24

STANDING COMMITTEE ON
PETROLEUM & NATURAL GAS
(2017-18)

SIXTEENTH LOK SABHA

MINISTRY OF PETROLEUM & NATURAL GAS

SAFETY, SECURITY AND ENVIRONMENTAL ASPECTS IN PETROLEUM SECTOR

TWENTY FOURTH REPORT

LOK SABHA SECRETARIAT
NEW DELHI

July, 2018 / Shravana, 1940 (Saka)

CP&NG No.

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Presented to Lok Sabha on 25.07.2018

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(iii)

COMPOSITION OF THE STANDING COMMITTEE ON PETROLEUM & NATURAL GAS (2017-18)

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SECRETARIAT

1	Shri A.K. Singh	Additional Secretary
2	Dr. Ram Raj Rai	Director
3	Shri Vinay Pradeep Barwa	Deputy Secretary

(iv)

INTRODUCTION

I, the Chairperson, Standing Committee on Petroleum & Natural Gas having been authorised by the Committee on their behalf, present this Twenty Fourth Report on „Safety, Security and Environmental Aspects in Petroleum Sector".

2. The Committee took evidence of the representatives of the Ministry of Petroleum & Natural Gas at their sittings held on 07.01.2015, 29.09.2015, 24.10.2017 and 06.12.2017.

3. The Report was considered and adopted by the Standing Committee on Petroleum and Natural Gas on 19.07.2018.

4. The Committee wish to express their thanks to the representatives of the Ministry of Petroleum and Natural Gas/OISD/Public Sector Undertakings, Ministry of Labour and Employment/Directorate General of Mines Safety (DGMS), Ministry of Commerce and Industry/Petroleum and Explosive Safety Organisation (PESO) and non-official witnesses/industry experts in petroleum sector for placing their views before them and furnishing the information desired in connection with examination of the subject.

5. The Committee also place on record their appreciation for the valuable assistance rendered to them by the officials of the Lok Sabha Secretariat attached to the Committee.

New Delhi;
***24 July*, 2018**
2 Shravana, 1940 (Saka)

PRALHAD JOSHI,
Chairperson,
Standing Committee on
Petroleum & Natural Gas.

REPORT

CHAPTER - I

A. Introductory

The Petroleum & Natural Gas Industry in India comprises 23 refineries, 15 Gas processing plants, 4 Liquefied Natural Gas (LNG) terminals, 680 oil and LPG installations and more than 39,000KM cross country pipelines spread across the length and breadth of the country. In Offshore exploration & Production, there are 21 production complexes, 252 well platforms and 33 rigs. In on-land exploration & production, there are 301 production installations & 230 rigs.

1.2 The installed refining capacity of the country is around 231 MMTPA; indigenous crude oil production is around 38 MMTPA while gas production is around 35 Billion Cu.m. per annum. The marketing touch points including retail outlets, depots, and terminals are spread throughout the nooks and corners of the country from Kashmir to Kanyakumari and far flung North East states to Kutch. It maintains steady supply of vital petroleum products supply in the country.

1.3 The Oil & Natural Gas Industry handles highly inflammable hydro-carbons in all physical forms – solid, liquid & gas – and operates processes under high temperature and pressure with presence of Oxygen (air) and many a times active source of ignition. Therefore, the safety in Petroleum and Natural Gas Industry is of paramount importance. It is not only critical for the operators‟ manpower and assets but also, by the very nature of possible adverse outcomes of safety system failure, critical for society at large - as such adverse outcomes may spill over the boundary of the industry establishment.

1.4 Safety of vital plants, installations, employees and public at large is accorded the highest priority. It may be mentioned that the safety of the Oil & Gas Installations in the country is ensured by the company concerned; and the Industry in both Public and Private sector, have taken suitable measures in this regard.

Safety Measures adopted by the Oil & Natural Gas Industry

1.5 But, in view of the societal risk involved, Govt. of India has found it prudent to create statutory authorities to oversee effectiveness of those safety systems under various legislations. As regards the stepping up of the safety measures at these vital installations is concerned, it may be mentioned that the Industry has taken measures and major steps for further strengthening the safety as enumerated below:

1.6 The safety measures taken by the Industry include both proactive and secondary measures to combat any unsafe situation and are systemic in nature. Each of the oil companies both in private and public sector are required to maintain highest level of safety standards for ensuring safe operations at the respective installations.

1.7 Some of the major safety measures undertaken by the Oil & Natural Gas Industry include:

- Incorporation of in-built safety aspects in the i.e. during the design phase itself. These include process safety, instrumentation & safety interlocks, safety while design of equipments following the best International Standards, etc.
- Review of Process & Instrumentation Diagram (P&ID) is carried out for incorporating the Quantitative Risk Assessment (QRA)/ Hazard & Operability (HAZOP) studies recommendations.
- Mounded Bullets storage for petroleum like Liquefied Petroleum Gas (LPG) and construction of Blast Resistant Control Rooms for enhanced safety of personnel and equipment.
- Development and implementation of well laid down systems and procedures like work permit system, operating manuals entailing start-up, shutdown down, emergency handling procedures, disaster management plan etc.
- Each installation has its own dedicated fire fighting facilities which are equipped with gadgets, well trained crew to fight fire in case of any eventuality.
- Safety measures in oil industry is looked after by dedicated group of personnel and headed by Senior Management Executive in the rank of GM/ED who in turn report to Top Management.
- By adopting both proactive and reactive measures in Fire and safety, Oil Industry is equipped with measures to protect its vital installations.
- The industry also carries out regular Internal Safety Audits and conducts periodic mock drills both on-site and off-site.

Current Statutory Authorities in Safety Enforcement in Petroleum and Natural Gas Industry

N.B. Other Statutory Authorities e.g. Inspectorate of Boiler, Inspectorate of Factories, CEA, CPCB / SPCB regulate in their respective areas in both Upstream & Downstream segments of Petroleum & Natural Gas industry thru the Factories Act; Indian Boiler Act; Electricity Act; Environment (Protection) Act etc.

Current Statutory Authorities in Safety Enforcement				
Industry Segment	**Concerned Ministry**	**Concerned Acts**	**Concerned Rules / Regulations**	**Statutory Authority**
Upstream - E&P Onshore (upto Territorial water)	**Labor & Employment**	**Mines Act, 1952**	**Oil Mines Regulations, 2017**	**DGMS**
Upstream - E&P Offshore (upto EEZ)	**PNG**	**Oilfields Regulation and Development Act, 1948**	**P&NG (Safety in Offshore Operations) Rules, 2008**	**OISD – Competent Authority**
Downstream & Gas (Natural) Processing Plants (GPP)	**DIPP, Commerce & Industry**	**Petroleum Act, 1934 Explosives Act, 1884**	**Petroleum Rules, 2002 SMPV Rules, 2016 Gas Cylinder Rules, 2016**	**PESO**
Downstream (incl. Pipeline)	**PNG**	**PNGRB Act, 2006**	**PNGRB Regulations**	**PESO/ PNGRB**

CHAPTER - II

SAFETY MANAGEMENT SYSTEM AND AGENCIES REGULATING THE OIL AND GAS SECTOR

A. SAFETY MANAGEMENT SYSTEM IN SOME OF THE OIL & GAS INSTALLATIONS

Safety of Oil Wells

1.8 Essentially, the safety management systems are guided by two National Standards – the Oil Mines Regulations 1952 (for on-shore E&P Installations) and the Petroleum and Natural Gas (Safety in Offshore Operation) Rule 2008.

1.9 Accordingly, safety measures taken by the upstream oil companies include both primary and secondary measures to combat any unsafe situation and are systemic in nature. Each of the oil companies both in private and public sector are required to maintain highest level of safety standards for ensuring safe operations at the respective installations. OISD STD-105 (Work Permit System), OISD-RP-174 (Well Control), OISD-GDN-186 (Simultaneous Operations in E&P) and OISD- STD-189 (Fire Fighting Equipment for Drilling Rigs, Work over Rigs & Production Installations) etc. are followed. The major safety measures are:-

Incorporation of in-built safety aspects i.e. during the design phase itself. These include process safety, instrumentation & safety interlocks, safety while design of equipment following the best International Standards, etc.

Review of P&ID is carried out for incorporating the Quantitative Risk Assessment (QRA)/ Hazard & Operability (HAZOP) studies recommendations.

Offshore installations are of two types - production platform and drilling rigs. The following safety measures are in place on the offshore installation:

- ✓ **Process safety:**

This is ensured by safety devices installed on vessel and piping. In case of any abnormality like over pressurization, leakage, these devices send alarm and actuate shut down systems.

- ✓ **Emergency shutdown system:**

Safety devices like sub Surface Safety Valves(SSSV) in oil and gas wells, Shut down valves (SDV) in process piping are provided on well/process platforms for isolation of inventory in case of emergency situations.

- ✓ **Well Control System:**

On drilling rigs, primary and secondary well control is maintained to avoid any influx of formation fluid to surface. Primary well control is maintained by drilling fluid and the secondary well control measures is Blowout Preventer (BOP) system.

- ✓ **Fire and Gas detection system:**

Fire detection system detects any fire in the working and accommodation area of the installation. It activates automatic shutdown of the process and start of firefighting system.

Gas Detection system detects presence of hydrocarbon and hydrogen sulphide gases in the atmosphere on the installation and cause process shut down, thereby ensuring safety of personal and installation .

- ✓ **Fire suppression system:**

Automatic water deluge, water sprinkler, flooding system etc. Manual firefighting equipment like dry chemical powder system, foam firefighting system, portable fire extinguishers are also provided to fight fire.

- ✓ **Emergency response system:**

Each offshore installation has its own emergency preparedness organization and plan means for evacuation and equipment for recovery and rescue.

Safety Measures - Pipelines

1.10 OISD carries out periodic audits including pre-commissioning audit for Cross country pipelines, monitors implementation of Safety audit recommendations with industry for compliance, carries out investigation of major incidents for learning and preventing recurrence. The basic purpose of the same is to improve the safety systems in those establishments & that no untoward incident takes place in the oil installations.

1.11 The progress for implementations of the safety audits recommendations is closely monitored by OISD to expedite the compliance with follow ups with industry on regular basis. OISD has recently uploaded the status of progress of implementation in website for close follow ups & monitoring along with Industry for speedy implementation and transparency.

1.12 With respect to the Cross country pipelines, OISD has developed various standards such as OISD-STD-226 (Natural Gas Transmission Pipelines and City

Gas Distribution Networks), OISD-STD-141 (Design and construction requirement for cross-country pipelines) and OISD-STD-214 (Cross-country LPG pipelines). Special attention has been given for infusing latest technology for critical activities like cathodic protection, external coating, pigging (Cleaning as well as intelligent pigging) facility etc.

1.13 OISD, in the year 2013, has also released Guidelines OISD GDN 233 on „Guidelines on Inspection of Onland Non-Piggable Pipelines" for regular inspection & maintenance of such non-piggable pipelines in the country.

1.14 In addition to above, following additional safety checks and measures are ensured by OISD to ensure the protection of oil and natural gas pipeline network in the country:

- Health integrity monitoring of the pipeline through „Pipeline Integrity Management System", which includes coating health assessment survey, Cathodic protection monitoring, monitoring of internal and external corrosion, intelligent pigging etc.
- The system of "Supervisory control and data acquisition" (SCADA) for real time & effective monitoring of operating parameters such as pressure, flow etc., for pipeline operation.
- Ground patrolling and inspection of Right of way (ROW) for effective monitoring on a sustained basis.
- Implementation of Management of change procedure.
- Standard operating procedures for all critical functions and extent of awareness among the working people.
- Surge analysis.
- Adequacy of Fire water calculations and firefighting equipment in the station.
- Emergency shutdown procedures.
- Development and implementation of well laid down systems and procedures like work permit system, operating manuals entailing start-ups, shutdown, emergency handling procedures, Disaster Management Plan etc.,
- By adopting both proactive and reactive measures in the fire and safety, oil industry is equipped with measures to protect its vital installations.
- Risk Assessment of ageing pipelines (piggable & non-piggable) in line with the SOP developed by OISD in consultation with the industry members.

Safety Measures in Refineries

1.15 Safety aspect of Oil Refineries are considered during design stage itself meeting the OISD and other international standards w.r.t. safe separation distance, process safety management, proper selection of metallurgy, safety relief system, proper handling, storage and dispatch system. Special emphasis is given for work permit system, hot work, incident reporting, work at height, confined space entry, energy isolation, scaffold safety, behavior based safety, management of change, job safety analysis, etc.. Adequate dedicated fire-fighting facilities are provided at each oil refinery installations. Mutual aid scheme with nearby similar types of industries is also practiced by all refineries. Emergency Response and Disaster Management Plan (ERDMP) is also prepared by each installation and is approved by accredited agency.

1.16 All the Refineries have their own dedicated fire-fighting facilities which include equipment, a well-trained fire-fighting crew available 24X7 inside the plant. Safety measures in the Refineries are looked after by a dedicated group of personnel and headed by a senior management executive in the rank of GM, who in turn reports to the top management executive.

1.17 The Refineries also carry out regular internal safety audits and conduct periodic mock drills (both onsite and offsite). It has also developed its own Disaster Management Plan and organizes mock drills (both onsite and offsite) to ensure emergency preparedness.

1.18 The firefighting facilities have been designed in accordance with the OISD-STD-116 which was developed by OISD based on the inputs of all Oil Industry and different national & international standards / practices like NFPA, API, Petroleum Rules 2002, Fire Protection Manual (Part-II) Of TAC and The Institute of Petroleum (U. K.), etc.

1.19 Fire-fighting facilities of a refinery are designed for fighting two simultaneous major fires anywhere in the complex. Besides the above the following design consideration also considered in the Refinery installation:

Firefighting facilities consists of the following major facilities depending upon size of the installation and risk involved:

- Fire Water System –includes Fire water pipeline network, Fire hydrants & Fire Hose, Fixed water monitors, Fixed water spray on storage tanks & Process Unit.
- Semi-fixed foam system for storage tanks.
- Automatic firefighting systems
- Water Spray for Electrical Installation
- Clean Agent (Halon substitute) for Control rooms & Satellite Rack Room (SRR)
- Foam tender System
- Clean Agent Fire Protection system
- Carbon Dioxide System
- Dry Chemical Extinguishing System
- Detection and Alarm system
- Communication System
- Portable firefighting equipment
- Mobile firefighting equipment
- First Aid Fire Fighting Equipment.

Automatic fire-fighting systems installed in the refineries include:

Automatic Actuated Rim seal Detection & Suppression System for external floating roof tanks Automatic Water Spray for Pressurised storages including LPG / Hydrogen, Automatic deluge water spray system, High Volume Long Range (HVLR) monitor in other parts of the facilities.

Personal Protective Equipment required during Fire Fighting like Water gel based blanket, Fire Proximity Suit, Self-contained breathing apparatus, Airline breathing apparatus, Safety Helmets, Fire Helmets, Stretcher, First Aid box, Rubber hand gloves, canister mask, emergency kit, etc.

Other Equipment like Portable Gas detectors, Explosive meter, Oxygen meter, Hand operated siren, Red/Green Flag for fire drill, Safe walk roof top ladder, emergency lighting, portable mega phone, various leak plugging gadgets, oil dispersants and oil adsorbents, lifting jacks (for rescue of trapped workers), etc.

Safety Measures in Oil Marketing Installation (LPG & POL)

Key differentiating features of Oil Marketing Installations (LPG & POL) are:

(i) Operation in discrete shifts (as opposed to 24 x 7 operating style of Refineries / Pipelines)

(ii) Ingress of third party vehicles and personnel and engagement of contractors labour all through the working shifts, thereby increasing process variability.
(iii) Human habitation in close proximity of the locations with nominal buffer space.
(iv) Absence of active source of ignition within location licensed area.

1.20 Keeping in view these differentiating features, specific OISD standards have been developed such as OISD-STD-244 (Storage and handling of Petroleum Products at Depots and Terminals including standalone crude oil storage facilities), OISD-STD-144 (Liquefied Petroleum Gas-LPG Installations), OISD-STD-150 (Design and Safety Requirements For Liquefied Petroleum Gas Mounded Storage Facility), OISD-GDN-169 (OISD Guidelines on Small LPG Bottling Plants -Design and Fire Protection facilities), OISD-STD-117 (Fire Protection Facilities for Petroleum Depots, Terminals, Pipeline Installations and Lube Oil Installations) and OISD-STD-118 (Layouts for Oil and Gas Installations).

1.21 OISD carries out periodic audits including pre-commissioning audit for LPG & POL Marketing Installations, monitors implementation of Safety Audit recommendations with industry for compliance, and carries out investigation of major incidents for learning and preventing recurrence. The basic purpose of the same is to improve the safety systems in these establishments and that no untoward incident takes place in the Oil Installations. The progress for implementations of the Safety Audits recommendations is closely monitored by OISD to expedite the compliance with follow-ups with industry on regular basis. OISD has developed a program for monitoring of compliance of its audit observation.

1.22 In addition to above, respective oil marketing companies also carries out internal inspection of all POL & LPG Installation every year as stipulated in various OISD Standards.

B. AGENCIES REGULATING PETROLEUM SECTOR

1.23 Details in regards to the role and functional jurisdiction of DGMS, PESO and OISD in the supervision of safety and security of on-shore and off-shore oil installations in the country are as under:

"Directorate General of Mines Safety (DGMS) : Exploration and Production - On-Shore

Safety in Onshore is being regulated by Directorate General of Mines Safety (under Ministry of Labor) through the Oil Mines Regulations, 1984 framed under provisions of The Mines Act, 1952. These regulations cover entire gamut of operations in oil mines right from drilling to oil / gas production including their storage and transportation by pipelines with chapters on protection against fires and on General Safety Provisions. The focus of the Mines Act, 1952 is on regulating mining operations with due emphasis on health and safety of workmen. The Act extends up to territorial waters (up to 12 nautical miles). In the Mines Act, 1952, definition of minerals includes mineral oils (which in turn include natural gas and petroleum) thus oil & gas industry also comes under the ambit of this Act.

Oil Industry Safety Directorate (OISD) : Exploration and Production - Off-Shore

Govt. of India notified the Petroleum and Natural Gas (Safety in Offshore Operations) rules, 2008 in exercise of the powers conferred by Sections 5, 6 and 7 of the Oilfields (Regulation and Development) Act, 1948 wherein OISD is the Competent Authority as stipulated in Section 8 read with Rule 174 of the Petroleum and Natural Gas (Safety in Offshore Operations) rules 2008 to administer the said rules.

Petroleum and Explosives Safety Organization (PESO) : Downstream Petroleum

Safety in downstream petroleum activities is regulated by Chief Controller, Petroleum and Explosive Safety Organization operating under Department of Industrial Policy and Promotion (DIPP), Ministry of Commerce & Industry through the Petroleum Rules, 2002; the Gas Cylinder Rules, 2004 and the Static and Mobile Pressure Vessel (unfired) Rules, 1981. The Petroleum Rules 2002 were made in exercise of the power conferred by the Petroleum Act 1934. The Petroleum Act is administered by the Ministry of Petroleum & Natural Gas. Gas Cylinder Rules, 2004 and Static and Mobile Pressure Vessel (unfired) Rules, 1981 were made in exercise of the power conferred in the Explosives Act, 1884. The Explosives Act is administered by the Ministry of Commerce & Industry."

The role and functioning of these three agencies are detailed below:

OIL INDUSTRY SAFETY DIRECTORATE

Role of OISD in Safety

1.24 OISD, a technical directorate under the aegis of MoP&NG, over the years, has developed technical expertise in overseeing Safety in entire Oil and Gas sector to its all activities and with its core competency is in a position to give undivided

attention to Safety in entire Oil and Gas sector in the country. The core competencies of OISD include:

- ✓ Laying down Safety norms and development of technical safety Standards.
- ✓ Carrying out Safety audits/inspection of entire industry and verify compliance to Standards.
- ✓ Carrying out Pre-commission Safety audit of Petroleum Refineries, cross country pipelines and Marketing locations prior to commissioning of the facility.
- ✓ Investigating major causes of fire and incidents to prevent recurrence.
- ✓ Disseminating Safety knowledge by organizing seminars, training, workshops and Newsletter of OISD at regular intervals.

Development of Safety Standards

1.25 OISD develops Standards / Guidelines / Recommended Practices for the oil and gas sector thru a participative process involving all the stakeholders (including the public at large), drawing inputs from international standards and adapting them to Indian conditions by leveraging the experience of the constituents.

1.26 These standards cover inbuilt design safety, asset integrity and best operating practices in the field of production, processing, storage and transport of petroleum. OISD standards are reviewed periodically to ascertain needs of developing new standards, updating / amending existing standards to incorporate the latest technological developments as well as current experiences on the ground.

1.27 As on date, OISD has developed 120 technical safety standards for the Oil & Gas Industry. 09 of these standards are included in the statutory provisions of the Petroleum Rules, 2002, the Gas Cylinder Rules, 2016, the Static & Mobile Pressure Vessels (Unfired), Rules, 2016.

1.28 Further, 16 OISD standards (four of which are common to those included in other statutes as above), have also been included in the recently notified the Oil Miners regulations (OMR), 2017.

1.29 In this regard it may be pertinent to mention here that the Oil Mines Regulations, 1984 (Specific to E&P Sector Onshore) framed under provisions of The Mines Act, 1952, have been revised in August 2017.

1.30 During the year 2016-17, OISD has revised/ amended 08 Numbers of the existing standards. These standards, upon their approval in the 34th Safety Council Meeting held on 14th September, 2017, have been released for implementation by the Industry.

1.31 In the last three years safety of following new areas has been addressed by OISD by framing New OISD Standards for these areas:

- OISD-STD-235 on „Storage, Handling, Refueling and Fire fighting at Aviation Fuelling Stations"
- OISD-STD-236 on „Design, Layout, Operation & Maintenance of Refrigerated LPG Storage"
- OISD-STD-237 on „Layout, Design consideration, Safety, Operation and Maintenance of Lube/ Grease Manufacturing and Filling Plants"
- OISD-STD-244 - Storage and Handling of Petroleum Products at Depots and Terminals Including Standalone Crude Oil Storage Facilities" – This was one of the recommendations of the M B Lal Committee for a comprehensive Standard for such installations. These safety features were earlier addressed in various OISD standards.
- OISD-RP-238 on „Well Integrity"
- OISD-GDN-239 on „Sustained Casing Pressure Management"

1.32 When the Committee asked as to whether oil companies have collaborated with any foreign global players for knowledge sharing in petroleum sector for the maintenance of highest safety standard at the oil and gas installation, the Ministry submitted the following reply:

> "In this regard it is mentioned that OISD, the technical Directorate under the aegis of MoP&NG, with its objective to enhance process safety across the entire spectrum of Oil & Gas Industry have signed reciprocal (without cost) MoU on knowledge sharing with some of the International Organizations of repute.
>
> OISD has already signed MoUs with Bureau of Safety and Environmental Enforcement (BSEE), Govt. of USA – in E&P sector; Centre for Chemical Process Safety (CCPS), AIChE, USA – in process safety management in the downstream sector.
>
> Further, to enhance Process Safety in the entire Oil & Gas Industry in India; recently OISD has signed a MOU with the American Petroleum Institute (API), – the world leader in Formulation of technical Standards including safety standards for the Petroleum Industry worldwide. The signing of this historical and landmark MoU would not only be beneficial to both the Organizations i.e. OISD and API, but it would go a long way in enhancing the Safety of the entire Oil & Gas Industry as a whole".

1.33 When asked to furnish the note on the kind of training provided to employees and officers of Oil PSUs regarding safety and security issues, the Ministry gave the following reply:

> "As per stipulations laid down in OISD standards all the workers including the contract and security personnel involved in risk operations should be imparted regular training and refresher trainings as per the guidelines prescribed in OISD STD 154. During audits of each installation, OISD checks this aspect and gives its observations/recommendations to bridge any gap existing in terms of training needs of the employees, contractors as well as security personnel engaged in risk operations".

DIRECTORATE-GENERAL OF MINES SAFETY (DGMS)

STATUTORY FRAMEWORK AND REGULATORY PROVISIONS

1.34 Under the Constitution of India, safety, welfare and health of workers employed in mines are the concern of the Central Government (Entry 55-Union List-Article 246). The objective is regulated by the Mines Act, 1952 and the Rules and Regulations framed thereunder. These are administered by the Directorate-General of Mines Safety (DGMS), under the Union Ministry of Labour & Employment. Apart from administering the Mines Act and the subordinate legislation made thereunder, DGMS also administers some other allied legislation, including the Indian Electricity Act.

