सत्यमेव जयते

NATIONAL DISASTER MANAGEMENT GUIDELINES
STRENGTHENING OF SAFETY AND SECURITY FOR TRANSPORTATION OF POL TANKERS

July, 2010

NATIONAL DISASTER MANAGEMENT AUTHORITY
GOVERNMENT OF INDIA

National Disaster Management Guidelines

STRENGTHENING OF SAFETY AND SECURITY FOR TRANSPORTATION OF POL TANKERS

Strengthening of Safety and Security Regulations on POL Tankers

June 25th 2010

National Disaster Management Authority convened a meeting to coordinate with the oil companies and different ministries/regulatory authorities dealing with transportation of POL tankers under the chairmanship of Lt Gen (Dr) J. R. Bhardwaj, Member, and NDMA on 29th April, 2010. The following Oil Companies and Ministries /Departments were invited to attend the meeting:

1. Bharat Petroleum Corporation Limited (BPCL)
2. Indian Oil Corporation Ltd (IOCL)
3. Hindustan Petroleum Corporation Limited (HPCL)
4. GAIL (India) Limited
5. Indraprastha Gas Limited (IGL)
6. Reliance Industries Limited(RIL)
7. Kochi Refineries Ltd
8. ESSAR Refineries
9. Railway Board
10. Ministry of Petroleum and Natural Gas
11. Oil Industry Safety Board (OISD)
12. Petroleum and Natural Gas Regulatory Board (PNGRB)
13. Ministry of Road Transport & Highways
14. Director General of Shipping
15. Chief Controller of Explosives
16. CBRN Defense, INMAS (DRDO)
17. Disaster Management Institute (DMI), Bhopal
18. Former Director General – National Safety Council
19. FICCI

Twenty Six senior representatives from invited organizations participated in the meeting. A list of the participants is given in Annexure I.

The following issues were discussed to strengthen the safety and security regulations for the transportation of POL tankers –

i. Interaction with petroleum companies, regulatory authorities and departments about their roles and responsibilities
ii. a) Revisiting the existing Rules, Regulations and Guidelines on Transportation of Hazardous Chemicals

b) Identification of Gaps in Regulatory Framework and recommendations on filling in the same

iii. Need to standardize SOPs for loading of POL Tankers across the industry in the country.

iv. Strengthening en-route safety and security.
   a) Vendor's responsibility. `
   b) Vehicle fitness and governing regulations
   c) Defined route and route map to drivers (to be made mandatory)
   d) Training of drivers and cleaners.
   e) VTS, Vehicle tracking system and its installation on all POL tankers to be mandatory.
   f) Introducing GPS for all POL tankers
   g) Safe parking places en-route and resting places for crew.

v. Safety and security of Destination
   a) Need to standardize SOPs for unloading of POL tankers across the country

vi. Transport discipline guideline (TDG)

An active discussion has taken place between oil companies and various regulating authorities on the various issues defined above. Since there were large number of issues brought in during discussion. It was decided that all the representatives will send their written comments at the earliest. The under singed constituted a core group for "Strengthening Safety and Security Regulations for the POL tankers" (Annexure II) who will coordinate and compile recommendations based on the comments received from various representatives. The comments from all the representatives were received by 20th May, 2010. The comments so received from various representatives were incorporated in the document entitled "Strengthening Safety and Security Regulations for the POL tankers" which is hereby attached.

(Lt Gen (Dr.) J R Bhardwaj)

