines Act
- 1972- The Water (Prevention and Control of Pollution) Act, 1974
- 1974- The Oil Industry (Development) Act
- 1980- The Forest Conservation Act
- 1982- The Air (Prevention and Control of Pollution) Act
- 1984- The Oil Mines Regulations
- 1986- The Environment Protection Act
- 1991- The Public Liability Insurance Act
- 1992- The Rio Declaration on Environment and Development
- 1994- The Environmental Impact Assessment Notification
- 2000- The Noise Pollution (Regulation and Control) Rules
- 2002- The Biological Diversity Act
- 2003- The Petroleum and Natural Gas (Amendment) Rules
- 2005- The Disaster Management Act
- 2006- The Petroleum and Natural Gas Regulatory Board Act
- 2011- The Oil Mines Regulations
- 2011- The Coastal Regulation Zone Notification
- 2017- The Oil Mines Regulations

TABLE OF ABBREVIATIONS

Serial No	List of Abbreviations	Expansions
1	AOC	Assam Oil Companies
2	CBM	Coal Bed Methane
3	CCI	Competition Commission of India
4	CPCB	Central Pollution Control Board
5	CSIR	Council of Scientific and Industrial Research
6	CRZ	Coastal Regulation Zone
7	DGH	Director General of Hydrocarbons
8	DSNP	Dibru -Saikhowa National Park
9	EAC	Expert Appraisal Committee
10	ESZs	eco-sensitive zones
11	EWT	Extended Well Test
12	EOI	Expression of Interest
13	E&P	Exploration and Production
14	EIA	Environmental Impact Assessment
15	GDP	Gross Domestic Products
16	GoI	Government of India
17	HELP	Hydrogen Exploration Licensing Policy
18	ML	Mining Lease
19	MPSC	Model Production Sharing Contract
20	MoEF&CC	Ministry of Environment, Forest and Climate Change
21	NELP	New Exploration Licensing Policy

22	NECs	National Oil Companies
23	NEIST	North East Institute of Science and Technology
24	OIL	Oil India Limited
25	ONGC	Oil and Natural Gas Corporations
26	O&NG	Oil and Natural Gas
27	OIDB	Oil Industry Development Board
28	OALP	Open Acreage Licensing Policy
29	OMR	Oil Mine Regulation
30	PSC	Production Sharing Contact
31	PSCs	Public Sector Companies
32	PEL	Petroleum Exploration License
33	PH	Public Hearing
34	PSC	Revenue Sharing Contract
35	SEIAA	State Environment Impact Assessment Authority
36	SLAC	State- Level Appraisal Committee
37	SPCB	State Pollution Control Board
38	TERI	The Energy Resources Institute
39	WHO	World Health Organization
40	WII	Wildlife Institute of India

CONTENTS

Certificate	ii
Declaration	iii
Acknowledgement	iv
Preface	v
Table of Cases	vi
Table of Statutes	vii
Table of Abbreviations	viii
Contents	x
CHAPTER 1- Introduction	1
1.1. Introduction	1
1.2. Research problem	6
1.3. Aim	6
1.4. Objective	6
1.5. Research Questions	7
1.6. Scope & Limitations	7
1.7. Literatures review	8
1.8. Research Methodology	9
CHAPTER 2 - Licensing provision onshore E&P	10
2.1 Regimes of Licensing	10
2.2. Licensing Provision under ORD Act 1948 & P&NG Rules 1959	15
2.3. Environment Clearance for E&P	16

CHAPTER 3 – Legislative & Regulatory framework oil and natural sector in India	24
3.1. Legislative Framework	27
3.2. Regulatory framework	44
3.3. The Director General of Hydrocarbons (DGH)	46
3.4. Environmental Legislations	50
CHAPTER 4 - Disasters Relating to Onshore Exploration and Production	55
4.1. Onshore Disaster of Exploration and production	55
4.1.1. In 1993 gas pipeline leakage in Komarada mandal, Andhra Pradesh	55
4.1.2. In 1995 Pasarlapudi ONGC Well fire at Andhra Pradesh	56
4.1.3. In 2005 oil well blowout at Dikom, Assam	59
4.1.4. In 2020 at Baghjan OIL well blowout and fire	60
CHAPTER 5- Judicial Interpretations	68
Conclusion	72
Bibliography	74

Chapter 1

Introduction

1.1. Introduction: Oil and Natural Gas is a major source of energy in India. Production of oil and natural gas is the standard for growth of economy, which work as a backbone of Indian economy. In India total 15% of GDP contributed from oil and natural gas sector.¹ Economic growth and environment protection is both international and national concerned. In international level Principle 4 of the Rio declaration captures that in order to achieve sustainable development; environment protection shall constitute an integral part of development process and cannot be considered in isolation from it. In national level the constitution of India contains specific provisions of environment under the Directive Principle of State Policy and Fundamental Duties. Article 48-A provides that state shall endeavour to protect and improve the environment and safeguard the forests and wildlife of the country. Article 51-A(g) provides that it shall be duty of the every citizen of India to protect and improve the environment the natural environment including forests, lakes, rivers and wildlife and to to have compassion for living creatures. In India onshore oil and natural gas E&P mainly dominated by two public sector companies OIL and ONGC.² For regulation and management of O&NG Indian Parliament enacted several legislations. In India, the regulation and development of oilfields and mineral oil resources, petroleum and petroleum products, and other liquids and substances are declared under law by the Parliament as dangerously inflammable, falls under the Union List Article 246, Seventh Schedule. The principle government body at the central level is the Ministry of Petroleum and Natural Gas. At the state level, there are departments and directorates that regulate and control activities related to petroleum and natural gas in onshore fields.³ This dissertation deals with legislative and regulatory framework for development and management of onshore E&P in terms of environmental perspective. The importance of sustainable economic growth with regards to oil and gas industry is essential.⁴ In India O&NG sectors need to maintain the sustainability

¹ Nishith Desai Associate, 'Oil & Gas Industry in India Legal, Regulatory and Tax' (2018) <www.nishithdesai.com>.

² Dimple S Bath, 'Legal Aspects of Oil and Gas Projects in India' (1999) 18(3) Australian Mining & Petroleum Law Journal 221. MLA 8th Ed. Bath, Dimple S', vol 18 (1999) <<https://heinonline.org/HOL/License>>.

³ Anmol Soni and Anomitra Chatterjee, 'Governance of the Petroleum and Natural Gas Sector in India: A Status Note The Energy and Resources Institute TERI-NFA Working Paper Series No. 15 Iii Acknowledgements' (2014) <<https://www.teriin.org/projects/nfa/2008-2013/pdf/working-paper-15-Governance-of-the-petroleum-and-natural-gas-sector-in-india-a-status-note.pdf>>.

⁴ Mohamad Danish Anis and Tauseef Zia Siddique Siddiqui, 'Green Attraction—Transnational Municipal Climate Networks and Green City Branding' (2015) 5 Journal of Management and Sustainability 1.

in this sector. In India last three decades witnessed tremendous disasters relating to onshore oil and natural gas exploration and production. In this studies highlight the major disaster relating to onshore E&P. It is repeatedly blowout gaping of several year's. Which are as follows -

- In 1993 gas pipeline leakage in Komarada mandal , Andhra Pradesh
- In 1995 Pasarlapudi ONGC Well fire at Andhra Pradesh
- In 2005 blowout and fireoutbreak on ONGC Exploratory well at Tandavapalli
- In 2005 oil well blowout at Dikom , Assam
- In 2020 at Baghjan OIL well blowout and fire

Therefore it is necessary to understand the links between environment and development in order to make choices for development that will be economically efficient, socially equitable and responsible, as well as environmentally sound.⁵ According to Oil Mine Regulation 2017 'Blowout' means uncontrolled sudden violent escape of fluid from a well. These disasters adversely effects on environment and human health and safety. For regulation and development oil and gas sector as per Indian constitution Entry 53, List 1, Scheduled vii conferred power on the central government to legislate oil and natural gas sector. Onshore E&P mainly regulated by the Oilfield Regulation & Development Act 1948 and the Petroleum and Natural Gas Rule 1959, which make provision for the regulation of petroleum operation and grant of licenses and leases for exploration, development and production of petroleum in India. Oil and Natural Gas E&P Environmental sector driven by EIA notification for the purpose of recognizing the need for environmental protection from the oil and gas operation under the Environment Protection Act 1986. Other environment legislation such as The Water Prevention and Control of Pollution Act, 1972, The Air Prevention and Control Of Pollution Act 1981, For respond disaster the Disater Management Act, 2005. In India the Central government has framed Environment Protection Act, 1986 to broadly encompass and regulate an array of environmental issues. As per the Environment Impact Assessment (EIA) notification 2006, all projects of oil and gas exploration, development and production comes under category 'A' in the schedule and shall require prior environmental clearance from the Central Government in the Ministry of Environment and Forests.

⁵ Parliamentary Affairs, 'Offshore and Onshore Oil & Gas Exploration ,Development and Protection , Government of India' 16 <http://environmentclearance.nic.in/writereaddata/Form-1A/Homelinks/TGM_Offshore Onshore_010910_NK.pdf>.

In International level in field of E&P have “The Oil Industry International Forum” to see the health, safety and environment protection. E&P activities are subject to extensive legislation and regulation concerning health and safety and environment. In India the Oil and natural gas sector divided into three parts –

i. Upstream: This sector includes searching for potential underground or underwater crude oil and natural gas fields, drilling exploratory wells and subsequently drilling and operating the well that recover and bring the crude oil and raw material gas to the surface.the upstream is known as the exploration and production.⁶

ii. Midstream: It processes stores, market, transports commodities such as crude oil and natural gas, natural gas liquids (NGLs, mainly ethane, propane and butane) and sulfur. The midstream provides the vital link between the far flung petroleum producing areas and the population centres where most consumers are located.⁷

iii. Downstream: This includes all refineries, petrochemical plants, petroleum products distributors, retail outlets and natural gas distribution companies.⁸ It refers to the refining of crude oil and the selling and distribution of natural gas and products derived from crude oil.

The origin of oil and gas industry in India tracked back to 1867, when oil struck at Makum near Margherita about 8 miles from Digboi, Assam. However, Exploration and Production started a systematic way in 1899 after Assam Oil Company was formed.⁹ India is one of the largest countries in the world in terms of size , and it is also home to some mineral resources such as coal,(fourth largest reserves in the world), along with Natural Gas , Diamonds , petroleum , iron ore , petroleum , limestone.¹⁰ Oil resources were found found in few states such as Assam, Gujrat, Rajasthan, Andhra Pradesh, and in the offshores of Mumbai in Maharastra.¹¹The history of oil industry in India back to 19th century, when Assam Railways and Trading Companies found oil in Digboi Assam in 1889, and Transferred the oil interests to Assam Oil Companies. AOC built a refinery in Digboi 1901 before Burmah Oil Companies took over AOC in 1907. Later Burmah Oil Companies was changed to Burmah Shell group of companies. Under the Government of India (Allocation of

⁶ IH Mackay, ‘Oil and Gas.’ (1976) 69 CIM Bulletin 73.

⁷ ibid.

⁸ ibid.

⁹ Sanjay Arya and USA US Commercial Services, ‘Indian Oil and Gas Industry’ 1 <<https://www.researchgate.net/profile/Sanjay-Sakariya>>.

¹⁰ R ILANGO, ‘04_chapter 1 (3).Pdf’ <<http://hdl.handle.net/10603/323104>>.

¹¹ ibid.

Business) Rules 1961, hydrocarbon exploration and exploitation transacted through the Ministry of petroleum and Natural. The Ministry of Petroleum & Natural Gas. It has set up the Directorate General of Hydrocarbons under its administrative control with the aim of promoting sound management of Indian oil and natural gas resources, with balanced regard for the environment, safety, technological and economic aspect of petroleum activity.¹² Indian policy documents envisages that the purpose of EIA is to identify and evaluate the potential (beneficial and adverse) impacts of development project on the environmental, social, cultural and aesthetic concerns in the planning stage of industrial project. EIA is a systematic evaluation of significant physical, biological and socio-economic effects of developmental projects on the natural and manmade environment to arrive at a rational and logical decision making. This dissertation covers all legislative and regulatory frameworks relating to onshore E&P. Apart from this highlighted on environment law of India relating to E&P. Oil and gas blowouts result in emission of large quantities of harmful gases such as sulphur dioxide, carbon monoxide, hydrogen sulphide and other oxides of nitrogen and as well as particulates containing burnt hydrocarbons and metals that are potentially harmful to human health and vegetation. Oil and Natural gas exploration and production impact on environment as follows

—

- Oil and gas blowouts result in emission of large quantities of harmful gases such as sulphur dioxide, carbon monoxide, hydrogen sulphide and other oxides of nitrogen and as well as particulates containing burnt hydrocarbons and metals that are potentially harmful to human health and vegetation. The emissions from drilling activity and their relative contribution to different types of environmental damage were shown in. The oxides of sulphur and nitrogen lead to decline in growth of plant and animal life and especially nitrogen oxides can affect the respiratory system in living organisms and humans. Carbon dioxide is a greenhouse gas which cause global warming.
- Noise from Drilling Operation Out of entire oil and gas exploration activity, drilling phase produces more noise pollution. Noise affects not only humans but also wildlife. The sounds produced from drilling operation can have a serious impact on living creatures, depending on the closeness to the well site. The impact of drilling operation

¹² Lewis Manning, Bernadita Tamura and Lawson Lundell Llp, 'Oil and Gas Regulation in Canada : Overview' 1 <[https://uk.practicallaw.thomsonreuters.com/4-635-5648?transitionType=Default&contextData=\(sc.Default\)&firstPage=true#:~:text=The Petroleum and Natural Gas,Ensure an adequate supply.>](https://uk.practicallaw.thomsonreuters.com/4-635-5648?transitionType=Default&contextData=(sc.Default)&firstPage=true#:~:text=The Petroleum and Natural Gas,Ensure an adequate supply.>)>.

is of varying magnitude both on socio-economic and environmental parameters. However, the threshold also varies from place to place.

- **Hydrological Impact/Soil Ecosystem** The important concern in drilling from hydrological perspective is that the degradation of land, water and air near the drill site. Major sources of pollution from drilling activity that cause hydrological and affect the quality of soils are chemicals such as bentonite, barite, diesel, mercury, cadmium, arsenic formaldehyde and heavy metals in drilling fluids. Most of the drilling muds are very toxic. These pollutants cause contamination of ground and surface waters. The mud pits used in drilling operation can affect the ground water and ecology of the surroundings by the process of lateral migration through fractures present in the subsurface. Two main significant impacts of drilling activity to soil ecosystem are invasion of drilling mud and chemicals into surrounding formations, Compaction of pores due to removal of oil and gas leads to subsidence in the area.
- **Flora and Fauna** the interruption of the ecological balance due to drilling operation occurs through surface discharge of pollutants affecting the environment. Mainly damage is caused due to construction of roads, pipelines, establishment of drilling site, support infrastructure etc. The loss of vegetation in the area affects nutrient cycles, deteriorates soil quality and reduces the availability of habitat for wild life. Habitat damage also includes vegetation or soil removal, erosion topographies, sedimentation, and hydrology. The changes in the abundance and distribution of certain wildlife species can have significant effect on the livelihood of indigenous people living in that area.

The **first chapter** gives introduction that oil and natural gas major source of energy and major contributor of country economy. It also deals with a history of oil and natural gas in India. This chapter detailed about origin oil and gas exploration in India. It leads high risk of disaster relating to oil and natural gas onshore E&P. First chapter also reflected the statements of problem, aims, objectives, research question, literatures review and research design.

In **second chapter** deals with the licencing procedure and brief explain how it licensing pattern changing time to time to the field of E&P of oil and natural gas. In this chapter licensing regime divided into four regimes that is Nomination, Pre-NELP, NELP and HELP. Also discuss the EIA laws relating to grant exploration of mining license and lease. Also

discussed the procedure that followed for E&P for prior consent of establish and consent to operation. This chapter also deals with changing perspective EIA.

In **third chapter** deals with what are the legislatives and regulatory framework in India for management and development of oil and natural gas onshore E&P in India. This chapter also highlighted all legislative provisions of onshore E&P relating to the environment and safety. This chapter also reflected environmental legislation in India which explicitly dealing with link with all provision on oil and gas sector control and management of oil and natural gas industry during E&P in terms of environment. Also studies public sector oil and natural gas company organization.

In **fourth chapter** deal with the liability principle of oil and natural gas companies through judicial doctrines i.e. public trust doctrine, polluter pays principle, precautionary principle, absolute liability principle and sustainable principle.

In **fifth chapter** primarily focused on upstream oil and gas disasters and how it impact on environment and human health. Also there are overviews the cause for of disaster. Also overviews on The Disaster Management Act 2005 for respond these kinds of manmade disaster.

1.2. Research problem

An understanding the issue environment impact relating to oil and natural gas disaster is very much important. Last three decades in India repeatedly happened disaster on onshore upstream O&NG sector. For control this disaster therefore it is essential to evaluate and analysis our legislative and regulatory framework concerning about precautionary measures for meet disaster.

1.3. Aim

The aim of this paper is to analyses and evaluates the prime cause of such disaster which repeatedly occurred in same O&NG companies (OIL, ONGC).

1.4. Objective

The Objective of this paper is to analyses and evaluates the onshore E&P legislation and regulatory body to achieved dealing with environment protection.

1.5. Research Questions

1. How the existing legislative and regulatory framework of India on onshore E&P of oil and natural gas meets its contemporary environmental challenges?
2. What are the procedures established in the existing laws and policies for the issuance of licenses for the oil and natural gas sector?
3. How far the environmental laws of the country are addressing the challenges of oil and natural gas sector?
4. How the existing laws crucial elements of liability and accountability in case of oil and natural gas disasters?