- MINES ACT, 1952
  - Coal Mines Regulations, 2017
  - Metalliferous Mines Regulations, 1961
  - Oil Mines Regulations, 2017
  - Mines Rules, 1955
  - Mines Vocational Training Rules, 1966
  - Mines Rescue Rules, 1985
  - Mines Creche Rules, 1966
- ELECTRICITY ACT, 2003
  - Central Electricity Authority (Measure relating to Safety and electric Supply) Regulation, 2010
- ALLIED LEGISLATION
  - Explosive Rules, 2008
  - Factories Act, 1948 : Chapter III & IV
  - Manufacture, Storage & Import of Hazardous Chemicals Rules, 1989 – under Environmental Protection Act, 1986
  - Land Acquisition (Mines) Act, 1885
  - The Coal Mines (Conservation & Development) Act, 1974

ORGANIZATIONAL SET-UP OF DGMS

1.35 The organisation has its headquarters at Dhanbad (Jharkhand) and is headed by Director-General of Mines Safety. At the headquarter, the Director-General is assisted by specialist staff-officers in mining, electrical & mechanical, occupational health, law, survey, statistics, administration and accounts disciplines. The headquarters has also a technical library and S&T laboratories as a back-up support to the organisation.

1.36 The field organisation has a two-tier network of field offices. The entire country is divided into eight zones, each under the charge of a Deputy Director-General of Mines Safety. There are three to four Regional offices under each zonal office. Each Region is under the charge of a Director of Mines Safety. There are in all 29 such Regional Offices. Sub-regional offices have been set up in important areas of concentrated mining activities away from Regional office. There are two such sub-regional offices, each under the charge of a Deputy Director of Mines Safety. Each Zone, besides having inspecting officers of mining disciplines has officers in electrical & mechanical engineering and occupational health disciplines.

MECHANISM ADOPTED BY DGMS TO ADMINISTER THE PROVISIONS OF THE MINES ACT, 1952, AND THE OIL MINES REGULATIONS, 2017 AND RULES FRAMED THEREUNDER

Inspection of mines

1.37 Serious hazards like blowouts, fires, explosions, collapse of derrick/platforms/rigs are associated with oil mining. Inspecting officers of DGMS make sample inspections and do necessary follow-up actions to enforce compliance of the statutes for occupational health, safety and welfare of the persons working in the mines.

Investigation into -

(a) accidents

(b) dangerous occurrences - emergency response

(c) complaints & other matters

(a) Interactions for development of safety equipment, material and safe work practices through workshop etc.

(b) Development of Safety Legislation & Standards

(c) Safety Information Dissemination

Amendment of various statutes

1.38 Section 57 and Section 58 of the mines Act, 1952 empowers the Central government to make regulations and rules consistent with the Act. Exercising these powers, regulations and rules have been framed, which have been brought in line with the technological developments by the Central Government.

Recent Amendment of the Oil Mines Regulations

1.39 The Oil Mines Regulations, 2017, has been published in the Official Gazette vide GSR 1029(E) on 18th day of August, 2017 and enforced with immediate effect. The last regulations were published in the year 1996, and to keep pace with the technological advancement in the petroleum sector, a comprehensive change was warranted.

1.40 The newly enforced Oil Mines Regulations, 2017, is a step towards shift from "prescriptive to goal setting legislation". The regulation has been made more flexible, dynamic and self-regulation based, which will enable to effectively address changing and site-specific conditions of mines and also enable in the "ease of doing business".

1.41 Following are the main new features of this regulation:

(i) Incorporation of Safety Management System as a part of self-regulatory approach
(ii) Replacement of all permissions and approvals with pre-existing regulatory mechanism by adopting standard based approach.
(iii) Provisions to enable maintenance of plans, sections & records and submission of notices & returns in electronic form (in line with the Digital India Mission launched by Central Government).
(iv) Incorporation of "Forms" for submission of different notices and returns made dynamic by enabling Chief Inspector to change the Forms as and when the situation so warrants.
(v) Omission of Quarterly Returns and retaining only Annual Returns.
(vi) Incorporation of Responsibilities of Contractors, Suppliers, Manufacturers & Designers, which was required in the context of present business model.

Issue of Technical, Legislative and Approval Circulars from time to time

Safety promotional initiatives including:

(a) Organisation of -

- Conference on Safety in Mines
- National Safety Awards

- Safety Weeks & Campaigns

(b) Promoting -

- safety education and awareness programmes
- workers‟ participation in safety management through -
  - workmen‟s inspector
  - safety committee
  - tripartite reviews

STATISTICS OF INSPECTIONS, ENQUIRIES AND PROSECUTIONS IN OIL MINES

1.42 Statistics of inspections, enquiries, accidents and prosecutions pertaining to 112 nos. of oil mines in India.

Inspection and Enquiry into Accidents, Dangerous Occurrences etc. in Oil Mines

1.43 **Statutory Provisions:** Officers of DGMS also conduct inquires into fatal accidents, some of the serious accidents and dangerous occurrences including complaints in the mines to find out the root causes of such accidents so that suitable preventive measures are taken.

Following actions are taken after an enquiry:

- Modification/improvement in the method of working
- Action by management like stoppage of increment, dismissal from service, recorded warning, withholding promotion and
- Prosecution in the court of law

The number of inspections and enquiries conducted by DGMS officers during the years 2008 to 2017 (upto October) are given below:

Table 1: Inspection and Enquiry in Oil Mines

YEAR	NO. OF INSPECTIONS	NO. OF ENQUIRIES	TOTAL
2008	216	24	240
2009	250	52	302
2010	243	52	295
2011	321	68	389
2012	292	40	332
2013	329	60	389
2014	588	111	699
2015	786	36	822
2016	638	96	734
2017*	493	29	522

*Figures upto 31.10.2017

Trend in Fatalities in Oil Mines

1.44 The trend of fatal accidents with fatalities and the rate of fatality per 1000 persons employed are detailed in table 2 below:

Table 2: Trend in Fatalities in Oil Mines

Year	No. of Fatal Acci-dents in Oil Mines	Public Sector Oil Mines				Private Sector Oil Mines				Oil Mines (Total)			
		Fatalities		Fatality Rate per 1000 persons employed		Fatalities		Fatality Rate per 1000 persons employed		Fatalities		Fatality Rate per 1000 persons employed	
		Contract	Total	Contract	Total	Contract	Total	Contract	Total	Contract	Total	Contract	Total
2008	5	1	6	0.27	0.28	0	0	0.00	0.00	1	6	0.19	0.25
2009	2	1	2	0.23	0.09	1	1	0.74	0.36	2	3	0.35	0.12
2010	4	2	4	0.27	0.15	0	0	0.00	0.00	2	4	0.21	0.14
2011	5	1	5	0.17	0.21	0	0	0.00	0.00	1	5	0.13	0.18
2012	1	1	1	0.17	0.04	1	1	0.65	0.26	2	2	0.23	0.09
2013	3	1	4	0.17	0.27	0	0	0.00	0.00	1	5	0.10	0.19
2014	4	1	5	0.17	0.33	0	0	-	-	1	5	0.12	0.20
2015	3	2	4	0.21	0.15	1	1	0.61	0.25	3	5	0.31	0.18
2016	6	3	6	0.31	0.22	0	3	-	0.75	3	9	0.31	0.33
2017*	1	0	1	-	-	0	0	-	-	0	1	-	-

*Figures are up to 31.10.2017.

Prosecution cases in Oil Mines

1.45 The details of prosecution cases launched in Oil Mines and their status are given in table 3 below:

Table 3: Prosecution cases

Year	No. of Prosecutions		
	Filed	Disposed	Pending
2000	01	01	00
2001	02	00	02
2002	02	02	02
2003	00	00	02
2004	00	00	02
2005	00	00	02
2006	02	01	03
2007	01	00	04
2008	02	00	06
2009	03	00	09
2010	01	00	10
2011	00	00	10
2012	00	00	10
2013	00	00	10
2014	00	00	10
2015	01	00	11
2016	00	00	11
2017*	00	00	11

*Figures upto 31.10.2017

PETROLEUM AND EXPLOSIVES SAFETY ORGANISATION (PESO)

1.46 The Petroleum and Explosives Safety Organisation (PESO) was formerly known as Department of Explosives, under the aegis of Department of Industrial Policy and Promotion, Ministry of Commerce and Industry. Since its inception on 05/09/1898, PESO is engaged in matters related to safety in manufacturing/refining, storage, transportation, Import & Export, handling and use of hazardous substances. The activities of the organisation, over the years have increased exponentially and expanded in diverse fields. Today, the organisation deals with a wide range of subjects related to explosives, petroleum, compressed gases, pressure vessels, gas cylinders, cross-country pipelines, LNG, CNG, Auto LPG, etc.

1.47 PESO is headed by Chief Controller of Explosives having headquarter at Nagpur and there are 5 Circle Offices located at Mumbai, Chennai, Kolkata, Faridabad and Agra and 18 Sub-Circle Offices under various Circle Offices. The organisation also has National Academy of Explosives & Petroleum Safety and Testing Station (NAEPS & TS) at Nagpur and Fireworks Research & Development Centre (FRDC) at Sivakasi (TN).

ROLE AND FUNCTION OF ORGANISATION

1.48 The organisation is primarily entrusted with the responsibility to ensure safety in explosives and petroleum industry. PESO plays the major roles as described below:

STATUTORY ROLE

THE EXPLOSIVES ACT, 1884 and the following rules framed thereunder

1. Explosives Rules, 2008
2. Ammonium Nitrate Rules, 2012
3. Gas Cylinders Rules, 2016
4. Static & Mobile Pressure Vessels (Unfired)[SMPV(U)] Rules, 2016
5. Notification No. GSR 625(E) dated 07.08.1983 regarding Acetylene Generator

(**Vide notification No. M-1272(1) dated 28/09/1938 declaring any gas contained in any metal container in the compressed or liquefied state to be an explosives within the meaning of Explosives Act 1884**)

THE PETROLEUM ACT, 1934 and the following rules framed thereunder

1. Petroleum Rules, 2002
2. Calcium Carbide Rules, 1987
3. Cinematography Film Rules, 1948 (Theses rules have become obsolete and already proposed for repeal)

THE ENVIRONMENT (PROTECTION ACT), 1986

1. Manufacture, Storage and Import of Hazardous Chemicals Rules, 1989

THE INFLAMMABLE SUBSTANCES ACT, 1952

ADVISORY ROLE

1. With the expertise available with PESO in specialized technical and safety aspects to prevent fire and explosion involving hazardous substances covered under the above acts and rules, the organization renders advice whenever requested not only to the industry but also to the government and other bodies like Ports, Railways, Defence Establishments, and Ministries of

Surface Transport, Environment & Forests, Petroleum & Natural Gas, ISRO, Pollution Control Authorities etc.

2. The organization plays important role in formulation of related BIS standards, Port by-laws, Indian Red Tariff and Regulations pertaining to transportation of hazardous goods by rail, road, sea and air.
3. The Chief Controller of Explosives is the member of the Central Crisis Group constituted by the Ministry of Environment & Forests and other officers also represent at State level and District level Crisis Management Groups.

e-Governance

Since early 2000, PESO is being geared up with the induction of Information Technology, under e-governance and as of now the entire gamut of activities of PESO is carried out online by all the offices (26 Nos.) PESO located across the country, accessing the central servers located at HQ, Nagpur through dedicated leased lines.

Functions and activities of PESO in Petroleum sector

- The import, storage, refining , blending and transportation of petroleum by road tanker and by cross country pipelines including approval of jetties, ports, flameproof equipments is regulated by PESO under Petroleum Act, 1934 & Petroleum Rules, 2002 framed there under.
- The transportation of compressed gases and cross-country pipelines carrying LPG, LNG, Natural gas and other flammable & hazardous chemicals including other hazardous compressed gases and jetties are regulated by PESO under Manufacture, Storage & Import of Hazardous Chemicals(MSIHC) Rules, 1989 notified under Environment (Protection) Act, 1986.
- The storage, transport and import of compressed gases in pressure vessels including approval of fabrication shop, design drawing of pressure vessel, etc. is also regulated by PESO under SMPV(U) Rules, 2016 notified under Explosives Act, 1884.
- The storage, transport and import of compressed gases in gas cylinders including Auto LPG & CNG dispensing station and approval of cylinders, valves & regulator manufacturing units is also regulated by PESO under Gas Cylinders Rules, 2016 notified under Explosives Act, 1884.

1.49 The Petroleum Rules specify various provisions in respect of the critical parameters that have direct bearing on the safety in petroleum sector. Major activities covered under the rules are regulating import of petroleum, approval of Ports/Jetties, transport of petroleum by road/rail/ pipelines, storage of petroleum and production/refining/blending of petroleum.

1.50 The Petroleum Rules have been amended from time to time to incorporate new technologies, suggestions of stakeholders and learning from past accidents. The erstwhile Petroleum Rules, 1976 were repealed and the Petroleum Rules, 2002 were notified vide GSR 204(E) dated 13/03/2002. The said Petroleum Rules, 2002 were further amended to Petroleum (Amendment) Rules, 2011 vide Gazette Notification No. GSR 857(E) dated 01/12/2011.

1.51 The Gas Cylinders Rules, 2004 and Static & Mobile Pressure Vessels (Unfired) Rules, 1981 were substituted by Gas Cylinders Rules, 2016 and Static & Mobile Pressure Vessels (Unfired) Rules, 2016 respectively.

1.52 PESO has been handling the safety regulations in hazardous premises like refineries, cross country pipelines, petroleum storage installations, auto LPG and CNG dispensing stations, hazardous compressed gas storage installations i.e., LPG, CNG etc., and over the years PESO has developed domain knowledge, expertise, experience and infrastructure in regulating safety in petroleum sector.

1.53 The Committee were informed by PESO that they regulate 97 per cent of the petroleum sector safety related activities which accounts 2.38 lakhs premises whereas DGMS regulate 4500 oil installations constituting 2 per cent whereas OISD regulate 2000 premises which is about 1 per cent. Asked about the strength of PESO to carryout its activities, the official from PESO made the following reply:

> “At present, we are having 137 sanctioned posts of officers against which 119 posts are currently filled up”.

1.54 Asked about the timelines for approving a retail outlet, the PESO official made the following reply:

> "We take 21 days……For each service, we have fixed timelines which are being followed by all the authorities throughout the country”.

1.55 When enquired as to whether the existing manpower is sufficient, the Official from DIPP MADE the following comments:

> “Actually, it is not. That is the reason why we conducted a study through NPC and they have given the recommendation as to what should be the ideal manpower. We have taken it up with DoPT and considerations have already started. We have given the recommendation about what should our manpower be and by how much time we should get them filled. That is work in progress”.

1.56 When asked about the status of the pipelines laid across the country for transporting petroleum products, the ministry official made following comments:

"Sir, there was some pipeline which was laid decades ago.

…..We have advised them to carry out a safety audit. We are asking them to replace the old pipelines. In a phased manner, these pipelines are being replaced. Normally, it is 25 years; now it is more than 40 years. They are replacing it in a phased manner. Mainly the GAIL pipeline network is having this issue. We have taken it up and they are also coming forward. In the old days, these lines were not approved by PESO. Subsequently when the rules were notified they started realising that approval was required. We are asking them for old pipelines which were not approved. Before asking for post-facto approval, we are asking for a health assessment report".

1.57 When asked by the Committee whether the Ministry is satisfied with the prevailing system for effective implementation of various aspects of safety in Oil and Gas Industry by different designated agencies and changes the Ministry proposes to improve the same, the Ministry submitted the following written reply:

"The present statutes on safety in Oil & Gas Industry empower different agencies to look after the same viz. DGMS, PESO, PNGRB& OISD. Each of these agencies are empowered under different statutes and it has been found that there is fragmentation in the safety regulatory scenario in PNG Industry. Further, it has also been observed that there are instances of overlap and multiple benchmarks (as set under various statutes) for same / similar working areas. Therefore, it has been felt by MoP&NG that for effective implementation of the safety regulations there is a need for creation of an umbrella agency overseeing implementation of safety systems across the entire PNG Industry. Keeping this in view, MoP&NG has already initiated a draft Bill viz. The Petroleum and Natural Gas Industry Safety Board Bill 2013 targeted towards creation of Petroleum and Natural Gas Industry Safety Board (PNGISB) – the said umbrella safety regulator for PNG Industry. This Bill is presently under discussion in the Committee of Secretaries (CoS). Two meetings of CoS has already taken place wherein issues related to transfer of jurisdiction from agencies under Ministry of Labour and Employment and DIPP (DGMS), Ministry of Commerce and Industry (PESO) and PNGRB had been raised. MoP&NG"s views on the said issues have been placed with the CoS for further discussions in the next meeting".

1.58 When asked to furnish update on the conferment of statutory status upon OISD, the Ministry furnished the following detail in a written reply:

"This Ministry has brought a proposal before the Committee of Secretaries (CoS) for establishment of Petroleum & Natural Gas Industry Safety Board (PNGISB) to regulate the safety of Petroleum & Natural Gas Industry in the entire country. The proposal envisage establishment of Directorate General of Natural Gas and Industry safety. Once this proposal is approved, OISD will be developed as Directorate General. Two meetings of the CoS have been held on 01.07.2014 & 07.11.2014 and no final decision has been taken. The matter is still pending in CoS".

1.59 Further during the oral evidence, the Secretary made the following observations:

> "You had mentioned about setting up of the Petroleum and Natural Gas Safety Board. At present there are a number of agencies which look after the security issues. We have OISD, Director-General of Mines Safety, Petroleum and Natural Gas Regulatory Board and for off shore installations there is a separate security mechanism. Looking at all this we had framed a proposal for having a unified security Board for the entire sector. This was considered by the Committee of Secretaries. The Committee of Secretaries made certain observations and recommendations. The basic theme of that observation was that no new organisation should be created. If possible, no new legislation should be carried out".

1.60 When asked by the Committee about the decision of the Committee of Secretaries(COS) on the issue, the Secretary, MOPNG stated the following during the oral evidence:

> "As I have mentioned, CoS had stated that they will prefer that no new organization is created. In fact they said that a statutory framework may be preferred for regulating the safety in the industry. It also mentioned that the Ministry may weigh the options of strengthening the existing mechanism *vis-à-vis* a single regulator. But the preference was towards strengthening the existing mechanism. It mentioned that strengthening existing regulatory agencies or bodies may be preferred over creation of a new organization. One more thing was that the organization which is entrusted with the safety and security of these installations should be at arm"s length away from the entities which will be regulated by them".

1.61 Asked to explain the arms length mechanism, the Secretary further stated the following:

> "Suppose, it is an upstream industry. The safety or security regulation of upstream industry should not be with that industry but should be away from the industry so that there is no conflict of interest in the security related issue.
>
> Another issue that was mentioned was since petrochemical industry is now more or less part and parcel of refinery, it goes along with the refinery industry – there may be some independent petrochemical plants but many of the refineries are integrated with the petrochemical plants – petrochemical security should also be looked at by the same agency. A framework should be prepared where the security of petrochemical establishments is also included."

CHAPTER – III

SAFETY

A. ACCIDENTS / INVESTIGATIONS

ACCIDENTS THAT HAVE OCCURRED IN THE OIL & GAS INSTALLATIONS AND THEIR CAUSES AND PREVENTIVE MEASURES TAKEN THEREAFTER

1.62 Details of the Major Onsite Incidents that have happened in the Oil & Gas Industry in the last three years including the number of incidents of the current year (As on 30.11.2017), is given in the following Table:

Sl. No.	Company Name	Year	Accidents	Fatalities	Injured	Compensation (Rs in Lakhs)	Operational Loss (Rs. In Lakhs)
1	IOC	2014-15	14	6	9	111.28	Nil
		2015-16	16	9	18	75.03	Nil
		2016-17	10	3	9	18.0	Nil
2	BPCL	2014-15	8	1	10	12.25	12.0
		2015-16	2	0	6	0	0
		2016-17	1	1	1	0	0
3	HPCL	2014-15	54	8	22	12.75	0
		2015-16	65	6	24	8.300	5.5
		2016-17	30	6	15	0	0
4	OIL	2014-15	05	00	05	3.36	0
		2015-16	07	00	07	3.93	0
		2016-17	07	01	06	6.04	0
5	GAIL	2014-15	3	22	18	530	0
		2015-16	2	3	4	4	0
		2016-17	0	0	0	0	0
6	ONGC	2015-16	35	9	18	302.99	0
		2016-17	36	6	9	5.80	0
		2017-18	14	0	12	-	0

1.63 On being enquired on the reasons for the accidents the representative of the Ministry sated during evidence as under:

> "Sir, as you are asking about the reasons, in each and every major accident, OISD does the investigation and then they send the report to the company, local people and also to the Ministry. So, there are different types of reasons. One is not following the standard operating procedure. So, though there is a SOP, people are not following it. Then, there is human error because of some reason. Then, there may be some fault with the equipment. They have made an analysis as to what percentage of accidents has happened due to which type of error. That analysis has also been done by the OISD for separate type of accidents. They presented the report in the Safety Council Meeting. The Safety Council Meetings happens under the chairmanship of the Secretary. The data is presented there where all the CMDs are there. Analysis is made

as to what is happening. They also do the safety audits of all the installations. The Safety Council also monitors whether the companies are complying with the Safety Audit‟s recommendations. So, they take some time to implement the recommendations. That is also analysed and examined in the Safety Council. I would say that a lot of things have been done. Nobody can say that everything has been done".

ACCIDENTS CAUSED BY WORKERS OF CONTRACTORS

1.64 The table below gives the details of major onsite incidents for the period from 2014 to 2017 in the Oil and Gas Industry caused by workers of contractors.

Sl. No.	Company Name	Year	Accidents	Fatalities (of contract workers)	Injured
1	IOC	2014-15	12	5	8
		2015-16	10	8	5
		2016-17	6	3	5
2	BPCL	2014-15	8	6	10
		2015-16	3	2	6
		2016-17	1	1	2
3	HPCL	2014-15	7	2	4
		2015-16	3	1	2
		2016-17	1	0	1
4	OIL	2014-15	04	01	03
		2015-16	02	01	01
		2016-17	00	00	00
5	GAIL	2014-15	0	0	0
		2015-16	2	3	4
		2016-17	0	0	0
6	ONGC	2014-15	-	-	-
		2015-16	14	6	9
		2016-17	5	4	2

ACCIDENTS OCCURRED DURING THE TRANSPORTATION OF PETROLEUM PRODUCTS

1.65 On being enquired on the company wise details of accidents that involved trucks transporting petroleum products during the last three years and the steps taken to prevent such accidents the Ministry in a written reply submitted the following:

Name of OMC‟s	2014-15	2015-16	2016-17
IOCL	161	204	198
BPCL	152	200	144
HPCL	171	193	175
Total	484	597	517

1.66 The Ministry has further stated that the following measures have been taken to prevent such incidents:

- Ensuring and enhancing training of drivers.
- Ensuring endorsement on driving license for carrying hazardous goods to avoid frequent change of drivers.
- Ensuring placement of second crew
- Implementation of VTS- Vehicle Tracking System.
- Strengthening of checking of safety fittings of Tank Trucks.

- Only those Tank trucks are contracted that have valid Explosive License and TT Fabrication drawing approved by PESO
- Quarterly inspection of Tank lorries using comprehensive checklist.
- Anti-lock Braking System (ABS) conforming to IS:11852:2003 are installed on all contract TTs
- Speed Governors installation in all TTs
- Yearly health check –up camps are organized for TT crew
- Side crash guards installation in all TTs
- All Tank trucks are compliant to Motor Vehicle Act 1988 regulations
- Ensuring availability of First Aid Box in the Tank Trucks
- Fusible link provided which will permit automatic closing of the emergency valves in the event of fire.
- Mandatory for all drivers to undergo refresher training course / training programs organized by the location.
- Availability of two fire extinguishers (one no. 10 Kg DCP and one no. 1 Kg DCP / CO2) in operating condition.
- Provision of Transport Emergency (TREM) Card.
- Emergency Information Panels are displayed on the TT.
- Vehicle is in good condition and valid fitness certificate issued by RTO is available at all times
- The driving license of the drivers is endorsed by RTO for transportation of hazardous goods.

1.67 To a query on the use of Global Positioning System (GPS) for monitoring and tracking the trucks carrying inflammable petroleum products the Ministry has stated that it is not mandatory for oil companies to install GPS system, however, tank trucks carrying Aviation Turbine Fuel (ATF) are provided with GPS system.

SAFETY AUDIT OF OIL AND GAS INSTALLATIONS

1.68 When enquired on the frequency of external and internal safety audits of oil and gas installations, the Ministry in its written reply stated as under:

OISD carries out periodic safety audits of all types of Oil & Gas installations to monitor their compliance with the OISD standards. The frequency of external safety audits (ESA/SSA) of various types Oil & Gas Installations is given as under:

OISD External Safety Audits (ESAs) Frequencies			
Industry	**Audit Frequency**	**Audits Unit**	**Total ESA/Year**
Refineries & Gas Processing Plants including LNG Terminals	03 Years	Nos	14-15
Cross Country Pipelines in Kilometres of Length	04 years	Kms	7000-8000 Kms
Marketing Installations (POL)	07 Years	Nos	40
Marketing Installations (LPG)	07 Years	Nos	30
E & P Onshore	04 Years	Nos	50
E & P Offshore	04 Years	Nos	16

It may also be mentioned that to ensure safe & productive capitalization thereby enabling uninterrupted distribution of petroleum products for the public at large, OISD, in addition to the ESA/SSAs also carries out pre-commissioning safety audits of Greenfield projects across the Oil & Gas Industry. These audits are conducted where; green-field developments and also major additional facilities at existing locations are being done, to ensure *ab initio* compliance of these facilities to the OISD standards at the construction stage itself.