Member NDMA

CONTENTS

ABBREVIATIONS

ABS	Antilock Braking System
CMVR	Central Motor Vehicles Rules
DCS	Distributed control systems
DDMA	District Disaster Management Authority
DGFASLI	Directorate General, Factory Advice Service and Labour Institutes
ECU	Emergency Control Unit
ERDMP	Emergency response to disaster management planning
GPS	Global Positioning System
HAZCHEM	Hazardous Chemicals
ITDG	Industry Transport Discipline Guidelines
LPG	Liquefied Petroleum Gas
MoE&F	Ministry of Environment and Forests
MoP&NG	Ministry of Petroleum and Natural Gas
MoST&H	Ministry of Surface Transport and Highways
MSDS	Material safety data sheet
MSIHC	Manufacture, Storage and Import of Hazardous Chemical
MV Act	Motor Vehicle Act
NDMA	National Disaster Management Authority
NDRF	National Disaster Response Force
NFPA	National Fire Protection Association
OISD	Oil Industry Safety Directorate
OMC	Oil Manufacturing Companies
PESO	Petroleum and Explosive Safety Organisation
PNGRB	Petroleum and Natural Gas Regulatory Board
POL	Petroleum, Oil and Liquid
RTO	Regional Transport Officers
SDRF	State Disaster Response Force
SOP	Special Operating Procedures
TREM	Transport Emergency Management
TT	Tank Truck
VTS	Vehicle Tracking System

1. Executive Summary

*H*azards refer to 'potential to cause injury' and risk is 'probability of occurrence of such event'. Due to unprecedented growth of industries since Independence the chemical risk contained within the boundaries of industry has now reached the densely populated zones in the form of 'transportation vehicles'. The exponential increase in number of vehicles carrying petroleum goods corresponds to the significant increase in industrial growth. Accordingly, a rapid increase in number of incidences involving tankers has also increased.

With the advent of Disaster Management (DM) Act, 2005, a process of institutionalizing disaster management framework was initiated. Chemical (Industrial) Disaster Management Guidelines and Chemical (Terrorism) Disaster Management Guidelines were, thereafter developed and released.

The Environment Protection Act, the Petroleum Act, the Factories Act and Central Motor Vehicles Rules provide significant regulations starting from design approval to safe/ secure transportation of POL tankers. However, the major limitation is the multiplicity of regulations, stakeholder involved and in-effective coordination amongst various emergency service providers. The existing mechanism of operation of such vehicles starts from design approval by PESO to multiple authorized checks till reaching consignee place. The increase in terrorist threat has also raised concerns on current safety and security aspects.

Consequently, NDMA has undertaken an initiative based on recommendations of the regulators to a) discuss the vital issues with both all the regulators and important oil companies and; b) to identify critical gaps to develop preparedness /mitigations strategies there upon. After meeting with all the important stakeholders and service providers (Appendix I), a core group (Appendix II) was constituted under the chairmanship of Lt Gen (Dr) JR Bhardwaj, Member, NDMA.

NDMA in its approach towards disaster management firmly believes that man-made disasters which include the incidents involving POL tankers can be very well minimized, if prevention and preparedness practices are adopted to a level that

there is no chance left of slippage. The important recommendations to be implemented include: Regulatory frame work should address the roles of occupiers, transporters, drivers and district and state authorities explicitly for fail safe transportation of POL tankers; b) Response capabilities of hospitals, fire services and police on transportation routes especially in mofusil towns should be strengthened; c) More emphasis should be given to maintenance of safety features in POL tankers; d) National tanker registry should be developed; e) Tracking of POL tankers through GPS and VTS should be compulsorily adopted; f) DDMA should have a cell for transportation of POL Tankers g) Separate data base of petroleum products should be created; h) Emergency response guide for transportation of POL tankers should be prepared; i) Efforts should be made to designate and train community leaders on prominent highways for down the line training of communities en-route and; j) Safety documents should be prepared by the occupier/ transporter for vehicle, driver and journey management for pre, during and post transportation phases.

Training & Re-training

It is necessary to continue with the efforts of training and re-training drivers and accelerating public awareness for safe handling during transportation of dangerous goods. Corrective measures should be ensured for improving compliance of statutory provisions, prepare, rehearse and actuate on-site and off-site emergency plans to combat exigencies en-route during transportation.

Highway Disaster Management Planning

The highways and selected other routes where the POL traffic is very high, should be mapped for provision of first aid boxes and reliable communication facilities. The available study material and information for the specific highways stretches that carry high traffic density of HAZCHEM carriers shall be replicated for other national/state highways. The highway disaster management plan should delineate preparedness, mitigation and prevention strategies for accidents of POL tankers as recommended by National disaster management guidelines for Chemical (Industrial) disasters.