1.6 Scope & Limitations

This study comprehensively deals with the issues of disaster on onshore exploration and production and its environment impact, human health. It deals with how legislative and regulatory framework dealing on onshore E&P. It highlighted about environment provision on existing oil and natural gas sector laws. It specifically analyses the constitution provisions of environment as well as judicial doctrines. This dissertation neither analyses midstream nor downstream provision of oil and natural gas sector. The researcher has taken sincere efforts to collect relevant, updated and accurate data both primary and secondary sources to as possible effort. But in study of this certain problems were faced in this regards. These are include:

1. Lack of previous work on this subject:

Instead of National and International platform several laws have been adopted to onshore and offshore Exploration and production of oil and natural gas, several incident took place both national and international level which affect the environment, but there have been few work done on the subject. In India since pre independence period oil had been explored and post independent era new regime has been evolved on E&P. But there has been not systematically work have been done on upstream oil and gas sector.

2. Lack of library resources and availability of books:

Due to the outbreak of the Covid-19 pandemic 2nd phase, the researcher had not able to access any book on this subject so therefore to obtain data through online which are availed.

1.7. Literatures review

1.7.1. Bath¹³

This Article deals with detailed discussion about the legal aspect of oil and gas projects in India. This article mentioned in legal aspects how OIL and ONGC are engaged in the exploration, development and production of hydrocarbon resources and the management and decision making particularly with regard to private investment and along with the Ministry of Petroleum and Natural Gas. this article systematically analyses how legal aspect related to management and development of oil and natural gas sector in terms such as production sharing, acreage, canalization, administered pricing mechanism financing, new exploration licensing policy, risk sharing specifically mentioned environmental liabilities which deals with strict environmental legislation has been introduced in India.

1.7.2. Das¹⁴

This article comprehensively deals with on environmental issue relating to onshore oil and natural gas exploration and production. Which are the causes of several environmental degradation. The author discussed the regulatory and legislative framework to safeguard the environment. The Author is trying to understand the link between exploration and development of oil field and requirement of environmental management.

1.7.3. Anis & Siddique¹⁵

This article explores that internationally oil and natural gas plays important role in sustainable development. The author in this article explained that economic development and environment protection is part of sustainable development. The importance of sustainable economic growth with regards to the oil and natural gas industry has also been highlighted. Oil and gas industries inadequacy leads some environmental risk therefore wellbeing

¹³ Bath (n 2).

¹⁴ Pulak Das, 'Environmental Management in Oil and Gas Upstream Industry in India' (2014) 30 Journal of Industrial Pollution Control 59
<https://www.researchgate.net/publication/267772608_Environmental_Management_in_Oil_and_Gas_Upstream_industry_in_India>.

¹⁵ Siddiqui (n 4).

companies obeying the law and developing strategies for sustainable practices of their businesses in their operational environment.

1.7.4. Jain, Yerramilli & Yerramili¹⁶

This article author highlighted the major blowouts in Krishna – Godavari basin have leads to number of risk related to loss of human lives, environmental pollution and loss of material assets. Also discuss the effect of exploration and production of oil and natural gas on environment. Author stated that recommendation presented will be utmost importance for oil and gas operators and service companies to take necessary steps in future drilling operations in over pressured formations of KG basin prevent loss to property, personnel and damage to the environment.

A review of the existing literature on the subject matter although has been helpful in understanding the importance of oil and natural gas for economic development in one side and protection of environment is other side, therefore need sustainable development is important aspect for both. Environmental Impact Assessment (EIA) is an instrument of environmental policy designed to for a conscious and systematic assessment of environmental impacts of developmental project before decision making. It predicts the likely environment impacts of project to reduce unacceptable impacts and offers various options and alternatives to the decision makers. In simplest terms it is the assessment of quality of the total human environment before decision making exercise of a developmental project for well being of humanity.

1.8. Research Methodology

The present research work includes doctrinal studies the doctrinal work deals with literature relating to the onshore exploration and production oil and natural gas. The primary sources like statutes and regulations which deal with onshore E&P. The secondary sources like Article, online journal, online database and report have been used in the study.

¹⁶ CK Jain, SS Yerramilli and RC Yerramilli, 'A Case Study on Blowout and Its Control in Krishna-Godavari (KG) Basin, East Coast of India: Safety and Environmental Perspective.' (2012) 2 Journal of Environment and Earth Science 49 <<https://core.ac.uk/download/pdf/234662918.pdf>>.

Chapter 2

Licensing provision onshore E&P

The Oilfields Regulation and Development Act 1948 provide a structure for the leasing of petroleum and gas blocks. Along with the Petroleum Rules 1959, it governs the granting of both Petroleum Exploration License (PEL) and Mining Leases (ML), laying down who may apply for leases and the terms with respect to maximum area and time. It prohibits mining or prospecting without a valid lease as obtained under these regulations and obtained from the central government, and also gives the person(s) obtaining the license exclusive rights to extract oil or gas, depending on the nature of the license, for as long as the time period permits. It also prescribes the fiscal regime that India follows in this sector. This Act is mainly related to upstream activities of exploration, recovery and production.¹⁷ The history of the Indian oil and natural gas industry can be traced back to the first commercial discovery of oil in 1889 in Digboi, Assam. Subsequently, the Assam Oil Company was established to take control of the petroleum production. In 1921, Burmah Oil Company was appointed as technical manager to Assam Oil Company (AOC). Post-independence, more oil was found near Digboi and in West Bengal. In 1955, the ONGD (Oil and Natural Gas Directorate) was set up under the Ministry of Natural Resource and Scientific Research. In 1956, the Directorate was elevated to a Commission. In 1959, OIL India Private Limited was formed to increase the pace of exploration in North Eastern India. The Government of India owned only a third of the shares, while the rest was owned by Assam Oil Company. This was changed in 1981, when the Government of India (GoI) bought all the shares of OIL India Private Limited.¹⁸ With respect to licensing during this period, Petroleum Exploration Licenses (PEL), which the Central Government had the power to grant, were required under the Petroleum and Natural Gas Rules, 1959, for carrying out prospecting operations for oil in any area.¹⁹ In The regime governing regulation and development of exploration and production on upstream the licensing policy divided into four categories. These are: Nomination, Pre-NELP, NELP, and HELP.

2.1 Regimes of Licensing

2.1.1. Nomination

¹⁷ Rohith Kamath and Kumar Srivastava, 'Nlsiu B' 214.

¹⁸ *ibid.*

¹⁹ *ibid.*

The Oilfield Regulation and Development Act 1948 and The Petroleum and Natural Gas Rules 1959 do not prescribe the policy to be adopted by the Government for the award of blocks to E&P companies.²⁰ At the time when the Act and the Rules were framed blocks were awarded to NOCs on nomination basis. Nomination basis licensing regimes refers to the era when acreages were awarded by the Government only to the two National Oil Companies namely Oil India Limited and Oil and Natural Gas Corporation.²¹ For the purpose of prospect petroleum and mine petroleum must be issued petroleum exploration license and petroleum mining lease. Petroleum exploration license specified the covered area and it provides for term four years also which extended for two further periods of one year each. In a recent development, the Ministry of Petroleum and Natural Gas (MPNG) has been urged to release acreage for bidding in a series of licensing rounds. The Oil Industry (Development) Act was passed in 1974 under which the Oil Industry Development Board (OIDB) was created at a time when the need to promote self-reliance in the oil and gas sector was realized. The mandate of the Board is to facilitate development of the sector. The Board is responsible for collecting the oil industry development cess on the blocks that have been awarded to upstream oil companies on a nomination basis. It also extends financial assistance to companies in the sector in the form of loans.²² In this regime, as between ONGC and OIL, much of acreage was gained on a nomination basis and private companies have to be assured that any new acreage will have high exploration potential. The first acreage to be offered is expected to be a group of 55 shallow marine and land blocks of predetermined size and shape that have featured in previous licensing rounds. This will be followed by deep-water acreage, the idea being that public sector undertakings will have to convert their nominated acreage operated under the terms of the Administered Pricing Mechanism (APM) to acreage conforming to the new exploration licensing policy.²³ In 1992, a committee headed by Shri P. K. Kaul was formed and recommended the creation of a Directorate General of Hydrocarbons (DGH) to take over the regulation of leases, licensing, safety, environmental concerns and development from Oil and Natural Gas Corporation (ONGC). Pursuant to this, the DGH was set up in 1993 under the Government of India. With respect to licensing during this period,

²¹ Natural Gas Rules, 'Petroleum Federation of India Report on Review of the Oilfield (Regulation and Development) Act , 1948 and the Petroleum And'
<<https://www.fipi.org.in/Reports/ReportonReviewofORDA.pdf>>.

²² Soni and Chatterjee (n 3).

²³ Bath (n 2).

Petroleum Exploration Licenses (PEL), which the Central Government had the power to grant, were required under the Petroleum and Natural Gas Rules, 1959, for carrying out prospecting operations for oil in any area.²⁴ These were given to National Oil Companies (hereinafter NOCs) on a nomination basis until 1991.²⁵

2.1.2. Pre- New Exploration License Policy

Between 1991 and 1993, a different regime of granting Petroleum Mining License (PML) was followed, whereby the license was granted through International Competitive Bidding. In the pre-NELP stages, 28 blocks were awarded to private companies, and NOCs were allowed to participate after discoveries had been made.²⁶ Regarding Pre-NELP discovered field or development round for the small, medium-sized and discovered fields proven reserves as discovered by OIL and ONGC. Petroleum mining lease was granted to private parties for these fields. The Indian Government has signed 28 contracts for 29 discovered fields. Out of these 25 contracts are active.²⁷

2.1.3. New Exploration Licensing Policy

Government of India formulated a policy called New Exploration Licensing Policy (NELP) in 1997. NELP was formulated by the Government of India (GoI) in 1997 to open up the oil and gas upstream sector to private players in order to facilitate better investments in the sector.²⁸The main objective was to attract significant risk capital from Indian and Foreign companies, state of part technologies, new geological concepts and best management practices to explore oil and gas resources in the country to meet rising demands of oil and gas. This policy, NELP was approved in 1997 and it became effective in February, 1999. Since then licenses for exploration are being awarded only through a competitive bidding system and National Oil Companies (NOCs) are required to compete on an equal footing with Indian and foreign companies to secure Petroleum Exploration Licences (PELs). In 1997 the government introduced a new system of licensing, the New Exploration.²⁹Licensing Policy, whereby the awarding of PELs on a nomination basis was discontinued. This system was

²⁴ Kamath and Srivastava (n 17).

²⁵ *ibid.* ²⁵ Rules (n 21).

²⁶ Kamath and Srivastava (n 17).

²⁷ The law review, an extract from the oil and gas law review -7th edition.j SAGAR Associates.

²⁸ Kamath and Srivastava (n 17).

²⁹ *ibid*

adopted in 1999 and provided the same opportunities to private investors as it did to NOCs.³⁰ The announcement of the new exploration licensing policy in 1997 and efforts towards its implementation since the beginning of 1998 is encouraging. The policy provides incentives to increase the domestic supply of oil and gas in order to meet the growing domestic demand for oil and seeks to decrease the country's dependence on imported petroleum products. The principal highlights of the policy include:

1. No automatic state participation in commercial discoveries.
2. Companies, including ONGC and OIL, being paid the international price of oil for new discoveries made under the policy.
3. Royalty payments for exploration in deep waters being charged at half the rate for offshore areas for the first seven years after commencement of commercial production;
4. Freedom to market crude oil and gas in the domestic market.
5. Tax holiday being available for a period of seven years after commencement of commercial production; Articles The Legal Aspects of Oil and Gas Projects in India " state companies such as ONGC to have the same duty concessions on import of capital goods under the new exploration licensing policy as private company production sharing contracts; " cess levied under the Oil Industry Development Act of 1974 being abolished for new exploration blocks; and " tax stabilization through a separate petroleum tax code approved in principle by the Finance Ministry, which codifies all the existing fiscal incentives provided for oil exploration. It will also give the investor a composite picture of tax levies and concessions.³¹

The salient features of NELP are as under:

- 100% FDI (Foreign Direct Investment) is allowed under NELP
- No mandatory state participation through ONGC/OIL or any carried interest of the Government.
- Blocks to be awarded through open international competitive bidding.
- ONGC and OIL to compete for obtaining the petroleum exploration licenses on a competitive basis instead of the existing system of granting them PELs on nomination basis.
- ONGC and OIL to get the same fiscal and contract terms as private companies.

³⁰ Kamath and Srivastava (n 17).

³¹ Bath (n 2).

- Freedom to the contractors for marketing of crude oil and gas in the domestic market.
- Royalty at the rate of 12.5% for the onland areas and 10% for offshore areas.
- Royalty to be charged at half the prevailing rate for deep water areas beyond 400 m bathymetry for the first 7 years after commencement of commercial production.
- Cess to be exempted for production from blocks offered under NELP.
- Companies to be exempted from payments of import duty on goods imported for petroleum operations.
- No signature, discovery or production bonuses.
- A Model Production Sharing Contract (MPSC) which is reviewed for every NELP round. Contracts to be governed in accordance with applicable Indian Laws. NELP draws its power to award acreages from Rule 5 of the Rules which provides for an agreement between the Government and the Licensee or Lessee containing additional terms and conditions with respect to the License or Lease.³²

2.1.4. Hydrogen Exploration License Policy

The Hydrocarbon Exploration and Licensing Policy (HELP) was introduced in 2016, in order to revamp the oil and gas sector and address various industry concerns in the New Exploration and Licensing Policy (NELP) regime.³³ The Open Acreage Licensing Policy (OALP) was introduced as part of the HELP. OALP is aimed at increasing the domestic production of petroleum and expediting the appraisal of Indian sedimentary basin by providing the investors with an access to geo-scientific data available in National Data Repository (NDR). OALP further provides the flexibility to carve out exploration acreages through an open acreage licensing process and increased operational autonomy through a new revenue sharing model. Under the OALP, an Expression of Interest (EOI) can be made round the year with bidding round every six months. The EOIs would form the basis of blocks being offered in the bidding rounds.³⁴ Blocks would be allocated under the policy wherein companies can submit bids for areas of their choice. Companies can choose blocks from the designated area round the year without waiting for roadshows and auctions like in NELP.³⁵ HELP is a huge improvement from NELP in so far as it provided (a) uniform license for exploration and production of all forms of hydrocarbon (b) marketing and pricing

³² Rules (n 21).

³³ Associate (n 1).

³⁴ *ibid.*

³⁵ *ibid.*

freedom for the crude oil and natural gas produced (c) easy to administer revenue sharing model and (d) an open acreage policy.

- Uniform license for exploration and production: Unlike the multiple license models under NELP, HELP brings in a uniform licensing model, allowing drilling of all forms of hydrocarbons, including shale gas, coal bed methane, oil and gas, to be done under a single contract. Under the new regime, a common license for all hydrocarbons is awarded to firms offering maximum revenue to the Government of India would be given. It does away with complex investment multiples and provides for a lot more autonomy and flexibility to the operator.³⁶
- Marketing and Pricing freedom for the crude oil and natural gas produced: The HELP policy provides for freedom in the marketing and pricing of crude oil and natural gas from these blocks, which are produced under the new contractual and fiscal regime. This is in sharp contrast with the previous NELP policy. In addition, the HELP policy is aimed at incentivizing production.³⁷
- Revenue Sharing: HELP introduces revenue-sharing mechanism which replaced the profit sharing model under NELP. Where the government would not micro-manage the costs incurred, and would instead concentrate on receiving a share of the gross revenue. Revenue sharing will not be subject to cost recovery, monitoring will be simple, and the government share will acquire immediately on production, unlike in cost-recovery, monitoring will be simple, and the government share will accrue immediately on production.³⁸

2.2. Licensing Provision under ORD Act 1948 & P&NG Rules 1959

Petroleum and natural gas sector is managed largely at the central level in the country. As per the Petroleum and Natural Gas Rules (PNGR), states are to grant the licenses for exploration of onshore blocks with prior approval from the central government. In this regard, the license fee and royalty from production from that field accrues to the respective state government.³⁹ The Oilfields (Regulation and Development) Act of 1948, the central government was granted the power to make rules for regulating the authorization of mining leases (for offshore blocks). Further, the Act also empowers the central government to determine rates of

³⁶ *ibid.*

³⁷ *ibid.*

³⁸ *ibid.*

³⁹ Soni and Chatterjee (n 3).

royalty payable by the holder of the mining lease for onshore as well as the offshore blocks.⁴⁰ No prospecting or mining except under a license or a lease: No person shall prospect for petroleum except in pursuance of a petroleum exploration license (hereinafter referred to as a license) granted under these rules, and no person shall mine petroleum except in pursuance of a petroleum mining lease (hereinafter referred to as a lease) granted under these rules. Every holder of a license and every holder of a lease shall in these rules be referred to as the licensee and the lessee respectively.⁴¹ Grant of license or lease:

- A license or lease in respect of
- Any land or mineral underlying the ocean within the territorial waters or continental shelf of India vested in the Union, shall be granted by the Central Government; and
- Any land vested in a State Government, shall be granted by the State Government with the previous approval of the Central Government.
- Every license and lease shall contain such of the terms covenants and conditions prescribed by those rules as are applicable and such additional terms, covenants and conditions as may be provided in the agreement between the Central Government and the licensee or the lessee. Provided that where the license or the lease has been or is to be granted by the State Government, the Central government shall consult the State Government before agreeing to such additional terms, covenants and conditions.
- The Central government, if it deems fit, may from time to time notify in the official Gazette particulars regarding the basis on which the Central Government may be prepared to consider proposals for prospecting or mining operations in any specified areas.⁴² The area covered by a license shall be specified therein and the term of a license shall in the first instance be valid for a period of four years which may be extended for two further periods of one year each.⁴³

2.3. Environment Clearance for E&P

In India the Central government has framed Environment Protection Act, 1986 to broadly encompass and regulate an array of environmental issues. As per the Environment Impact Assessment (EIA) notification 2006, all projects of oil and gas exploration, development and

⁴⁰ *ibid.*

⁴¹ Natural Gas Rules, 'Latest The Petroleum And Natural Gas Rules ', (1959) 1948.