Details of Safety Audits carried out by OISD during the last three years including the current year (as on 30.11.2017) are as under:

Installation-wise Safety Audits conducted by OISD				
Installations	**Financial Year**			
	2014-15	**2015-16**	**2016-17**	**2017-18 (Nov'17)**
Refineries, Gas Processing Plants and LNG Terminals	41	39	36	16
Marketing Installations (POL/LPG)	89	98	114	80
Cross country Pipeline Installations (Kms)	6564	7896	9532	5075
Exploration & Production Installations	71	67	66	53
Note: The number of safety audits includes the Precommissioning safety audits of the Oil & Gas Installations.				

IOCL:

Internal Safety Audit by Multi-disciplinary team is carried out for all locations annually in line with OISD-145. In addition to MDT inspection, External Safety Audits by OISD is also carried out. The details of audits for last three years are as under:

AUDIT	YEAR	Refineries	Marketing	Pipeline
Internal Audit	2014-15	8	325	80
	2015-16	8	325	80
	2016-17	8	323	85
External Audits	2014-15	6	21	8
	2015-16	3	25	2
	2016-17	4	43	8

Gaps identified during Safety audits are complied on regular basis in time bound manner. For audit points which are likely to take longer time for compliance, Qualitative Risk Analysis (QRA) is conducted and the suggested Mitigation measures are taken till the compliance of the point.

The compliance of audit observation is monitored at various levels in the corporation and quarterly Safety Audit compliance reports are submitted to OISD. Board Members are also apprised and monitor on compliance status of audit observations along with mitigation measures taken.

BPCL:

- Internal Safety Audits are carried out by a multi-disciplinary team as per OISD 145. The frequencies of these audits are once in a year.
- External safety audit by OISD is carried out once in 3-4 years. ESA is also carried out when there is a major change in or addition of facilities in the existing plants. Surprise safety audits are also carried out by OISD on random basis.

AUDIT	YEAR	RETAIL	LPG	PIPELINE	AVIATION	REFINERY	LUBE PLANT
Internal Audits	2014-15	82	49	28	31	2	4
	2015-16	82	49	18	30	2	4
	2016-17	81	49	48	37	2	4
	2017-18*	76	49	21	17	1	4
External Audits	2014-15	7	4	0	0	1	0
	2015-16	5	6	2	0	1	0
	2016-17	10	5	0	1	1	1
	2017-18*	13	7	0	0	0	0

*Data upto November 2017.

HPCL:

HPCL carried out Internal Safety Audits once in a year for every installation.

AUDIT	YEAR	OD&E	LPG	PIPELINE	AVIATION	DS	Refineries
Internal Audits	2014-15	84	46	24	15	4	2
	2015-16	80	46	24	15	4	2
	2016-17	79	48	27	24	6	2
External Audits	2014-15	8	6	0	0	0	1
	2015-16	6	6	7	0	0	1
	2016-17	15	9	5	0	0	1

B. SAFETY IN UPSTREAM OIL SECTOR

1.69 Information furnished by the Ministry on the kind of safety procedures adopted by the upstream oil companies:

"Essentially, the safety management systems are guided by (a) the Oil Mines Regulations 1952 (for on-shore E&P Installations) and (b) the Petroleum and Natural Gas (Safety in Offshore Operation) Rule 2008.

The major safety measures are:-

- Incorporation of in-built safety aspects in the design. These include safety instrumentation & interlocks, safety while design of equipment following best International Standards, etc.
- Review of P&ID is carried out for incorporating the Quantitative Risk Assessment (QRA)/ Hazard & Operability (HAZOP) studies recommendations.
- Following OISD standards like OISD STD-105 (Work Permit System), OISD-RP-174 (Well Control), OISD-GDN-186 (Simultaneous Operations in E&P) and OISD- STD-189 (Fire Fighting Equipment for Drilling Rigs, Work over Rigs & Production Installations) etc.

Offshore installations are of two types - production platform and drilling rigs. The following safety measures are in place on the offshore installation:

- ✓ **Process safety:** This is ensured by safety devices installed on vessel and piping. In case of any abnormality like over pressurization, leakage. These devices send alarm and actuate shut down systems.
- ✓ **Emergency shutdown system:** Safety devices like sub Surface Safety Valves(SSSV) in oil and gas wells, Shut down valves (SDV) in process piping are provided on well/process platforms for isolation of inventory in case of emergency situations.
- ✓ **Well Control System:** On drilling rigs, primary and secondary well control is maintained to avoid any influx of formation fluid to surface. Primary well control is maintained by drilling fluid and secondary well control measures are Blowout Preventer (BOP) system.

- ✓ **Fire and Gas detection system:** These systems detect fire and presence of hydrocarbon & H2S - activates automatic shutdown of the process and start of firefighting system.
- ✓ **Fire suppression system:** Automatic water deluge, water sprinkler, flooding system etc. Besides, firefighting equipment like dry chemical powder system, foam firefighting system, portable fire extinguishers are also provided to fight fire.
- ✓ **Emergency response system:** Each offshore installation has its own emergency preparedness organization and plan means for evacuation and equipment for recovery and rescue."

1.70 When the Committee enquired as to whether the standard operating procedures and practices have been put in place at oil rig and platforms and installations for safety of workers, the Ministry furnished the following details:

> "Yes, standard operating procedures (SOPs) are put in place at the rigs, platforms and installations for safety of workers. The SOPs have been developed in accordance with relevant OISD standard, OEM/ API, ISO and other international standards, best practices and findings of investigation into incidents."

1.71 When the Committee enquired as to what mechanisms have been devised to secure the compliance of these procedures, the Ministry furnished the following details:

> "For off-shore E&P installations, provisions of the Petroleum and Natural Gas (Safety in Offshore Operation) Rule 2008 apply. As per the said rules, the Safety Management system should include operating procedures; these are checked by OISD while issuing consents to operate for offshore installations.
>
> Further, periodic internal audits are being carried out at the rigs and production installations by the operating Oil companies. External Safety audits are also carried out in the entire E&P sector (both on-shore & off-shore) is carried out by OISD periodically to ensure compliance. The compliance status of implementation of OISD audit recommendations is monitored at OISD on quarterly basis.
>
> In case of on-shore oil installations / rigs, statutory requirements of the Oil Mines Regulations, 1952 apply. DGMS – the competent authority vides these regulations".

1.72 When asked to Provide details of the existing rescue and evacuation measures at the oil rigs and platforms in the event of any untoward incidents or fire accidents, the Ministry furnished the following details:

> "The rescue and evacuation measures for On-shore as well as Off-shore E&P Installations are included in the Installation specific Emergency Response Plan (ERP).

The offshore E&P Installations" emergency response system is in line with the Petroleum and Natural Gas (Safety in Offshore Operation) Rule 2008; the rescue and evacuation equipment are as per the International Convention for the Safety of Life at Sea (SOLAS). OISD-GDN-227 provides the guidelines for management of emergency response for offshore installations.

Drilling rigs and production platforms are provided with life boats, life rafts of sufficient capacity to rescue operational crew. One standby boat is available for each of the rig/platform for 24 hours. One emergency helicopter having licensed for night flying is also available at each Asset during night for emergency situation. Well established communication system to communicate with base office, control rooms and other agencies in emergencies.

Regular emergency drills to abandon the installation are carried out frequently. All the crew members are being trained for survival at sea at regular interval".

FIRE INCIDENTS IN E&P SECTOR

1.73 A total of 19 fire incidents took place in the E&P sector during the period 2010-11 till 2014-15 (as on 11.03.15).

1.74 When enquired about the causes of accidents, the Ministry replied the following:

"Incidents are investigated in-depth by multi-functional OISD team to establish – (a) The sequence of events; (b) The root cause and (c) Corrective and/or preventive measures to obviate recurrence in future.

Following is the findings of the root cause of fire from the Investigation reports of major fire incidents:

A. Miscreant activities = 05 (26.3%)
B. Equipment failures = 07 (36.8%)
C. Non adherence to SOP & work permit system = 04 (21.0%)
D. Electrical short circuit = 02 (10.5%)
E. Poor housekeeping = 01(5.1%)".

1.75 When the Committee asked whether the accidents in Indian Oil and gas installations are evaluated and benchmarked against global standards and the outcome of such assessment, the Ministry submitted the following reply:

"All the Accidents / Incidents are investigated as per OISD Standard GDN-206 which has been prepared with reference to all Global Standards and Best Practices. The accidents are investigated with laid down terms of references including Root cause analysis, lapses, equipment failure etc. The recommendations are implemented in a time bound manner.

The incidents are investigated to identify the root cause and learnings are shared with all Oil PSUs. The assessment of these incidents stress on the following:

(a) Strict compliance to SOPs.
(b) Enhance safety rounds to identify unsafe act / condition
(c) Compliance of Work Permit System
(d) Need for Tool Box Talk before start of job
(e) Preparation of Job Safety Plan to identify the hazards
(f) Proper use of PPEs while executing the jobs

The outcome of the investigation is strict compliance of Maintenance schedule of equipments etc. to avoid future incidents".

1.76 When asked to explain the root causes for major fire accidents are miscreant activities (26%) and equipment failures (36%), the Ministry in a written reply stated the following:

"Following is the explanation of root cause of major fire accidents in E&P installations in respect to „miscreant activities" and „equipment failures":

Miscreant activities:

Major Fire is caused when miscreants make illegal attempts to take out the oil from isolated „Well head installations" by opening/damaging the X-mas tree &well head assembly or oil pipelines. Since miscreants are unaware about the safety implications of handling highly inflammable nature of oil & gas, it often results in fire and loss of life & properties.

In some instances, the fire is resulted when surrounding areas like paddy fields and heavy vegetation are set on fire by villagers or unknown persons. The fire spreads to installations if not contained in time.

Equipment failures:

i) Inadequate maintenance of electrical & mechanical equipment in the installations resulting in overheating, spark & fire.

ii) Material failure of equipment and oil pipelines due to metallurgical or other reasons like corrosion, pitting etc".

1.77 When the Committee asked about measures initiated to prevent the accidents due to equipment failure, the Ministry submitted the following in its written reply:

"Inspection and maintenance program has been developed for all the critical equipment as well as operational equipment by the operators in line with the guidelines of OEM (Original Equipment Manufacturer) and applicable OISD and API Standards. In external safety audit, OISD team ensures that the inspection and maintenance of the equipment is carried out in accordance

with the developed program/ Preventive maintenance schedule of the equipment, maintaining „Equipment Log Books". It is also ensured by OISD that respective SOPs are displayed near the equipment and training of the operational personnel in operation and maintenance of the equipment are also provided by the E&P companies. For Hi-Tech Critical Equipment, AMC (Annual Maintenance Contract) is in place for maintaining „fit for purpose" of the equipment for the intended purpose".

1.78 When the Committee enquired regarding the policy and mechanism to decide the amount of compensation to be paid to victims who die or injured in the accidents in oil and gas installations, the Ministry in its written reply submitted the following:

"The policy and mechanism to decide the amount of compensation to be paid to victims who die or injured in the accidents in oil and gas installations are governed by Employees Compensation Act, 1923 or ESI Act, 1948 and Insurance Policy adopted by individual companies".

CRUDE OIL PIPELINE NETWORK

1.79 Information submitted regarding the safety procedures in the transportation of crude oil through pipeline network by upstream companies in the country:

"For safety related aspects in offshore operations, the Petroleum and Natural Gas (Safety in Offshore Operations) Rules, 2008 are in force since June, 2008.

Detailed safety procedures for offshore pipelines such as free span survey, lateral displacement survey, pigging of pipelines, intelligent pigging, hydro testing of pipeline, inspection of sacrificial anode, continuous potential survey, inspection of valves etc., are carried out as per OISD-STD-139 while pipeline design is carried out in line with DNV 1981".

MUMBAI HIGH - SAFETY

1.80 Mumbai High is an important strategic crude oil asset and main production field for the country. When the Committee asked to furnish a note on the Safety System in place at Mumbai High, the Ministry submitted the following:

"Following fire detection and suppression systems are being used for safety of the platforms at Mumbai High:

Fire Detection Systems:
Fire detection is accomplished through Ultraviolet (UV) detection system, Thermal and smoke detection system, Gas detection system and Fusible plug loops.

Fire Suppression Systems:
Fire suppression is achieved through the use of Fire water system, Spray system, Sprinkler system, Foam & water hose reel, Dry chemical fire fighting system, Halon/FM200 system, Fire fighting vessels and Fire extinguishers.

The platform paging / communication system is utilized for all emergency alarms to ensure that platform personnel are aware of emergency conditions that might arise.

Emergency Plans:

The following emergency plans exist for western offshore:

- **Emergency Response Plans (ERP)**
  Aim of ERP is to provide Guidance to the personnel for action to be taken under various emergency conditions at an offshore installation. This document states responsibilities of individuals, departments, organizational resources available for use, sources outside the organization, general methods or procedures to be follow, authority to make decisions, requirement for implementing procedures within departments, training in and practice of emergency procedures, communication and reporting required.
- **Disaster Management Plan (DMP)**
  All offshore installations are provided with adequate life saving equipment and be maintained, tested and kept ready for instantaneous use. The purpose of life saving equipment is to provide safe means of survival in emergency situation in offshore
  All persons on board installation use proper personnel protective equipment while working. Specific PPE is also worn for hazardous operations.

Offshore Platform Safety Systems:

i) Design of Safety Systems:
The major objective of the safety system should be to prevent the release of hydrocarbon from the process and to minimize the adverse effects of such releases, if they occur. The design is based on API-RP-14C. The various systems are fitted with different safety devices.

ii) Well Control Safety System:
Subsurface safety valve (SSSV) is installed in a well, below the wellhead, designed to prevent uncontrolled well flow when actuated. The SSSV is controlled from the surface by hydraulic means. A surface safety valve (SSV) is also installed on the wellhead to shut-off the well when actuated.

iii) Emergency Shut Down (ESD) System:
An ESD is a system of manual control located on a platform which when actuated will initiate shut down of all wells and other process systems. ESD system provides a means for personnel to initiate process shut down of a platform when an abnormal condition is detected.

iv) Fire Shut Down System:
Similar to ESD system, a fire shut down (FSD) system also exists on the platform. It is a system of manual control, in addition to control from various fire sensing devices".

1.81 The following safety systems have been put in place to ensure safe operations in KG-D6 Block:

"Safety systems put in place to ensure safe operations and to attend any untoward incident at short notice at KG D-6 are as below:

i. **Design of Safety Systems:**
The safety system is designed with various safety devices. The safety devices are fitted in Well & well head, Flow line, Headers, Pressure vessels, Fired vessels, Pump and Compressor.

ii. **Well Control Safety System:**
In order to protect wellhead installation, subsurface safety valve (SSSV) is installed in a well, below the wellhead, designed to prevent uncontrolled well flow when actuated.

iii. **Emergency Shut Down System:**
ESD is a system that initiate shut down of all wells and other process systems. It provides a means for personnel to initiate process shut down of a platform when an abnormal condition is detected.

iv. **Fire Shut Down System:**
Fire shut down (FSD) system also exists on the platform. It is a system of manual control, in addition to control from various fire sensing devices.

v. **Fire Detection Systems:**
Fire detection is accomplished through Ultraviolet (UV) detection system, Thermal and smoke detection system, Gas detection system and Fusible plug loops.

vi. **Fire Suppression Systems:**
Fire suppression is achieved through the use of Fire water system, Spray system, Sprinkler system, Foam and water hose reel, Dry chemical fire fighting system, Halon/FM200 system, Fire fighting vessels and Fire extinguishers.

vii. **Emergency Response Plans (ERP):**
ERP are taken under various emergency conditions at offshore installation.

viii. **Disaster Management Plan (DMP):**
DMP is a pre planned methodology carrying out various emergency combating plans, to lay down clear cut procedure to rescue & rehabilitation".

1.82 Asked by the Committee about the role of the state governments in the field of oil and gas installations in the country, the Ministry submitted the following:

"State Government has major roles to play - starting from the project‟s inception to safe operation in the form of according legal, environmental and safety – both occupational & process safety – clearances in line with the existing statutes. A greater role is envisaged from the State Governments particularly in the context of mitigation of societal risk as well as process safety risks. Some of these areas include clearing of encroachment of ROW

of oil & Gas Pipelines; regulating land usage pattern around high-hazard Oil & Gas installations etc.".

GEOPHYSICAL MAPPING OF POTENTIAL DISASTERS

1.83 In reply to a query on the plans of the oil and gas industry on geophysical mapping of potential disasters in the upstream assets the Ministry has informed that:

> "ONGC has developed an in-house application for GIS mapping of its pipelines laid in onshore locations. The mapping of the pipelines is nearly complete. Certain areas do exist in ONGC wherein GIS has been used for the benefit of the organisation:
>
> - GIS system is being used in seismic surveys, Lease area mapping
> - GPS based Vehicle tracking system is being used in ONGC
> - Basin Geographical Information Tool – A&AA Basin, Jorhat
> - Pilot project on 3D GIS mapping – Tripura Asset, Agartala
>
> ONGC is also evaluating GIS based technologies which helps in equipment tracking based on images of the equipment along with GIS data i.e. using the concepts of augmented reality. A conceptual study report is being undertaken in this regard.
>
> With regards to any guideline on GIS mapping of upstream assets, so far, no such guideline has been brought out by OISD". (PER, Feb.18, pg.9, Ans.10)

1.84 When asked whether there are any plans by the oil and gas industry to have geophysical mapping of potential disasters in upstream assets, the Ministry gave the following reply:

> “ONGC is planning to carry out the feasibility study for Geophysical mapping of potential disasters”.

1.85 When the Committee asked whether it is mandatory for oil companies in United States of America (USA) and other developed countries to have GIS mapping of their assets and Have any agency brought out any guidelines in this regard, the Ministry made the following submission:

> “It has been informed by ONGC that GIS mapping for oil & gas assets is prevalent in USA. Geographical mapping of onshore pipelines along with installations and oil wells is in progress. ONGC is also exploring the possibility of imbibing the GIS system for all other assets. No guidelines have been given in this regard either by OISD or DGMS”.

C. SAFETY ASPECTS IN REFINERY AND TRANSPORTATION OF PETROLEUM PRODUCTS

Safety Aspects

1.86 Following information have given by the Ministry regarding safety practices in place for the protection of oil refinery installations in the country:

> "Safety aspect of Oil Refineries are considered during design stage itself meeting the OISD and other international standards w.r.t. safe separation distance, process safety management, proper selection of metallurgy, safety relief system, proper handling, storage and dispatch system. Special emphasis is given for work permit system, hot work, incident reporting, work at height, confined space entry, energy isolation, scaffold safety, behavior based safety, management of change, job safety analysis, etc.. Adequate dedicated fire-fighting facilities are provided at each oil refinery installations. Mutual aid scheme with nearby similar types of industries is also practiced by all refineries. Emergency Response and Disaster Management Plan (ERDMP) is also prepared by each installation and is approved by accredited agency.
>
> OISD has developed safety standards to enable oil industry to comply with the requirements of safety. To achieve safety in Oil & Gas industries, regular audits are conducted to ensure that safety systems are in place and are in accordance with the guidelines. These audits are effective tools to identify areas of strength and weaknesses and to develop action plan to overcome the gaps".

1.87 When the Committee asked the Ministry to provide details in regard to the existing safety practices while transporting Petroleum product from Refineries to retail outlets, the following written reply was submitted:

> "POL products from refineries are mostly evacuated in bulk through pipeline / ocean going *or* coastal tankers / railway tank wagons to intermediate marketing installations. Therefrom the products are delivered to the Retail Outlets by Bulk Tank Trucks. Safety management system in such transportation modes is ensured thru compliance to statutory requirements of the Petroleum Rules, 2002; relevant OISD standards and SOPs of individual OMCs developed thereon. Further, compliance is also monitored thru periodic Safety Audits of those installation carried out by OISD. The system is also monitored by PESO in so far as the compliance to licensing (renewable) conditions thereon is concerned. Further, the OMCs are maintaining frequent safety checks of the Bulk Tank Trucks thru structured systems with the objective of loading only those TTs which had been found safe during those checks".

1.88 Asked by the Committee as to whether it is made mandatory for oil companies to install Global Positioning System (GPS) for monitoring and tracking of tank trucks carrying inflammable petroleum products, the Ministry gave the following reply:

"Currently it is not mandatory for oil companies to install GPS system. However, tank trucks carrying ATF (Aviation Turbine Fuel) are provided with GPS system".

1.89 When asked as to whether oil companies are deploying their own fleet of tank trucks or any private truckers have been utilised for the transportation of petroleum products, the Ministry submitted the following in its written reply:

"OMCs deploy hire tank trucks for transportation of Bulk LPG and LPG cylinders to distributors and these tank trucks are inducted through Public Tender Process".

1.90 When the Committee enquired about the safety requirements enforced in private tankers engaged by OMCs for transportation of petroleum products, the Ministry stated the following:

"POL

Following are the measures by which safety is ensured on the private fleet for transportation of petroleum products by oil companies:-

i) Only those TTs are contracted that have valid explosive licence and TT fabrication drawing approved by PESO
ii) The TTs are checked on daily and quarterly basis as per OISD norms.
iii) TTs engaged from transporters have been fabricated by PESO approved fabricators as per standards framed by PESO.
iv) Anti Lock Braking System conforming to IS:11852:2003 is mandatory for all TTs engaged.
v) All tank trucks are compliant to motor vehicle act 1988 regulations and Gazette Notification No SO 72(E) dated 18.10.1996(carriage as per RLW & ULW norms).
vi) TT crew is imparted with hazardous product handling training and their driving licenses are endorsed by RTO for having undertaken such training from State/Central Government approved parties.
vii) All TTs engaged by oil companies are to be necessarily fitted with Vehicle Tracking System.

LPG

Following safety fittings are ensured in the bulk Tank Trucks:

a. CCOE (Chief Controller of Explosives) approved spark arrester
b. 2 nos. of IS approved 10 kg DCP (Dry Chemical Powder) type Fire extinguishers
c. Internal Excess Flow Check Valve (IEFCV)
d. Anti Lock Braking System(ABS)
e. Vehicle Tracking System (VTS)
f. Master cut off switch
g. Height barrier

h. 2 Nos. of drivers
i. Tank Trucks are painted with standardized colour scheme of the Corporation along with Emergency contract details
j. Safety/First-Aid kit".

SAFETY ASPECTS IN HANDLING AND TRANSPORTATION OF LPG CYLINDERS

1.91 When asked to give details of safety measures being implemented in the LPG bottling plants, the Ministry gave the following written reply:

"LPG Bottling Plants of PSU OMCs comply with the requirements of OISD-STD-144 (Design, Layout, Storage, Loading / Unloading, Operation, Inspection & Maintenance, Fire protection, Emergency Planning and Safety Audit Systems of LPG Installations); OISD-STD-169 (OISD Guidelines on Small LPG Bottling Plants - Design and Fire Protection Facility); OISD-STD-150 (Design and Layout of Liquefied Petroleum Gas Mounded Storage Vessels); OISD-STD-159 (LPG Tank Trucks - Requirements of Safety on Design / Fabrication and Fittings) – as applicable – in addition to all concerned statutory requirements. The safety system is ensured right from the commissioning stage through OISD Pre-commissioning safety and compliance to the recommendations made thereon. Ongoing compliance is further ensured through periodic safety audits conducted by OISD and liquidation of the audit observations made therein".

1.92 Details of practices being followed in the transportation of LPG Cylinders from bottling plants to distributor:

"LPG Cylinders are transported from Bottling plants to distributors through packed trucks.

To ensure safety, all the trucks are provided with the following:

CCOE (Chief Controller of Explosives) approved spark arrester.
i. 2 nos. of 10 kg DCP Fire Extinguishers.
ii. Anti lock braking system (ABS)
iii. Anti static rubber mat on the truck floor
iv. Master cut off switch
v. Cylinders are transported in vertical position only.
vi. Body of the truck is covered with caging system for better stability and security of cylinders
vii. Trucks are painted with standardised colour scheme of the Corporation along with Emergency contact details".

1.93 When the Committee asked about the accidents happened involving trucks transporting petroleum products on roads and measures taken to prevent the same, the Ministry gave the following information:

"Details of accidents happened involving trucks transporting petroleum products during last three years are as under:

No. of Accidents 2012-13, 2013-14, 2014-15 – last three years	
IOCL	394
BPCL	411
HPCL	385

Measures to prevent accidents by OMCs are under:

1. Periodic Safety fittings checks for road worthiness of Trucks.
2. Regular training to crew members on road safety.
3. Regular health check-up for crew members.
4. Conduction of sensitization programme for the bulk transporters to appoint good drivers and to ensure best upkeep of the tank trucks.
5. Design of the Tank Trucks carrying Petroleum Products Confirms to the provisions of OISD Standard 167.