Authorized Parking Spaces

The central and state governments should approve parking places in their respective areas of control for safe and secure parking of POL Tankers.

PESO should be provided with appropriate man power to critically re-evaluate its approvals with

regard to submissions made by the industries as well as transporters.

RTOs in various states, who have also been working overtime in discharge of responsibilities with regard to all sorts of vehicles engaged in commercial activities and for personal use, should be sensitized towards this important responsibility of managing POL tankers.

Suggested Mechanism for Implementation

A single window approach should be adopted for implementation of existing regulations and suggested new rules and regulations.

Single Window Approach

It is an opinion of experts that transportation of POL tankers requires single window control mechanism which can only be provided by a defined regulator. Petroleum and Natural Gas Regulatory Board (PNGRB) based on their existing mandate and statutory backup shall act as a regulator. PNGRB shall coordinate, monitor and ensure the implementation of rules, regulations and SOPs for POL tankers. It shall develop an adequate mechanism to put up a check on functioning of various stakeholders / service providers with respect to safety and security aspects of POL Tankers.

Transportation Disaster Management Planning is very important and should be formulated under ERDMP (emergency response to disaster management planning) in the country. It shall cover important transportation routes of hazardous chemical and dangerous goods including the transportation of POL tankers.

The ***implementation model*** should be undertaken in a phased manner under defined timelines. It shall include the following: a) strategy to enhance the infrastructure requirement and capacity development by providing adequate manpower to various existing stakeholders/ service providers; b) Adoption of single window approach to facilitate the functioning and ensuring implementation of various rules and regulations and; c) State level emergency management planning for different types of transportation hazards and special mechanisms to address linkages. The model needs to be implemented in a stipulated time period using a consultative and participatory approach.

2. Background

An unprecedented growth of chemical Industries, led to a significant increase in proportion of transportation vehicles carrying dangerous and hazardous chemicals. Approximately, two-third of these vehicles carries flammable petroleum products including Kerosene, Petrol, LPG, Naphtha, etc. The movement of such substances is more prone to accident than the movement of normal goods. Road accidents, involving such carriers cause disastrous consequences like fire, explosion, injuries, in addition to property loss and environmental pollution.

An incident involving a fuel tanker in Thane district in November 1991 resulted in death of 96 people and 117 injured. The detailed analysis of this incident reveals high risks and potential impact of disasters that can be happen with POL tankers. A number of incidences involving carriers of petroleum goods have since been reported. This called for a focused concerted approach towards strengthening safety and security aspects related to transportation of POL tankers. Special attention was required for developing preventive, preparedness and mitigation strategies so as to minimize/eliminate the occurrence of such incidences or reducing the post disaster impacts.

The pipeline network is the best mode for transportation of petroleum products especially from the view point of safety and security. It is expected to grow exponentially in the country in near and distant future. To over-view and monitor, as well as provide statutory touch to the safety and security aspects starting from design stage to functioning part, The Government of India has appointed a single window regulator, PNGRB, which has already taken the assigned work in its stride and has issued comprehensive regulation on emergency response and disaster management plan (ERDMP), regulations, 2010. The implementation of the ERDMP shall be monitored directly by PNGRB and violations, if any, shall be viewed seriously by the regulatory board.

The fast growth of pipeline network in the country is a welcome step, however transportation

through POL tankers may continue unabated in the interim period. In fact the volume of traffic may even increase to meet the increasing demand of petroleum products.

During last 18 years, oil companies have taken some pro active actions with regard to training of drivers and creation of awareness among community which has shown good results in minimizing causalities and management of incidences For example, The prompt action of drivers resulted in containing the leakage and averting a major disaster during the overturning of a tanker on Panvel Raigad highway in Jan 2009.