⁴² The Petroleum And Natural Gas Rules ,R(5)

⁴³ Rules (n 41).

production comes under category 'A' in the schedule and shall require prior environmental clearance from the Central Government in the Ministry of Environment and Forests.⁴⁴ After 2006 Amendment the EIA cycle comprises of four stages i.e. screening, scoping, public hearing and appraisal. Categories A projects require mandatory environmental clearance and thus they do not undergo the screening process.⁴⁵ The EIA provision was hence made a mandatory requirement under the Environment Protection Act, 1986 with the following four objectives: forecast the environmental impact of projects proposed Discover methods to mitigate adverse impacts Formulate the projects to suit local environment present the predictions and alternatives to the decision-makers

2.3.1. Procedure for Environment Clearance

The Ministry of Environment ,Forest and Climate Change has notified the Environmental Impact Assessment Notification 2006 under the provisions of the Environmental Protection Act 1986, which regulates development and their expansion/modernization of 39 sectors/activities listed in the Schedule to the EIA Notification, 2006. There are two Categories of the projects in the notification namely Category 'A' and Category 'B' projects. Category 'A' projects are appraised at the level of The Ministry of Environment, Forest and Climate Change (MoEF&CC) and Category 'B' projects are appraised by the respective State Environment Impact Assessment Authority (SEIAA) following the procedure prescribed under the EIA Notification, 2006.⁴⁶ The offshore and onshore oil and gas exploration, development and production activities are covered under item 1(b) of the Schedule to the said notification and being category 'A' project is appraised in MoEF&CC. The environmental clearance process for Category project comprises of three stages. These are: Scoping, Public Hearing and Appraisal.

- **Scoping:** Scoping refers to the process by which the Expert Appraisal Committee (EAC) constituted by MoEF&CC determines the comprehensive Terms of Reference (TOR) addressing all relevant environmental concerns for preparation of Environmental Impact Assessment (EIA) report. For seeking TOR, operator needs to

⁴⁴ Das (n 14).

⁴⁵ Law Management, 'INTERNATIONAL JOURNAL OF LAW MANAGEMENT & HUMANITIES Expedition of Environment Impact Assessment in India : Where Do We Stand in 2020 ?' (2020) 3 1180 <<https://www.ijlmh.com/wp-content/uploads/Expedition-of-Environment-Impact-Assessment-in-India-Where-do-we-stand-in-2020.pdf>>.

⁴⁶ Standard Terms and others, 'Procedure for Environment Related Clearances in Oil and Gas Sector ': <http://dghindia.gov.in/assets/downloads/sop_env.pdf>.

submit an online application to MoEF&CC in prescribed Form 1 along with a copy of pre feasibility project report and draft TORs proposed by the applicant. For reducing the delays, standard TORs have been developed by MoEF&CC with inputs from experts and Expert Appraisal Committees (EAC) of the respective sectors. Standardization of the TOR would enable the operator to commence the EIA study after successful online registration. The EAC will have the right and the responsibility of stipulating additional TOR in specific projects considering its project features within 30 days of the online registration of the proposals. After appraisal by the EAC, TORs are conveyed to the operator by MoEF&CC within 30 days and are also displayed on the website of MoEF&CC.⁴⁷ The application for prior environmental clearance/TOR if rejected by regulatory authority on the recommendations of EAC would also be conveyed to the applicant along with reasons for rejection. Standard Terms of reference for undertaking Environmental Impact Assessment (EIA) study for the offshore and onshore oil and gas exploration, development and production activities and information to be included in EIA/ EMP reports as issued by MoEF&CC, are covered in Section 2. The Generic structure of EIA document is at Appendix III of the EIA notification. MoEF&CC has also uploaded the technical guidance manual for all activities covered under EIA notification 2006 including for the oil and gas sector on the environmental clearance portal.⁴⁸

- **Public Consultation:** Public consultation refers to the process by which the concerns of affected persons and others who have plausible stake in environmental impacts of the project are ascertained for taking into account the concerns in project activities. After the draft EIA study report, based on approved TORs, is completed, the operator shall make a request through a letter to the Member Secretary of the State Pollution Control Board (SPCB) or Union Territory Pollution Control Committee, in whose territory the project is located to arrange Public Hearing (PH). If a project extends beyond a state and in different districts of a state, public hearing is required in each district separately. The concerned SPCBs would initiate the process of organizing PH by giving wide publicity in national and local news papers. The details of procedure for conduct of PH is at Appendix IV of the EIA notification and covers documents required like draft EIA report, summary of EIA report in English and local language, the agencies to whom these documents are to be submitted, the Panel which will

⁴⁷ *ibid.*

⁴⁸ *ibid.*

conduct PH, the videography of the process, etc. The entire process is to be completed within 45 days and proceedings are to be displayed at office of Panchayats, SPCB website etc. The operator is then required to address the issues raised in PH and annex their response in the final EIA report to be submitted to MoEF&CC for appraisal.⁴⁹

- **Appraisal:** Appraisal means detailed scrutiny by the regulatory authority i. e. MoEF&CC and EAC for consideration of the project for grant of environmental clearance. For this stage the operator has to apply on line with documents like final EIA report, public hearing proceedings etc. The operator is generally invited to participate in the EAC meetings for furnishing necessary clarification in person. The EAC then makes its recommendation to MoEF&CC for grant of prior environmental clearance on stipulated terms and conditions or rejections with reasons for the same.⁵⁰ The minutes of the EAC meeting are displayed on the website of MoEF&CC and the case is then processed for final decision. The environmental clearance letter is uploaded on the website and the operator is also conveyed of the decision .The process of appraisal and conveying the decision takes 105 days.⁵¹ The activities involved in upstream sector require clearances from certain other ministries; therefore, a liaison is required for development of this sector. Some Oil and Gas Industry linked Ministries and nature of regulations came in their purview are: Ministry of Environment, Forests and Climate Change (MoEF&CC) The activities involved in oil and gas sector has a bearing affects on sustainability, therefore certain environmental clearances are required for various activities in upstream sector.⁵² These are :

Environmental Impact Assessment (EIA) Study: Like all sectors listed in the Schedule to the Environmental Impact Assessment (EIA) Notification, 2006, Oil and gas sector is also supposed to carry out the Environmental Impact Assessment (EIA) under the provisions of the Environment (Protection) Act, 1986 under Article 14 of the Model Production Sharing Contract (MPSC). The offshore and onshore oil and gas exploration, development and production activities are covered under item 1(b) of the Schedule to the said notification and being category 'A' project is appraised in MoEF&CC. As per Article 14 of the MPSC, there are two such studies required to be carried out. The first study aims to determine the

⁴⁹ *ibid.*

⁵⁰ *ibid.*

⁵¹ *ibid.*

⁵² Arya and US Commercial Services (n 9).

prevailing situation relating to the environment, human beings, flora, and fauna in the contract area and its adjoining regions. The first study is required to be carried out in two parts, namely, a preliminary part which must be concluded before commencement of any field work relating to a seismographic or other survey, and a final part relating to drilling in the Exploration Period. The second part of the study requires approval from the government before commencement of any drilling operations. The second Environmental Impact Assessment (EIA) study needs to be completed before the commencement of Development Operations with approval from the government. The government, on its part, will grant environmental clearances in accordance with the relevant notifications, rules, regulations, and orders concerning EIA issued by the MoEF from time to time. Clearance under Coastal Regulation Zone (CRZ): Procedure for clearance under Coastal Regulation Zone (CRZ) notification 2011 also needs to be followed under Coastal Regulation Zone (CRZ) notification under the Environment (Protection) Act, 1986 as there apply restrictions on certain areas on setting up and expansion of new industries, operations or processes. Color Codes of Industries for Environment Clearances the Ministry of Environment, Forest and Climate Change (MoEFCC) has developed the Pollution Index 'for the purpose of categorization of industrial sectors'. These are:

1. Red Category - Industrial Sectors having Pollution Index score of 60 and above.
2. Orange category - Industrial Sectors having Pollution Index score of 41 to 59.
3. Green Category - Industrial Sectors having Pollution Index score of 21 to 40.
4. White Category - Industrial Sectors having Pollution Index score incl. & up to 20.

The Oil and Gas sector has been kept in 'Red Category' as per this color classification, which implies that sustainability aspects need to be given more priority for the companies operating in this sector.⁵³ Under the model revenue sharing contract issued according to the Hydrocarbon Exploration and Licensing Policy, an exploration period of eight years is provided for onshore (including coal bed methane) and shallow water blocks, and a period of ten years is provided for forward area, deep water area and ultra deep water blocks. In certain circumstances the period can be extended by six months. Requests for extensions beyond six months will be decided by the Directorate General of Hydrocarbons, based on the policy for

⁵³ *ibid.*

extension of exploration phases set out by the government.⁵⁴ The rights to explore and produce oil and gas have been granted by the Indian government to private contractors under the (PSC) regime, which sets out the rights and obligations of the parties. Under the new Hydrocarbon Exploration and Licensing Policy, the Indian government will enter into revenue sharing contracts with private contractors. Apart from nominated blocks, production sharing contracts are awarded by the government to successful private contractors under the NELP after an international competitive bidding process. After the blocks are awarded, the contractors are issued with petroleum exploration licenses and petroleum mining licenses under the ORD Act & PNG Rules 1959. The duration of these exploration and mining licenses has the same term as the PSC or RSC (as the case may be).⁵⁵

2.3.2. Standard for Onshore Oil and Gas Exploration, Development & Production The Onshore Oil and Gas Exploration, Development & production following standard maintain⁵⁶:

- Executive summary of a project.
- Project description, project objectives and project benefits.
- Cost of project and period of completion.
- Site details within 1 km of the each proposed well, any habitation, any other installation/activity, flora and fauna, approachability to site, other activities including agriculture/land, satellite imagery for 10 km area. All the geological details shall be mentioned in the Top sheet of 1:40000 scale, superimposing the well locations and other structures of the projects. Topography of the project site.
- Details of sensitive areas such as National Park, Wildlife sanctuary and any other eco-sensitive area along with map indicating distance.
- Approval for the forest land from the State/Central Govt. under Forest (Conservation) Act, 1980, if applicable.
- Recommendation of CRZ clearance as per CRZ Notification dated 6th January, 2011 (if applicable).
- Distance from nearby critically/severely polluted area as per Notification, if applicable. Status of moratorium imposed on the area.

⁵⁴ Manning, Tamura and Llp (n 12).

⁵⁵ *ibid.*

⁵⁶ Affairs (n 5).

- Does proposal involve rehabilitation and resettlement? If yes, details thereof.
- Environmental considerations in the selection of the drilling locations for which environmental clearance is being sought. Present any analysis suggested for minimizing the foot print giving details of drilling and development options 5 considered.
- Baseline data collection for air, water and soil for one season leaving the monsoon season in an area of 10 km radius with centre of Oil Field as its centre covering the area of all proposed drilling wells.
- Climatology and Meteorology including wind speed, wind direction, temperature rainfall relative humidity etc.
- Details of Ambient Air Quality monitoring at 8 locations for PM2.5, PM10, SO2, NOx, CO, VOCs, Methane and non-methane HC.
- Soil sample analysis (physical and chemical properties) at the areas located at 5 locations.
- Ground and surface water quality in the vicinity of the proposed wells site.
- Measurement of Noise levels within 1 km radius of the proposed wells.
- Vegetation and land use; flora/fauna in the block area with details of endangered species, if any.
- Incremental GLC as a result of DG set operation, flaring etc.
- Potential environmental impact envisaged during various stages of project activities such as site activation, development, operation/ maintenance and decommissioning.
- Actual source of water and 'Permission' for the drawl of water from the Competent Authority. Detailed water balance, wastewater generation and discharge.
- Noise abatement measures and measures to minimize disturbance due to light and visual intrusions.
- Details on wastewater generation, treatment and utilization /discharge for produced water/ formation water, cooling waters, other wastewaters, etc. during all project phases.
- Details on solid waste management for drill cuttings, drilling mud and oil sludge, produced sand, radioactive materials, other hazardous materials, etc. including its disposal options during all project phases.
- Disposal of spent oil and lube.

- Storage of chemicals and diesel at site. Hazardous material usage, storage and accounting.
- Commitment for the use of water based mud (WBM) only.
- Oil spill emergency plans for recovery/ reclamation.
- H2S emissions control.
- Produced oil/gas handling, processing and storage/transportation.
- Details of control of air, water and noise pollution during production phase.
- Measures to protect ground water and shallow aquifers from contamination.
- Whether any burn pits being utilized for well test operations
- Risk assessment and disaster management plan for independent reviews of well designed construction etc. for prevention of blow out. Blowout preventer installation
- Environmental management plan.
- Total capital and recurring cost for environmental control measures.
- Emergency preparedness plan.
- Decommissioning and restoration plans.
- Documentary proof of membership of common disposal facilities, if any.
- Details of environmental and safety related documentation within the company including documentation and proposed occupational health and safety Surveillance Safety Programmed for all personnel at site. This shall also include monitoring programmed for the environment.
- A copy of Corporate Environment Policy of the company as per the Ministry's O.M. No. J-11013/ 41/2006-IA.II (I) dated 26th April, 2011 available on the Ministry's website.
- Any litigation pending against the project and or any direction/order passed by any court of law against the project. If so details thereof.

Therefore environmental perspectives for prospective licensing for the consent to establish and consent to operate are required under both the Water (Prevention and Control of Pollution) Act, 1974 and the Air (Prevention and Control of Pollution) Act, 1981 from respective State Pollution Control Boards.

Chapter 3

Legislative & Regulatory framework oil and natural sector in India

3.1. Legislative Framework

India has a federal government structure under which the Indian government and governments at state level can enact legislation on the subjects reserved for them under the Constitution of India. Under the Constitution, the regulation and development of oilfields, mineral oil resources, petroleum and petroleum products falls within the jurisdiction of the Parliament that is the central legislative body in India.⁵⁷ For regulation and development oil and gas sector Indian constitution Entry 53, List 1, Scheduled vii conferred power on the central government to legislate oil and natural gas sector⁵⁸. The legislation are as follows:

3.1.1. The Petroleum Act, 1934

This act regulates the import into India, transfers within, storage, production, refining and blending of petroleum and deals substantially with midstream activities. No one shall import, transport or store any petroleum save in accordance with the rules made under section 4. Save in accordance with the conditions of any licenses for the purpose which he may be required to obtain by rules made under section 4, no one shall import petroleum Class A, and no one shall transport transport or store any petroleum. The Central Government makes rules for import, transport and storage of petroleum.⁵⁹The Central Government makes rule for import, transport and storage of petroleum.⁶⁰For this purpose makes following rules:

- a) Prescribing places where petroleum may be imported and prohibiting its import elsewhere.
- b) Regulating the import of protection.
- c) Prescribing the periods within which licenses for the import of petroleum Class A shall be applied for, and providing for the disposal, by confiscation or otherwise, of any petroleum Class A in respect of which a licenses has not been applied for within the prescribed period or has been refused and which has not been exported.

⁵⁷ Manning, Tamura and Llp (n 12).

⁵⁸ Rules (n 21).

⁵⁹ The Petroleum Act 1934,s 3

⁶⁰ § 4

d) Regulating the transport of petroleum.

e) Specifying the nature and condition of all receptacles and pipe-lines in which prescribing the periods within which licenses for the import of petroleum Class A shall be applied for, and providing for the disposal, by confiscation or otherwise, of any petroleum Class A in respect of which a license has not been applied for within the prescribed period or has been refused and which has not been exported petroleum may be transported.

f) Regulating the places at which and prescribing the conditions subject to which petroleum may be stored.

g) Specifying the nature, situation and condition of all receptacles in which petroleum may be stored.

h) Prescribing the form and conditions of licenses for the import of petroleum Class A, and for the transport or storages of any petroleum, the manner in which applications for such licenses shall be made, the authorities which may grant such licenses and the fees which may be charged for such licenses under this Act The Central Government may, by notification in the Official Gazette, authorize, any officer by name or by virtue of office to enter any place where petroleum is being imported, transported, stored, produced, refined or blended and to inspect and take samples for testing of any petroleum found therein.⁶¹ The Central Government may make rules—

(a) Regulating the taking of samples of petroleum for testing;

(b) Determining the cases in which payment shall be made for the value of samples taken, and the mode of payment, and

(c) Generally, regulating the procedure of officers exercising powers under this section.⁶² The Central Government may authorize any officer by name or by virtue of office to test petroleum of which samples have been taken under this Act, or which may have been submitted to him for test by any person, and to grant certificates of the results of such tests.⁶³ All tests of petroleum made under this Act shall be made with a test apparatus in respect of which there is valid certificate under section 16, shall have due regard to any correction specified in that certificate, and shall be carried out in accordance with rules made under

⁶¹ The Petroleum Act 1934,s 14

⁶² Ibid

⁶³ S 16

section 21. The testing officer after testing samples of petroleum shall make out a certificate in the prescribed form, stating whether the petroleum is petroleum Class A or petroleum Class B or petroleum Class C and if the petroleum is petroleum Class B or petroleum Class C, the flash-point of the petroleum.⁶⁴ Petroleum Class A” means petroleum having a flash-point below twenty-three degrees Centigrade.⁶⁵ Petroleum Class B” means petroleum having a flash-point of twenty-three degrees Centigrade and above but below sixty-five degrees Centigrade.⁶⁶ Petroleum Class C” means petroleum having a flash-point of sixty-five degrees Centigrade and above but below ninety-three degree Centigrade.⁶⁷ No license needed by railway administration acting as carrier. a railway administration as defined in section 3 of the Indian Railways Act, 1890 (9 of 1890) need not obtain any license for the import or transport of any petroleum in its possession in its capacity as carrier.⁶⁸

3.1.2. The Oilfield Regulation and Development Act, 1948

This act constitutes the basic statute for licensing and leasing of petroleum and gas blocks by Government of India, empowering the same with broad authority to make rules providing for the basic regulation of oilfields and for the development of mineral oil resources. Along with Petroleum Rules, the Oilfields Act governs the grant of Production Exploration Licenses and mining leases. “Mining lease” means a lease granted for the purpose of searching for, winning, working, getting, making merchantable, carrying away or disposing of mineral oils or for purposes connected therewith, and includes an exploring or a prospecting license.⁶⁹ This Act gives importance on three things, these are:

- Grant of license or lease in respect of petroleum and natural gas.
- Conservation and development of petroleum and natural gas.
- Royalty in respect of production of petroleum and natural gas.