1.94 When the Committee asked about the General safety practices that are being adopted for the handling of LPG Cylinder at the level of godown and distributor agencies, the Ministry furnished the following information:

"Distributors follow SOPs issued by OMC"s for safe handling of LPG cylinders at their go-down, which includes safe loading & unloading of cylinders, proper staking of empty/filled LPG cylinders as per norms, segregation of defective & leaky cylinders, bituminized anti-static mastic flooring in the go-down, provision of adequate nos. of DCP type portable fire extinguishers / sand buckets etc. to take care of any exigencies. Such LPG cylinder go-downs (at the distributor"s end) are built as per PESO approved drawing. Further, renewable licenses are issued by PESO indicating the maximum number of filled cylinders permitted to be stored therein. These provisions are in line with the requirements of the Gas Cylinder Rules, 2004".

D. SAFETY COUNCIL

1.95 To ensure proper implementation of various aspects of safety in the Oil & Gas industry, Government of India set up a "Safety Council" at the Apex in January, 1986 under the administrative control of MoP&NG as a special self-regulatory industry agency for safety matters & procedures in respect of Hydrocarbon sector.

Safety Council is headed by Secretary of MoP&NG as Chairman & includes members comprising Additional Secretary, Joint Secretaries, Chief Executives of all Public Sector Undertakings, at least two Chief Executives from Private / JV Companies on rotational basis, Statutory bodies such as Chief Controller of

Explosives, Director General of Mines Safety, Adviser (Fire), Secretary, Central Electricity Board and Director General of Factory Advice service and Labor.

Safety Council is assisted by Executive Director, OISD who also acts as the member secretary of Safety council.

1.96 On being asked on the number of meetings of the safety council held during the last 3 years and the major decisions taken in these meetings the Ministry informed in a written reply that:

> "During the last three years, four meetings of the Safety Council have been held on 09th December 2014, 15th March 2016, 07th June 2016 and 11th September 2017 respectively.
>
> Some of the major decisions taken in the Safety Council meetings are as under:
>
> **(i)** Approval of New / Revised / Amended Standards / Guideline / Recommendatory Practices by Safety Council
>
> New: 07 Numbers (234, 235, 236, 237, 244, 238, 239)
>
> Revised: 16 Numbers (109, 153, 190, 202, 111, 133, 137, 174, 179, 192, 194, 207, 139, 156, 173, 191)
>
> Amended: 06 Numbers (175, 216, 116, 117, 144, 169)
>
> Identification of enhanced hazard potential by the companies upon release of new /revised /amended OISD Standards
>
> **(ii)** Subsequent to release of new/revised/amended OISD Standards / Guidelines / Recommendatory Practices, the industry must do a gap analysis to identify the enhanced hazard potential in view of stipulation prescribed in such documents; and companies to make a concrete plan to bridge those gaps in a time bound manner.
>
> **(iii)** The Safety Council observed that there is need for further strengthening the safety management across the Industry and Industry must strive to enhance the safety level in their respective installations. Safety Council raised its concern about the rise in number of fatalities in E&P Sector as compared to previous two years. E&P companies were advised to take remedial measures to minimize the loss of live to achieve the ultimate objective of not only nil fatalities but nil incidents.
>
> **(iv)** Activities related to setting up of pilot ERCs in the country should be expedited and concerned PSU Oil companies should complete setting up their respective ERC at the earliest as decided in the review meeting.
>
> - All the Oil & Gas Companies must aim to liquidate the pending recommendations of all audits carried out by OISD till 31.12.2013 by October,

2016. Recommendations which are considered difficult to implement (If any) by the respective company must be taken up with respective boards to decide future course of action in this regard.

(v) Safety Audits of POL installations having storage capacity less than 30000 KL – A new initiative for strengthening the Safety of such installations by OISD

- It was decided that companies must comply with the recommendations made by OISD and submit quarterly status progress report to OISD.

(vi) Implementation of MB Lal Committee Recommendations – Functionality checks enhanced for installed equipment

- It was informed that OISD, during safety audits, has started laying more focus on the functionality checks of the critical firefighting equipment like HVLRMs, ROSOVs, RSFPS, MEFG etc., which have been installed in the Industry as part of M B Lal Committee recommendations.

(vii) Secretary, PNG and Chairman, Safety Council, while taking serious note of the long pending observations of more than five years, called for further strengthening of the existing enforcement mechanism of ESA monitoring at the Ministry level. In this regard, Secretary PNG and Chairman Safety Council advised his Ministry to explore the possibilities of including the weightage of Safety Audits compliance in the respective annual MoU targets of the given PSU Company".

1.97 Elaborate the mechanism being adopted by the Safety Council as an apex body for the foolproof implementation of safety guidelines/rules as framed from time to time for the oil and gas sector.

"Safety Council of MoP&NG under the Chairmanship of Secretary, P&NG as an apex body oversees implementation of safety systems in the entire PNG Industry through – (i) approval of OISD standards for adoption in the PNG Industry; (ii) review of safety performance of the PNG Industry during Safety Council Meetings; (iii) sharing of lessons learnt in the process of investigation of major incidents amongst the relevant PNG Industry members to obviate recurrence and (iv) periodic review of status of implementation of recommendations emanating out of the periodic safety audits, OISD investigation reports and findings of the expert committees formed by MoP&NG to investigate significant incidents".

1.98 When the Committee asked about the meetings of the Safety Council held since it was set up, the Ministry furnished the following written reply:

"Total 31 nos. of Safety Council meetings have been held since OISD was set up in 1986.
Broadly the major agenda items discussed during the Safety Council Meetings but not limited are as given below:-

i) Action items arising out of previous meeting

ii) Major Activities of OISD

a) Review of major activities undertaken by OISD in the previous year
b) Activity plan of OISD for next year

iii) Manpower status of OISD

iv) Approval of new/Revised/Amended OISD Safety Standards. These standards, prior to being put up for approval of the Safety Council are duly adopted by the Steering Committee consisting of HSE Heads of the Industry and the meetings of Steering Committee are held once in a year under the Chairmanship of Executive Director (OISD).

v) Budget vis-à-vis Actual expenditure for the year previous year and the Revised Budget Estimates for the current year & Budget Estimate for the next year.

vi) Adoption of the Annual Audited Accounts of OISD for the last year.

vii) Appointment of Auditors for the current year.

viii) Any other item with the permission of the Chair".

1.99 Explaining the trend of accidents and role of safety council, an official of the Ministry made the following observations during oral evidence:

"Sir, in 2016-17, that is the last year, it has been reduced to 31. So, the number of fires and accidents from 74, it has been reduced to 31 in the last five years. Perhaps one of the reasons may be the implementation of the recommendations of the M.B. Lal Committee Report.

Sir, as you are asking about the reasons, in each and every major accident, OISD does the investigation and then they send the report to the company, local people and also to the Ministry. So, there are different types of reasons. One is not following the standard operating procedure. So, though there is a SOP, people are not following it. Then, there is human error because of some reason. Then, there may be some fault with the equipment. They have made an analysis as to what percentage of accidents has happened due to which type of error. That analysis has also been done by the OISD for separate type of accidents. They presented the report in the Safety Council Meeting. The Safety Council Meetings happens under the chairmanship of the Secretary. The data is presented there where all the CMDs are there. Analysis is made as to what is happening. They also do the safety audits of all the installations. The Safety Council also monitors whether the companies are complying with the Safety Audit‟s recommendations. So, they take some time to implement the recommendations. That is also analysed and examined in the Safety Council. I would say that a lot of things have been done. Nobody can say that everything has been done".

M.B. LAL COMMITTEE RECOMMENDATION

1.100 Asked by the Committee about the present status of implementation of MB Lal Committee recommendations, the Ministry in its written reply furnished the following:

> "Apropos Jaipur fire incident, the committee set-up under the chairman ship of Shri MB Lal made 118 recommendations. Of the 118 recommendations, 05 related to policy matters. Amongst them, with regard to creation of buffer zone around installations and regulating land-use pattern around high-hazard Petroleum Installations, MoP&NG has advised Chief Secretary of all the states in April, 2013 for appropriate action. One of the policy related recommendations which is under active consideration of Government of India, is regarding conferring statutory status on OISD. This is planned to be achieved via creation of Petroleum & Natural Gas Industry safety Board– the umbrella regulatory authority for the whole Petroleum & Natural Gas Industry – thru appropriate legislation. The rest of the recommendation in this context stands complied with.
>
> 113 of the 118 MB Lal recommendations were meant for implementations at the existing installations. At present, implementation of these recommendations is at advanced stages of completion and the status of implementation is under constant review of OISD and MoP&NG.
>
> As on date, **Oil Marketing Companies have implemented 95% of the said recommendations in totality**. These implementations include both Hardware and software areas.
>
> As desired by the Hon"ble Standing Committee, the status of Implementation particularly with regard to Rim Seal Fire Detection System and Hydrocarbon Detection system is placed in Tabular form at **Annexure-III".**

BUFFER ZONES

1.101 Asked about the status of land to be allotted by the states government for buffer zone around the petroleum installations, the Ministry submitted the following reply:

> "In pursuance of recommendations of M .B. Lal Committee, a letter dated 01.04.2013 was addressed to all Chief Secretary of States/UTs requesting them to ensure adequate provisions in their land allotment rules to prohibit proliferation of unauthorized hutments, shops or residential colonies within a band of at least 250-300 metres around periphery of the oil installations and to maintain a buffer zone around the periphery of petroleum installations to minimize the impact on surrounding areas in case of a major accident.
>
> No feedback has been received from State Government".

EMERGENCY RESPONSE CENTRES (ERCs)

1.102 In a detailed note on Emergency Response Centres (ERCs) that are to be set up with accidents in the petroleum the Ministry in their written reply submitted the following:

"MB Lal Committee which investigated the Jaipur Fire Incident, recommended to set up Emergency Response Centre in India which can handle Oil Fire with specialized and expertise available with them. Recommendation is reproduced here under:-

"Wherever there is cluster of different companies, an emergency response centre equipped with advance firefighting equipment viz; fire tenders & trained manpower shall be considered on cost sharing basis or on outsourcing basis."

Subsequently, in the M.B. Lal Committee Recommendations Implementation Review Meet. It was decided that a „Committee" to be set up with representatives of IOCL, HPCL, BPCL and EIL for Setting up ERC. Accordingly ERC Committee was constituted by OISD with Scope as under:

i. Committee to finalize the locations &
ii. Scope of work for setting up of the ERCs.

Since the concept of setting up of Emergency Response Centres in the country was a new concept, it was thought to have first-hand experience of such models available internationally.

Accordingly, an expert team visited two locations at Texas, USA (Refinery Terminal Fire Company (RTFC), Corpus Christi, Texas and Williams Fire & Hazard Control Inc., Port Arthur, Texas in June"2014.

Subsequently, the RTFC experts from Texas were also invited to visit the country and provide their suggestions for setting up such centres. Accordingly, RTFC experts visited few locations in India to understand the Indian conditions and suggested the methodology to be adopted for setting up of ERC.

Thereafter, a committee was formed by OISD to finalise modalities to set up one pilot ERC at Hazira. The detailed modalities were finalised by the Committee to set up one pilot ERC.

It was, however, decided that five ERCs will be piloted by each of the Oil Companies instead of earlier decision of one pilot ERC. Based on this decision, ERC committee comprising of members from industry have decided to set up ERCs at following locations:

1. IOCL - Jaipur
2. HPCL - Vizag
3. BPCL - Manmad
4. ONGC - Hazira

5. GAIL - Guna

During the review meeting for setting up emergency response centers (ERCs) on 19.09.2016 the following points emerged:

1. Global tender for Expression of Interest (EoI) be floated to get ideas about ERCs.
2. Mode of tendering (LSTK or conventional) matter may be examined by EIL/PSUs.
3. A team may be sent to working ERCs to get operational exposure.
4. IOCL, BPCL, HPCL, ONGC and GAIL to obtain approval of their respective competent authorities for setting up of ERCs.
5. Approval of respective boards for engagement of M/s EIL as consultant of ERCs

Basis above, Industry had decided to appoint EIL as consultant with BPCL as coordinator, and the committee advised EIL to submit the offer on nomination basis. Accordingly, EIL submit its cost. As EIL was not providing any engineering services and rate was high, Industry decided to close the EIL tender and decided to float a global tender for appointment of consultant for PMC for setting up 5 ERC.

Industry meeting was held for discussing draft Global tender document. The Committee finalised draft tender document and is expected to be floated shortly. The PSUs are being asked to expedite the tender process".

1.103 On being enquired on the number of ERCs to be set up and the present status the Ministry stated the following:

"It may be mentioned that M B Lal Committee recommended “Wherever there is cluster of different companies, an emergency response centre equipped with advance firefighting equipment viz; fire tenders & trained manpower shall be considered on cost sharing basis or on outsourcing basis.”

As regards the number of ERCs to be setup, it may be mentioned that the MB Lal Committee did not specifically mention any such number in its report".

1.104 The Ministry has further stated that:

"Apart from the recommendation about setting up the ERCs in the country, M B Lal Committee had given various recommendations related to effective fire – fighting by installing high performance equipment as listed below:

- High Volume Long Range Monitors (HVLRMs) to fight full surface tank fire,
- Medium Expansion Foam Generation (MEFG) for handling accidental spillage,
- Hydrocarbon Leak detection system at potential source to provide early alarm for corrective action,

- Double fire contingency in line with refinery for providing adequate fire-fighting system,
- Tank level gauge and overfill protection to prevent loss of containment.
- Safety PLC with integration of ROSOV / DBBV / MOV for safe shut down in emergency.

The above recommendations have been completed by OMCs. It may be pertinent to mention here that after implementation of above recommendations in Oil & Gas Installations, the firefighting capability is adequate to meet any major fire emergency arising out on account of routine operations. The concept of ERC is to act as a second line of defence in case of catastrophic events for which even various other avenues like mutual aid partner industries, state fire brigade etc. are already in place".

BUTCHER ISLAND ACCIDENT

1.105 On 6th October, 2017 there was a major fire accident at one of the tank farms of BPCL situated at Butcher Island asked to furnish the details on the cause of fire, time of notice of fire, response made thereafter, etc. the ministry in their written reply stated that on 6th October, 2017 at about 16:24 hrs during heavy rains and thunderstorm, there was an intense lightning strike in the BPCL tank farm area at Marine Oil Terminal- MOT (Butcher Island). At the same time, Tank no 13 on HSD Service caught fire on roof. Immediately MOT operation crew rushed to the site. Fire water sprinkler of Tank no.13 and adjacent tanks (Tank no 11, 12, 14, 15 and 16) were started for cooling the tanks and to contain the fire. High Volume Long Range Monitors-HVLR (2000 GPM) of Tank no. 13 was started. Foam was also applied to fight the fire. Meanwhile MBPT fire crew who are responsible for firefighting operations at MOT reached the site and coordinated the firefighting activities.

The fire water pressure was maintained at 9 to 10 Kg/Cm2 at all times by operating three diesel pumps and one electric pump at MBPT fire water pump house.

On receipt of information from MOT to fire station at BPCL-Mumbai Refinery, BPCL refinery fire crew along with senior operating personnel rushed to fire site at MOT for providing necessary guidance and assistance for fighting the fire.

In order to reduce the risk due to fire and to salvage the product from the tank, evacuation of the product from Tank no. 13 (Tank on fire) and adjacent HSD tanks nos.12 and 14 started. All efforts were also made to contain the fire within tank 13 only, by ensuring proper cooling of adjacent tanks.

The mutual aid members viz. Mumbai Fire Brigade, ONGC, HPCL, Aegis, IOCL, etc. rushed to site & provided assistance and resources for fire-fighting activities.

The firefighting operations continued with the primary objective of containing fire only to Tank 13. Necessary precautions were taken by frequently adjusting the position of HVLR and other monitors as per wind direction. It was also ensured that the water sprinklers in the adjacent tanks are effective at all times.

The HSD in Tank no 13 was allowed to burn in a controlled manner by controlling the flame height and monitoring on round-the-clock basis through experienced fire crew of Mumbai Fire Brigade, MBPT and BPCL, with senior level guidance.

Fire was put off at 00:15 Hrs on 10th October, 2017 and cooling continued for some more time. There was no injury or casualties during the entire incident.

On being enquired whether the operation and maintenance of fuel storage tanks in Butcher Island owned by BPCL is carried out by employees of BPCL or through outsourced staff it was informed that operation & maintenance of fuel storage tanks at MOT is carried out by BPCL. However, activities like gauging, sampling of tanks, lining up for pipeline transfers, pump operation etc are carried out through outsourced party under the supervision of BPCL.

Over a period of time, there was drastic reduction in BPCL employees (technician &general operatives) due to retirements & by the year 2014-15 shortfall was to the tune of 40%. Another constraint in MOT was growing age factor of staff (average age 52 yrs) & tough operating conditions being a remote location with its own logistic limitations. Information gathered from industry members revealed that many experienced parties are available to carry out similar jobs & at many locations such outsourced support is taken. Accordingly a fresh tender was floated & successful bidder was engaged.

1.106 Explaining the incident the Executive Director, OISD stated during evidence as under:

> "Basically, this incident had taken place due to lightning on that day. Whenever there is lightning, it will give energy of almost 30,000 amperes of current and that needs that the tank should be in a healthy condition in totality.

Probably, some thinning had taken place in the tank roof. The tank has already completed ten years of service and it was about to go for a maintenance and maintenance was just due".

1.107 On being enquired whether there were any lapses on the maintenance of the tank he stated as under:

"The validity of 10 years was there up to September, 2017. On the 6th June, they had done the acoustic test for the place and they found it in order. Hence they had extended the validity by one year, which can be extended up to 15 years. At that point of time, there could have been some pitting on the rood because that was the monsoon time. When this lightning had struck, probably it had struck on the place where the thickness was lower than 4.8 mm, as per IS code. If the plate's thickness if 4.8 mm and above, the charge of the lightning can be withstood by the tank and it gets earthed."

1.108 On being enquired whether the tank required change or repair and whether the officials of BPCL had certified it for perfect use the Ministry in their written reply have stated that:

"Tank no. 13 has completed 10 years of service after the last maintenance & inspection in the year 2007. It was due for next M&I in the year 2017. The tank was inspected by BPCL official & certified for use.

Due to operational requirements, Acoustic Emission Testing of the tank was carried out to check the possibility of extension of the tank for M&I. Based on this, AE Testing of tank-13 was carried out on 13.09.2017 by M/s. Physical Acoustics. Based on AE Testing report and bottom plate corrosion rate assessment as per OISD-129, the next internal inspection period was extended to Sept 2018".

1.109 On being enquired whether OISD conducted any inspection prior to accident and after accident of the tank, frequency of checks and the observations/directions of OISD about the tanks there including the tank which caught fire, the Ministry in their written reply stated that:

"The frequency for carrying out ESA of facilities at Refinery is every three years. As per records, Marine Oil Ternical (MOT) facilities at Butcher Island were not audited by OISD. During the last External Safety Audit (ESA) of BPCL, Mumbai Refinery by OISD during 26th - 30th Sept, 2016, the MOT facilities were not mentioned & offered for safety audit.

OISD ask companies to not use the tanks to store fuel in case of major non-compliance to Safety vis-à-vis safety requirements prescribed in various OISD Standards.

OISD constituted a committee to investigate the incident after fire was reported by BPCL at MOT, Butcher Island. Committee concluded that the Tank-13 roof plates were thinned out / pitted which got punctured due to lightning strike. As flammable hydrocarbon vapours were present inside the tank, it got ignited due to heat, resulting in fire on top of HSD Tank-13.

1.110 When asked to furnish the details of fire fighting systems installed in all the storage tanks in Butcher Island including the tank which caught fire and whether they could protect the tanks and minimize the loss. The Ministry in their written reply stated that:

"Design & specification of fuel storage tank is done as per API 650 international standard. For fire protection system OISD standards are followed. The MOT tank farm is having total 8 nos. of storage tanks, out of which 3 tanks (TK-12, 13 & 14) are used for storing HSD and 5 tanks (TK-11, 15, 16, 17 & 18) for storing FO. Tank-12 is of external floating roof type, rest all are fixed roof tanks. HSD and FO comes under category of Class B/C petroleum products.

As per OISD-STD-116, the automatic actuated Rim Seal fire detection & extinguishing system shall be provided on external floating roof tanks (EFRT) storing Class A Petroleum products. As BPCL MOT tanks are not storing any Class A petroleum products, the provision of Rim Seal Fire protection system for EFRT is not mandatory.

Further, there are seven tanks of cone roof type and one tank (TK12) is of floating roof type in Tank Farm. All the cone roof tanks are having sprinkler system with flash plates connected with main Fire hydrants of 24"" through 8""/10""pipes.

The floating roof tanks has spray sprinkler system having two rings covering full circumference and shell plates through spray nozzles.

Facility for new foam pourer system has been provided. Installation of 4 no foam vessel along with foam header around the tank farm has been completed and connected to tank-11 with new foam nozzles on tank shell.

The existing foam system of tank 12, 13, 14 has also been connected with the new foam network. However, provision of foam nozzles on these tanks is planned along with Tank M&I

Tank farm is surrounded by 24"" fire water main line connected to MbPT Fire mains. On this ring, there are:

a. 16 monitors
b. 30 double hydrants
c. 8 HVLR (High Velocity Long Range) monitors provided in year 2015.

MbPT has three jockey (180 m3/hr), five Diesel pumps (626 m3/hr) and three electrical pumps (545 m3/hr). Additional two diesel driven pumps (626 m3/hr) installation in progress.

a. Auto-operation for new pumps for hydrant operation is as follows:
b. Minimum pressure 8.8 kg per cm2
c. At 7.5 kg per cm2, second jockey pump will start.
d. At 6.5 kg per cm2 both jockey pumps will stop and first Diesel pump will start.
e. Next 3 Diesel Pumps will start at 1 kg further drop in pressure.

In pump House, there are portable fire extinguishers like 4 DCP Extinguishers of 9 kg each, In Electric Sub-Station, there are 3 CO2 Extinguishers, 4 DCP Extinguishers of 9 kg each. There are seven number of Fire call points in Tank farm area".

1.111 Asked as to whether the Operation and maintenance is done by own staff of BPCL or OUT SOURCED with unskilled employees during the oral -evidence, the ED, BPCL made the following observations:

"….Sir, what you are saying is outsourced only for the operation and not for inspection and maintenance. The inspection and maintenance of all the facilities in Butcher Island is done by the Refinery Team where we have got our own people. It is not outsourced. We have outsourced the operation, but under the supervision of BPCL officers".

VIEWS OF EXPERTS

1.112 The Committee decided to seek the views of experts in the oil industry. So it invited Shri HIREK DATTA, ED (RETD), OISD AND Shri SETHI, EX, GM, HSE, IOCL to share their views on safety, security related issues. When asked to offer the views on safety and security related aspects of onshore and offshore oil and gas installations as well as in refineries and pipelines, Shri Hirek Datta made the following submission:

"Sir, our installations, either refinery or oil and gas expansion, are very vital assets of national importance. Regarding their safety, four things are important. First is the design of the plant; second is whether we know how to operate the plant; the third aspect is how we maintain the plant and fourth one is the human assets.

Until and unless design is robust, we cannot operate a plant properly. So, design is the paramount thing in safety of the plant be it refinery, be it in pipeline or be it in offshore or onshore pipelines. So, design is the first thing.

We may have the best of the designs, but if you do not know how to operate a plant properly, if you do not know the nitty-gritty of the plant, then you will have unsafe incidents. So, understanding, knowing the operation is very import.

The third important aspect is the maintenance part. We may have the best of the design. We know how to operate but if we do not maintain things properly, there will be unsafe situations.

The fourth one is the human assets. Do we properly train the human assets? Do we properly educate the human assets? These are one part of safety. There should not be any unsafe situation if these things are strong. However, if this fails, then we must have adequate fire and fighting facilities or infrastructure. Nothing should happen if these things are strong. But, then if something happens, we must have good fire fighting infrastructure".

1.113 Asked to give his views on M.B. Lal Committee recommendations and its impact on oil PSU"s, SHRI HIRAK DUTTA, made the following submission:

"…..Sir, prior to the October 2009 Jaipur fire fighting incident, our terminals and oil installations were not automated. Only we had fire fighting monitors 144 metre cube per hour and they were not automatic plants. Tanks used to overflow and there was no protection for overflow. Subsequent to M.B. Lal Committee recommendations and OISD 116 and 117, which is a part of Petroleum Rules, lot of improvement has taken place, lot of automation has taken place. Yet we see that there were some fires. We are seeing that in recent times also.