It is necessary not only to continue with the efforts of training and re-training drivers and accelerating public awareness for safe handling during transportation of dangerous goods but also to take corrective measures for improving compliance of statutory provisions, prepare, rehearse and actuate on-site and off-site emergency plans. The plans in first place should be comprehensively prepared to combat exigencies en-route during transportation. This would require all round concerted efforts on the part of regulatory agencies to revisit the regulatory frame work, to identify gaps and prepare action plans to fill the gaps for fail safe transportation. Additionally, the oil companies including all other functionaries engaged in the process of storages, loading and unloading, training and retraining as well as organizing transportation of POL tankers have to strengthen the safety functions and provisions. This will decrease the possibility of failures significantly, and even in-case of any emergency, expert services will be available for immediate response to take care of the causalities for medical aid, relief and in case of need, rehabilitation. The most important part is also identification and role playing of off-site responders under the supervision of the district and state authorities, firstly to prepare effective off-site emergency plans, highway disaster management plan and then to rehearse these regularly to make them effective in case of real emergency.

All the emergency services in the highways and selected other routes which carry maximum POL tankers should be mapped for provision of first aid boxes, communication means with emergency numbers for first responders to respond to emergencies within assigned time lines, which should be fixed and comparable with the best maintained world over.

2.1 Safe and Secure transportation by POL Tankers

The safe and secure transportation of POL tankers require full coordination of all the participating organizations / agencies to overview each and every aspect of safe functioning from the starting point at the consigner place, en route to consignee place.

The active and fail safe functioning of the oil companies as consigner or occupiers, transporters as carriers, statutory agencies like PESO, RTOs, district authorities; priority responders to Off-site emergencies as well as well informed community on the way and highway disaster management authorities with regard to prompt service provision of assistance from police, fire services and medicos pave the way of successful trip of a POL tanker.

2.2 Objective

The objective of strengthening of safety and security of POL tankers can be achieved if all the stakeholders/ service providers developed a mechanism of working in unison and coordination to conform not only to regulations but also to best practices prevalent world over. NDMA in its approach towards disaster management firmly believes that man-made disasters where the activity of transportation of POL tankers falls in, can be very well minimized if prevention and preparedness practices are adopted to a level of leaving no chance of slippage. This would be possible by firming up the regulations, setting up of mechanism of strict conformation, as well as fail safe functioning by each role player.

3. Existing Regulatory Framework

Comprehensive regulations are in place for controlling transportation of dangerous and hazardous goods. Transportation of POL tankers are also statutorily managed by elaborate and strict regulatory frame work. Some of these are contained under the following acts/ rules discussed below in regulation section.

3.1 Regulations

Environment Protection Act, 1986	Applicability of PLI for occupier/ transporter
Manufacture, storage and import of hazardous chemicals rules, 1989 and amendments 1994 and 2001	MSDS provisions, Compatibility of chemicals, On/Off-Site Emergency Plans, Safety Reports and Safety Audit, notification of major accidents, disclosure of the information. Import of hazardous chemicals, importer ensuring that transport of hazardous chemical from port of entry to the ultimate destination is in accordance with the provisions of the CMV rules 1989 and amendments framed under MV act 1988
Hazardous wastes (Management, handling and trans boundary movement) Rules, 2008)	Manifest system and analysis of hazardous waste for compatibility, trans boundary movement provisions. The transportation of hazardous waste shall be in accordance with these rules and the rules made by the central governments under MV act

	1988 and other guidelines issued from time to time, information to be furnished regarding notification of a major accident (rule 5 (1))
The Petroleum Act, 1934; Petroleum Rules 1976 and amendments	Approval, Supervision, Monitoring and Over viewing Provisions especially as vested with PESO (discussed below) for the transport of the petroleum products on land by vehicles approved on tank vehicles , capacity etc.
Indian Explosives Act, 1983 (Amended 1984); Gas Cylinder Rules, 1981 The Static and Mobile Pressure Vessels (Unfired) Rules, 1981	-do-
Central Motor Vehicles Act Central Motor Vehicles Rules, 1989: Amendments 2001 and 2009	Nodal enactment of transportation of goods of dangerous or hazardous nature to human life. List of hazardous goods and applicability of Rules 129 to 137 as well as duties and responsibilities of RTOs during movement in states, chapter 11, and rule nine provides for education qualifications for drivers of goods carriages carrying dangerous or hazardous goods.
The Factories Act - 1948 and amendments	Responsibility of the occupier, right to information, (under sch 41-B compulsory discloser of information by the occupier), (under chapter IV –A on provisions relating to hazardous processes) and information & education to community etc., as vested with Chief Inspectorate of Factories