The Central Government may, by notification in the Official Gazette, make rules for regulating the grant of mining leases or for prohibiting the grant of such leases in respect of any mineral oil or in any area.⁷⁰ The Central Government may, by notification in the Official

⁶⁴ S 19

⁶⁵ S 2 (b)

⁶⁶ S 2 (bb)

⁶⁷ S 2 (bbb)

⁶⁸ S 10

⁶⁹ The Oilfield Regulation And Development Act 1948,s 3 (d)

⁷⁰ The Oilfield Regulation and Development Act 1948,s 5

Gazette, make rules for the conservation and development Mineral oil.⁷¹ The Central Government may, by notification in the Official Gazette, make rules for the purpose of modifying or altering the terms and conditions of any mining lease granted prior to the commencement of this Act so as to bring such lease into conformity with the rules made under section 5 and 6 of this Act. Provided that any rules so made which provide for the matter mentioned in clause (c) of sub-section (2) shall not come into force until they have been approved, either with or without modifications by the House of the People. Section 7 (2) The rules made under sub-section (1) shall provide- (a) for giving previous notice of the modification or alteration proposed to be made there under to the lessee, and where the lessor is not the Central Government, also to the lessor and for affording them an opportunity of showing cause against the proposal; (b) for the payment of compensation by the party who would be benefited by the proposed modification or alteration to the party whose rights under the existing lease would thereby be adversely effected; and (c) for the principles on which, the manner in which and the authority by which the said compensation shall be determined. The Central Government may, by notification in the Official Gazette, direct that any power exercisable under this Act shall be exercised, subject to such conditions, if any, as may be specified therein by such officer or authority as may be specified in the direction.⁷² For the purpose of ascertaining the position of the working, actual or prospective, of any mine or abandoned mine or for any other purpose mentioned in this Act or the rules made there under, any officer authorized by the Central Government in this behalf shall have the right to – (a) enter and inspect any mine ; (b) order the production of any document, book, register or record in the possession or power of any person having the control of or connected with, any mine (c) examine any person having the control of, or connected with, any mine. (2) Any Officer authorized by the Central Government under sub-section (1) shall be deemed to be a public servant within the meaning of section 21 of the Indian Penal Code. The Central Government may, if satisfied that it is in the public interest so to do, authorize in any case the granting of any mining lease or the working of any mine of terms and conditions different from those laid down in the rules made under sections 5 and 6. The provision of this Act is binding upon the government in respect of management of mining lease and license.

3.1.3. The Petroleum and Natural Gas Rules, 1959

⁷¹ S 6

⁷² S 8

These rules provide a framework for grant of exploration licenses and mining leases, and together with the Petroleum Act, 1934 regulate the sale and distribution of petroleum and petroleum products. The Central Government makes these rules in respect of power given by the Oilfield Regulation and Development Act 1948. These Rules have makes certain amendment. The right to explore and produce oil and gas from blocks is awarded to the Contractor under NELP through a Production Sharing Contract (PSC) signed by the Contactor with the Government. Besides payment of royalties and other taxes, the PSC calls for sharing of oil and/or natural gas produced in the awarded block between the Government and the Contractor in a pre- determined manner. Coal Bed Methane (CBM) blocks are offered by the Government under the CBM Policy which invites companies to bid for CBM blocks and the Government evaluates the bids based on the Production Linked Payments (PLPs) promised by each bidder. Thus two separate sets of policies are in place to exploit two different kinds of resources via CBM and oil & gas. The P&NG Rules made amendment Rule 7 relating to grant of Mining Lease, where lessee has exclusive right to carry out oil and gas operation, may be suitably amended to provide preference to the existing operator who has made the additional discovery of either Rule 14 (1) (a) may be amended to replace the term “mineral oil” with “crude oil, casing head condensate, natural gas, coal bed methane or gas obtained from gas hydrate” CBM or oil & gas for undertaking simultaneous exploration of CBM and Oil & Gas . Provision to Rule 14 (1) (a) may be amended to suggest that “no royalty shall be payable in respect of any crude oil, casing head condensate, natural gas, coal bed methane or gas obtained from gas hydrate which is unavoidably lost or is returned to the reservoir or is used for drilling or other operations relating to the production of petroleum or natural gas or both”. Rule 14 (1) (a) states that, notwithstanding anything in any agreement, a lessee shall pay to the Central or State Government, as the case may be, royalty in respect of any mineral oil mined, quarried, excavated or collected by him from the leased area at the rate specified in the Schedule of the Act. The term mineral oil is defined in the Act as including natural gas and petroleum. Relying on the definitions of ‘CBM’⁷³as given in the Rules and the definition of “natural gas” as given in the Model Production Sharing Contracts (MPSC), it may be inferred that natural gas includes CBM as well.

Proviso to Rule 14 (1) (a) may be amended to suggest that “no royalty shall be payable in respect of any crude oil, casing head condensate, natural gas, coal bed methane or gas obtained from gas hydrate which is unavoidably lost or is returned to the reservoir or is

⁷³ The Petroleum and Natural Gas Rules 1959, Rule 3(ab)

used for drilling or other operations relating to the production of petroleum or natural gas or both”.

The Rules do not specifically address the issue of Extended Well Test (EWT). Rule 7 (1) (i) does, however, give an exclusive right to the holder of a Petroleum Exploration License (PEL) to carry out information drilling and test drilling operations for petroleum. The Rules should be suitably amended to insert relevant clause(s) relating to Extended Well Tests addressing issues such as approvals, duration, volume, liability to pay royalty, tax obligations, environmental concerns etc. Rule making powers with respect to safety (HSE matters) should be explicitly mentioned in the Act and the Rules for offshore areas. Rule making power, to notify agency for supervision of safety in offshore E&P operations, to be provided in the Act and the Rules.

Rule 4 of these Rules referred that No person shall prospect for petroleum except in pursuance of a petroleum exploration license (hereinafter referred to as a license) granted under these rules, and no person shall mine petroleum except in pursuance of a petroleum mining lease granted under these rules. Every holder of a license and every holder of a lease shall in these rules be referred to as the licensee and the lessee respectively.

Rule 32-A provides Penalties : (1) If the holder of a Petroleum Exploration License or Mining Lease or his transferee or assignee fails, without sufficient cause, to furnish the information or returns or acts in any manner in contravention of sub-rule (2) of rule 14, rule 19 and rule 24, or to allow any authorized person as provided in Rule 32 to enter into and inspect any oil well or gas well or any drilled hole or information well in the process of drilling, he shall be punishable with imprisonment for a term which may extend to six months or with fine which may extend to one thousand rupees or with both.⁷⁴

3.1.4. The Mines Act, 1952

This Act basically deals with health and safety provision of employee in the field of oil and natural gas industry. This Act given power to the Central Government to makes regulation.⁷⁵ The Central Government may, by notification in the Official Gazette, make regulations consistent with this Act for all or any of the following purposes, namely:—

⁷⁴ Rules (n 41).

⁷⁵ S 25

- For prescribing the qualifications required for appointment as Chief Inspector or Inspector
- For prescribing and regulating the duties and powers of the Chief Inspector and of Inspectors in regard to the inspection of mines under this Act.
- For prescribing the duties of owners, agents and managers of mines and of persons acting under them, and for prescribing the qualifications (including age) of agents and managers of mines and of persons acting under them.
- For requiring facilities to be provided for enabling managers of mines and other persons acting under them to efficiently discharge their duties.
- For regulating the manner of ascertaining, by examination or otherwise, the qualifications of managers of mines and persons acting under them, and the granting and renewal of certificates of competency.
- The Central Government may, by notification in the Official Gazette, appoint such a person as possesses the prescribed qualifications to be Chief Inspector of Mines for all the territories to which this Act extends and such persons as possess the prescribed qualifications to be Inspectors of Mines subordinate to the Chief Inspector.⁷⁶

This Act referred curtailed powers on the Chief Inspector and Inspector of Mines.⁷⁷ These powers are include : —

- Make such examination and inquiry as he thinks fit in order to ascertain whether the provisions of this Act and of the regulations, rules and bye-laws and of any orders made there under are observed in the case of any mine.
- With such assistants, if any, as he thinks fit, enter, inspect and examine any mine or any part thereof at any time by day or night Provided that the power conferred by this clause shall not be exercised in such a manner as unreasonably to impede or obstruct the working of any mine.
- Examine into, and make inquiry respecting, the state and condition of any mine or any part.
- Exercise such other powers as may be prescribed by regulations made by the Central Government in' this behalf Provide that no person shall be compelled under this subsection to answer any question or make any statement tending to incriminate himself.

⁷⁶ GOI Ministry of labour and employment, 'The Mines Act, 1952' 33
<<http://www.dgms.gov.in/writereaddata/UploadFile/Mines Act, 1952.pdf>>.

⁷⁷ *ibid.*

This Act also provides the provisions for management of mining operation. Every mines shall have sole manager. Before starting mining operation the owner, manager and agent shall be given the notice in writing to the Chief Inspector, Indian Bureau of Mines and the district magistrate of district in which mine is situated.⁷⁸ Manager shall be responsible for the overall management, control, supervision and direction of the mine and all such Except in case of an emergency, the owner or agent of a mine or anyone on his behalf shall not give, otherwise than through the manager, instructions affecting the fulfillment of his statutory duties, to a person, employed in a mine, who is responsible to the manager instructions when given by the owner or agent shall be confirmed in writing forthwith.⁷⁹ When any accident of the nature referred to in any of the clauses of sub-section (1) of section 23 occurs in or about a mine, the Central Government may, if it is of opinion that a formal inquiry into the causes of and circumstances attending the accident ought to be held, appoint a competent person to hold such inquiry and may also appoint one or more persons possessing legal or special knowledge to act as assessor or assessors in holding the inquiry.⁸⁰ This Act gives importance on health, safety, and welfare provisions for employee of mines. This Act also provides the role of the Chief Inspector and Manager of mines.

3.1.5. The Oil Mine Regulation, 1984

This regulation was made by the Central Government with response empowered by the Mines Act 1952. This regulation referred the provision of appointment of Manager, Installation Manager, and Safety Officers and their duties in regards of mines management.

Appointment of Managers:

- No mine shall be opened, worked or re-opened unless there is a manager of the mine, being a person duly appointed. If any question arises whether any person so appointed is competent to perform the duties of manager, it shall be referred to the Chief Inspector whose decision thereon shall be final.
- No person shall act or be appointed to act as manager of more than one mine except with previous permission in writing of the Chief Inspector and subject to such conditions as he may specify therein. The Chief Inspector may at any time by an order in writing vary or revoke any such permission if the circumstances under which the

⁷⁸ S 16

⁷⁹ S 17

⁸⁰ S 27

permission was granted have altered or the Chief Inspector finds that the manger has not been able to exercise effective supervision in the mines under his charge.

Appointment of Installation Manager:

- At every mine one or more installation managers shall be appointed to hold charge of the different installations of the mine.
- An installation manager may hold charge of more than one installation.

Appointment of Safety Officer:

- The owner or agent of every mine shall appoint a safety officer to assist the manager in promotion of safety and health at work, who, to the best of the knowledge and belief of the owner or agent, has skills and competence suitable for the appointment. In case of any doubt the matter may be referred to the Chief Inspector whose decision thereon shall be final.

This Regulation provides the duties on various authorities i.e. (Manager, Installation Manager, and Safety Officer). These are:

Duties of Managers:

- The Manager shall be responsible for the safe and proper working of the mine by exercising supervision and control.
- The manger shall see that sufficient supply of proper materials and appliances for the purpose of carrying out the provisions of the Act, the regulations and orders made there under and for ensuring the safety of the mine and persons employed therein, is always provided at the mine; and if he is not the owner or agent of the mine, he shall report in writing to the owner or agent when anything which he is not competent to order, is required for the aforesaid purpose. A copy of every such report shall be recorded in a bound paged book kept for the purpose.
- The manger shall assign to every competent person and official his specific duties and on his appointment make over to him a copy of the regulations, rules and bye-laws and any orders made there under which affect him and he shall take all possible steps to ensure that every such person understands, carries out and enforces the provisions contained therein in a proper manner.

- The manger shall examine all reports, registers and other records required to be made or kept in pursuance of the Act, the regulations and orders made there under and shall countersign the same and date his signature. He may, however by an order in writing delegate this duty to Dy. Manager or Installation Manger.
- The manger shall pay attention to and cause to be carefully investigated any specific representation or complaint that may be made to him in writing by a work person of the mine as to any matter affecting the mine environment or safety or health of persons in or about the mine.
- When an accident resulting in any serious bodily injury to any person or in loss of life occurs in a mine, the manger shall inspect the site of accident immediately and shall also either himself or through safety officer have an enquiry made into the causes of and circumstances leading to the accident. The results of every such enquiry and a plan and section of the site of the accident showing the details shall be submitted to the Regional Inspector within seven days of the date of occurrence.
- The manager shall perform such other duties as have been specified in this behalf under the Act, the regulations and orders made there under.
- The manager may suspend or take such disciplinary action as he thinks fit against the work persons for contravention of any provision of the Act, the regulations and orders made there under.

The manager shall maintain in a bound paged book kept for the purpose, a diary, and shall record therein the findings of each of his inspections and also the action taken by him to rectify the defects mentioned, if any.

Duties of Installation Manager:

- The installation manager shall have charge and control of such installations and shall carry out such duties, as may be assigned to him by the manager.
- He shall see that a notice of his appointment is posted at a place in the installation in such a position that it can be easily and conveniently read.
- He shall see that in the installation assigned to him, all work is carried out in accordance with the provisions of the Act and the regulations and orders made there under.
- He shall visit and examine the installations under his charge on every working day to see that safety in every respect is ensured. He shall maintain a detailed record, the

results of each of his inspections and also the action taken by him to rectify the defects noticed, if any.

- He shall see, when any drilling rig, work-over rig and associated equipment or production equipment or pipeline is shifted or newly installed, that it is given a trial-run before it is put into use and shall be present during every such trial run.
- He shall see that all persons employed at the installation are thoroughly instructed and familiar with the provisions of the standing orders made under these regulations, prevention of blowout and fire.
- He shall see that the provisions of the Act and the regulations or orders made there under relating to the installation, maintenance, operation or examination of machinery and equipment are properly carried out by him or by competent persons or work persons, as the case may be, appointed for the purpose.

When, during the construction of an installation or any operation thereat, there is an emergency or apprehended emergency endangering the life or safety of any person or the stability and safety of the installation, he shall himself take or cause to be taken such measures as are necessary or expedient to avoid the emergency. No requirement in these regulations shall be taken as prohibiting or restricting the taking of such measures.

Duties of Safety Officer:

- The Safety Officer shall inspect, as often as may be necessary, the installations of the mine with a view to identify the dangers which may cause bodily injury or impair health of any person.
- He shall advise the manager on measures necessary to prevent dangerous situations.
- He shall enquire into the circumstances and causes of all accidents whether involving persons or not and advise the manager on measures necessary to prevent recurrence of such accidents.
- He shall collect, compile and analyses information in respect of accidents and dangerous occurrences with a view to promote safe practices and improvement of working environment.
- He shall organize regular safety education programmes and safety campaigns to promote safety awareness amongst persons employed in the mine.
- He shall see that all new workers and workers transferred to new jobs receive adequate safety training, instructions and guidance.

- He shall maintain a detailed record of work performed by him every day.
- No duties other than those specified above shall be assigned to the safety officer without the written approval of the Regional Inspector.

Duties of Fire Officer:

- The Fire Officer shall ensure the observance of the provisions of the Act, regulations and orders made there under concerning fire detection, fire-fighting systems and shall advise the manager on measures necessary to ensure adequate protection against fire.
- He shall ensure proper layout, installation and maintenance of fire-fighting equipment.
- He shall see that contingency plan for likely fire situations are prepared.
- He shall organize regular training of persons in charge of fire-fighting duties with particular reference to contingency plan for fire, correct assessment and handling of fire problem. He shall see that persons in charge of fire fighting duties undertake simulated fire drills at least once in every month to study promptness of response and effective tactics.
- He shall examine at least once in every quarter all devices and equipment of fire detection and fire-fighting systems in the mine and report any defects in the same to the manger.
- He shall exercise a general supervision and co-ordination during control and extinguishment of any fire in the mine.
- He shall into the causes and circumstances of all fires in the mine.
- He shall maintain detailed record of work.

This regulation expressly dealing with the provisions of precaution has been taken for prevention of blowout of well and during the time of production operation and drillings. Also provides in every drilling operation need the firefight equipment.⁸¹

3.1.6. The Oil Mine Regulation, 2011

This regulation made amendment of the provision of the Oil Mine Regulation 1984. This OMR 2011 amend to enter the area with ear protection noise level is continuously or equivalent of 90 db (A). Prior the OMR 1987 the noise level to enter with ear protection was

⁸¹ S 70

115 db (A). Under this regulation The Chief Inspector may, from time to time, by notification in the Official Gazette, specify the permissible noise exposure in any area or place in a mine. This regulation made that the Explosives shall be stored only in a magazine duly approved by the licensing authority under Indian Explosives Act, 1884 and shall be transported as per the provisions of the said Act.

Well completion by perforation: (1) (a) Explosives used in well perforation shall be transported in suitable containers. (b) No person other than a competent person authorized for the purpose shall handle, transport and use explosives meant for well-perforation. (2) Well-perforation operation shall be carried out under the direct personal supervision of an official authorized for the purpose. (3) Before commencement of perforation operation, the official shall see that : (a) the well is adequately filled with mud so as to keep the bottom hole pressure under control; (b) all well head equipment including the blowout preventer assembly is pressure and function tested and the results of the test are recorded in a bound paged book kept for the purpose and are signed and dated by the competent persons performing the test; (c) the perforation gun can be safely lowered down the well; (d) a lubricator and wire-line blowout preventer are provided at the wellhead while perforating through tubing; and (e) all equipment including drilling rig, pipe rack and cable used for perforation are efficiently earthed; electrical bonding is established between equipment and well-head before connecting up explosive charges. (4) Well-perforation shall not be carried out during night hours or under conditions of lightning, thunder, high winds and heavy rain. (5) Normal work at the well shall not be resumed until firing of the charge has been completed and official has removed the perforation equipment from the site. (6) Adequate firefighting equipment shall be kept readily available at site for the whole period while well perforation operations are in progress.