…Whatever has been provided is not adequate to fight major fires. Whatever has been provided is good if we had some sort of unsafe situations; with 1000 GPM HVLR or 1500 GPM HVLR we will be able to fight normal fires in a plant. There are various protection layers so that accidents do not take place. But, in case of a major fire, one of the M.B. Lal Committee recommendations was if there is a cluster of terminals or if a big disaster type of thing takes place in a terminal or in a oil and gas terminal or in a pipeline; that facility was not provided in this term. So, some other infrastructure, bigger infrastructure need to be incorporated so as to fight. For example, the recent fire which took place in Butcher Island or the Jaipur fire incident, we did not adequate infrastructure to fight it. One deficiency which I see is we need bigger HVLRs and emergency response system through which we can adequately fight.

Secondly, adequate amount of water and foam is not available to fire fight. If water and foam, which are two important things to fight fire, are not adequate, if we do not have higher 10,000 GPM HVLRs with modern and sophisticated instruments for fighting disaster type of situation, for example a full surface tank fire. Full surface tank fire cannot be controlled with 750 or 1000 GPM HVLRs. We need higher GPM HVLRs and we also need to fight aerially from a height so that we can fight fire from some 50 feet height and directly put 10,000 GPM water and foam into the tank so that fire can be doused. Such facility has not been incorporated as yet in our oil installations".

1.114 Asked as to whether the Oil PSU"s are shying away investing due to higher cost, the witness said the following:

"I believe, safety is never a cost. Safety is an investment".

1.115 Supplementing further,

> "Emergency response was planned to be done. We implemented various other recommendations. This is the one which has got delayed. I do not think it is cost prohibiting but it has got delayed.
>
> Sir, it is a tricky question. One is oil companies and the gas companies have invested so much. So, there is a chance of that. Yes, we have made so much of investment. So, let us wait. But, then, decision was taken when I was in OISD to go ahead with the emergency response system. It was decided".

CGD NETWORK

1.116 When the Committee asked about the agency which is responsible for the safety in city gas distribution projects, the Ministry submitted the following reply:

> "Petroleum and Natural Gas Regulatory Board has issued the Petroleum and Natural Gas Regulatory Board (Technical Standards and Specifications including Safety Standards for City or Local Natural Gas Distribution Networks) Regulations, 2008 which inter alia cover he design, materials, fabrication, installation, inspection and testing, commissioning, operation, maintenance, modifications and abandonment of CGD network for domestic commercial and industrial users and also the safety aspects of operation and maintenance of CGD network.
>
> The compliance to the PNGRB Regulations is monitored through accredited third party agency as per the Petroleum and Natural Gas Regulatory Board (third Party Conformity Assessment) Regulations, 2015.
>
> The CNG Station, CNG Mother Station, CNG On-Line Station and CNG Daughter Station shall be designed, operated and maintained in line with the requirements of the Chief Controller of Explosives as detailed in the Gas Cylinder Rules, 2004 as modified or amended from time to time".

TRANSPORTATION PRACTICES OF LNG

1.117 When the Committee asked about the standard supply / transportation practices of LNG in India and other developed countries in the world, the Ministry stated as under:

> "Natural gas is ordinarily supplied/transported in gaseous form through cross country and cross border pipelines after compressing the same to high pressures. After, extraction of natural gas from onshore and offshore block fields, natural gas is transported to processing plants through a network of gathering pipelines for removing impurities like H2S, CO2 and water and separating value added hydrocarbons to make it suitable for pipelined transportation. Further, for import of natural gas in large quantities over long distances, natural gas is liquefied at cryogenic temperatures in liquefaction plants. Liquefied Natural Gas (LNG) is then transported through LNG ships

and is received and stored in storage tanks at LNG regasification terminals from where it is regasified and is again transported in cross country pipelines to end consumers".

1.118 When the Committee enquired about any proposal to supply LNG through trucks in India and if so, whether any specific regulations or guidelines are in place, the Ministry submitted the following in its written reply:

"LNG is being supplied through cryogenic road tankers (trucks) in India. Indian Oil Corporation Limited had started supplying LNG by road tankers for the first time in India in the year 2007. Petroleum & Explosive Safety Organization (PESO) is the nodal Statutory Authority for LNG transportation in India. The Static & Mobile Pressure Vessel (SMPV) Rules are applicable for LNG transportation through trucks in India. LNG may be transported through Trucks in India after taking care of proper design and safety considerations".

CROSS-COUNTRY PIPELINE NETWORK

1.119 The Ministry furnished the following note regarding safety measures that are in place to ensure the protection of oil and natural gas pipeline network in the country:

"OISD carries out periodic audits including pre-commissioning audit for Cross country pipelines, monitors implementation of Safety audit recommendations with industry for compliance, carries out investigation of major incidents for learning and preventing recurrence. The basic purpose of the same is to improve the safety systems in those establishments & that no untoward incident takes place in the oil installations.

In addition to above, following additional safety checks and measures are ensured by OISD to ensure the protection of oil and natural gas pipeline network in the country:

- Health integrity monitoring of the pipeline through „Pipeline Integrity Management System", which includes coating health assessment survey, Cathodic protection monitoring, monitoring of internal and external corrosion, intelligent pigging etc.
- The system of "Supervisory control and data acquisition" (SCADA) for real time & effective monitoring of operating parameters such as pressure, flow etc., for pipeline operation.
- Ground patrolling and inspection of Right of way (ROW) for effective monitoring on a sustained basis.
- Implementation of Management of change procedure.
- Standard operating procedures for all critical functions and extent of awareness among the working people.
- Surge analysis.
- Adequacy of Fire water calculations and firefighting equipment in the station.

- Emergency shutdown procedures.
- Development and implementation of well laid down systems and procedures like work permit system, operating manuals entailing start-ups, shutdown, emergency handling procedures, Disaster Management Plan etc.,
- By adopting both proactive and reactive measures in the fire and safety, oil industry is equipped with measures to protect its vital installations.
- Residual health assessment of ageing pipelines (piggable & non-piggable) in line with the SOP developed by OISD in consultation with the industry members".

1.120 When the Committee enquired about any online monitoring of gas pipeline infrastructure by midstream oil companies in the country, the Ministry submitted the following information:

> "GAIL, the entity marketing the majority of the natural gas in the country, has round the clock online monitoring of pipeline operations done at Regional Gas Management Centre (RGMC) and overall monitoring is done at National Gas Management Centre (NGMC). Besides, the entity has Supervisory Control and Data Acquisition (SCADA) available for all of its trunk pipelines. Real time data for pipeline operating conditions i.e. flow, pressure, temperature etc. and infrastructure status like valve positions, running status of compressors etc. are received through SCADA at RGMC/NGMC and is being monitored round the clock.

1.121 When the Committee enquired about the status of replacement of old pipelines with new pipelines and the time frame fixed for this, the Ministry submitted the following in its written reply:

> "Replacement of pipelines is being done based on the health assessment of pipelines. Several techniques like PSP (Pipe to Soil Potential) monitoring, coating surveys, intelligent pigging etc. are used for health assessment of pipelines. Based on the health assessment, replacement work has been undertaken by various companies details of which are given hereunder:-
>
> **IOCL:**

a. 47 KM pipeline section in Barauni – Kanpur Pipeline.
b. 72 KM pipeline section in Mundra – Panipat Pipeline.
c. 142 KM pipeline section in Koyali -Viramgam Pipeline.

> 11.26 KM pipeline section in Haldia Barauni Pipeline.
>
> **BPCL**

- There is a well established Pipeline Integrity Management System for pipelines. Baseline data for all pipelines is available.
- Thorough inspection and necessary corrective actions are being taken for pipelines.

- Pigging of lines are being done regularly in cross-country pipelines and analysis of sludge generated is carried out to check internal corrosion.
- The functioning of cathodic protection system for all buried pipelines is ensured by regular monitoring in line with OISD requirement.
- Intelligent pigging survey is carried out on all piggable lines in a time bound manner.
  Based on the corrosion rate and the current thickness of the pipe, replacement of pipeline is taken up.

HPCL

HPCL"s both Mumbai and Visakh refineries are having jetty lines dedicated for petroleum products loading from refinery to the tankers As per OISD Guidelines, all these jetty lines are periodically carried out health checks by means of visual inspection and pigging. Basis the observations, testing /replacements of pipe lines is being carried out.

ONGC

ONGC has started replacing of old pipelines with new pipelines based on OISD GDN 233. ONGC has made a plan to replace around 100 Km of pipelines/year/Asset which comes to around 1000 Km of pipeline/ year in ONGC for both Onshore and Offshore.

OIL INDIA LTD.

As far as OIL is concerned, the study on identification of pipelines which need replacement has been initiated.

CPCL

Replacement of 30" crude oil line from Chennai Port to Manali Refinery with new 42" line has been taken up. Procurement of pipeline and time frame fixed for replacement of this pipeline is by November 2016".

PIPELINE ACCIDENTS ETC.

1.122 On 26 June 2014 an accident took place in the gas pipeline of Gas Authority of India Limited (GAIL) at Nagaram in East Godavari District of Andhra Pradesh wherein there was huge loss of lives and property due to the blast and fire.

1.123 When the Committee enquired as to whether any enquiry has been conducted on such accidents and if so, whether oil companies have initiated any disciplinary action against the erring officials in the blast incidents, the Ministry in its written reply submitted the following:

> "While the respective Oil Companies investigate the root cause of all the incidents occurring in their respective installations, OISD also investigates some of the major process safety related incidents. Reports of such investigations are shared not only with the Industry concerned but also with all

the Industry members to avoid recurrence of similar incidents in those installations.

MoP&NG regularly monitors compliance of leanings arising out of such incident investigations carried out by OISD. In GAIL pipeline blast fire occurred on 27.6.2014, MoP&NG directed GAIL to fix responsibility of the erring officials responsible for the incident".

1.124 In response to the specific query by the Committee about the cause of the accident and the analysis of PESO, the representative of PESO stated during evidence as under:

"We have investigated this accident in detail. A team was formulated. This pipeline was approved in 2001. it is supposed to receive dry natural gas which is not injurious to the pipeline. In this case, it was wet gas containing hydrogen sulphide, CO2, sulphur and all those things which has led to corrosion in the bottom. So, when natural gas is flowing condensed settles at the bottom, leading to corrosion. Perhaps the pipeline integrity management system was not set up there. So, at six o"clock there was a rupture of the sea which led to coming out of the natural gas in that particular portion which caught fire".

1.125 What the Committee desired to know whether any action was taken against those officials who let the situation go unchecked for such a long time and whether there were any persecutions the representative of the Ministry stated that:

"This particular rule called „Manufacture, Storage, and Import of Hazardous Chemicals Rules" are covered under the Environment Protection Act. After investigation, we have sent the detailed report to MoEF. We are not empowered to take prosecution action. We have told what the violations were and asked for stringent action to be taken. Whatever was supposed to be done under the rules by PESO has been done. Now it is for the MoEF to take action. PESO"s job is to do the investigation properly and submit the report ".

1.126 When the Committee asked about the installing gas pipelines with valves has been initiated by GAIL, the following details were provided by the Ministry:

"GAIL is operating and maintaining around 11000 KM natural gas pipeline and 2000 KM LPG pipelines across the country. These pipelines are equipped with Sectionalising Valves (SVs) to facilitate the isolation of particular pipeline section in case of any emergency. As per codes and standards, some of these SVs are remote operated and some are manual operated as per design philosophy. However, GAIL has taken action for conversion of all the SVs for remote operations in city locations/High risk locations/vulnerable locations and alternate SV in trunk pipelines including auto closure facility.

GAIL has around 325 remote operated valves as per design in different pipelines out of total 549 valves. Further, total 140 require action for conversion at different locations, based on above methodology. In this regard,

job at Mumbai is already awarded and near completion and for other locations, centralised tender is in advanced stage of awarding and expected to be awarded by mid of Nov, 2015. The entire job which requires supply of material, execution and testing, is expected to be completed progressively within one year of award".

1.127 On a query on the number of gas producing installations of oil PSUs having DGUs and the future plans, the Ministry in their written reply stated that:

"There are 32 gas producing installations of Oil PSUs fitted with Gas Dehydration Units (GDUs). As per ONGC, in Phase-II, 4 installations will be fitted with GDUs".

CHAPTER - IV

SECURITY

A. Security aspects of Petroleum & Natural Gas Industry in the country

1.128 The Physical security in Oil Companies is considered as an important function for sustenance of business with an objective nothing should impede “Life Safety and Continuity Goals”.

The security protection schemes are drawn by each facility which is specific to the threat it faces. The planning of security is centered round the strategies of deter, detect, delay and building resilience. It begins at the planning stage i.e. at the inception of the facility. The trained security forces are deployed (Central Industrial Security Force) in all the hyper sensitive locations. The other locations are guarded by private security services hired from Director General of Resettlement (DGR) as per government directives.

Intelligence Bureau (IB)/ Ministry of Home Affairs (MHA) carried out audit and inspection on regular basis in hyper sensitive locations. During heightened threat perception, reconnaissance is also carried out by federal defence agencies and at times, security sanitization is also carried out by the State Administration.

The necessary advices, support and alert in protecting the oil infrastructure are carried by corporate security to all the divisions and divisions get guided to take measures in curbing theft/pilferages or any other subversive activities.

Security sensitization is also an ongoing process. Activities such as Workshops, publication of security journal, active participation in Periodical meetings of Onshore Security Coordination Committee (OSCC) is a regular feature.

B. Security of On-shore Oil & Gas Installations including Pipelines Installations

1.129 Security for on-shore installations is provided by the owner oil companies with the help of their own security staff and by the Central Industrial Security Force (CISF) personnel who guard the installations and undertake necessary patrolling.

Remote surveillance systems are also used for monitoring security of sensitive installations.

All the Petroleum Industry Installations in the country are protected by an Industry type boundary wall of at least 3 Meter height including 0.6 Meters of Concertina Coil at the top in compliance with the MHA guidelines.

Ground/Aerial patrolling along the Right of Way (RoW) of the Hydrocarbon pipelines (Liquid as well as Gas Pipelines) is mandated in relevant OISD standards. Also, at least once a year company officials are also required to undertake a line walk as per the provisions stipulated in OISD standards.

C. Security of Offshore Oil & Gas Installations

1.130 For safety related aspects in offshore operations, the Petroleum and Natural Gas (Safety in Offshore Operations) Rules, 2008 are in force since June, 2008.

Security of Single Point Mooring (SPM) Installations in the country is ensured by the respective Installation Operators at their own cost.

Coast Guard, Navy and Police agencies are responsible for security related aspects.

For security of offshore installations, Vessel and Air Traffic Management System (VATMS) is being used to continuously monitor any unauthorized vessel approaching /operating in the western offshore, besides regular air & sea surveillance by the Navy/ Coast Guard.

500 Meters Zone around the offshore installations is designated as the safety zone, primarily to control movement of vessels around the installation to avoid collision.

The Ministry furnished the following note on security measures that have been put in place by the upstream oil companies for the protection of on shore and offshore oil installations in the country:

1.131 Asked by the Committee about the various security measures in place to ensure the Safety of SPMs, the Ministry submitted the following written reply:

> "Security of Single Point Mooring (SPM) Installations in the country is ensured by the respective Installation Operators at their own cost. Coast Guard, Navy and Police agencies are the responsible agencies for security related aspects of SPMs in the country".

1.132 When the Committee enquired about the practical constraints in entrusting the Coast Guard with responsibility to protect SPMs, the Ministry furnished the following in its written reply:

> "Ensuring the safety and protection of artificial islands, offshore terminals, installations and other structures and devices in any maritime zone has been envisaged under Clause 14(2) (a) of the Indian Coast Guard Act, 1978. Since SPMs can be categorized as „Offshore terminals", it is implied that the act envisages protection of SPMs".

1.133 When the Committee enquired about the security system in place for the protection of oil installations located in the North Eastern region, the Ministry gave the following written reply:

> "Special attention on security System to ensure protection of the Oil Installations located in the insurgency prone North-East Region
>
> - Security related matters are regularly discussed in Quarterly Onshore Security Coordination Committee (OSCC) meeting of oil sector PSUs of North East, chaired by DGP, Assam.
> - Industrial Security Inspection Team of IB visits OIL installations once in every two years and provide recommendations with respect to security measures and the recommendations are implemented with a stipulated time frame.
> - Recently, State Govt. of Assam as given approval for posting of one Police Officer in the rank of Addl. S.P. at Duliajan to look after the OIL related matters.
> - All vital OIL installations are having proper infrastructure like (10"+2") brick boundary wall which strong iron gate and watch tower etc.
> - Armed security teams are guarding the vital installations on 24X7 hours basis in the N-E region.
> - A scheme namely, "Mutual Aid for emergency response Plan" which is approved by District Authority of both Dibrugarh and Tinsukia District. Joint Mock drill is also carried out from time to time.
> - Sufficient physical security check at major installations, vigilance by mobile patrolling, deployment of CISF, Local Policy, Home Guards, VDPs and other Govt. Security Agencies are engaged for the security of various oil and gas installations.
> - CCTVs surveillance of vital installations under implementation, including offices, drilling locations, market places, bus stand, schools and township etc.

- Electronic gadget/sniffer dog are being used to strengthen the Security System in North-East Operational area.
- Security audit of vital installations are also carried out time to time through competent external agencies".

1.134 Special measures to carry out refinery operations in North Eastern region:

"There is a structured Crisis Management Plan with Standard Operating Procedure (SOP) to deal with major breakdown of Law and Order or imminent threat thereof from anti-social elements and insurgency groups. The Crisis Management Plan is jointly prepared and approved by CISF, Oil Company and District Authority. Regular security drills are being conducted within the plant area at different locations for bomb threat, militant attack etc. on monthly basis".

1.135 **Security systems in place at Mumbai High**

1. **Security Clearances or Passive Measures**: All ships / vessels that operate in the Offshore region, by the Navy, and clearance of all expatriate crew members by the MHA and police verification i.r.o Indian crew. They carry out constant monitoring of shipping traffic. All activities undertaken in the Offshore region are scrutinized and cleared by the MOP&NG and MOD.
2. **Declaration of Designated Area:** Ministry of External Affairs (MEA) had issued notifications declaring 500 Meters area around all Platforms/Structures as Designated Area and prohibited the entry of all Ships/ Vessels except the vessels of ONGC, Indian Navy and Indian Coast Guard or those vessels that have been given Naval Security Clearance (NSC) for operational purpose by the Indian Navy / MoD.
3. **Responsibility:** The Indian Navy is responsible for Security and Defence of all Offshore facilities. MAO, Indian Air Force is responsible for Air defence of offshore. However, there is a dedicated group of Indian Navy i.e. Offshore Defence Advisory Group (ODAG) headed by FODAG for advising ONGC and other operators on Offshore Security of the Offshore Assets (ODAs) was constituted on 31 Dec 1983. Post Kargil War FODAG has been additionally designated Advisor to GoI on Offshore Security.
4. **Access Control** Smart Card based identity cards for employees and non-employees are being used to enter offshore area through embarkation points. Identity cards to non-employees are issued after due police verification for Indians and MHA clearance for foreign nationals.
5. **Onboard Security** Ex-Naval Sailors have been inducted as Marine Security Supervisors (MSS) and posted on each process complex for assisting OIM on security issues. CCTV and Binoculars have been provided on process complexes for monitoring movement of men and material.
6. **Offshore Surveillance**:- The surveillance of the Offshore area is ensured by VATMS monitored by ODAG, HQ. Air surveillance in the form of air patrols by Indian Navy & Indian Coast Guard is also carried out on a regular basis.
7. **Patrols by Navy/Coast Guard Ships**: The Oilfield Development Area (ODA) is regularly patrolled by ships of Navy and Coast Guard. Defence of Bombay High exercises are also carried out, wherein actual threats to the Offshore region are simulated and the defence mechanism is rehearsed.

8. **Air Patrols**: Extensive air patrols are also carried out to keep the Offshore area under constant surveillance. In addition, Air Defence Exercises are also scheduled, wherein actual assets are deployed on various manned/unmanned platforms.
9. **Commando Exercises**: Regular Commando exercises are held on the Process Complexes to familiarize the marine commandos with the layout and location of various Rigs/Platforms.
10. **Safety Fairways:** DG Shipping promulgated Safety Fairways for safe navigation and safety of Platforms in ODA. Traffic Separation Schemes and Recommended Shipping Routes are also being processed by the Navy, to ensure safety of the Offshore facilities against collision.
11. **Monitoring of Security Management** MoPNG has constituted Offshore Security Coordination Committee (OSCC) under the chairmanship of DG Coast Guard for monitoring offshore security. Regional Contingency Committees (RCC) at Naval Commands in East, West and Andaman & Nicobar has been constituted as sub-committee of OSCC to deal with any safety or security contingencies.
12. **Sensitization of Fishermen Community:** ONGC in association with Indian Coast Guard are making efforts to sensitize Fishermen community about „Do"s and Don"ts while fishing in Oilfield development area".

1.136 When asked by the Committee as to whether there are any special security concerns regarding Mumbai High assets due to fishing activities and movement of vessels in the vicinity, the Ministry furnished the following written reply:

"THREAT PERCEPTION

(a) Clandestine attacks using innocuous fishing boats, dhows etc., by exploiting the dense fishing environment.
(b) Use of weapons such as shoulder-launched missiles, plastic explosives and other explosives/mines, by swimmers, for damage or destruction.
(c) Sabotage/hijacking by saboteurs / terrorists / criminal elements.
(d) Deliberate collision by ships / aircraft with the Process Complexes / Facilities to damage or destroy the same.
(e) Use of explosive-filled Fishing Boats / Fast Attack Crafts launched by merchant ships, for "Kamikaze" attacks.
(f) Infiltration through Offshore Supply Vessels / Other Vessels / Helicopters.
(g) Smuggling of explosive devices on to the Platforms concealed in the Stores being dispatched / shipped from Nhava Supply Base/through Mid Sea Transfer".

1.137 When asked as to how many plants and oil installations have set up Intrusion Detection System (IDS), the Ministry gave the following reply:

"IOCL

Close Circuit Television (CCTV) Cameras are provided at all installations and monitored at control room by security personnel round the clock to take care of any trespassing. At all refinery units except Gujarat and Haldia, the

Intrusion Detection System (IDS) is in place. At Gujarat and Haldia Refinery, the system is under commissioning stage.

HPCL

Close Circuit TV (CCTV) surveillance System has been installed at 81 POL locations. Out of 46 locations of HPCL Bottling Plant, 39 locations have been provided with Integrated Video Surveillance System (IVSS) in which Intrusion Detection System is a part of it.

Regarding Pipeline, Intrusion Detection System (IDS) has been installed at 150 KM length of pipelines, most vulnerable to third party intrusions and pilferage attempts.

Oil India Ltd.

As far as OIL is concerned, all the repeater stations (17 Nos. unmanned) of OIL‟s Naharkatiya Barauni trunk pipeline have been provided with Intrusion Detection System (IDS).

BPCL

In BPCL, 82 POL and 49 LPG Plants and Refineries, there are security men posted at the gate and at prominent locations to prevent intrusion. Also, CCTV cameras are installed at identified locations.

MRPL

MRPL has Intrusion Detection System (IDS) in place.

NRL

The plants and installations of the Refinery are covered under CCTV surveillance".

1.138 When the Committee wanted to know about the organizations that are entrusted with the responsibility of protecting gas pipeline network, the Ministry gave the following written reply:

"GAIL (India) Limited is the entity owning the majority of the existing gas pipeline infrastructure in the country. Besides, having its own internal security department for looking after the overall security of the pipeline infrastructure, the entity engages security personnel from Central Industrial Security Force (CISF) and Directorate General Resettlement (DGR) sponsored security agencies".

1.139 The measures initiated by the oil industry to prevent illegal pilferage along the gas pipeline network in the country:

"OISD recommends round the clock patrolling by Line walkers or alternative security surveillance system shall be implemented where the pipeline location is vulnerable from pilferage point of view. Line Walk by the official of the

company is also suggested at least once in a year for entire length of pipeline shall be carried out after the monsoon.
OISD also recommends to include sabotage pilferage as one of the scenario for the Emergency Response Plan (ERP) / Disaster Management Plan (DMP) towards an exhaustive crisis management system for onsite and offsite on „Emergency Preparedness Plan or Disaster Management Plan ‟ to combat oil leak , burst or fire.

In addition to above, in order to minimize the pilferage cases, OISD recommends that line patrolling to be carried out using modern gadgets such as GPS, GIS based Decision support system (DSS), state of the art communication system etc., so that the patrolling is more effective.

Further it may be noted that, amendment in the P&MP (Petroleum & Minerals Pipelines- Acquisition of Right of Users in Land) Act was made in 2012 called “P&MP Amendment Act 2011” where in provision has been made for more stringent punishment for persons caught in pilferage activity”.

SINGLE POINT MOORINGS (SPMS)

1.140 During the course of discussions the issue of security of SPMs was discussed following which the Ministry submitted a written note covering various aspects of the facility along with its security. The Ministry has stated that:

"A single-point mooring or SPM, also known as Single buoy mooring (SBM) is a loading buoy anchored offshore, that serves as a mooring point for Very Large Ships. It is a complete, self-contained single points offshore terminal facility which provides the means for both mooring and transferring cargo of very large crude oil carriers (VLCC) and Ultra Large Crude Carriers (ULCCs)".