Oil Industry Safety Directorate (OISD)	Standards setup for transportation, preparation and management of emergency plans. OISD-STD- 159 (LPG Tank Trucks: requirements of safety on design/fabrication and fittings), 160 (Protection fittings mounted on existing LPG tank trucks) ,167 (Tank lorry design and safety) etc
National Disaster Management Guidelines –Chemical Disaster Management	On-site/Off-Site plans linkages, Highway disaster management planning, harmonizing existing crisis management with disaster management functionaries, comprehensive medical management planning for chemical emergencies
National Disaster Management Guidelines- Chemical (Terrorism) Disaster Management	Security provisions at the consigner, consignee place and during transportation. Secured information sharing between local intelligence gathering and occupier for preventive counter-terrorism strategies.

3.2 Role of various governmental functionaries and oil companies

Statutory agencies assigned with the work of approvals, supervision monitoring and over viewing satisfactory conformation of the above regulations is different in different states. Most importantly, safety aspects of design and fabrication of POL tankers are very well provided under Petroleum Act/ Rules as well as under the guidelines issued by OISD. The main functionaries under regulations for transportation of POL tankers are primarily the consigners-oil companies, the transporters and the consignee – connected with oil businesses. The statutory backup is provided by PESO functionaries, RTOs and district authorities. District Collector continues to be off-site emergency area commander and off-site disaster management plan has to function with the help of primary responders-police, fire and medical services supported by other emergency support functions.

3.2.1 PESO

PESO is the statutory agency for approval of design of tankers and the competent persons appointed by PESO certifies the POL tankers for compatibility with design features. In PESO, chief controller of explosives in Nagpur is the nodal authority (network of joint and deputy controllers in various metropolis and industrial hubs in the country) for approving safety features provided in hazardous industries for storage and handling of hazardous chemicals. PESO is working through its regional offices in various states. Responsibility of PESO in revalidation of approvals is also vital for continued stability and robustness of the tanker bodies linked with the corresponding responsibility of consigners/ transporters in checking the soundness of the vehicles and the tankers. In addition these companies have to ensure training / re-training of the drivers which is the integral components of statutory responsibilities (as entrusted by law) for these companies

3.2.2 Regional Transport Officers

Central Motor Vehicle Rules, 1989 and subsequent amendments have detailed specifications/ regulations for road transportation of hazardous material/ dangerous goods. These are implemented through RTOs in various states. Transportation of POL tankers falls under CMVR Rules and therefore the nodal authority for monitoring; over viewing as well as organizing emergency assistance and rehabilitation are regional transportation officers at district / states. The coordination among each of these officers is paramount in sensitizing and activating other state / district authorities who are part of state / district 'off-site` emergency management plan that is being extended to Highway 'off-site` emergency management plan.

3.2.3 Central Ministries /Authorities /Departments

The central authorities belonging to Ministry of Environment and Forests, Ministry of Petroleum and Natural Gas, Ministry of Surface Transport and Highways continue to be nodal and expert authorities with regard to transportation of POL tankers where highly inflammable substances are transported from one place to another.

3.3 Existing Operational Mechanism of Transportation

There are number of regulations and different stakeholders operating / controlling the operations of transportation of petroleum products from consigner place to consignee place. The petroleum products, under the Petroleum Rules, 1976 are transported on road in a well

designed petroleum road tankers (as approved by the Chief Controller of Explosives as per in accordance with third schedule of petroleum rules). POL tankers are arranged by a oil company from a fleet of dedicated transport (self owned) or from a transporter who supplies the vehicle and enters into obligatory contract with the oil company to take responsibilities of safe and secured transportation from the consigners place (place of loading) – to the consignees place (destination). All safety provisions/ gadgets and compliances according to the CMV rules are the responsibility of the consigner. It is obligatory on the part of consigner to check all the oil tankers before dispatch either owned by consigner themselves or hired through the transporter under the contractual obligation.