3.1.7. The Oil Mine Regulation, 2017

This regulation is made amendment of certain provisions of Oil Mine Regulation 2011. This regulation provides revised version of Oil Industry Safety Directorate Standard (OISD) for fire fighting equipment and well perforation. The objective of this regulation is to revise the safety provision of mines. In this regards this regulation also amend the prior OMR 1987 of Section 91 the protection against noise. The Oil Mine Regulation 2017 made certain amendment these are include:

Precautions against blowout:

1. The owner, agent or manager of a mine shall ensure that the following control equipment for the drilling mud system are installed and kept in use during drilling operations, namely:-
 - A pit level indicator registering increase or reduction in the drilling mud volume and a visual and audio warning device near the driller's stand
 - A device to accurately measure the volume of mud required to keep the well filled at all times;
 - A gas detector or explosimeter at the primary shale shaker and connected to audible or visual alarm near the driller's stand
 - A device to ensure filling of well with mud when the string is being pulled out; and
 - A control device near the driller stand to stop the mud pumps when the well kicks.
2. If the control equipment referred to in sub-regulation (1) indicates that formation fluid is entering the well, immediate steps shall be taken to control the well.
3. The manager of every mine in which blow out preventer assembly is installed, shall, immediately after such installation, frame standing orders specifying the action to be taken when a well kicks and the duty of each person employed on the rig and of such other persons as may be necessary.
4. A copy of standing orders referred to in sub-regulation (3) shall be posted at conspicuous places near the rig.
5. Every person employed on a rig shall have an adequate understanding of the warning sign of a kick, the standing orders mentioned under sub-regulation (3) and the blowout preventer assembly, and competent person on the rig shall have knowledge to operate the controls for blowout preventer; and blowout prevention drill shall be conducted for this purpose once in seven days.
6. Suitable control valves shall be kept available near the well which may be used in case of emergency to control the well.
7. When running in or pulling out string, a suitable mechanism shall be kept readily available at the derrick floor to prevent uncontrolled flow from the string.

Precautions after occurrence of a blowout:

1. On the appearance of signs indicating that a well is blowing out, the manager of the mine shall ensure that all persons other than those whose presence is deemed

necessary for controlling blowout are immediately withdrawn from the installation and suitable action is taken in accordance with the procedures formulated in the emergency plan prepared under regulation 102.

2. During the whole time that any work of controlling a blowout is in progress, the manager of the mine shall ensure that- (a) a competent person is present on the spot throughout; (b) an area within five hundred meter of the well on the down wind direction is demarcated as danger zone, and- (i) all electrical installations within the danger zone is de-energized to prevent the ignition; (ii) flameproof or intrinsically safe lamp or torch is only be used within the danger zone; and (iii) no naked light or vehicular traffic is permitted within the danger zone; (c) a competent person ascertains the condition of ventilation and presence of gas with a flameproof or intrinsically safe instrument so far as safety of person is concerned; (d) adequate number of self-contained breathing apparatus or any other apparatus of such make in accordance with the standards, that is, IS 10245 Part-2 or IS 10245 Part 1 of the Bureau of Indian Standards or its revised versions are available at or near the place for use in emergency; and (e) adequate fire-fighting facility is kept readily available for immediate use.

Precautions against fire:

1. The manager of the mine shall ensure that dead leaves or dry vegetation is not allowed to accumulate or remain, and any combustible material other than that required for use within a period of twenty-four hours is not stored, within a distance of fifteen meter from any oil well or fuel tank storage area.
2. Where an internal combustion engine is located within thirty meter of any well, separator or storage tank - (a) its exhaust pipe shall be insulated or sufficiently cooled and the end of the exhaust pipe shall be directed away from the well head; and (b) its exhaust manifold shall be shielded to prevent its contact with liquid or gas which might otherwise fall on it.
3. The manager of the mine shall- (a) provide with an air intake shut-off valve with readily accessible remote control arrangement where a diesel engine is located within thirty meter of a well; (b) provide with water bath treated, heater treated and flare line, a suitable device for remote ignition of burners; and (c) ensure to effectively earth all plant, machinery and derricks for dissipation of any static electric charge.

Protection against pollution of environment:

1. The owner, agent and manage of every mine shall comply with the standards and guidelines of the Environment (Protection) Rules, 1986 for discharging liquid effluent and gaseous emission, and for disposal of solid waste, drill cutting and drilling fluid applicable for oil drilling and gas extraction industry.
2. Any oil discharged from a well during its completion, testing and repair shall be collected in suitably constructed and adequately fenced disposal pits or tanks suitably located.
3. No disposal pit shall be constructed within forty-five meter of any railway, public road or of any public works or of other permanent structure not belonging to the owner.
4. The untreated sewage, formation water, oil, drilling fluid, waste, chemical substances or refuse from a well, tank or other production installation shall not be permitted,- (a) to create hazard to public health and safety. (b) to run into or contaminate any fresh water structure or body of water or to remain in a place from which it might contaminate any fresh water or body of water; and (c) to run over or damage any land, highway or public road. (5) No fluid shall be discharged into sea or fresh water structure or any body of water, unless it is treated and samples of fluid at regular interval are obtained and analyses and the result of such analysis is maintained by the person collecting the sample and analyzing the same. (6) No scrap, surplus or unused material shall be permitted to be dumped or disposed off in the sea or in the vicinity of any installation. (7) (a) The gas produced at any installation shall not be discharged to the atmosphere unless burnt in accordance with clause (b); and (b) the gas to be burnt, referred to in clause (a) shall be discharged from a flare line in the following manners, namely:- (i) flare-stack height shall be in accordance with the standards referred under sub-regulation (1); (ii) the flare-line shall be adequately anchored and provided with suitable means to prevent extinction of the flame; and (iii) when the gas-flow is intermittent, the flare-line shall be provided with a remote controlled electrical ignition device or any other suitable device to ensure continuous ignition of any gases.

Precautions against dust, toxic gases and ionizing radiations:

- The owner, agent and manager of a mine shall ensure the prevention and control of emission of dust, toxic gas, fume and ionizing radiation at source as far as reasonably practicable.
- A competent person shall instruct every person liable to be exposed to dust, toxic gas, fume and ionizing radiation about the safe working method and technique.
- The permissible limit of exposure to dust, toxic gas, fume and ionizing radiation shall be as per the applicable regulatory requirements 2017.

Emergency plan:

- The owner, agent and manager of every mine shall frame an emergency plan for implementation in the event of an emergency and submit a copy thereof to the Regional Inspector and District Magistrate.
- The emergency plan referred to in sub-regulation (1) shall be prepared after carrying out risk assessment of the activities in the mines with respect to –
 - Fire
 - Blowout, explosion, ignition, influx of inflammable or noxious gas
 - Bursting of equipment, pipeline or uncontrolled escape of petroleum
 - Failure of structures
 - Chemical spillage
 - Natural calamities;
 - Medical evacuation; and
 - Any other emergencies.

This regulation is gives emphasis on regulation to protect environment and revised version of OISD safety standard. Section 129 of this regulation explicitly mentioned about it.

3.1.8. The Oil Industry Development Act, 1974

- This Act established the Oil Industry Development Board. This Act was enacted for the purpose to levy a duty of excise on crude oil and natural gas and for matters connected therewith. The Central Government by notification in the official Gazette appoints or shall be established the Oil Industry Development Board.⁸² The Board shall be a body corporate by the name aforesaid having perpetual succession and a

⁸² S 3

common seal, with power to acquire, hold and dispose of property, both movable and immovable, and to contract, and shall by the said name sue and be sued.⁸³ The Board shall consist of the following members, namely :-

- Not more than three members to be appointed by the Central Government to represent the Ministry or Ministries of the Central Government dealing with petroleum and chemicals;
- Two members to be appointed by the central Government to represent the Ministry of the Central Government dealing with finance;
- Not more than five members to be appointed by the Central Government to represent the Corporations, being Corporations owned or controlled by the Central Government, engaged in activities referred to in clause of section 2.
- Two members of who one shall be appointed by the Central Government from amongst persons who, in the opinion of that Government, have special knowledge or experience of oil industry and the other shall be appointed by that Government to represent labour employed in the oil industry.

When the management of an oil industrial concern is taken over by the Board, the Board may, by order notified in the Official Gazette, appoint as many persons as it thinks fit to be the Directors of that concern and nothing in the Companies Act, 1956 or in any law or instrument relating to the concern, in so far as it makes, in relation to a Director, any provision for the holding of any share qualification, age limit, restrictions on the number of directorships retirement by rotation or removal from office shall apply to any Director appointed by the Board under this section.⁸⁴

Function of the Board: (1) Subject to the provisions of this Act and the rules made there under, the Board shall render, in such manner, to such extent and on such terms and conditions as it may deem fit, financial and other assistance for the promotion of all such measures as are, in its opinion, conducive to the development of oil industry.

(2) Without prejudice to the generality of the provisions of such-section (1), the Board may render assistance under that sub-section by-

- Making grants or advancing loans to any oil industrial concern or other person who is engaged or is to engage in any activity referred to in clause (k) of section 2; (b)

⁸³ § 3 (2)

⁸⁴ § 10

Guaranteeing on such terms and conditions as may be agreed upon loans raised by any oil industrial concern or other person which are repayable within a period not exceeding twenty-five years and are floated in the market or loans raised by an oil industrial concern or other person from any bank which is a scheduled bank, or a State co-operative bank, as defined in the Reserve Bank of India Act, 1934;

- Guaranteeing on such terms and conditions as may be agreed upon deferred payments due from any oil industrial concern or other person in connection with import of capital goods from outside India or in connection with purchase of capital goods from outside India or in connection with purchase of capital goods within India by such concern or other person;
- Guaranteeing on such terms and conditions as may be agreed upon loans raised from, or credit arrangements made with, any bank or financial institution in any country outside India by any oil industrial concern or other person in foreign currency , Provided that no such guarantee shall be given without the prior approval of the Central Government.
- Underwriting the issue of stock, shares, bonds, or debentures by any oil industrial concern and retaining as part of its assets any stock, shares bonds or debentures which it may have to take up in fulfillment of its obligations thereto.
- Acting as agent for the Central Government or, with its approval, for any overseas financial organization or credit agency in the transaction of any business with any oil industrial concern in respect of loans or advances granted, or debentures subscribed by the Central Government of such organization or agency.
- Subscribing to the stock or shares of any oil industrial concern.
- Subscribing to the debentures of any oil industrial concern repayable within a period not exceeding twenty-five years from the date on which they are subscribed to: Provided that nothing contained in this clause shall be deemed to preclude the Board from subscribing to the debentures of any oil industrial concern, the amounts outstanding thereon may be convertible at the option of the Board into stock or shares of that concern within the period the debentures are repayable.

When the management of an oil industrial concern is taken over by the Board, the Board may, by order notified in the Official Gazette, appoint as many persons as it thinks fit to be the Directors of that concern and nothing in the Companies Act, 1956 or in any law or instrument relating to the concern, in so far as it makes, in relation to a Director, any

provision for the holding of any share qualification, age limit, restrictions on the number of directorships retirement by rotation or removal from office shall apply to any Director appointed by the Board.⁸⁵Subject to the control of the Board, the Directors appointed under section 10 shall take such steps as may be necessary for the purpose of efficiently managing the business of the oil industrial concern and shall exercise such powers and perform such duties as may be prescribed.⁸⁶The Directors appointed under section 10 may, with the previous approval of the Board, make an application to a court of the purpose of canceling or varying any contract or agreement entered into, at any time before the issue of the notified order under section 10, between the oil industrial concern and any other person and the court may, if satisfied after due inquiry that such contract or agreement had been entered into in bad faith and is detrimental to the interests of the concern, make an order canceling or varying (either unconditionally or subject to such conditions as it may think fit to impose) that contract or agreement and the contract or agreement shall accordingly stand cancelled or, as the case may be, have effect as so varied.⁸⁷There shall be formed a Fund to be called the Oil Industry Development Fund and there shall be credited thereto- (a) any sums of money paid under section 16 or section 17 (b) any grants that may be made by any person or institution for the purposes of this Act (c) any borrowings by the Board; (d) the sums, if any, realized by the Board in carrying out its functions or in the administration of this Act. (2) The Fund shall be applied- (a) for meeting the salaries, allowances, honoraria and other remuneration of the officers and other employees of the Board and of the advisers, consultants or other agencies whose services are availed of by the Board (b) for meeting the other administrative expenses of the Board (c) for rendering assistance under section 6 (d) for repayment of any loans taken by the Board or for meeting other liabilities under this Act.

3.1.9. The Petroleum and Natural Gas (Amendment) Rules, 2003

This rule made certain amendment in the field of petroleum exploration license. This rule made following amendment. ‘Coal bed methane’ means natural gas obtained from bore holes occurring in coal or lignite seams and consisting primarily of hydrocarbons.⁸⁸ ‘Exclusive economic zone’ shall have the same meaning as assigned to it in the Territorial Waters, Continental Shelf, Exclusive Economic Zone and Other Maritime Zones Act, 1976 as

⁸⁵ S 10

⁸⁶ S 10 (1)

⁸⁷ S 12 (2)

⁸⁸ Rules (n 41).

amended from time to time.⁸⁹ Natural gas' or 'gas' means gas obtained from bore-holes and consisting primarily of hydrocarbons but does not include helium occurring in association with such hydrocarbons. Under this rules grant of license or lease for exploration and production in respect of (i) any land or mineral underlying the ocean within the territorial waters or the continental shelf or the exclusive economic zone of India is vested in the Union, shall be granted by the Central Government, and (ii) any land vested in a State Government, shall be granted by the State Government with the previous approval of the Central Government. (2) Every license and lease shall contain such of the terms, covenants and conditions prescribed by these rules as are applicable and such additional terms, covenants and conditions as may be provided in the agreement between the Central Government and the licensee or the lessee. Provided that where the license or the lease has been or is to be granted by the State Government, the Central Government shall consult the State Government before agreeing to such additional terms, covenants and conditions. (3) The Central Government, if it deems fit, may from time to time notify in the official Gazette, particulars regarding the basis on which the Central Government may be prepared to consider proposals for prospecting or mining operations in any specified area or areas. The area covered by a license shall be specified therein and the term of a license shall in the first instance be valid for a period of four years which may be extended for further periods of one year each till the expiry of the exploration period(s) provided under the agreement if any, or unless otherwise specified by the Central Government in this regard.⁹⁰

3.2. Regulatory Framework of Oil and Natural Gas Sector

The Oil & Gas industry in India is closely regulated by the Ministry of Petroleum and Natural Gas, Government of India subjected to each link in the chain including E&P, refining, marketing and distribution; and import, export, and conservation of petroleum products and Liquefied Natural Gas (LPG).⁹¹ The upstream segment of the petroleum and natural gas sector does not have an independent regulatory authority. The Directorate General of Hydrocarbon (DGH), which is the technical arm of the Ministry of Petroleum and Natural Gas (MOP&NG), was formed in 1993. The regulatory structure of Oil and Gas sector in India has been divided into regulators for upstream and downstream sector. In upstream oil and natural gas sector there is no any independent regulatory authority. But under the Ministry of

⁸⁹ Rules (ca).

⁹⁰ Rules 10

⁹¹ Arya and US Commercial Services (n 9).

Petroleum and Natural Gas there is an administrative body namely Director General of Hydrocarbon. On the downstream there is a regulatory body namely The Petroleum and Natural Gas Regulatory Board. Also there is the Oil Industry Development Board which established through the Oil Industry (Development) Act, 1974. The regulators include:

3.2.1. The Petroleum and Natural Gas Regulatory Board (PNGRB)

This board was constituted under The Petroleum and Natural Gas Regulatory Board Act, 2006 (NO. 19 OF 2006) notified via Gazette Notification dated 31st March, 2006. The Act provides for the establishment of Petroleum and Natural Gas Regulatory Board to protect the interests of consumers and entities engaged in specified activities relating to petroleum, petroleum products and natural gas and to promote competitive markets and for matters connected therewith or incidental thereto. The PNGRB can be the regulator for both the upstream and downstream sector.⁹² Further as enshrined in the act, the board has also been mandated to regulate the refining, processing, storage, transportation, distribution, marketing and sale of petroleum, petroleum products and natural gas excluding production of crude oil and natural gas so as to ensure uninterrupted and adequate supply of petroleum, petroleum products and natural gas in all parts of the country.

3.2.2. Oil Industry Development Board (OIDB)

OIDB was established through the Oil Industry (Development) Act of 1974. This legislation was enacted in response to increasing international prices of crude oil since the 1970s. Accordingly, the Oil Development Act's purpose was to facilitate increased self-reliance in petroleum and natural gas through various measures such as providing financial assistance to the organizations engaged in development programs of the oil industry. The OIDB renders assistance in the following: (a) prospecting for and exploration of mineral oil within India (including the continental shelf thereof) or outside India; (b) the establishment of facilities for production, handling, storage and transport of crude oil; (c) refining and marketing of petroleum and petroleum products; (d) the manufacture and marketing of petrochemicals and fertilizers; (e) scientific, technological and economic research which could be, directly or indirectly, useful to oil industry; and (f) experimental or pilot studies in any field of oil industry.

⁹² The Function Directorate General Hydrocarbons <<https://www.prindia.org/report-summaries/functioning-directorate-general-hydrocarbons>>.