1.141 Commenting on the requirement of SPM, the Ministry has further stated that:

"VLCC and ULCC have significant cost-advantages; they need very high draft (more than 20 metres) for movement which is mostly not available near shores. SPM systems are regarded as instant port since they can be installed in deeper areas without any need for construction of jetties".

(a) The list of SPMs'

Sl. No.	Name/Location of SPM	State	No. of SPMs
1	Mundra Port ans SEZ (Adani), Mundra District Kutch	Gujarat	01
2	HMEL (HPCL-Mittal Energy Ltd.), Mundra, District Kutch	Gujarat	01
3	Reliance Industries Ltd. (RIL) Hazira, District Surat	Gujarat	01
4	Reliance Industries Ltd. (RIL) Sikka, District Jamnagar	Gujarat	05
5	Essar, Vadinar, District Jamnagar	Gujarat	01
6	Indian Oil Corporation (IOC), Vadinar, District Jamnagar	Gujarat	02
7	Bharat Oman Refinery Ltd. (BORL) Vadinar, District Jamnagar	Gujarat	01

8	Cairn India Ltd., P.N. Marg, Patel Colony, Jamnagar	Gujarat	01
9	ONGC Bombay High Oil Fields, Mumbai	Maharashtra	05
10	Ratnagiri Gas and Power Pvt. Ltd. (RGPPL), District Ratnagiri	Maharashtra	01
11	Bharat Petroleum Corporation Ltd. (BPCL), Puthuvypin Kochi, District Ernakulam	Kerala	01
12	Port of Pillai Perumal Nallur (PPN) Power Generating Company Ltd. Thirukkdaiyur, District Nagapattinam	Tamilnadu	01
13	Cairn Energy Pvt. Ltd. (Ravva Port), District East Godavari	Andhra Pradesh	01
14	Hindustan Petroleum Corporation Ltd. (HPCL), Vishkapatnam	Andhra Pradesh	01
15	Indian Oil Corporation Ltd. (IOCL), Paradip Port, Paradip, District Jagatsinghpur	Odisha	03
16	New Mangalore Refinery & Petrochemicals Limited (MRPL), Kuthethoor PO, Mangalore	Karnataka	01

(b) Security of SPM

1. Indian Coast Guard (ICG) have been stipulated under section 14(2)(a) to (f) of the Coast Guard Act, 1978 to ensure safety and protection of artificial islands, offshore terminals, installations and devices in any maritime zone rests with ICG. From this it is evident that protection of SPM is clearly a domain of ICG. However, ICG is of the firm view that it is not practicable for them to provide security to SPMs. However, currently Coast Guard ships while on surveillance and petrol do visit around SPMs.

2. The security of SPMs and areas of safety around SPMs was discussed in the 9th meetings of NCSMCS held under the chairmanship of Cabinet Secretary on 3rd July, 2014. In this meeting, it was decided that final view on this issue would be taken after Inter-Ministerial Committee (IMC) in MHA submits report by the end of August, 2014. It was also decided that legal opinion of Department of Legal Affairs (DLA) would be obtained in the matter.

3. As per the directions of Home Secretary, an Inter-Ministerial Committee under the chairmanship of JS (BM) has been constituted. The Committee has held three meetings till date.

4. In this regard, MHA informed Cabinet Secretariat (CS) that subsequent to several rounds of discussion in the IMC and in compliance of the above discussion of NCSMCS, that Ministry had referred the matter to M/o Legal Affairs with the request to examine whether in terms of Section 14 of the Coast Guard Act, 1978, the duty to protect the SPMs falls within the purview of Indian Coast Guard or not. D/o Legal Affairs, however, is stated to have returned the file with the suggestion that the MoD/ICG are of the view that under the Merchant Shipping Act, 1958, the

responsibility of providing security to the SPMs rests with the M/o Shipping and hence view of the Ministry of Shipping be obtained first.

5. Matter was therefore, taken up with M/o Shipping. Their views in the matter is that since most of the SPMs are located at a distance of more than 20 NM from the shoreline and operational area of the ports, SPMs should be treated as off-shore installations for all practical purposes, though they are theoretically within the port limits/water. Accordingly, the SPM security has to be viewed separately from the overall plan for security of the port facility due to their distance from the port area. They have therefore, declined to accept that contention of Indian Coast Guard as well as Ministry of Defence that the responsibility for proving security to SPM rests with them under the Merchant shipping Act, 1958. They have also not agreed with the view of M/o Defence that CISF should be designated as the organization responsible for security of SPMs because neither they have capabilities in marine operation nor they have fleet to provide security for SPMs. The matter has been referred to D/o Legal Affairs for their final advice in the matter.

6. The Secretary PNG has written to the Home Secretary on 24th November, 2014 and to the Cabinet Secretary on 9th December, 2014.

7. The issue was further discussed in the meeting of National Committee on Strengthening Maritime and Costal Security held under the chairmanship of Cabinet Secretary on 02.02.2015 and the following decisions have been taken:

> "Indian Coast Guard will take up the responsibility of providing protection to SPMs and may equip them suitably for the task. MHA in the meanwhile will examine the matter in greater detail through the mechanism of Inter-Ministerial Group already existing in the MHA headed by JS(BM)".

(c) Vessel and Air Traffic Management System (VATMS)

ONGC has installed a Vessel and Air Traffic Management System (VATMS) for surveillance of western offshore oil and gas installations. The state-of-the-art surveillance system has been implemented by ONGC on the recommendation of Naval Headquarters and Offshore Defence Advisory Group (ODAG). VATMS help in round the clock monitoring the waters of the Arabian Sea with real time data. The sophisticated surveillance system assist in search and rescue operations and also track any drifting or intruding vessel so that a timely interception can be made. A similar system is being put in place for East Coast as well and likely to be made functional soon. The VATMAS system on West coast and East cost are likely to be integrated with Maritime Domain Awareness Project initiated by Ministry of Defence. After integration the entire offshore Oil Installations would come under the single command and control of Indian Navy.

(d) Procurement of Immediate Support Vessels (ISVs)

HQ-ODAG in its perspective plan envisaged the requirement of high speed vessels for patrolling in Eastern and Western ODAs. In a meeting Chaired by Raksha Mantri to review Coastal Security a decision was taken that ONGC will procure 23 Immediate Support Vessels (ISVs) from its fund and hand over to Indian Navy.

The Present Status on Procurement of ISV project

Total 23 ISVs to be procured - 14 built by M/s SHM Shipcare and 09 built by M/s ADSB.

Status of 14 ISVs to be built by M/s SHM Shipcare.

- 07 commissioned into Indian Navy.
- 03 are under Delivery Acceptance Trials (DATs) by Indian Navy.
- Construction of remaining 04 is yet to start because of a dispute between ONGC and M/s SHM Shipcare which has been referred to Outside Expert Committee (OEC).

Status of 09 ISVs to be built by M/s ADSB.

- 03 ISVs have been commissioned into Indian Navy and deployed in East Coast.
- 06 ISVs have been handed over to Indian Navy and DATs would be undertaken after monsoon.

Onshore Installations

1.142 Responding to a query on onshore security, the representative of the Ministry stated during evidence as under:

> "Regarding the on-shore security is concerned, including the issue of theft, we do have the physical monitoring system by the patrolling party. In many places we have the GIS and the GPS also where the patrolling party goes. We come to know which are the areas being covered. As regards the technology is concerned, the HPCL and the BPCL of late has put in place the technology which is known as the Optical Fibre Based Caustic Sensors, where in fact anybody is puncturing into the pipeline will come to know online about it. Regarding the patrolling also, we have the GPS enabled vehicles also. Then FIRs are being lodged and investigations are done. Because many of these theft and involvement of mafias who have inter-State linkages, the Onshore Security Committee which is chaired by the DGs and nine States, there is also exchange of all these data. This is how we are trying to resolve this issue to a greater extent. We are also trying to sensitise the local population in view of the PMP Act, 2011. So, these are the broad ways

through which we undertake the security of the pipelines, refineries both on-shore and off-shore".

Adding further the Secretary MoPNG stated as under:

"About the security aspect, the major installations of GAIL are all under CISF, except the pipelines, where we have DGR sponsored agency who are doing the pipeline security and safety. What we have done after the incident, 100 per cent GIS mapping has already been started in the GAIL pipelines. By the end of this year, each and every pipeline will have GIS mapping. Today, the LPG pipeline, both from Vizag to Secunderabad and Jamnagar to Loni is being supervised already by GIS. Security guards are being monitored through GPS. They have the mobile equipments where we can trace where they moving along the pipelines. Pipelines which are in the vicinity of towns and cities have 24 hour patrolling now. Round the patrolling has started. The trunk pipeline patrolling has been increased now. The other system which the Security Advisor, ONGC mentioned, we are also putting that. In case of any third party because we already have a dedicated operating fiber cable system. In case of any intervention, we would get the alarm. That system is also being introduced. Like that a lot of IT interventions are taking place in GAIL and this would happen in a phased manner by the end of this year".

1.143 On the measures taken by the oil industry to prevent illegal pilferage along the gas/oil pipeline network in the country the Ministry in a written reply have stated that the following measures have been taken by OMCs to prevent such pilferage activities:

- Round the clock monitoring of Pipeline flow and pressure through Supervisory Control and Data Acquisition System (SCADA) for pipelines.
- Daily foot patrolling by Line Patrolmen (LPM) and Directorate General Resettlement (DGR) guards.
- Continuous interaction & sensitizing of villagers along pipeline Right of Way (ROW).
- Continuous monitoring of Repeater cum Cathodic Protection System (RCP) through CCTV based surveillance system.
- Issue of pilferages taken up at various levels of the police in all the states. Also regular interaction maintained with civil administration.
- Electronic Surveillance ; and
- Patrolling by local police.
- Besides, Government has amended the Petroleum and Minerals Pipelines (Acquisition of Right of User in Land) Act, 1962 to make it more stringent with

provisions of deterrent punishment for offenders engaged in pilferage and sabotage of petroleum and gas pipelines.

D. SECURITY OF OIL & GAS INSTALLATIONS IN THE NORTH-EASTERN REGION

1.144 In response to specific query whether any special kind of security system are in place to ensure the protection of oil installations located in the insurgency prone areas of North Eastern region in a written reply the Ministry has stated that:

"Special attention on security System to ensure protection of the Oil Installations located in the insurgency prone North-East Region

- Security related matters are regularly discussed in Quarterly Onshore Security Coordination Committee (OSCC) meeting of oil sector PSUs of North East, chaired by DGP, Assam.
- Industrial Security Inspection Team of IB visits OIL installations once in every two years and provide recommendations with respect to security measures and the recommendations are implemented with a stipulated time frame.
- Recently, State Govt. of Assam as given approval for posting of one Police Officer in the rank of Addl. S.P. at Duliajan to look after the OIL related matters.
- All vital OIL installations are having proper infrastructure like (10"+2") brick boundary wall which strong iron gate and watch tower etc.
- Armed security teams are guarding the vital installations on 24X7 hours basis in the N-E region.
- A scheme namely, “Mutual Aid for emergency response Plan” which is approved by District Authority of both Dibrugarh and Tinsukia District. Joint Mock drill is also carried out from time to time.
- Sufficient physical security check at major installations, vigilance by mobile patrolling, deployment of CISF, Local Policy, Home Guards, VDPs and other Govt. Security Agencies are engaged for the security of various oil and gas installations.
- CCTVs surveillance of vital installations under implementation, including offices, drilling locations, market places, bus stand, schools and township etc.
- Electronic gadget/sniffer dog are being used to strengthen the Security System in North-East Operational area.
- Security audit of vital installations are also carried out time to time through competent external agencies".

1.145 Giving details of various security systems in the oil companies installations, the Ministry stated as under:

"IOCL

Close Circuit Television (CCTV) Cameras are provided at all installations and monitored at control room by security personnel round the clock to take care of any trespassing. At all refinery units except Gujarat and Haldia, the

Intrusion Detection System (IDS) is in place. At Gujarat and Haldia Refinery, the system is under commissioning stage.

HPCL

Close Circuit TV (CCTV) surveillance System has been installed at 81 POL locations. Out of 46 locations of HPCL Bottling Plant, 39 locations have been provided with Integrated Video Surveillance System (IVSS) in which Intrusion Detection System is a part of it.

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Oil India Ltd.

As far as OIL is concerned, all the repeater stations (17 Nos. unmanned) of OIL‟s Naharkatiya Barauni trunk pipeline have been provided with Intrusion Detection System (IDS).

BPCL

In BPCL, 82 POL and 49 LPG Plants and Refineries, there are security men posted at the gate and at prominent locations to prevent intrusion. Also, CCTV cameras are installed at identified locations.

MRPL

MRPL has Intrusion Detection System (IDS) in place.

NRL

The plants and installations of the Refinery are covered under CCTV surveillance".

E. ROLE OF NATIONAL COMMITTEE ON STRENGTHENING MARITIME AND COASTAL SECURITY

1.146 On being enquired on the role and functions of the National Committee for Maritime and Coastal security, the Ministry in their written reply stated that:

"The National Committee on Strengthening Maritime and Coastal Security against threats from the Sea (NCSMCS) was formed in August 2009 with a view to ensure timely implementation of various important decisions taken by the Government in respect of maritime and coastal security of the country, consequent to the terrorists attack in Mumbai on 26/11. The Committee has been constituted with Cabinet Secretary as the Chairman and the following as members:

1. Chief of Naval Staff
2. Foreign Secretary
3. Defence Secretary

4. Home Secretary

5. Secretary (Border Management), Ministry of Home Affairs

6. Secretary, Department of Shipping, Ministry of Shipping, Road Transport and Highways

7. Secretary, Department of Animal Husbandry, Dairing & Fisheries, Ministry of Agriculture

8. Secretary, Ministry of Petroleum and Natural Gas

9. Deputy NSA cum Secretary, NSCS

10. Secretary (R), Cabinet Secretariat

11. Director, Intelligence Bureau

12. Director General, Indian Coast Guard, Ministry of Defence

13. Chief Secretaries/Administrators of coastal States and Union Territories

14. Secretary, Department of Revenue, Ministry of Finance

15. Chairman, CBEC, Ministry of Finance

2. The terms of reference of the National Committee on Strengthening Maritime and Coastal Security are as under:

(i) To review timely implementation of various proposals as approved by Cabinet Committee on Security (CCS) in its meeting held on 16 February, 2009 and other important matters pertaining to Maritime and Coastal Security.

(ii) To ensure effective coordination among various Central Ministries and Agencies and the Coastal State Governments/Union Territories.

3. As decided by the Chairman, the Committee meets at least twice a year. Twelve meetings of the National Committee have been held so far".

CHAPTER - IV

ENVIRONMENTAL ASPECTS IN PETROLEUM SECTOR

A. Environment protection measures in Oil & Natural Gas Industry in the country – Monitoring by OISD

1.147 Environment Management is a priority area for Oil companies. The Oil companies continuously strive to minimize adverse environmental impacts from company activities, products and services by using processes, practices, materials and products that avoid, reduce or control pollution. During operations waste water, flue gas emissions and solid wastes are generated. Following measures are taken for control and abatement of pollution.

Waste Water Management

The Companies are monitoring the use of our water resources and quality of effluent discharge. Refineries are equipped with well-designed Effluent Treatment Plants, (ETP), the salient features of which are segregated collection of various effluent streams and elaborate treatment involving physical, chemical and biological treatment methods. The Companies have installed and commissioned clean and more efficient state of the art treatment systems like Hydrogen Peroxide treatment/ Wet Air Oxidation for treating Spent Caustic Streams. ETPs are also upgraded/ being upgraded with advanced treatment systems like Tilted Plate Interceptor (TPI), Dissolved Air Floatation (DAF), Bio-tower, Ultra Filtration, Reverse Osmosis etc.

In Marketing and Pipeline locations effluent water is routed through oil water separator.

Water Conservation

The treated effluents are reused/ recycled for various purposes in refineries like fire water & cooling tower make up, coke cutting in Delayed Cokers and also for captive irrigation in our green belts & Eco parks and make up to Eco-ponds. This has helped in reducing discharge of treated effluent outside and to that extent fresh water consumption for our operations. We have achieved Zero discharge to treated effluent from Panipat Refinery.

Rainwater harvesting is done in Refinery units, Marketing and pipeline installations and at R&D Centre.

Prevention of Air Pollution

Utmost attention is given to control/reduce emissions in refineries. The major sources of gaseous emissions are flue gases from boilers and heaters, FCC regenerators and Sulphur Recovery Units. Hydrocarbon leaks and evaporation during storage, handling and transportation of petroleum products and crude oil are also potential sources of emissions to air. The refineries have adopted various measures to control emissions & effectively disperse the flue gases. Some of these measures are:

- Use of low sulphur fuel oil/sweet natural gas/ desulphurised refineries gas in boilers and heaters to minimize SO2 emission.
- Hydrogen Sulphide generated during desulphurisation of refinery gas is converted to elemental sulphur in Sulphur Recovery Unit.
- Sulphur dioxide emissions from Catalytic Crackers are controlled by effective feed sulphur management.
- Flue gas scrubbing at FCC units at Haldia & Barauni Refineries for arresting emission of sulphur dioxide and particulate matters.
- Carbon monoxide from FCCU regenerator is incinerated in CO Boilers and the resultant energy is utilized for stream generation.
- Use of floating roof tanks for crude and other light product services & Mechanical seals in pumps for minimizing fugitive emission of hydrocarbons.
- Use of close blow down vessels & safety release to flare system for arresting any emission of hydrocarbons during all situations, normal abnormal as well as emergencies.
- Continuous reduction in fuel consumption by ENCON measures.

Refineries are also monitoring ambient air quality at fixed monitoring stations. Mobile van equipped with sophisticated monitoring equipment is also in use at some Refineries.

On line continuous analyzers are installed in flue gas stacks at Refinery units. In Marketing installations all vehicles under contract are required to have PUC certificates and these are checked routinely during inspections.

Solid Waste Management

Various units/installations apply the principles „prevent, reduce, reuse and recover". Oily sludge in crude tanks, chemical sludge, bio sludge and spent catalyst are common solid wastes in refineries. Sludge management is done as follows:

- Reduction/prevention of Waste Generation
- Oil Recovery from Sludge
- Safe Disposal by bioremediation

Noise Pollution Control

The major sources of noise pollution are engines, compressor house, turbine hall, furnace etc. The units and installations have adopted following measures to control noise at source.

- Regular maintenance of machines
- Use of low noise machines
- Suitably designed enclosure for both source and receiver
- Use of sound absorbing material

Personnel Protective Equipment (PPEs) like ear plugs, earmuffs etc. are also used in identified high noise areas.

Auto Fuels Quality Improvement

The Oil Companies have upgraded quality of auto fuels in terms of emission related parameters and to meet the quality requirement of new generation vehicles, The Refineries have implemented various projects for meeting this objective. BS-IV auto fuel has been implemented all over India w.e.f 1.4.17. Further, Oil industry is gearing up to supply BS-VI in the entire country w.e.f. 1.4.2020.

Tree plantation/eco-park

Tree plantation in and around refineries and development of green belts/ecological parks has been a significant feature of Oil Companies operations. All refineries have developed green cover around their operations. Guidance from

eminent Botanists has been taken in scientifically planning and development of green belts in and around refineries.

Extensive tree plantation is carried out in Marketing & Pipelines installations and R&D Centre.

Clean Development Mechanism (CDM)

1.148 Monitoring and control of emission of Green House Gases, Mainly Carbon Dioxide is being done. Clean Development Mechanism (CDM) projects are also under implementation in Refinery Units.

B. Environmental protection measures Oil India Limited

1.149 Oil India Limited has taken up following specific Environmental Protection measures at its oil drilling sites in North East Region:

Air Quality and Water Management

- Ambient air quality monitoring is done in and around OIL‟s drilling sites and other vulnerable places with the help of a mobile Air Quality Monitoring Van procured by OIL
- OIL also tries to minimize the amount of water used by adopting recycling in all drilling activities.
- Eco friendly materials are being used in preparation of drilling fluid.

Sorting and recycling of Process waste

- Drill cuttings are stored in designated landfills lined with HDPE (High Density Poly Ethylene). Once the pits are filled they are covered with native soil.
- Recycling of drilling effluent pit water in drilling operations to contain all effluents within the well site premises and reuse of water.
- **Effluent Treatment Plants (ETP)** are installed in drilling locations for treating effluent water. The effluent generated out of drilling activity is treated in these mobile ETPs placed in the drilling location. The treated parameters are maintained as per guidelines of state Pollution Control Board (PCB). The treated water is again utilised for various useful purposes like washing, drilling fluid preparation etc. Adoption of this treatment and water recycle process in our drilling wells has resulted in saving of water thus helping in natural resource conservation and control of pollution.
- In order to prevent migration of drilling effluent to outside surrounding, OIL is putting up HDPE for Hazardous oil/waste/effluent disposal.

Biodiversity Conservation

- The company has taken various steps to mitigate the damage to environment like cluster & directional drilling practiced to minimise land use, no natural water course is diverted, abandoned well plinths are reclaimed/restored and economically valuable land, sensitive land etc. are avoided as far as practicable.
- OIL adopts compensatory & social plantation drives in a massive way in its field areas. Tree plantation is done in drill sites at suitable places. Average survival rate is about 80%. Plant species are selected accordingly to the land condition & requirement.

- Awareness drives are carried out at drill sites .

1.150 When the Committee enquired about projects of upstream oil companies that are awaiting environmental clearances, the Ministry gave the following written reply: (Point No. 11(a), June, 2015, pg.7)

"17 blocks pertaining to ONGC, OIL, Jubilant Oil, Focus Energy and Essar Oil are awaiting clearance from Ministry of Environment & Forest to commence exploration and production activities. The details are as under:

Sl. No	Block Name	Location	Company
1	AA-ONN-2001/1	TRIPURA	ONGC
2	AA-ONN-2009/3	ASSAM	
3	VN-ONN-2004/1	MADHYA PRADESH	
4	SIVSAGAR DISTRICT PEL	ASSAM	
5	GOLAGHAT DISTRICT PEL	ASSAM	
6	TICHNA ML	ASSAM	
7	PANDIDIHING ML	ASSAM	
8	NORTH-RUDRASAGAR-DISANGMUKH ML	ASSAM	
9	AA-ONN-2010/3	ASSAM	OIL
10	AA-ONN-2010/2	ASSAM	
11	CY-OSN-2009/2	TAMIL NADU	
12	DEOMALI PEL	ARUNCHAL PRADESH	
13	NAMCHIK PEL	ARUNCHAL PRADESH	
14	JAIRAMPUR EXTN.	ARUNCHAL PRADESH	
15	AA-ONN-2003/1	ASSAM	JUBILANT OIL
16	RJ-ONN-2003/2	RAJASTHAN	FOCUS ENERGY
17	AA-ONN-2004/3	ASSAM	ESSAR OIL

Delay in grant of environmental clearance / non-grant of environment clearance to carry out exploration work has been observed earlier in several exploration blocks. Operators of blocks/Fields including PSUs have faced hurdles like:

- Non-availability of block area for exploration activities due to block area falling in Reserve Forest area, Wild-Life Sanctuaries, National Parks, Eco-Sensitive Zones, Coastal Regulatory Zones etc.
- Delays in organizing Public Hearing".

1.151 When the Committee enquired as to whether upstream oil companies have to submit environmental impact assessment to Ministry of E&F for obtaining environmental clearances, the Ministry submitted the following:

"The upstream oil companies are required to obtain Environmental Clearances (EC) under the Environmental Impact Assessment Notification, 2006 from the Ministry of Environment, Forest and Climate Change (MoEF&CC). For seeking EC, the operator has to submit the Environmental Impact Assessment Report and follow the detailed procedure mandated in the EIA notification, 2006".

1.152 The Committee wanted to know about the plan by the oil companies to minimize the damage caused to marine life in the event of mid-sea oil ship wreckage, the Ministry furnished the following information:

> "The plan of the oil companies to minimize the damage caused to marine life in the event of mid-sea wreckage and oil spill thereafter are as under:-
>
> - Tier I (upto 750 tonnes) facilities are being maintained by respective Port Trusts.
> - The initial response of oil spill will be done by Contract operator of the oil companies.
> - Indian Cost Guard is the nodal agency and the operator liaises with Indian Cost Guard for oil spill management (Tier-II and Tier-III)".

1.153 When the Committee enquired about the R&D activities undertaken by oil companies to handle oil spill, the Ministry submitted the following reply:

> "Oil companies have informed that no specific R&D activities have been undertaken in this regard".

1.154 When the Committee enquired as to whether oil PSUs /other agencies have expertise to handle oil spill related issues, the Ministry gave the following reply:

> "ONGC is carrying out R&D activities in developing natural oil dispersants. ONGC has tested one such natural dispersant made up of saponin from NIO, Goa. The results were not up to the expectations.
>
> ONGC has trained manpower to handle oil spills. ONGC has infrastructure to handle spills up to 700 tonne (Tier-I). Beyond this and up to 10000 tonne (tier-II), the responsibility to handle the oil spill rests with Indian National Coast Guard and for spills beyond 10000 tonne (Tier-III), ONGC has a tie-up with OSRL limited of UK.
>
> Further, Oil PSUs/other agencies have Oil Spill Response equipment and manpower to combat Tier-1 oil spill. Indian Coast Guard has standardised the equipment list to be maintained by Oil handling agencies in the revised National Oil Spill Disaster Contingency Plan (NOSDCP), 2015. Accordingly, Oil PSUs/other agencies are taking action in this regard to upgrade the equipment/manpower in line with NOSDCP.
>
> In order to enhance the capabilities for oil spill response, it was decided to pool the resources available with the company located in the same vicinity. Accordingly MOU has been finalised in the following locations
>
> (i) Vadinar - IOCL, Essar, RIL & BORL
> (ii) Hazira - Cairn & Niko
> (iii) Kochi-Port & BPCL
> (iv) KG Basin - Cairn, RIL, ONGC & GSPC
> (v) Vizag-Port & HPCL
> (vi) Paradeep-Port & IOCL
> (Vii) Mumbai High-ONGC & BG

Additional back up assistance have been tied up with Oil Spill Response Corporation Ltd. (OSRL), Singapore by ONGC western Offshore, Cairn Energy, BG Exploration & Production (western offshore) and RIL".

1.155 Asked about as to whether any upstream oil PSUs are supporting any research activities on oil spill impact and restoration measures, the Ministry submitted the following reply:

"ONGC supports research proposals for conducting oil spill impact and restoration measures in other institutes. These institutes are NIO, Goa and TERI, Delhi. Further, Oil India Ltd. in liaison with TERI has implemented oil zapper technology for remediation of oily sludge and with Institute of Advance Studies in Science & Technology has done pilot scale study on phytoremediation of oil spilled sites".

C. Environment protection in Refineries

1.156 The details of special measures initiated by oil companies to protect environment in the surroundings of refineries are as under:-

- Environment impact Assessment is being carried to assess overall impact on environment before expansion/revamp of facilities or implementation of new project in the refinery.
- On line SOx & NOx, Continuous Ambient Air Quality Monitoring as MOEF notification Station since 2008.
- The following applicable rules and standards are being complied by Refineries. Compliance to the rules/standards itself ensure no adverse impact on the environment.
- CHG (Green House Gases) foot printing has been quantified as per ISO-14064: 2006 standards.
- Mechanized Cleaning of Crude tank instead of manual cleaning.
- The statutory bodies like State Pollution Control Board (SPCB) & Central Pollution Contr4ol Board (CPCB) regularly visit the refineries to check the compliance to environmental standards and also to suggest improvements in addition to internal inspections/audits.
- Tree plantation carried out every year in and around refinery area.
- Rain Water Harvesting being done.

FLARING OF GAS

1.157 When the Committee asked the Ministry about environmental damages caused by the flaring/open burning of gas at oil installations in exploration /production units and in refineries, the Ministry gave the following written reply:

"The flaring/open burning of gas at oil installations in exploration/production units and in refineries are provided for safe disposal of combustible, toxic gases which, are relieved from the process plants and offsite during start-up, shutdown, normal operation or in case of emergencies. These flare systems are integral part of all chemical industries including refineries.

The environmental impact of flaring is assessed as a part of Environmental Impact Assessment Studies carried out by the refineries whenever a new project or major modification to the facilities is carried out. The impacts are also addressed in the Environmental Management Plan, which are duly approved by the Environmental Assessment Committees formulated by Ministry of Environment & Forests & Climate Change before grant of Environmental Clearance.

In respect of E&P installations, ONGC has reported that it has proper arrangements for flaring viz. low NOx burners, jackets and enclosed flares from ground level surrounded by the asbestos walls with surrounding green belt helps in controlling environmental damage".

PART - II

OBSERVATIONS / RECOMMENDATIONS

1. <u>Safety, Security and Environment Protection in Petroleum Sector</u>

The Committee note that the petroleum and natural gas industry of the country comprises of three major streams namely exploration and production, refineries, marketing & distribution. The country has 23 refineries with installed capacity of 231 MMTPA, 15 gas processing plants, 4 LNG terminals, 680 oil and LPG installations and more than 39,000 KM cross country pipelines spread across the length and breadth of the country. In offshore exploration and production, there are 21 production complexes, 252 well platforms and 33 rigs while in on-land exploration and production, there are 301 production installations & 230 rigs. This industry handles highly inflammable hydrocarbons in all forms namely solid, liquid and gas and operates processes under high temperature and pressure. Moreover, Petroleum industry has a significant influence on the total pollution of the environment by exploration and production operations, oil spillage, gas flaring and oil refining operations. Therefore, the safety and security and environment protection in petroleum and natural gas industry is of paramount and vital importance and its operation in a safe mode is necessary both for the employees and the society at large. The hydrocarbons are essential for economic development and propriety of nation for decades to come. The Committee, therefore, desire that, the Ministry should accord the top priority to the safety, security and environmental aspects relating to the petroleum and natural gas industry. All these aspects should be continuously monitored and necessary changes in statutes, rules and regulations be made so that the legislations enforcing these measures are strengthened regularly to enhance the level of safety and security of the installations and minimize the adverse impact on environment from the activities at installations at par with the current global situation.

Safety aspects in Petroleum sector

2. Safety audits and accidents in oil installations

The Committee understand that oil installations handle hazardous and highly inflammable hydrocarbons. Therefore, safety of vital plants, installations, employees and public at large is accorded the highest priority. Safety Management System relating to oil wells, pipelines, refineries and oil marketing installations is governed by Safety Management Practices starting from careful selection of technology and design and incorporation of best engineering services and include well laid down systems and procedures for operation, maintenance, inspection, safety audits and fire protection systems. Despite, all these systems, accidents occur in oil sector causing significant damage to property / loss of lives. As per the data provided by the Ministry for the period 2014-17 (upto 30.11.2017) pertaining to both the upstream / downstream oil companies, a total number of 309 accidents took place in which there were 81 fatalities and 193 people were injured. The Committee although find that the number of accidents has come down in some of the PSUs but in HPCL and ONGC the numbers are still high which is alarming.

While going into the details of investigation process of accidents, the Committee note that the Oil Industry Safety Directorate (OISD) carries out safety audits and investigations and sends the report to the concerned company with recommendations for compliance. Besides this, the oil companies also carry out Internal Safety audit through their multi-disciplinary teams annually as per OISD standards. In addition to this, there are other statutory authorized Agencies like Directorate General of Mines Safety (DGMS), The Petroleum and Explosives Safety Organisation (PESO), Petroleum and Natural Gas Regulatory Board (PNGRB) who also have a mandate to oversee and enforce safety measures under various Acts and Rules in the oil and gas installations including pipelines and transport. The Committee, therefore, fail to understand that despite the provision of regular external and internal safety audits of installations and defined responsibilities of various enforcing organizations, the accidents keep recurring in the oil and gas sector installations. In Committee"s view there should be zero tolerance

towards fire incidents/accidents in oil and gas installations as the products are highly inflammable and any carelessness and casual approach may lead to serious problems. The Committee, therefore, recommend that the all concerned with safety of oil and natural gas sector installations should review the causes for accidents/ fire incidents and overcome the shortcomings identified in design, process, procedures, supervision, training, etc. so that safe working culture becomes a habit and the goal towards an accident free work is achieved.

3. <u>Role of Safety Council</u>

The Committee note that OISD carries out investigations of all the process safety related major incidents to determine root causes and recommend corrective actions to eliminate or control these hazards. The accident data analysis submitted to the Safety Council by OISD, indicates that the major causes of the incidents / accidents across the oil and gas industry include not following the Standard Operating Procedures, violation of work permit system and knowledge gap. It has further been stated that maximum number of such incidents could be avoided by ensuring strict adherence to SOPs and proper supervision. The Committee note with concern that Safety Council, an apex body under MOP&NG have not played their regulatory role in safety matters and procedures in respect of hydrocarbon sector. They have not been even able to ensure that all the companies strictly comply with safety audit recommendations. In Committee"sview, after observing the deviations of SOPs during safety audits, compliance should be sought within a fixed time frame followed by punitive action / penalty so that not only the objective nil fatalities but nil incidents is achieved. The Committee therefore, desire that Safety Council should ensure to liquidate all the pending recommendations made in all the audit reports carried out by OISD within a fixed time frame.

The Committee also find that there is no set procedure to fix the accountability for the accidents in oil and gas installations. The Committee feel that each major or minor incident should be taken seriously and any violation of SOPs should be dealt with firmly and decisively along with fixing of responsibility in each case. The Committee, therefore, recommend that the

Ministry and other agencies entrusted with enforcement of safety rules and regulations should fix accountability for violation of SOPs whenever any violation takes place. The Committee would also like to be apprised of the causes of accidents in the oil industry during the last three years and the action taken against the erring officials.

4. <u>Training to workers handling risk operations</u>

The Committee note that in the oil and gas industry several works are being done through the contractors. One of the important reasons of accidents at the oil installations has been found as the poorly trained personnel of these contractors and lack of their proper supervision. During the period 2014-17, 78 accidents were caused due to such workers of these contractors in which 43 contract workers lost their lives. The oil installations are hazardous work places and therefore, all the persons working here should be properly trained, skilled and alert at all times to prevent any accidents. Untrained workers and supervisors increases the risk of accidents due to human errors. The Committee note that as per OISD guidelines all the workers including the contract and security personnel involved in risk operations should be imparted regular training and refresher training. But such large number of incidents caused due to untrained contractual workers and loss of life creates an apprehension that whether OISD guidelines are being followed by the companies in letter and spirit or not. The Committee, therefore, strongly recommend that special attention should be paid for imparting regular training and refresher training of all the workers including contract workers and security personnel. OISD should also strictly check the aspect of training during their audits and fix the responsibility, if there is any gap in that regard. The Committee also desire that appropriate clauses regarding training to workers handling risk operations should be incorporated in the agreements with contractors and in case of violation, responsibility should be fixed against all the responsible persons either the contractor or PSU officials for any such violation.

5. Safety of Pipelines

The Committee note that OISD carries out periodic audits including pre-commissioning audit of cross country pipelines, other additional safety checks and measures to ensure protection of oil and natural gas pipeline network in the country. It includes monitoring of the pipeline through 'Pipeline Integrity Management System', Supervisory Control and Data Acquisition (SCADA), sustained ground patrolling, inspection of Right of Way (RoW), surge analysis etc. However, despite such measures in place, a major accident occurred in the GAIL pipeline at Nagaram in East Godavari District of Andhra Pradesh in the year 2014 which caused extensive damage to life and property. The explosion and fire tragically claimed 22 lives. The cause of the accident was pipeline / equipment failure due to violations of SOPs. In this case it has been reported that wet gas was being carried in the pipeline meant for dry gas without taking adequate precautions like pigging of pipeline at regular intervals. The Committee are deeply anguished on this incident and feel that accident could have been prevented by following proper procedures in the first place. The Committee also note that in this case other safety measures also seem to have failed pointing towards the failure of monitoring system. The Committee note that the PESO has submitted its report on the incident to the MoEF for further action. The Committee, therefore, desire that MoP&NG should take up the matter with MoEF and ensure an action against those found responsible for lapses and negligence which caused the accident.

Looking at the serious impact of such incidents of leakage of gas, the Committee strongly recommend that there should be a fool proof mechanism for monitoring of pipeline infrastructure network of the country both through human and sensor based system and any deviations should be reported and preventive action initiated immediately. There should also be backup measures for operation of remote valves and these should be such that they are not damaged due to fire etc. The communications lines could be placed underground or away and secured from tampering. There should also be audible warning system to warn the people of leaks etc. so that they can take precautions. The Committee, further, note that the safety of the population that lives around those places where the oil and gas pipelines pass is the

responsibility of the owner of the pipeline and should not be compromised in any way. Any report from the public about anything wrong like leaks in the pipeline or tampering should be taken seriously and investigated immediately to prevent any accident. Besides this, people should also be sensitized on the do's and dont's in the event of any accident on the pipeline. The Committee may also be apprised of all the initiatives for safety of pipelines taken in this direction.

6. <u>Safety during Transportation of Petroleum Products</u>

Petroleum products viz. Petrol, Diesel, LPG etc. are distributed from refineries, bottling plants to retail outlets and LPG distributors by roads using trucks. Since they carry hazardous and inflammable material, their movement on road has to be done with utmost care and safety to avoid accidents. During the year 2014-15 there were 484 accidents, in 2015-16 it was 597 and in 2016-17, 517 accidents took place that involved trucks transporting petroleum products of the three major oil marketing companies viz. IOCL, BPCL and HPCL. The Committee note that various measures have been taken by oil marketing companies to prevent transportation related incidents. This includes the provision of Vehicle Tracking System (VTS), speed governors and fabrication drawing approved by PESO in the Tank Trucks and Lories. The Committee desire that these measures should be enforced strictly for compliance to ensure safe and accident free transportation of petroleum products on road. The Committee, however, note that at present it is not mandatory to install GPS along with VTS in the tank trucks. The Committee, therefore, recommend that it should be made mandatory along with geo-fencing so that the movement of trucks is monitored in real time. PESO which is the nodal body should examine this matter and come out with appropriate rules / guidelines. The Committee, further, note that with the implementation of PMUY and proposed targets under the scheme would increase the number of consumers considerably. The Government also has ambitious targets for PNG and CNG consumers under city gas distribution network. Also the transportation, storage and usage of petroleum products in rural areas will also increase swiftly. The Committee desire that, therefore, consumers and other stakeholders like distributors, agencies, etc. should be educated for the

safe handling of LPG cylinders in particular and other products like kerosene, petrol and diesel, PNG and CNG.

7. <u>Pilferage from Pipelines</u>

The Committee observe that pilferage from oil pipelines by anti-social elements is a major concern. Such instances pose a major hazard and such activities put the lives of many at risk. The Committee note that preventive measures include maintaining regular interaction with the civil administration, electronic surveillance, patrolling by local police. The Petroleum and Mineral Pipelines (Acquisition of Right of Use in Land) Act, 1962 has also been amended and made more stringent against the offenders. Despite all this, such pilferage from pipelines has not been stopped. The Committee, therefore, recommend that pilferage from the pipelines should be prevented by proper monitoring of the pipeline network especially in those areas from where the pipeline runs through vacant land. The Committee, further, desire that appropriate warning signages requiring dangers and punishment for tampering with the pipeline should also be put up along the pipelines and those found involved in such pilferage activities should be punished severely.

8. <u>Butcher Island Fire Incident</u>

The Committee note that the fire at one of the tank farms of BPCL situated at Butcher Island near Mumbai on 06.10.2017 was the most recent major accident in the oil industry. There was no loss of life but one tank that was used for storing HSD was fully damaged. For fire fighting, High Volume Long Range Monitors - HVLR (2000 GPM) of tank number 13 was started and foam was also applied. Despite this the fire could not be put out and the HSD in the tank was allowed to burn in a controlled manner. The cause of the fire was attributed to intense lightning strike. The Committee were informed that a Committee constituted by OISD to investigate the incident has concluded that roof plates of tank were thinned out / pitted which got punctured due to lightning strike. The tank was also inspected by BPCL officials before the incident and was certified for use. However, the Marine Oil Terminal (MOT) facilities at Butcher Island was not audited by OISD in the last External Safety Audit (ESA) of BPCL, Mumbai Refinery on 26th-30th September, 2016 and these

facilities were not offered for safety audit. The Committee are of the view that the frequency of safety audits of tank farms should be reviewed in view of this incident. The Committee specifically desire that the frequency of ESA should be increased in those areas that are susceptible to particular vagaries of weather more often and preventive measures taken.

While analyzing the quality of firefighting equipment the Committee feel that at Butcher Island it was inadequate to put out the tank fire. While the Ministry and PSUs claim their capabilities for managing the fire incidents have improved after the implementation of M.B. Lal committee recommendation, the way the fire incident in Butcher Island was handled belie this, even though the adjacent tanks in the site were safeguarded from fire, the entire fuel in the storage tank was allowed to burn out instead of fire fighting to put out the fire. The Committee, therefore, recommend that the firefighting capabilities at all the storage sites of petroleum products across the country be upgraded to ensure quick extinguishing of fire. The Committee would like to be apprised of the further safety measures including the installation of advanced lightning protection system undertaken by the oil industry to prevent the recurrence of such incidents at par with the world wide practices being followed to deal with such situation.

9. <u>Setting up of Emergency Response Centres (ERCs)</u>

The Committee note that after the Jaipur major fire incident, the M.B. Lal Committee which investigated the incident had recommended for the setting up of Emergency Response Centre (ERCs) in the country to handle major oil fires like storage tank fire in fastest and specialized way.

The Committee also note that M.B. Lal Committee recommendations were approved by OMC and Ministry to be implemented immediately and all the recommendations including setting up of ERCs were to be completed by 2014. The Committee note that even after approval of the Ministry, the recommendation of setting up of ERCs is still pending.

The Committee further note that it has now been decided to set up five ERCs to be piloted by each of the oil companies at the following locations:

IOCL-Jaipur, HPCL-Vizag, BPCL-Manmad, ONGC-Hazira, and GAIL at Guna. The Fire Advisor, Ministry of Home Affairs too has recommended in 2006 & 2017 for establishing and positioning of ERCs at strategic locations. The Committee note that initially EIL was appointed as a consultant but was dropped due to high rates quoted by it, and now a global tender for appointment of consultant for Fire Expertise with PMC work for setting up of 5 ERCs has been floated. The Committee desire that engaging a Fire Consultant for setting up ERC before PMC work be expedited to ensure setting up of ERC, supply of equipment and operation of ERC at the earliest.

The Committee deplore the casual approach of the Ministry resulting in inordinate delay in the setting up of ERCs. It appears that the oil industry is waiting for another major disaster to happen to get on its feet. The Committee disagrees with the Ministry"s contention that the firefighting capabilities of the industry is adequate to meet any major fire emergency and that the concept of ERC is a second line of defence in case of catastrophic events for which various other avenues like mutual aid partner industry, state fire brigade etc., are already in place. The Committee further note that an ERC would take up 3 to 4 years to be set up and any incident during the intervening period may cause huge losses. The Committee, therefore, strongly recommend that for the interim period the OMCs should procure required advanced firefighting equipments viz. robotic monitors, high capacity pumps with portable foam monitors, large hoses etc. for all the 22 locations for the proposed ERCs and later such equipments could become a part of the ERC. The Committee also desire that till the ERCs are set up, the OMCs should appoint an experienced agency on temporary basis who can provide 24x7 emergency firefighting services with advanced equipments as mentioned above immediately without any further delay.

The Committee agree with the views of the industry experts who deposed before them and are of the opinion that OMCs should consider procuring equipments/setting up of ERCs as they are an investment in safety. The Committee, therefore, desire the Ministry to take immediate action for the setting up of all 22 ERCs starting with 11 ERCs at strategic locations specially

where there is cluster of oil companies/terminals to meet any disaster, taking into consideration the requirements of a rapidly growing industry.

10. <u>Formation of Unified Safety Board</u>

The Committee note that depending on the type of installations, there are various statutory authorities involved in the safety enforcement in the Petroleum and Natural Gas Industry. In the E&P onshore and offshore industry segments Exploration and Production the DGMS and OISD under the administrative Ministries of Labour and Employment and P&NG respectively have jurisdiction. In the Downstream & Gas (Natural) Processing Plants (GPP) segments the PESO and PNGRB under the administrative Ministries of Commerce & Industry and P&NG respectively are enforcing safety. The Committee also note that the proposal for having a unified Petroleum and Natural Gas Safety Board has been under consideration since the last four years and nothing has been finalised as yet. The Committee were informed that the matter was considered by the Committee of Secretaries (CoS) and they were of the view for strengthening the existing regulatory bodies over creation of a new organization. Thereafter, the recommendations of the CoS were considered by the Ministers of the Ministry of Petroleum and Natural Gas, Commerce and Labour. They have decided that a report should be prepared after studying the safety and security aspects keeping in view the international practice. The Committee are not satisfied with the current state of affairs as such an important issue is being unduly delayed. It appears that the three Ministries are reluctant to give up their role in the safety related aspects as they perceive it akin to losing power.

The Committee have been informed that among the three bodies namely PESO, DGMS and OISD, almost 97 percent of the premises are regulated for safety by PESO and 2 percent by DGMS and 1 percent by OISD. PESO has been handling the safety regulations in hazardous premises like refineries, cross country pipelines, manufacturing, storage and transportation of exploring storage & use of explosives in oil mines, Auto LPG and CNG dispensing stations. The Committee feel that the MoPNG wants to retain its

dominant role through the OISD. The Committee would like to point out here that the OISD has no permanent staff of its own and most of its officers are on deputation from the Oil Companies. Therefore, the concept of arms length in the safety aspect is certainly not fulfilled here. Due to conflict of interests, such officers can not be expected to give adverse reports against their own employers. Therefore, in Committee"s view, considering the capabilities, infrastructure and proportion of work administered in Hydrocarbon sector, PESO is more suitable body to reposition it to administer safety regulations in entire hydrocarbon sector. The Committee, therefore, strongly recommend that PESO may be empowered to work as a single framework for regulation of safety in entire hydrocarbon sector. For that purpose the capacity of PESO should be enhanced by providing it prosecution powers and strengthening the Human Resource and coordination with District authorities, upgradation of Research and Testing infrastructure and capacity building of external stakeholders.

11. <u>Creation of Buffer Zones around installations</u>

The Committee note that one of the recommendations of the M.B. Lal Committee was to create a buffer zone around installations and regulating land use pattern around high hazard petroleum installations. Accordingly, all the Chief Secretaries of States/UTs were requested in April 2013 to ensure adequate provisions in their land allotment rules to prohibit habitations to come up within a band of at least 250-300 meters around the periphery of the oil installations and to maintain a buffer zone to minimise the impact on the surrounding areas in case of a major accident. In this regard, the Committee were informed that no feedback has been received from the state governments. The Committee understand that buffer zones around petroleum installations are an important aspect for maintenance of safety and therefore, desire that there should be no let up in pursuing the matter with the States/UTs and the importance of creation of buffer zones should be impressed on them so that M.B. Lal Committee recommendation regarding safety of high hazard installations is implemented without any further delay.

12. Geo-physical Mapping of Potential Disasters

The Committee have been informed that ONGC has developed an in-house GIS mapping of its pipelines laid in onshore locations and the mapping is nearly complete. ONGC is also undertaking a conceptual study in this regard. The Committee also note that no guidelines for GIS mapping of upstream assets has been brought out by OISD.

The Committee desire that all the oil and gas companies should mandatorily carry out GIS mapping of their assets. This will not only enable for tracking purpose both onshore and offshore but also as a tool for risk assessment of the areas around petroleum and gas installations/pipelines during major accidents. The Committee recommend that the world wide practice should also be studied for adopting the same in the Indian scenario for advance planning to minimise damage and to deal with accidents efficiently and effectively.

Security aspects

13. Onshore Security

The Committee note that the security for the on-shore installations is provided by the owner oil companies owned security staff along with the Central Industrial Security Force (CISF), through patrolling. Technology such as Intrusion Detection System (IDS), remote surveillance, GIS, GPS, is also extensively being used for monitoring security of installations and pipelines. There is an Onshore Security Committee Chaired by the DGPs which acts as an inter-state linkage. The same pattern is being followed in securing the Oil & Gas installations in the North-Eastern region. The Committee desire that the security of such vital installations should be fool proof to deal with all possible types of threats in the current security scenario. Security audit should be carried out at periodic intervals to update and upgrade the security systems in all the oil and gas installations. Worldwide practices in this area should also be examined and adopted wherever feasible. Apart from the internal security mechanisms, the State Governments and the local administration also have a major role in the security of the oil & gas installations. Regular interaction with

the state authorities should be an essential feature of the security system for sharing of information on threats and for timely action during an emergency. The illegal encroachments/construction around the periphery of the oil & gas installations and on the Right of Way (RoW) around pipelines should not be allowed to come up as they pose a security threat. In this regard the Committee desire that Central Industrial Security Force (CISF) should be empowered to register cases against violators. The Committee further desire that the security risk assessment of all the onshore oil and gas installations should be carried out and the security strengthened by addressing and filling the gaps found therein. The Committee further desire that the best of the equipment and technology is used by the oil industry to secure their installations.

14. <u>Offshore Security</u>

The Committee note that Navy, Indian Coast Guard, Offshore Defence Advisory Group (ODAG) a dedicated group of the Navy, are presently engaged to provide security to the Western and Eastern Offshore Oil and Gas platforms. The on boat security is exclusively been done by ONGC. The state police or the coastal police looks after the security from onshore to 12 nautical miles. The Offshore Security Co-ordination Committee (OSCC) comprising of the members from the Indian Coast Guard, Navy and the Ministry of Shipping reviews the security issues. The Committee were further informed that the offshore activity of vessels both sea borne and air is closely monitored through the Vessel and Air Traffic Management System (VATMS), besides this the Navy, ODAG, and the Indian Air Force also keep a watch on the movement of vessels. The Immediate Support Vessels of the Navy carry out regular patrolling of the waters. The Committee also note that to address underwater threats a comprehensive security solution is also being developed.