3.3. The Director General of Hydrocarbons (DGH)

Director General of Hydrocarbon (DGH) was established under Regulation No.O-20013/2/92-ONG, D-III, Ministry of PNG, Government of India on April 8, 1993.¹⁹ The DGH, under the administrative control of the Ministry of PNG, is responsible for the environmental, safety, technological, and economic activities related to the oil and gas industry. The DGH facilitates E&P activities through regulation as well as research. In unexplored or poorly explored areas, the DGH conducts studies, surveys, information drilling, and other related activities. The DGH reviews the exploration programs and reservoir production of companies for adequacy and advises the Government of India on such activities.⁹³ Further, the DGH oversees matters concerning production sharing contracts for discovered field and exploration block. Established in the year 1993, under the administrative control of Ministry of Petroleum & Natural Gas through Government of India Resolution, the objectives of DGH are to promote sound management of the oil and natural gas resources having a balanced regard for environment, safety, technological and economic aspects of the petroleum activities. DGH has been entrusted with several responsibilities, like implementation of NELP and HELP, matters concerning the Production Sharing Contracts for discovered fields and exploration blocks, promotion of investment in E&P Sector and monitoring of E&P activities including review of reservoir performance of producing fields. In addition, DGH is also engaged in opening up of new unexplored areas for future exploration and development of non-conventional hydrocarbon energy sources like Coal Bed Methane (CBM) as also futuristic hydrocarbon energy resources.

3.3.1. Evolution Directorate General Hydrocarbon

During early nineties, the Government of India, in the Ministry of Petroleum and Natural Gas had under consideration, the need to have an appropriate agency to regulate and oversee the upstream activities in the petroleum and natural gas sector and also advise the Government in these areas. The committee headed by late Dr. A. B. Dasgupta, which had reviewed the management of the Bombay High reservoir, had recommended the creation of an autonomous conservation board to oversee and review that oilfield development programmes conform to sound reservoir engineering practices in line with national interests. Subsequently, the committee headed by late Sh. P. K. Kaul, which examined ONGC's organizational structure,

⁹³ Arya and US Commercial Services (n 9).

also recommended the establishment of an independent regulatory body called the Directorate General of Hydrocarbons. Moreover, the upstream petroleum sector was largely a monopoly of public sector companies till then and the sector was at that time being increasingly opened up to new operating companies in the private and joint sectors. Thus a need was felt to establish an agency that could effectively supervise the activities of all these companies in the national interest. Taking all the above into consideration, Government of India, decided to set up a Directorate General of Hydrocarbons (DGH) under the administrative control of the Ministry of Petroleum and Natural Gas. DGH was set up through a Government Resolution dated 8th April, 1993. The Exploration and Production sector has been opened up with the implementation of New Exploration Licensing Policy (NELP) and Coal Bed Methane (CBM) Policy. These policies have provided a level playing field to private investors by giving same fiscal and contract terms as applicable to National Oil Companies (NOCs) for the offered exploration acreages. It was in this context, the need was felt to establish an agency that could effectively supervise the activities of all E&P companies from the private and joint venture sectors in the national interests.⁹⁴ "DGH was established after studying and suitably modifying the structure, functions and responsibilities of various regulatory authorities around the globe with special focus on Norwegian Petroleum Directorate (NPD) of Norway."⁹⁵

3.3.2. Function of Directorate General Hydrocarbons

The Directorate General was originally assigned the following functions and responsibilities as per the Government Resolution:-

- To provide technical advice to the Ministry of Petroleum and Natural Gas on Issues relevant to the exploration and optimal exploitation of hydrocarbons in the country and on the strategy of taking up exploration and exploitation of oil and gas reserves abroad by the national oil companies.
- To review the exploration programmes of companies operating under Petroleum Exploration Licenses granted under the Oilfields (Regulation and Development) Act, 1948 and the Petroleum and Natural Gas Rules, 1959 with a view to advising Government on the adequacy of these programmes.

⁹⁴ Thirteenth Report, "functioning of Directorate General of Hydrocarbons (Dgh)" Thirteenth Report' (2016) 1938 <http://www.prsindia.org/uploads/media/Mental Health/SCR_Summary_Mental_Health_Care_Bill_2013.pdf>.

⁹⁵ *ibid.*

- To reassess the hydrocarbon reserves discovered and estimated by the Operating companies in discussion with them;
- To advise the Government on the offering of acreages for exploration to Companies as well as matters relating to relinquishment of acreages by Companies.
- To review the development plans for commercial discoveries of hydrocarbon reserves proposed by the operating companies and advise Government on the adequacy of such plans and the exploitation rates proposed and matters relating thereto.
- To review and audit concurrently the management of petroleum reservoirs by operating companies and advise on any mid course correction required to ensure sound reservoir management practices in line with the optimal exploitation of reserves and the conservation of petroleum resources.
- To regulate the preservation, upkeep and storage of data and samples Pertaining to petroleum exploration, drilling, production of reservoirs etc. and to cause the preparation of data packages for acreages on offer to companies;
- To advise Government on the laying down of safety norms and framing Regulations on safety in oil field operations, prescribe pollution control measures and assist in inspection and periodic safety audit.

3.3.3. Power of Directorate General Hydrocarbon

DGH was subsequently designated to exercise the following powers and functions of Central Government through Gazette Notification dated 1st September 2006, these include:

- Review and monitor the exploration programmes and development plans for commercial discoveries of hydrocarbons reserves proposed by licensee or lessee with a view to optimizing hydrocarbon recovery from a reservoir in accordance with generally accepted international petroleum industry practices
- Review the management of petroleum reservoirs by licensee or lessee and advise them on any action which may ensure proper management of the petroleum reservoirs including their conservation in accordance with generally accepted international petroleum industry practices
- To ask for and maintain in a readily retrievable form all geo-scientific data, reports and information from licensee or lessee and store and preserve data and samples pertaining to petroleum exploration, drilling, production and connected operations

- Review the reserves discovered by the licensee or lessee in accordance with generally accepted international petroleum industry practices
- To lay down norms for declaration or announcement of discoveries by licensee or lessee To exercise the power of the Central Government as given in Rules 24,25,26,27 and 30 of the Petroleum and Natural Gas Rules, 1959
- To monitor oil and gas production and royalty or any other charges or fees or levies, and where applicable, cost petroleum, etc, due to the Central Government in receiving accurate royalty and other statutory charges by the due date. Provided that in case where the Central Government has signed a Production Sharing Contract or a contract or an agreement for exploration and production of hydrocarbons, the powers and functions shall be discharged by Directorate General of Hydrocarbons in accordance and consistent with the respective Production Sharing Contract or contract or agreement.

DGH functions under the Administrative Control of Ministry of Petroleum & Natural Gas and carries out regulatory and contract management functions on behalf of Ministry of Petroleum & Natural Gas. DGH functions under the Administrative Control of Ministry of Petroleum & Natural Gas and carries out regulatory and contract management functions on behalf of Ministry of Petroleum & Natural Gas. DGH has been delegated with administrative and financial powers for its operations as per stipulations of the Ministry of Finance and Ministry of Petroleum & Natural Gas from time to time. Vide notification of 1st September, 2006 DGH has been delegated the powers and functions to monitor the upstream petroleum operations in India in accordance with the Oil Fields (Regulations and Development) Act, 1948 and the Petroleum and Natural Gas Rules, 1959. DGH is part of the Management Committee and performs review, advisory and approval functions on important matters such as annual work programmes and budgets and performance thereof; proposals for surrender or relinquishment of parts of the contract area, proposals for development plan; determination of development area, audit of blocks, claims for or on behalf of or against the contractor in excess of limits fixed. Further, delegation of powers as necessary for effective functioning of DGH is under consideration. To ensure that the DGH can operate effectively, it should be empowered with an independent financing and staffing mechanism. The funds required for day to day operations must be made available automatically, on a formulaic basis, through the OID (Oil Industry Development) cess. The DGH should be established as a multi-member, multidisciplinary body with professional teams that have expertise in different domains such

as legal, environmental, financial and technical. The DGH should further have the flexibility in its charter to access global experts, and maintain a permanent cadre at competitive remuneration rates. The DGH should also be developed as a knowledge centre or knowledge hub that acts as a central repository for best practices, geo-scientific data on Indian basins (through creation and maintenance of NDR), state-of-the-art technologies available locally or globally etc. It is commonly understood that, a Regulator is deemed to be independent if appeals against its decision lie to a body independent of the Govt. e.g. CCI, PNGRB, CERC etc. In that sense DGH is not independent.⁹⁶ The upstream regulators in all countries function under the control of the respective Governments.⁹⁷ The role of a regulator gains importance in situations where there is no level playing field. The NELP and CBM policies have already ensured a level playing field for all including the Private and Public Sector Thirteenth report Directorate general hydrocarbon. "DGH functions under the Administrative Control of Ministry of Petroleum & Natural Gas and carries out regulatory and contract management functions on behalf of Ministry of Petroleum & Natural Gas."⁹⁸

3.4. Environmental Legislations

3.4.1. The Environment Protection Act 1986

This Act is an umbrella legislation designed to provide a framework for the co- ordination of central and state authorities established under the Water (Prevention and Control) Act 1974 and Air (Prevention and Control) Act 1981. Under this Act the central government is empowered to take measures necessary to protect and improve the quality of the environment by setting standards for emissions and discharges, regulating the location of industries, management of hazardous wastes and production of public health and welfare. Oil and Natural Gas E&P Environmental sector driven by EIA notification for the purpose of recognizing the need for environmental protection from the oil and gas operation under the Environment Protection Act 1986.

3.4.2. The Environment protections rules 1986

The Central Government makes this rules powers conferred by the section 6 and 25 of the Environment Protection Act 1986. The purpose of this rule to fulfill the object of the

⁹⁶ *ibid.*

⁹⁷ *ibid.*

⁹⁸ *ibid.*

Environment protection Act is to protect and improve environment. The objective of this rule protects and improves quality of environment and provide standards effluent from Industries and operation process. This rule establish standards for emission or discharge of environmental pollutants, factors to be considered while prohibiting or restricting the location of industries, and sampling procedures.

3.4.3. Environmental Impact Assessment Notification 1994

In India for the first time EIA was conducted in the year 1977-78 to evaluate of River Valley Projects and later it was extended to mining, Industries, thermal power, port and harbors, atomic power, rail and road highways, bridges airport and communications, etc. The notification of 1994 brought a significant change in the functioning of Government including private sectors for environmental activities. The Central Government directed that on and from the date of publication of this notification in the Official Gazette, expansion or modernization of any activity (if pollution load is to exceed the existing one, or new project listed in Schedule I to this notification), it shall not be undertaken in any part of India unless it has been accorded environmental clearance by the Central Government in accordance with the procedure hereinafter specified in this notification. The Central government exercised the power vested under the Environment (Protection) Act, 1986. The EIA provision was hence made a mandatory requirement under the Environment Protection Act, 1986 with the following four objectives: -

- Forecast the environmental impact of projects proposed.
- Discover methods to mitigate adverse impacts.
- Formulate the projects to suit local environment.
- Present the predictions and alternatives to the decision-makers.

The EIA notification 1994 was amended in 1997 and in this amendment first time introduced the process of public hearing as part of the environmental clearance process and the State Pollution Control Boards (SPCB) were assigned to carry out public hearing to get the views and concerns of the affected community and interested parties for the proposed project. It was also entrusted with forming an committee to ensure fair representation in the public hearing process.⁹⁹

⁹⁹ Management (n 45).

3.4.4. Environmental Impact Assessment Notification 2006

Ministry of Environment and Forest introduced the EIA 2006 notification as a consequence of the recommendations of the Govindarajan Committee on 14th September, 2006. The objective of this notification was to address the limitations in the old EIA Notification (1994). Various modifications were made taking into account the feedback from diverse stakeholders. It was constituted to examine the procedures for investment approvals and project implementation. One major change effected by the 2006 EIA regulation was an increase in the number of projects requiring environmental clearance. Apart from this, the notification engaged states in granting clearance for projects mentioned in Schedule I, and mandated the formation of a state- level appraisal committee (SEAC), the recommendations of which were to be considered before granting approval. The responsibility of conducting public hearings was given to the pollution control boards instead of the proponents of the project. Environment Impact Assessment Notification of 2006 has decentralized the environmental clearance projects by categorizing the developmental projects in two categories, i.e., Category A (national level appraisal) and Category B (state level appraisal).¹⁰⁰

- Category A projects are appraised at national level by Impact Assessment Agency (IAA) and the Expert Appraisal Committee (EAC) and Category B projects are appraised at state level.
- State Level Environment Impact Assessment Authority (SEIAA) and State Level Expert Appraisal Committee (SEAC) are constituted to provide clearance to Category B process.

The offshore and onshore oil and gas exploration, development and production activities are covered under item 1(b) of the Schedule to the said notification and being category ‘A’ project is appraised in Ministry of Environment Forest and Climate Change.¹⁰¹

3.4.5. The Wildlife Protection Act 1972

The Wildlife Protection Act (WLPA), 1972 is the major legislation which is specifically enacted for the protection of the wildlife in India. This act aims to protect wild animals, birds and plants and safeguard the natural habitat that sustains the wildlife. It gives high level of protection to an area with adequate ecological, natural or zoological significance for

¹⁰⁰ *ibid.*

¹⁰¹ Affairs (n 5).

protecting or developing wildlife or its environment. The act empowers the central and state governments to declare any area a wildlife sanctuary, national park and closed area. There is a ban on carrying out any industrial activity inside these areas.¹⁰²

3.4.5. The Water (Pollution Prevention and Control) Act, 1974

Statutory obligations mandate that all onshore oil drilling projects adhere to strict compliance of obtain consent under the provisions of the Water (Prevention & Control of Pollution) Act, 1974 (hereinafter referred to as the Water Act), the Air (Prevention & Control of Pollution) Act, 1981 (hereinafter referred to as the Air Act), and Authorization under the Hazardous Waste (Management & Handling) Rules, 1989 and the Hazardous and Other Wastes (Management & Trans boundary Movement) Rules, 2016.¹⁰³ Section 25 deals with restrictions on new outlets and new discharges. Under this section no person shall without previous consent of the State Board to establish any industry, operation process, or any treatment and disposal system or any extension or addition thereto, which is likely to discharge sewage or trade effluent into a stream or well.

3.4.6. The Air Prevention and Control Pollution Act, 1981

Article 21 Restrictions on use of certain industrial plants — (1) Subject to the provisions of this section, no person shall, without the previous consent of the State Board, establish or operate any industrial plant in an air pollution control area:

Provided that a person operating any industrial plant in any air pollution control area immediately before the commencement of section 9 of the Air (Prevention and Control of Pollution) Amendment Act, 1987, for which no consent was necessary prior to such commencement, may continue to do so for a period of three months from such commencement or, if he has made an application for such consent within the said period of three months, till the disposal of such application.

3.4.7. The Noise Pollution (Regulations and Control) rules 2000

The Central Government hereby makes the following rules for the regulation and control of noise producing and generating sources. This rule provides the noise level in different area.

¹⁰² ibid

¹⁰³ Bonani Kakkar and others, 'July, 2020' (2020) 2020 <https://cpcb.nic.in/NGT/Preliminary_report_28.07.2020.pdf>.

Noise standard for industrial area is 75dB in day times and 70dB at night times. The respective State Pollution Control Boards or Pollution Control Committees in consultation with the Central Pollution Control Board shall collect, compile and publish technical and statistical data relating to noise pollution and measures devised for its effective prevention, control and abatement.¹⁰⁴

3.4.8. The Biological Diversity Act, 2002

This Act was enacted by the Parliament of India for the purpose of conservation of biological diversity. This Act was enacted to meet the obligations of the Convention on Biological Diversity as member countries of this convention. This Act provides setting up National Biodiversity Authority in national level and State Biodiversity Board at state level, Biodiversity Management Committee. This Act empowers State Biodiversity Board made.

3.4.9. The Coastal Regulation Zone Notification, 2011

The Coastal Regulations Zone Notification (CRZ) was announced with the objectives to ensure livelihood security to the fisher communities and other local communities living in coastal areas, to conserve and protect coastal stretches, and its unique environments, to promote development through sustainable manner based on scientific principles taking into account the dangers of natural hazards in the coastal areas , to restrict the setting up and expansion of any industry, operations or processes and manufacture or handling or storage or disposal hazardous substances.

¹⁰⁴ Rules 4

Chapter 4

Disasters Relating to Onshore Exploration and Production

Disaster means a catastrophe, mishap; calamity, or grave occurrence in any area, arising from natural and manmade causes or by accident or negligence which result in substantial loss of human suffering or damage to and destruction of property, or damage to, or degradation of environment, and is of such as nature as to be beyond the coping capacity of the community of the accident area.¹⁰⁵ Disasters are of two type's natural and anthropogenic hazard or man-made hazards. A natural disaster is a major adverse geologic process resulting as floods, earth quakes, tsunamis which cause severe damage of life, property and environment. While the anthropogenic hazard results in the form of human intent, negligence, human error and involving a failure of man-made system. Man-made disasters cover a wide range of events created largely due to accidents, negligence or sometimes even by human design, which result in huge loss of lives and property every year.¹⁰⁶ These include road, rail, river, marine and aviation accidents, oil spill, building and Bridge collapse, bomb blast, industrial and chemical accidents etc. India has experienced several man-made disasters. One among them is the 'Bhopal Gas Tragedy' it happened in the early morning hours of December 3, 1984, a highly toxic cloud of methyl isocyanate leaked from Tank – E610 engulfing the city of Bhopal resulting as many as 10,000 peoples deaths . In the state of Andhra Pradesh, there was a massive gas well blow-out that had occurred on January 8, 1995, at Pasarlapudi, of East Godavari District, it is also popularly known as the second biggest blow-out in the world.¹⁰⁷In India last three decades we have seen several disaster relating onshore exploration and production. Here in this study reflected the major disaster in chronological orders which affects on environment and human health and also highlighted the provision in response to handle these disasters.

4.1. Onshore Disaster of Exploration and production

4.1.1. 1993 Gas Pipeline Leakage in Komarada mandal, Andhra Pradesh, (1993)

¹⁰⁵ The Disaster Management Act 2005, s 2(d)

¹⁰⁶ M Roja Lakshmi and V Dileep Kumar, 'Anthropogenic Hazard and Disaster Relief Operations: A Case Study of GAIL Pipeline Blaze in East Godavari of A.P' (2015) 189 *Procedia - Social and Behavioral Sciences* 198 <<http://dx.doi.org/10.1016/j.sbspro.2015.03.215>>.