The Committee are satisfied to note the present security mechanism in place for protection of offshore oil and gas installations, nevertheless, desire that the maritime security and surveillance should keep abreast with the latest technology and further enhanced with equipment that are required for the protection of important offshore assets of the nation.

Environment Protection aspects in Petroleum sector

15. Environment protection in and around oil refineries

Today India"s oil refining capacity is of about 5 million barrels per day and it exceeds the countries demand of oil products resulting in exports of more than one million barrel per day. Efforts are also being made to develop India as a refining hub in coming years. Surging demand in domestic and export markets offers an attractive growth for Indian refiners. The Committee, however, feel that the growth of India"s refinery industry and country"s sustainable future are closely linked tightening emission standards of international levels. Refineries emit a wide variety of pollutants. Common air pollutants coming out of refineries are Sulphur Dioxide, Oxides of Nitrogen, Carbon Monoxide, green house gases and other carcinogenic air pollutants. Similarly, the pollutants from the refineries are also responsible for pollution of water bodies and contamination of ground water. Noise pollution from refineries is also a cause of concern. All these pollutants have harmful health effects relating to respiratory system, heart, eyes, skin, digestion etc. and other serious health disorders. Prevention and control of air, water and noise pollution is being done under various acts of environment protection. This includes water pollution, air pollution and noise pollution monitoring and control, development of green belts and eco parks, carbon management, use of renewable and alternate energy and solid waste and e-waste management etc. The Committee, however, are not sure whether refining emission standards are strictly being followed by the refineries and also whether the effluent treatment facilities in all the refineries are of global level because the population living around the refineries face respiratory and other problems and the water bodies in the adjoining areas to the refineries are heavily polluted. There are refinery modernization / expansion projects in progress and in pipeline. The Committee caution the Ministry that such projects should not be undertaken at the cost of increase in pollution of environment and contamination of water. The Committee, therefore, desire that in view of global environmental standards improvement, the environmental management in Indian refineries also needs shift from conventional to more pragmatic approaches. Refineries should ensure that there is a regular monitoring and

control of environmental pollution and the level is not disturbed further due to expansion / modernization of refineries. They should put in efforts for mitigating environmental pollution using the latest and cleaner technology, recovery of by products and resource conservation and effluent treatment facilities and all these factors should be monitored and upgraded regularly at par with the international standard. The Committee may be apprised about the efforts made in this direction and the outcome thereof.

16. <u>Incidents of Oil Spill</u>

The Committee note that oil spill is a major problem in hydrocarbon sector which adversely affects the environment. There have been few incidents of oil spill, notably the recent one in Chennai coast in January 2017 due to the collision of two vessels. Similarly many incidents of oil spill due to accidents involving oil vessels, oil platforms/rigs/pipelines etc have happened in the past in the Indian coast. As the country has long coast both on the Eastern and Western side, there has to be an effective monitoring mechanism to avoid such incidents.

The Committee note that Oil spill causes enormous impact on marine life as well as to environment alongwith the economic costs associated with cleaning and treating the oil sludge. The management of oil spill involves significant financial, technical and human resources. The Committee are surprised to note that oil companies have not undertaken any serious R&D activities to develop their own expertise in handling the spills. As Indian hydrocarbon sector is expanding, there is a need for the Indian hydrocarbon sector to develop the best capabilities in this regard. Therefore, the Committee recommend that the Ministry should coordinate with other agencies like NDMA, Indian coast guard, Ministry of Environment, Forest & Climate Change, Ministry of Shipping, etc. to monitor and enhance the indigenous capabilities of managing the Oil spill effectively.

New Delhi;
***<u>24 July</u>*, 2018**
2 Shravana, 1940 (Saka)

PRALHAD JOSHI,
Chairperson,
Standing Committee on
Petroleum & Natural Gas.

ANNEXURE I

MINUTES

STANDING COMMITTEE ON PETROLEUM & NATURAL GAS (2014-15)

EIGHTH SITTING (07.01.2015)

The Committee sat on Wednesday, the 7 January, 2015 from 1130 hrs. to 1330 hrs. in Committee Room „C", Parliament House Annexe, New Delhi.

PRESENT

Shri Pralhad Joshi - Chairperson

MEMBERS

LOK SABHA

2. Dr. Ravindra Babu Pandula
3. Shri P.K. Biju
4. Shri Kalikesh N. Singh Deo
5. Smt. Rama Devi
6. Shri Elumalai V.
7. Dr. Thokchom Meinya
8. Smt. Pratima Mondal
9. Shri Arvind Sawant
10. Shri Raju Shetty
11. Dr. Bhola Singh
12. Shri Ravneet Singh
13. Shri Rajesh Verma
14. Shri Om Prakash Yadav
15. Shri Laxmi Narayan Yadav

RAJYA SABHA

16. Shri Ishwarlal Shankarlal Jain
17. Shri Prabhat Jha
18. Shri Bhubaneshwar Kalita
19. Smt. Gundu Sudharani

SECRETARIAT

1.	Shri A.K.Singh	-	Joint Secretary
2.	Shri S.C. Chaudhary	-	Director
3.	Smt. Jagriti Tewatia	-	Deputy Secretary

Representatives of the Ministry of Petroleum & Natural Gas

1	Shri Saurabh Chandra	-	Secretary
2.	Dr. S.C. Khuntia	-	SS&FA
3.	Dr. Neeraj Mittal	-	Joint Secretary

4.	Shri U.P.Singh	-	Joint Secretary
5.	Shri Sandeep Poundrik	-	Joint Secretary
6.	Ms. Archana S. Mathur	-	Eco. Advisor

Representatives of Public Sector Undertakings and other Organisations

1.	Shri B. Ashok	-	Chairman, IOCL
2.	Shri S.Varadarajan	-	CMD, BPCL
4.	Shri B.C.Tripathi	-	CMD, GAIL
5.	Shri D.K.Sarraf	-	CMD, ONGC
6.	Shri S.K.Srivastava	-	CMD, OIL
7.	Shri A.K.Purwaha	-	CMD, EIL
8.	Shri Virendra Sinha	-	C&MD, Balmer Lawrie & Co. Ltd.
9.	Shri Gautam Roy	-	MD, CPCL
10.	Shri P. Padmanabhan	-	MD, NRL
11.	Shri Y K Gawali	-	Director, HPCL
12.	Shri P K Rao	-	Director, OVL
13.	Shri H. Kumar	-	MD, MRPL
14.	Shri G. Mukhopadhyay	-	DGM, Biecco Lawrie
15.	Shri S.L.Chakraborty	-	Director, OISD
16.	Shri P.K.Rao	-	Director, OVL

2. At the outset, Hon'ble Chairperson welcomed the Members and representatives of the Ministry of Petroleum and Natural Gas and PSUs to the sitting of the Committee held to have a briefing by the representatives of the Ministry of P&NG on the subject 'Safety, Security and Environmental Aspects in Petroleum Sector'. After the customary introduction, the representatives of the Ministry made a brief presentation on safety and security measures being undertaken in petroleum sector in India.

3. The Committee thereafter deliberated upon various safety issues and security challenges being faced by on-shore and off-shore installations such as complex operational system of handling petroleum products, guidelines for the integrity of cross-country pipelines, audit of LNG terminals, composition of safety council with the inclusion of national and international level experts, fire accidents at Bombay High of ONGC, Numaligarh refinery in Assam and Tatipaka pipeline of GAIL, layered security apparatus in and around off-shore sites, present status of the implementation of M B Lal Committee recommendations. Further, safety of supplying LNG through trucks in India, centralised online monitoring and control system to check leakages in pipelines, replacement of ageing pipelines, security patrolling along trunk pipelines, third party GIS mapping of on-shore and off-shore

sites, requirement for umbrella legislation for oil and gas sector, objections from farmers to the laying of pipelines in some southern states etc. The Committee also discussed the issues of security preparedness in the wake of 26 November attack and Porbander infiltration alongwith budget allocation for safety and security, overlapping of powers among Ministries over the security supervision of oil sites and the resultant lack of consensus on the issue. The Committee also raised the issue of open burning of gas in oil fields, involvement of traditional fishermen in the protection of off-shore oil installations, division of security functions between Coast Guard and the state police over the protection of off-shore oil installations. The Committee then adjourned for lunch break.

4. The Committee then reassembled after lunch break. Thereafter, the Committee called the representatives of MoPNG, OMCs and Sugar Mill Associations to take their evidence on the subject, "Ethanol Blended Petrol and Bio- Diesel Policy". The Committee then discussed various issues related to the subject such as purchase and availability of ethanol by sugar manufacturers to oil marketing companies and constarints being faced in the process, storage capacity available with OMCs for storing Ethanol, State levies and taxes on the purchase and interstate movement of Ethanol, fixation of procurement price of ethanol by oil-companies. In addition to this, terms and conditions of the tendering process for ethanol procurement, price differential of ethanol and its benchmark pricing. and negotiations with sugar mill owners over the pricing etc. were also deliberated upon.

5. The clarifications sought by the Members on various points were provided by the representatives of the Ministry. However, on some of the points where the information was not readily available, the Hon'ble Chairperson instructed the Ministry to furnish written information to the Secretariat at the earliest.

6. A copy of the verbatim proceedings of the sitting has been kept for record.

The Committee then adjourned.

ANNEXURE II

MINUTES
STANDING COMMITTEE ON PETROLEUM AND NATURAL GAS
(2015-16)
SECOND SITTING
(29.09.2015)

The Committee sat on Tuesday, the 29 September, 2015 from 1100 hrs. to 1315 hrs. in Committee Room 'B', Parliament House Annexe, New Delhi.

PRESENT

Shri Pralhad Joshi - Chairperson

MEMBERS

LOK SABHA

2 Dr. Ravindra Babu Pandula
3 Shri P. K. Biju
4 Shri Kalikesh N. Singh Deo
5 Shrimati Rama Devi
6 Shri Elumalai V.
7 Shri Naranbhai Kachhadiya
8 Dr. Thokchom Meinya
9 Shrimati Pratima Mondal
10 Shrimati Jayshreeben Patel
11 Shrimati Anupriya Patel
12 Shri Arvind Sawant
13 Shri Raju Shetti
14 Dr. Bhola Singh (Begusarai)
15 Shri Rajesh Verma
16 Shri Om Prakash Yadav
17 Shri Laxmi Narayan Yadav
18 Shri A.T. Nana Patil

RAJYA SABHA

19 Shri Mani Shankar Aiyar
20 Shri Ishwarlal Shankarlal Jain
21 Shri Prabhat Jha
22 Shri Bhubaneshwar Kalita
23 Shrimati Gundu Sudharani
24 Shri Praful Patel

SECRETARIAT

1. Shri A.K.Singh - Additional Secretary
2. Shri H. Ram Prakash - Additional Director

Representatives of the Ministry of Petroleum & Natural Gas

1 Shri Kapil Dev Tripathi - Secretary
2 Shri Ajay Prakash Sawhney - Additional Secretary
3 Shri U.P. Singh - Additional Secretary (E)

4	Shri Sandeep Poundrik	-	Joint Secretary
5	Shri Ashutosh Jindal	-	Joint Secretary
6	Smt. Sushma Taishete	-	Joint Secretary

Representatives of Public Sector Undertakings and other Organisations

1	Ms. Nishi Vasudeva	-	C&MD, HPCL
2	Shri Gautam Roy	-	MD, CPCL
3	Shri Sanjiv Singh	-	Director, IOCL
4	Shri K.K.Gupta	-	Director, BPCL
5	Shri A.K.Diwedi	-	Director, ONGC
6	Shri M.Ravindran	-	Director, GAIL
7	Shri M. Venkatesh	-	Director, MRPL
8	Shri D.K.Adhikari	-	Director, OISD
9	Shri N.Borthakur	-	GM, NRL

2. At the outset, the Hon'ble Chairman welcomed the Members and representatives of the Ministry of Petroleum and Natural Gas and PSUs to the sitting of the Committee held to have an evidence by the representatives of the Ministry of P&NG on the subject 'Safety, Security and Environmental Aspects in Petroleum Sector'. After the introduction, the representatives of the Ministry made a brief presentation on safety and security measures being undertaken in petroleum sector in India.

3. The Committee, thereafter, deliberated upon various safety issues such as road side accidents of trucks carrying LPG, fire accidents due to miscreant activities, fatalities as result of accidents, and financial losses incurred to oil PSUs due to accidents and also because of cessation of operations. Further, the role of OISD in ensuring safety, security aspects and penalties imposed on erring oil companies and meetings of the Committee of Secretaries over PNG Safety Board were also discussed at length. In addition, other issues like non adherence of standard operating procedures by oil companies, setting up of Gas Dehydration Units in oil installations, human factor in accidents, blasts in gas pipelines, protection of Single Point Moorings by the Coast Guard, geo-physical mapping of potential disasters in upstream assets, pendency and redressal of accident compensation cases, flaring of gas in oil fields and refineries and the subsequent losses, environmental and forest clearances, multiplicity of agencies in the safety domain of petroleum sector and resultant overlapping of powers among Ministries over the safety and security supervision of oil sites and the conspicuous absence of consensus on the issue,

current status of the implementation of M.B Lal Committee recommendations were also discussed.

4. On many of these issues, clarifications were sought by the Members. However, on some of the points where the information was not readily available, the Hon‟ble Chairperson instructed the Ministry to furnish the written replies to the Secretariat at the earliest.

5. A copy of the verbatim proceedings of the sitting has been kept for record.

The Committee then adjourned.

ANNEXURE III

MINUTES
STANDING COMMITTEE ON PETROLEUM AND NATURAL GAS
(2017-18)
THIRD SITTING
(24.10.2017)

The Committee sat on Tuesday, the 24 October, 2017 from 1500 hrs. to 1700 hrs. in Committee Room No. '4', PHA Extn. Building, A-Block, New Delhi.

PRESENT

Sh. Pralhad Joshi - Chairperson

MEMBERS

LOK SABHA

2 Shri Rajendra Agrawal
3 Dr. Ravindra Babu Pandula
4 Dr. P. K. Biju
5 Shri Kalikesh N. Singh Deo
6 Smt. Rama Devi
7 Shri Elumalai V.
8 Shri Naranbhai Kachhadiya
9 Dr. Thokchom Meinya
10 Smt. Pratima Mondal
11 Shri Ashok Mahadeorao Nete
12 Shri Arvind Sawant
13 Shri Ravneet Singh
14 Shri Rajesh Verma
15 Shri Om Prakash Yadav
16 Shri Laxmi Narayan Yadav

RAJYA SABHA

17 Shri Bhubaneshwar Kalita
18 Shri Om Prakash Mathur
19 Shri Bhaskar Rao Nekkanti
20 Shri Narayan Lal Panchariya
21 Shri A. Vijayakumar
22 Ch. Sukhram Singh Yadav

SECRETARIAT

1. Shri A.K.Singh - Additional Secretary
2. Dr. Ram Raj Rai - Director
3. Shri H. Ram Prakash - Additional Director
4. Shri Sujay Kumar - Under Secretary

Representatives of the Ministry of Petroleum & Natural Gas

1 Shri K. D. Tripathi - Secretary
2 Shri Sandeep Poundrik - Joint Secretary
3 Shri Amar Nath - Joint Secretary

Representatives of Public Sector Undertakings and other Organisations

1	Shri Shashi Shankar	-	CMD, ONGC
2	Shri B. C. Tripathi	-	CMD, GAIL
3	Shri M.K. Surana	-	CMD, HPCL
4	Shri Utpal Bora	-	CMD, OIL
5	Shri H. Kumar	-	MD, MRPL
6	Shri P. Padmanabhan	-	MD, NRL
7	Shri Gautam Roy	-	MD, CPCL
8	Shri Anish Aggarwal	-	Director, IOCL
9	Shri V.S. Shenoy	-	Director, HPCL
10	Shri P.K. Sharma	-	Director, OIL
11	Shri V.J. Rao	-	ED, OISD
12	Shri Manohar Rao	-	ED, HSSE, BPCL

2. At the outset, Hon'ble Chairperson welcomed Shri Bhaskar Rao Nekkanti, M.P. (RS) the newly nominated member to the Committee. Thereafter, he welcomed the Members of the Committee and officials of the Ministry of Petroleum and Natural Gas/PSUs to the sitting of the Committee.

3. The representative of the HPCL made a brief power point presentation on the subject "Safety, Security and Environmental Aspects in Petroleum Sector". Thereafter, Hon'ble Chairperson and Members of the Committee sought clarification on a number of issues such as the status of implementation of MB Lal Committee recommendations, the frequency of the meetings of safety council functioning under OISD, legal status of OISD, establishment of Emergency Response Centres (ERC) as recommended by MB Lal Committee, measures taken to minimise the impact of hydrocarbon exploration on environment and lack of statistical information about loss of life and property and compensation paid to the victims of petroleum related accidents.

4. Further, Members also expressed concern over the fire incident in a petroleum tank maintained by BPCL in Butcher island in Mumbai and sought clarifications as to the quantum of loss in the accident, causes of the accident, enquiry conducted/action taken/contemplated against the officials responsible and lack of clarity on the issue of safety audit undertaken on the site.

5. Moreover, Members also sought clarification on issues like mechanism to ensure that work is contracted out to qualified people, safety to rural customers of

LPG through awareness campaigns, need for an autonomous agency to ensure security of oil installations, etc. The Committee also decided to invite experts and other concerned agencies connected with the subject.

6. A copy of the verbatim proceedings of the sitting has been kept for record.

The Committee then adjourned.

ANNEXURE IV

MINUTES

STANDING COMMITTEE ON PETROLEUM AND NATURAL GAS
(2017-18)

SIXTH SITTING
(06.12.2017)

The Committee sat on Wednesday, the 6 December, 2017 from 1100 hrs. to 1330 hrs. in Committee Room No. '139', PHA, New Delhi.

PRESENT

Sh. Pralhad Joshi - Chairperson

MEMBERS

LOK SABHA

2. Shri Rajendra Agrawal
3. Dr. Ravindra Babu Pandula
4. Dr. P. K. Biju
5. Shri Elumalai V.
6. Dr. Thokchom Meinya
7. Smt. Pratima Mondal
8. Shri Arvind Sawant
9. Shri Raju Shetti
10. Shri Rajesh Verma
11. Shri Om Prakash Yadav
12. Shri Laxmi Narayan Yadav
13. Shri Santosh Kumar

RAJYA SABHA

14. Shri Bhubaneshwar Kalita
15. Smt. Ranee Narah
16. Shri Bhaskar Rao Nekkanti
17. Shri Narayan Lal Panchariya
18. Ch. Sukhram Singh Yadav

SECRETARIAT

1. Shri A.K.Singh - Additional Secretary
2. Dr. Ram Raj Rai - Director
3. Shri H. Ram Prakash - Additional Director
4. Shri Vinay Pradeep Barwa - Deputy Secretary

Representatives of the Ministry of Commerce and Industry

1. Shri Shailendra Singh - Additional Secretary, Deptt. of Industrial Policy & Promotion (DIPP)
2. Shri N.T. Shahu - Chief Controller of Explosives, Petroleum and Explosives Safety Organisation (PESO)

Representatives of the Ministry of Labour & Employment

1.	Ms. Kalpana Rajsinghot	-	Joint Secretary
2.	Shri Prasanta Kumar Sarkar	-	Directorate General of Mines Safety (DGMS)

Non-Official Witnesses / Industry Experts

1.	Shri Hirak Dutta	-	Ex. ED, Oil Industry and Safety Directorate (OISD)
2.	Shri C.M. Sethi	-	Ex. Head of Fire and Safety Deptt. (IOCL)

2. At the outset, the Hon'ble Chairperson welcomed the Members of the Committee and officials of the Ministry of Commerce & Industry/Petroleum and Explosives Safety Organisation (PESO) and Ministry of Labour and Employment/Directorate General of Mines Safety (DGMS).

3. After a brief introduction, the representatives of the two Ministries briefed the Committee on the subject 'Safety, Security and Environmental Aspects in Petroleum Sector'. Thereafter, Joint Secretary, M/o Labour & Employment explained the role of DGMS in regulating the safety of oil mines and the latest amendments regulation in 2017. Further, the representatives of PESO gave a small power point presentation on the subject elaborating various aspects relating to PESO such as offices of PESO and its functions, Acts and Rules administered by PESO, regulation of environmental aspects through MSIHC Rules 1989 under EP, Act 1986, role of Safety Regulatory Authorities viz. PESO, OISD, DGMS in the petroleum sector, introduction of new technology initiatives by PESO, major oil sector premises under purview and monitoring and enforcement activities of PESO.

4. Thereafter, Members of the Committee sought clarifications on various points such as specific role of the Ministry of Labour & Employment and Ministry of Commerce & Industry in the safety of mines and oil sector installations and the number of employees to regulate the responsibilities, multiplicity of agencies responsible for regulating safety aspects in the field of oil sector and prospects of bringing them under one umbrella organization, the time taken to approve a retail outlet, safety audit of oil and gas pipelines, safety of labourers involved in the installation of pipelines, the role of PESO in implementation of recommendations of M.B. Lal Committee Report and safety, security and environmental aspects on flaring

of gas at oil installations, detection of leakage and pilferage in pipelines and depots, establishment of Emergency Response Centres, responsibility of agencies for incidents at Ports, deployment of untrained personnel for fire-fighting in oil and gas installations, appointment of safety consultants, prosecution powers of PESO. These issues were responded to by the Addl. Secretary, Ministry of Commerce & Industry, the Joint Secretary, Ministry of Labour & Employment, representatives of DGMS & PESO. On other issues where the information was not readily available the Chairperson directed the Ministries to submit the same to the Secretariat within 15 days.

5. Subsequently, the Committee deliberated on GAIL operated gas pipeline explosion at Tatipaka in Andhra Pradesh and the recent accident at Butcher Island oil storage tank and sought detailed reports on these two accidents alongwith the action taken by PESO/DIPP and other agencies concerned in both the cases.

(The witnesses then withdrew)

(At 1230 hrs., Non-official witnesses/Industry Experts in Petroleum Sector were invited)

6. The Hon'ble Chairperson welcomed Shri Hirak Dutta, Ex. ED, OISD and Shri C.M. Sethi, Ex. Head of Fire and Safety Department, IOCL. They were requested to present their views on the subject 'Safety, Security and Environmental Aspects in Petroleum Sector'. Shri Sethi gave a power point presentation that enabled the Committee to have a better understanding of the subject. The experts also shared their views on Emergency Response Centres, difference in normal fire fighting and handling a major fire disaster and common causes for fire break outs at oil and gas installations. Thereafter, Members raised several queries with regard to measures required for improving safety and security of onshore and offshore oil and gas installations and the same were clarified by both the experts. At the end of deliberations, Members of the Committee appreciated their knowledge and experience in the field of safety of oil and gas installations and requested them to present their views and suggestions on various safety aspects in writing to the Secretariat.

7. A copy of the verbatim proceedings of the sitting has been kept for record.

The Committee then adjourned.

ANNEXURE V

MINUTES
STANDING COMMITTEE ON PETROLEUM AND NATURAL GAS
(2017-18)

SIXTEENTH SITTING
(19.07.2018)

The Committee sat on Thursday, the 19 July, 2018 from 1500 hrs. to 1530 hrs. in Committee Room 'C', PHA, New Delhi.

PRESENT

Sh. Pralhad Joshi - Chairperson

MEMBERS

LOK SABHA

2. Shri Rajendra Agrawal
3. Dr. Ravindra Babu Pandula
4. Dr. P.K. Biju
5. Smt. Rama Devi
6. Dr. Thokchom Meinya
7. Smt. Jayshreeben Patel
8. Shri Arvind Sawant
9. Shri Laxmi Narayan Yadav

RAJYA SABHA

10. Shri Narayan Lal Panchariya
11. Shri V. Lakshmikantha Rao
12. Shri V. Vijayasai Reddy
13. Shri A. Vijayakumar
14. Ch. Sukhram Singh Yadav

SECRETARIAT

1.	Shri A.K.Singh	-	Additional Secretary
2.	Dr. Ram Raj Rai	-	Director
3.	Shri H. Ram Prakash	-	Addl. Director
4.	Shri Vinay Pradeep Barwa	-	Deputy Secretary

2. At the outset, the Hon'ble Chairperson welcomed the Members of the Committee to the sitting. Thereafter, the Committee took up the draft report on the subject 'Safety, Security and Environmental Aspects in Petroleum Sector' for consideration and adopted the same with minor modifications.

3. The Committee, thereafter, authorised the Chairperson to present/lay the Report in both the Houses of Parliament.

The Committee then adjourned.