¹⁰⁷ *ibid*.

The first incident of gas pipeline leakage which subsequently caught fire was reported in Komrada mandal in the district as early as 1993. The ONGC officials who successfully capped the fire were, however, found wanting in a repeat of the incident two years later at Pasarlapudi.¹⁰⁸ Andhra Pradesh on 20.3.93 at about 5 PM caused considerable damage. The oil got sprinkled on nearby houses, crop, wells, drain- age and irrigation canals. The revenue officials of East Godavari district estimated the damage to crops as Rs. 50 lakhs, i.e., paddy and coconut. About fifty acres of land cover ring paddy and nearly 2000 coconut tree have been damaged. About 1500 people have been rendered hopeless and another 2000 fishermen have lost their fishing rights due to oil spill into drains and irrigation canals. Two relief camps have been conducted accommodating about 2000 people but no medical assistance has been provided so far to the affected people of the surrounding areas. People in the neighboring areas are panic- stricken due to oil and gas leakage and at last, after about a month, the spill was stopped on 16.4 93. The people in the area complained that the entire air was polluted and that they were suffering from a peculiar disease. besides the above mentioned losses suffered by the people of my constituency, prawn culture owners suffered heavy lessees as the oil get spilled into the ponds and thus caused irreparable less to their business.¹⁰⁹

4.1.2. Pasarlapudi ONGC well fire in Andhra Pradesh, (1993)

The Pasarlapudi blowout on Jan.8, 1995, was the biggest ever recorded in the history of the country's oil and natural gas exploration with the fire that engulfed the 19 drilling sites continuing for over two months. Although the blowout has not caused any casualties, it destroyed a drilling rig worth Rs 12 crore and caused damage worth about Rs 7 crore to other equipment at the well site.¹¹⁰ Going up in smoke every day is gas worth Rs 17 lakh. That is besides the Rs 20-crore lost on equipment damaged or destroyed in the fire which broke out after a blowout on January 8 and threatens to put the ONGC's plans on hold, at least for the moment. Coming at a time when the corporation is considering listing on major stock exchanges the 2-per cent shares divested by the Government, the latest disaster may turn out to be a blowout in more ways than one. To start with, a costly operational failure such as this will obviously affect the premium that the ONGC hopes to raise on its shares. Not to speak of

¹⁰⁸ M Rajeev, Fridays Blowout Not An Isolated Case, The Hindu (Chennai, 24 June 2014) <<https://www.thehindu.com/news/national/andhra-pradesh/fridays-blowout-not-an-isolated-case/article6155927.ece>>.

¹⁰⁹ <<https://parliamentofindia.nic.in/lslsdeb/lsls10/ses6/0421049301.htm>>.

¹¹⁰ ibid

the toll it could take on its plans for a further divestment of 8 per cent of the Government's stake. And the effect it could have on the corporation's plans to tap the market for Rs 10,000 crore. Since the blowout - incidentally the fourth in the 152 wells that the ONGC has dug in the Krishna-Godavari basin - comes within two years of a similar incident which occurred at Komarada, also in East Godavari district, in March 1993, it raises serious doubts about the organization's fire fighting preparedness. The comments of the corporation's director of drilling operations, S.S. Paintal, notwithstanding: "Blowouts are like the acts of God. We take every care but we cannot prevent them." Says M.C. Balayogi, the MP from Amalapuram: "The cause lies in the use of substandard equipment, poor quality materials, and gross negligence." The theory that seems to have gained popular acceptance as being closest to the truth is that the fire broke out when the sparks caused during a "fishing operation" - when the rig crew tried to pull out an embedded pipe - lit the gas. It's also believed that the disaster was not something that was totally unexpected. First, because the stuck pipe problem had cropped up last December. Second, the ONGC does not seem to have found the time to organize the fire fighting measures required to handle a blowout, a major possibility in such circumstances. And third, since the manner in which the crew of about 30 escaped the fire without any kind of burn injuries, is reason enough to believe that the men must have been at least partially aware of the impending danger. If anything, it is the intensity of the fire that may have come as a surprise: being flared at present are 1 million cubic metres of natural gas a day - 10 times the daily targeted flow of the well. Given the ferocity of the fire - houses in the vicinity have begun developing cracks because of the heat - the blaze is turning out to be no easy job for the fire fighting team which comprises the ONGC's blowout control group led by S.D. Bhasin and American consultants, the Texas-based Neil Adams Fire Fighters Inc. For Adams, a veteran who has put out many such fires in the post-Gulf War Kuwait and elsewhere, the fire at Pasarlapudi is still one of the most intense he has ever seen. And, there have been significant slip-ups even after the blowout. Though the well has not so far spewed toxic gases, the Americans are worried, as are the district authorities, about the head start the fire has had on the team: the ONGC took four days to move equipment to train water jets at the fire, even though it is available in plenty in a nearby canal. By the time they stepped up the pressure with nine more pumps brought in from around the country, the fire had risen from 100 to 140 metres and was a fortnight old. It was only after the Komarada disaster that the ONGC formed crisis management teams working offices at Baroda, Bombay, Sibsagar in Assam and in Narsapur in Andhra Pradesh - less than a 100-km from the Pasarlapudi site - to prevent and tackle such disasters. And that too with personnel whose technical skills in the

field are dated, thanks to the lack of proper equipment. "Positioning pumps and creating a water fountain around the drilling site within a fortnight on its own by the ONGC is a significant improvement over the earlier years," says Bhasin, of the initial time taken to train the water jets at the fire. The corporation does not even have a ready plan for drilling sites with regard to blowouts. Senior officials fly in and out of the disaster scene on the corporation's helicopters to work on and review the plan. So well known is the organization's lack of safety measures that it took the district officials' intervention to persuade the residents of the villages near the disaster site to allow the corporation to position a rig for drilling a relief well at Gandrothimeraka, a site parallel to Pasarlapudi 19. The well, which is essential for the operation, will be used to pump mud sludge into the rogue well, to reduce the pressure of the flow at the blowout. "The apparent lack of transparency in its operations is the cause for panic and concern," says the East Godavari district collector Sameer Sharma. "The only emergency plan they seem to have is on providing security during an employees' strike." Strangely, the corporation does not even have ready replacements of head flanges, a vital link between blowout preventers and the drilling pipe even and has to depend on the one Adams has offered to supply. The bill: Rs 20 lakh. Little wonder then that the consultants are picking up Rs 1.5 lakh a day for their advice. To quench the flames, the team has to first use water jets to form a fountain around the drilling site to cool the surrounding area and make way for ace fire fighters to move in and clear the damaged parts of the rig and other debris. If the water jets are not effective enough, the team will have to switch to the more expensive method of spraying fire retardant chemicals. The third option is to starve the burning gas of essential oxygen by triggering high power explosives at the mouth of the well. This, while being a sure way to extinguish the fire will, however, render the well useless in future. The ONGC, however, differs with its American counterparts on this matter. Says Bhasin: "We have revived an oil well Ghandhar 61 in Gujarat after a blowout and it should be possible here." To attempt a similar operation this time, the team will have to first contain the fire and then recap the well - provided the well mouth is still in shape so that blowout preventers and a head flange can be placed to cap it. The ONGC is willing to abandon the well only if the mouth is damaged. The relief well, meanwhile, will take about 60 days to dig. "This is both expensive and time consuming but has to be done as a precautionary measure." explains A.M. Bhatt, the ONGC's southern region director. Expert estimates are that the fire will be blazing for about the same time unless the underground gas supply line and channels to the blazing well collapse to automatically stop the flow. The slow pace of the fire fighting operations has only heightened the distrust of the ONGC in the basin even though it spent Rs 1 corer on

developmental activities in 1994-95. It has also maintained the daily supply of 17.45 lakh cubic meters of gas to industries in the region and produces 1,100 tones of oil. "The poor public perception is probably because not many locals have got jobs in the oil industry and the absence of an open involvement in the development of general infrastructure like roads in the region," says the sugar industry technologist and Lok Sabha member Dr B.B. Ramaiah. Adds Bhasin: "The ONGC has its own problems. The four or five companies with crisis management systems will not allow others to learn the technology and that is why it is taking so much time." But he is hopeful of the ONGC honing its fire fighting skills in a few years while the corporation may seek solace in such statements and beliefs, it will not be long before it will have to face the anger of an already dissatisfied people. For though the gas that has been burning so far is without any trace of oil, thus keeping any immediate fears of major environmental hazards at bay the first signs of disturbance are already beginning to show. Paddy, coconut palms and shrimp farms in a 2-km radius around the blowout have already been damaged or destroyed by the 24 hour scorching heat. While cultivation in the farms should be possible in the next kharif season, the damage done to some of the palms may be permanent. Also, with the bright flame turning night into day, the sleep of people living in the vicinity has been affected. But the worst may be far from over for the ONGC. The operation, towards its final hours of completion, will require the evacuation of the population in the peripheral villages. And the houses in the area will have to be kept cool with jets of water. The reason is that the smallest possible gas leakage during the capping process, in the hours between putting out the fire and fixing the flange and blowout prevention, could result in a major ecological threat. And the smallest spark could start a fire all over again at that final stage. For the ONGC, therefore, this operation is going to be touch and go till the very end.¹¹¹

4.1.3. Oil Well Blowout at Dikom, Assam

A major fire broke out in an abandoned oil well of Oil India Limited (OIL) at Kuhibari near Dikom in Assam, Dibrugarh district at the dated on 15 Sept, 2005. More than 500 families and hundreds of tea workers were evacuated to safer place. The fire in oil well number 15, closed on after twenty days of its occurrence.¹¹² The Dikom oil field is one of the most productive oilfields of Oil India. A team of US specialists is also at the site but have failed so far to bring the fire under control. It is still not clear what caused the fire to break out at the

¹¹¹<[https://www.indiatoday.in/magazine/special-report/story/19950215-ongc-struggles-to-control-blaze-erupting-from-its-gas-well-in-andhra-pradesh-806879-1995-02-15,\)](https://www.indiatoday.in/magazine/special-report/story/19950215-ongc-struggles-to-control-blaze-erupting-from-its-gas-well-in-andhra-pradesh-806879-1995-02-15,) Amaranth >.

¹¹² Dibrugarh oil fire rages on, 500 families evacuated (Guwahati, 15 September 2005) <https://zeenews.india.com/home/dibrugarh-oil-fire-rages-on-500-families-evacuated_241870.html>.

oil field. Two more experts from the Houston-based Boots and Coots International Well Control, Inc., a leading company dealing with oil and gas well blowouts and fires, joined their colleagues already at the site. Global fire-fighting experts had to be flown in to control a blaze at an abandoned oil well located in Dikom. It took about 45 days to control As a precautionary measure OIL have dug a pond at Dikom that could store huge quantities of water and they were waiting for heavy pressure pumps and a particular kind of sand that's available in western India," said Utpal Bora, general manager (production) for Oil India Ltd which owns the well. As response this disaster OIL had shut down 30 wells as protective measures. The General Managers of OIL said that this would affect the production. They had not any option. Also said that they have given priority to control the fire. They have evacuated 5000 families to safer place.¹¹³ As a precautionary measure, the district authorities have blocked NH 37 and also cut off electricity as high tension wires passed near the oil well and spillage area.¹¹⁴

4.1.4. Baghjan Oil well spill and fire breakout at Tinsukia, Assam (2020)

The Facts of the Disaster:

The Assam was again faced another major disaster after 15 years back of Dikom OIL Well-15 blowout and fire. The Well Baghjan-5 blowout started on 27.05.2020 and continued for at least 14 days before the explosion on 09.06.2020. The fire continues to burn even after more than 50 days since the explosion on 09.06.2020. Machinery failure usually leads to a blowout, which is an uncontrolled release of crude oil or gas from a production well. This particular well is under Oil India Limited or OIL Baghjan oilfield it adjoins the Maguri-Motapung wetland and not far from the Dibru-Saikhua National Park. For 13 days, gas had been following out “uncontrollably” despite the pumping in of water. Around 1610 families evacuated nearby affected area and camped in four relief camps with an immediate compensation of Rs. 30000 per affected family from OIL.¹¹⁵

Geographical Location:

¹¹³ Assam Oil Well shut (19 September, 2005) <http://news.bbc.co.uk/2/hi/south_asia/4260710.stm>.

¹¹⁴ ibid

¹¹⁵ ‘All about the Assam oil well fire’ The Hindu (Chennai, 14 June 2020) <<https://www.thehindu.com/news/national/all-about-the-assam-oil-well-fire/article31826171.ece>>.

Baghjan is located in the Doomdooma Revenue Circle of the district of Tinsukia in the State of Assam, India. It is situated 20 kms away from the Sub- Divisional Headquarter Doomdooma and 50 kms away from the District Headquarter Tinsukia. The Tinsukia district, located in the north corner of the Upper Brahmaputra is characterized by flood plains, beels / wetlands and swamps and occasional highlands. The area may be divided into three distinct physiographic zones stretching parallel to the Brahmaputra River including the active flood plain and 'charland' / sandbars, the middle plain and the southern foothills. Baghjan and surrounding areas are flanked by the Dibru-Saikhowa National Park (hereinafter referred to as the DSNP) and Biosphere Reserve in the north to north west and Maguri-Motapung wetland complex in the south under the district of Tinsukia. Eastern side of the area is covered by Baghjan Tea Garden and Diamuli Tea Garden. This landscape lies in close proximity with the Eastern Himalayas and is characterized as an Important Bird Area (IBA) and Endemic Bird Area. It lies below the periphery of the DSNP comprising an area of 340 km² which is the core of the larger Dibru-Saikhowa Biosphere Reserve (hereinafter referred to as the DSBR) and spans over 765 km². There are several oil and gas based wells of OIL as well as related infrastructure like pipeline in Baghjan and surrounding areas. It is worth mentioning here that Well Baghjan-5, which is site of the blowout on 27.05.2020 and explosion on 09.06.2020, constitutes both parts of the Assam Arakan basin and the Indo Burma Biodiversity Hotspot. Additionally, it is at a distance of 1.46 kms aerial distance from the DSNP Eco-Sensitive Zone boundary GPS Serial No.15. On the other hand, Maguri-Motapung wetland is located less than 1.75 kms south to the above- mentioned Gas and Condensate Well. The connection of the water from Dibru River to DSNP increases the possibility of pollutants spreading to the National Park in the downstream especially during flood period. Bherjan-Padumoni-Borajan Wild Life Sanctuary is south to the Baghjan area and the Maguri-Motapung wetland. The Bherjan segment has an aerial distance of about 6.2 kms from the Baghjan (ERM, 2018) while it is aurally 12 kms from Padumoni segmen Well Baghjan-5, falls primarily within the depositional plains of the River Brahmaputra and its tributaries. The key physical features include flood prone areas which lie in the riverbed of the Dangori River and in the periphery of the southern part of the DSNP. The Dibru River, a main river channel of the Brahmaputra which flows in the northern side of the area separates the DSNP and the Well Baghjan-5.¹¹⁶

Affect from Disaster:

¹¹⁶ Kakkar and others (n 102).

The explosion on 09.06.2020 and the subsequent fire which broke out has led to immense damage to the local population and their homes, apart from small tea gardens which were completely burnt down. Reports indicate that the grasslands on the south-western side and the western side have been impacted by the fire and during the field survey conducted by the experts, it was observed that bird density and diversity within a 1km radius had reduced substantially. The Preliminary Committee of Expert constituted by the Hon'ble National Green Tribunal, Principal Bench, New Delhi; places reliance on the Report of Wildlife Institute of India (WII) for a preliminary finding on assessment of damages due to the incident. To this Preliminary Report following area affects by oil well disaster at Baghjan areas:

Air Quality: Several representations received from the local communities in and around the site of incident have revealed complaints of difficulty in breathing and the ambient air being laden within toxic and heavy fumes. Even scientific teams from institutions such as the WII, who have visited the site, have reported such experiences. To this end, some preliminary data of the presence of high level of pollutants in the air is available. The WII has measured the Nitrogen, Sulphur Dioxide, Carbon Monoxide and HCOH (formaldehyde) in the environment surrounding the site of incident. NO₂ has shown 16 % increase on May 27 which is the highest recorded in the data time window (1st May to 10th July). According to the study, SO₂ (Sulphur Dioxide) levels spiked on 27.05.2020 and the highest has been recorded on 09.06.2020, following which it subsided. HCHO (Formaldehyde) also showed a spike on 28.05.2020 and 09.06.2020, with the highest reading on 21.06.2020. The CO (Carbon Monoxide) levels do not show many changes before and after the blowout.

Water Quality: In several representations filed before the Committee, it has come to light that local residents, especially of villages located close to the site of incident have been suffering because of contamination of the ground water. It has been stated before the Committee, that tube-wells used by villagers are emanating foul smelling water which makes it unusable. Several villages which are predominantly dependent on fishing from the nearby water bodies, such as the Maguri-Motapung wetland have been deprived of their livelihood because of the condensate on the water surface which has caused widespread damage to the aquatic ecosystem and also contaminated the water. The water quality post the blowout has also been examined by scientific teams. Some of the preliminary data from institutions such as the WII reveal that there has been large scale impact on the quality of water in the

surrounding water bodies, thereby, as a corollary causing substantial damage to the aquatic ecosystem. The Wildlife Institute of India (WII) assessed the quality of water through essential physiological parameters such as pH, Dissolved Oxygen (DO), Total Dissolved Solids (TDS), Conductivity, Specific Conductance Temperature and Polycyclic Aromatic Hydrocarbons (PAHs) pollutants based on ground sampling of water, soil and tissue of dead animals. In the opinion of the Institute, the Maguri-Motapung wetland is the worst affected with large scale death of aquatic fauna. The pollutants in water have also had a disastrous impact on the aquatic fauna. High mortality has been reported among fishes, insects, herpetofauna and insects including the decline of Gangetic River Dolphin Population in the area. Mortality 66 among the Gangetic Dolphin Population due to oil poisoning in the area has also been reported. It has been found that encounter rate of Gangetic River Dolphin in the area has decreased by 89% post of the oil blowout. While dolphin presence was recorded in Lohit and Dibru areas, no recording of Dolphin sound in Maguri-Motapung areas, which was the most impacted site.

Soil Quality: The impact assessment report of the WII states that high levels of carcinogenic Polycyclic Aromatic Hydrocarbons (PAH) pollutants which have been found in the ecosystem surrounding the site of incident will eventually percolate into the ground and even contaminate the ground water. In their view, the toxicity from these groups of pollutants is known to persist in the soil and aquatic system for a long time due to sustained release which will cause prolonged ill effects on all life forms. The PAHs in the soil and sediment samples used by the Institute ranged from 37.6 to 395.8 $\mu\text{g/Kg}$.

Sound/Noise: Preliminary data available before the Preliminary Committee demonstrate that the noise a level existing currently in the vicinity of the site of incident is well above the limits set by the World Health Organization (WHO) and the Central Pollution Control Board (CPCB), which it makes it detrimental to both human and animal life. The assessment carried out by the WII at the site has arrived at the same finding. According to their study, the noise level in 12 km radius of 70db or above is higher than standard limits set by WHO and CPCB and is not suitable for both human and animal life. Exposure for a prolonged period may result in hearing loss and many other ailments apart from affecting most of the birds and mammal species. It has been stated by WII that the noise level of this magnitude will cause high levels of stress for humans who are in the vicinity and may become a threat to wildlife as well.

Loss of Flora: The spread of gas and condensate from the Well Baghjan-5 since 27.05.2020 poses a threat to the biodiversity of the area that included Maguri-Motapung wetland, DSBR and the surrounding villages. The vegetation under 2km radius comprised of tall grassland and aquatic vegetation of Maguri-Motapung wetland including part of the DSNP and Biosphere Reserve. Condensate created a layer over the grassland and wetland plant species that used as a habitat by critically endangered, endangered and rare birds, herpetofauna, butterflies and other wildlife. The water bodies are also source of rich diversity of phytoplankton in the area. The condensate layer and other pollutants on the plant species restricted the photosynthetic processes and resulted in injury and death of the species. The severe impact of the pollutants from gas well could be seen on the grassland communities in Baghjan area and Maguri-Motapung Beel. Aaranyak (NGO) identified a dried area (130 hectares) due to condensate (before 09.06.2020) covering current agricultural land (43.9 ha), gas well area (1.64 ha), betel nut gardens, small tea gardens, bamboo groves and home gardens (12.6 ha), grasslands (56.02 ha) and water spread areas (15.84 ha). The report of WII confirmed burnt out of the vegetation amounting to about 60-70 hectares around the blowout well that caught fire on 09.06.2020. The pollutants also spread over the surrounding forest vegetation that comprised of basically mixed deciduous in characters with some semi-evergreen elements. The entry of different hydrocarbon compounds in the ecosystem severely disturbed the aquatic animals specially fish diversity due to the adverse effects on micro flora specially the phytoplankton. As phytoplankton (producer) is the major component of the food web of the aquatic ecosystem, the bio-magnification of the toxic pollutants in different tropic levels need to be studied and monitored to assess the actual damage in the wetland area of Maguri-Motapung wetland and DSBR.¹¹⁷

Loss of Fauna: The spread of gas and condensate from 27.05.2020 to 09.06.2020 before the fire broke out, caused severe damage to the air, water, soil and surrounding vegetation and settlement area including agricultural fields. It caused death and injury of different groups of wild and domestic animals in the area. The noise pollution also caused significant decrease of diversity of wildlife from the area. According to the reports of WII, a dead Gangetic Dolphin (National aquatic animals of India) was found dead from Maguri-Motapung wetland after the blowout incident. The Post-Mortem Report conducted by WII suggested the probable cause of death of the dolphin could be the inhalation or ingestion of

¹¹⁷ ibid

toxic substance leading to hypoxia. Some of the observations of damages on wild fauna and its habitats made by the Report of the WII after the Baghjan blowout incident are summarized in the following points-

- The observed levels of PAHs (Polycyclic aromatic hydrocarbons) after the incident are reported to have severe impacts on fishes, plants, microbes, birds, reptiles, amphibians and mammals.
- The total PAHs concentration reported in fish samples appears to be 10 - 100 folds higher than the earlier reported concentration in India. The impact is significant and will have long term effect, as many of these pollutants will leach into the ground and contaminate ground water.
- Maguri-Motapung wetland was severely damaged and polluted with respect to level of dissolved oxygen (DO), and total petroleum hydrocarbons. Fish richness declines by 71% and abundance by 81% between poor and good site. It was observed that fishes having visible symptoms on body due to oil toxicity, like loss of scales, decolouration, bleeding and excess mucous secretion. Large numbers of species have shown signs of oil impact. Among the affected fishes, some like – *Cirrhinus Reba*, *Banagana dero*, *Labeo bata*, *Labeo calbasu*, *Sperata aor*, *Sperata seengala*, *Channa marulius*, *Channa punctatus*, and *Eutropiichthys vacha* have high economic value in market and some other fishes like – *Puntius sophore*, *Puntius chola*, *Pethia gelius*, *Salmophasia bacaila*, *Baralius barna*, *Mystus vittatus*, *Xenetodon cancila*, *Anabus testudineus*, and *Parambassis ranga* are ornamentally important fishes. The abundance of these species was found to be significantly less in Dibru River and Maguri-Motapung wetland, likely due to the mortality and avoidance of high toxic areas due to oil spill. About 30 carcasses of fish were recovered in water bodies around the blowout site. Communications with locals reveal that there were many more dead fish earlier after the gas well blowout and they have either washed out due to flood or fished out.
- The predicted noise level from oil blowout point to 12 kms away ranges from 113 to 70db. This level of noise will adversely impact mammals, birds and insects, from disorientation to health issues.

- The encounter rate of Ganges river dolphin was 4.5/10 kms, which was reduced to 1.5/10 kms in May and by June it was 0.48/kms indicating 89% decline in use of this area between February and June.
- The decline in bird richness is evident in grassland (59%) and wetland (85%) habitats. vii. Species richness and abundance of butterflies increases with distance from well blowout site indicating impact of oil spill. Presences of oil film on wings of green marsh hawk and ditch jewel dragonfly and a carcass of a scarlet skimmer species with oil film on wings were noticed.
- There was a direct impacts of explosion burn down at least in 500 meter, and impacts of oil spill seems to be the likely cause for reduced encounter of herpetofaunal species. Live herpetofauna was recorded from 500m up to 6 km from the oil well explosion site and recovered carcasses at 400m and 6 km.

Remedial Measures by OIL: OIL has engaged M/s ERM India Pvt. Ltd., a leading global service provider of environmental, health, safety, risk consulting services, to conduct an Impact Assessment to review the site surroundings and the affected areas around Well Baghjan-5 in order to identify the environmental & ecological impacts and community health issues and recommend remedial measures. The study includes inter-alia an assessment of the air quality, contamination of surface, ground water and soil, impact to biodiversity.

OIL has engaged the Energy Research Institute (TERI) with the objective to recuperate the original properties of soil and water that has been contaminated by the spillage and suggest bio remedial measures. This would also enclose an assessment of the impact/contamination to the surface water, ground water and soil in the affected areas.

Competent authorities from Assam Agriculture University have been engaged to assess the damage to crops, trees, plants including paddy, tea, fruits and vegetables in the area affected in the aftermath of the Blowout. CSIR NEIST has been requested to assess the vibrations and tremors that are being experienced in and around the vicinity of the Well Baghjan-An amount of Rupees Nine Crores has been deposited with the Office of the District Administration towards payment of one time compensation to the families residing in the relief camps.5.

10 relief camps are presently being managed together by OIL and the Office of the District Administration. 1961 families are being accommodated in these relief camps. OIL has designated one officer per camp to oversee the management of the camps. Regular visits with representatives of the Office of the District Administration on a daily basis. Further, a team of two doctors and five Para medicos are stationed at oil installations in Baghjan with medicine and ambulances. Medical camps are being regularly conducted at the relief camps by OIL doctors, local hospitals and ARMY doctors. Medical cases reporting high fever with symptoms are being referred to the AMCH, Dibrugarh for COVID tests. So far, no cases of COVID 19 have been reported from the relief camps. A net expenditure of Rupees Eighteen Crores and Ninety two Lacks towards providing relief and rehabilitation to the affected areas has been spent, till date.

Chapter 5

Judicial Interpretation

In India Judiciary is playing vital role for balancing environment and development projects. One of the main developments in the Indian Judiciary is the Public Interest Litigation. In India after Bhopal Gas Leakage Disasters create new history in Indian Environmental Jurisprudence. After this incident The Judiciary has been developed doctrines Absolute Liability which meets modern industries disasters; replaced the doctrine strict liability. The judiciary of India developed several doctrines to improve the protection and improvement the environment. These doctrines are i.e. Polluter Pays Principle, Precautionary Principle, Public Trust Doctrine and Sustainable development.

5.1. Absolute Liability: The rule of Absolute liability was laid down by the Hon'ble Supreme Court of India in the case of M.C. Mehta v. Union of India¹¹⁸ and Bhopal Gas Leak case. Where the Hon'ble Apex Court maximize the limit of rule of Ryland V. Fletcher. In 1985 leakage of oleum gas from one of the units of Shriram Foods and Fertilizers Industries in Delhi, belonging to Delhi Cloth Mill Ltd. A Case: - A writ petition under Article 32 of the Constitution was brought by way of Public Interest Litigation. The Supreme Court took a hard and holds decision holding that it was not bound to follow the 19th Century rule of English Law, and it could evolve a rule which is suitable to prevail in the Indian of social and economic at the present day. It evolved the rule of 'absolute liability' as a part of Indian Law in preference to the rule of strict liability laid down in Ryland v. Fletcher, Bhagwati, C.J. observed in this context – "This, rule (Ryland v. Fletcher) evolved in the 19th century at a time when all these developments of science and technology had not taken place cannot afford any guidance in evolving any standard of liability consistent with the constitutional norm and the needs of the present day economy and social structure. The Court also laid down that the measure of compensation payable within the capacity of the enterprise, so that the same can have the deterrent effect. The Court held that "We would also like to point out that the measure of compensation in the kind of eases referred to must be correlated to the magnitude and capacity of the enterprise because such compensation must have a deterrent effect. The large and more prosperous the enterprise, greater must be the amount of the

¹¹⁸ (1987) 1 SCC 395

compensation payable by it for the harm caused on account of an accident in the carrying on the hazardous or inherently dangerous activity by the enterprise.¹¹⁹

The rule laid down in MC Mehta was also approved by the Apex Court in Charan Lal Sahu v Union of India. The Court pointed out that that this rule is 'absolute and non-delegable' and the enterprise cannot escape liability by showing that it has taken reasonable care and there was no negligence on its part.¹²⁰

5.2. Polluter pays Principle: In Vellore Citizen's Welfare Forum v. Union of India¹²¹ the Supreme Court has declared that the polluter pays principle is an essential feature of the sustainable development. It is a rule in international environmental law where the polluting party pays for the harm or damage done to the natural environment.¹²²

5.3. Precautionary Principle: The Supreme Court of India, in Vellore Citizens Forum Case, developed the following three concepts for the precautionary principle: Environmental measures must anticipate, prevent and attack the causes of environmental degradation Lack of scientific certainty should not be used as a reason for postponing measures Onus of proof is on the actor to show that his action is benign.¹²³

5.4. Public Trust Doctrine: In M. C. Mehta v. Kamal Nath¹²⁴ and Others the Court held that the public trust doctrine is a part of the law of the land. The Public Trust Doctrine primarily rests on the principle that certain resources like air, water, sea and the forests have such a great importance to people as a whole that it would be wholly unjustified to make them a subject of private ownership.¹²⁵

5.5. Sustainable Development: In Rural Litigation and Entitlement Kendra v. State of UP,¹²⁶ The court for the first time dealt with the issue relating to the environment and development; and held that, it is always to be remembered that these are the permanent assets of mankind and or not intended to be exhausted in one generation.

¹¹⁹ Bharat Parmar and Aayush Goyal, 'Absolute Liability : The Rule of Strict Liability in Indian Perspective' <<http://docs.manupatra.in/newsline/articles/Upload/2D83321D-590A-4646-83F6-9D8E84F5AA3C.pdf>>.

¹²⁰ *ibid.*

¹²¹ AIR 1996 5 SCC 647

¹²² BA Year, Technical Sciences and Assistant Of Law, 'A Study on Principle and Doctrine By Supreme Court' (2018) 120 2365 <<https://acadpubl.eu/hub/2018-120-5/3/203.pdf>>.

¹²³ *ibid.*

¹²⁴ (1997) 1 SCC 388

¹²⁵ *ibid.*

¹²⁶ (AIR 1987 SC 1037

In Vellore Citizen's Welfare Forum, In this case, the Supreme Court observed that sustainable development has come to be accepted as a viable concept to eradicate poverty and improve the quality of human life while living within the carrying capacity of the supporting eco-system.

The World commission on Environment and Development (WCED) in its report prominently known as the "Brundtland Report" named after the Chairman of the Commission Ms. GH Brundtland highlights the concept of sustainable development. As per Brundtland Report, Sustainable development signifies development that meets the needs of the present without compromising the ability of the future generations to meet their own needs. There is a need for the courts to strike a balance between development and environment.¹²⁷

In Goa Foundation vs. Union of India In Goa,¹²⁸ the Hon'ble Supreme Court of India mandated that under the Environment (Protection) Act, 1986, States should declare eco-sensitive zones (ESZs) around the protected areas to keep a check on their fragmentation that may result from industrial development. Accordingly, mining and most polluting industries were prohibited in these zones. The Hon'ble Supreme Court further ordered that till the States do not identify such ESZs, all the projects that require environment clearance and are within 10 km of a protected area boundary, including mining, would be allowed only after getting an approval from the National Board of Wildlife (NBWL).

In Indian council for Enviro-Legal Action v. Union of India,¹²⁹ in this case explained the polluter pays principle as once the activity carried on hazardous or inherently dangerous, the person carrying on such activities liable to make good the loss caused to any other person of his activity irrespective of the fact whether he took reasonable care.

In A. P. Pollution Control Board v. Prof. M.V. Nayudu, in this case S.C. applied the precautionary principle in considering a petition against the development of certain hazardous industries. In this case the Court observes that the principle of precaution involves the anticipation of environment harm and taking measures to avoid it or to choose the least environmentally harmful activity. It is best on scientific uncertainty. Environmental protection n should not only aim at protecting health, property and economic inters but also protect the environment for its own sake, precautionary duties must not only triggered by

¹²⁷ *ibid.*

¹²⁸ W.P(C) No. 460/2004

¹²⁹ (1996)3 SCC 212: AIR 1996 SC 1446

suspicion of concrete danger but also by justified concern or risk potential.¹³⁰

In *M.C Mehta v. Kamal Nath and Others*, where the Indian Supreme Court applied public trust with regard to the protection and preservation of natural resources. In this case, the State Government granted lease of riparian forestland to a private company for commercial purpose. The purpose of the lease was to build a motel at the bank of the River Beas. A report published in a national newspaper alleged that the motel management interfered with the natural flow of the river in order to divert its course and to save the motel from future floods. The Supreme Court initiated suo moto action based on the news paper item because the fact disclose, if future would be a serious act of environmental degradation.¹³¹

¹³⁰ AIR 1999 SC 812)

¹³¹ (1997)1 SCC 388

Conclusion

This paper aspired to analyses the potential of disaster relating to onshore exploration and production laws in India regulating this sector. For this purpose, it was primarily important to study why the field requires regulations in first place. The examination the disasters which lead high potential environmental risk and affect on ecology, health and safety. Oil & Natural gas sectors plays important role in global economic growth. In International level in field of E&P have “The Oil Industry International Forum” to see the health, safety and environment.

India is concerned international standards for balance development and environment. As participants of Stockholm conference India had been given importance on environment. The Parliament amend the constitution article 48-A, article 51-A (g). Today India has a variety of legislative measures, policies and programs to deal with environmental prevention and protection. Environment legislation shadowed the development industries in terms of environment protection.

However the judiciary is playing crucial role for balancing between development and environment. The judiciary developed doctrines to come up to mitigate the damage being caused to the environment. After Bhopal Gas Disater case the new rule came up in environmental jurisprudence. In Oleum gas leakage case judiciary replaced the old principle of strict liability Ryland v. Fletcher and developed new principle Absolute liability. Judiciary has made tremendous progress in disturbing environmental justice. The courts however are not the Forum to solve the all Environmental related challenges in the Country; it has to be equipped with creation of additional capacities to deal with whole gamut of Environmental related issues.

In India, the analysis of the existing onshore E&P statutes that provides extensive provisions for regulating exploration and production, health and safety. Apart from this the existing environmental statutes provides express provisions for environmental standards to establish and operation of onshore E&P..

Upon perusal of the findings of the literature, the following measures are suggesting by the researcher to streamline the existing regulatory framework for the control of oil and natural gas disaster in India:

- **Independent Regulatory Board for onshore exploration and production:** In onshore exploration and production is high potential risk of disaster. Therefore

perpetual regulatory body is very much essential. For regulation, this sector there is no any independent regulatory body, Director General of Hydrocarbons is technical arm under the administration of Ministry of Petroleum and Natural Gas.

- **Proper precautionary measures should be taken:** Due to development of science and technology's there are needs to analysis scientific certainties of proposed sectors. In precautionary measures must be standards of international precautionary measures.
- **Proper trainings the firefighter to meet disasters:** In all major disaster to this sector Indian oil and natural gas companies till depending on foreign well or fire controlled experts. Also there needs to restore highly technical advanced equipment to control disaster.
- **India is need a better response to oil well disasters:** It is felt that the regulations are inadequate as the government should also be made liable for giving license to such activities and the liabilities must be shared to bring back the environment as it was as earliest.

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