The responsibilities of all the statutory authorities are well defined but in practice these are executed by the consigner who owns the products until delivered. The consigner also has the overall responsibility to ensure that POL tankers engaged in service meet all specified safety and security norms besides making the driving crew fully conversant with the product safety data as well as safety features conforming to CMV rules, 128 to 137, exclusively pertaining to transportation of goods of hazardous nature to human life. The existing operational mechanism for transportation of petroleum products is diagrammatically represented as follows (Figure 1):

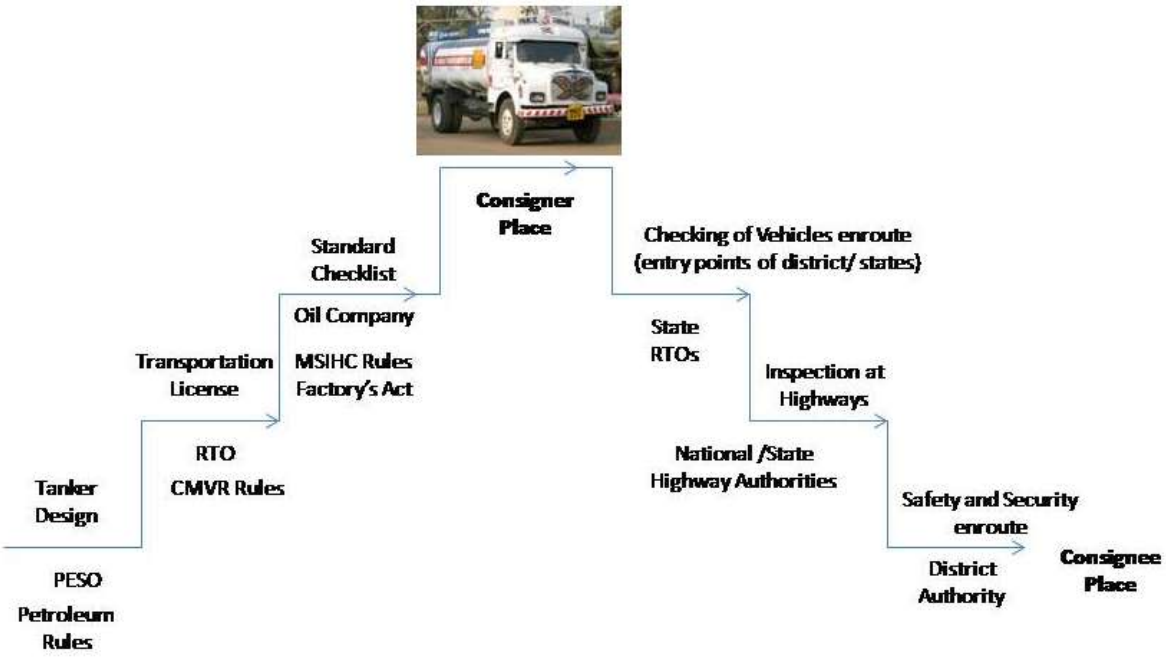

Figure 1: Operational mechanism of transportation through POL tankers

The consigner takes an insurance cover under public liability Insurance act 1992, and rules made there under in 1993. It is observed that the responsibilities of the transporters are not well defined for him to share full or part of responsibility in case of an adverse incidents en-route to consignee's place. GPS , VTS systems for vehicle tracking are normally followed along with on line monitoring of the transfer of the products at the consignee's place by the consigner, yet unsafe operations at the time of loading and unloading of products by deliberate putting off control room managed (through DCS) interlocking system at the filling / transfer stages and putting it on manual operations some times for malpractices by interested parties for pilferage of products at different places renders the entire operations including transportation, highly vulnerable to adverse incidences. The existing system is not full proof and there are numerous areas that need improvement which has been discussed in subsequent sections.

4. Gaps

The onus of safe operations of POL tankers generally rest on the oil companies, the consigners and if this is taken on that spirit, the transportation of POL tankers would be safe and secure. Other issues factoring for the safety are significant but solutions would definitely be more satisfactory, if there is improvement in alert level maintenance in oil companies. This shall ensure fail free and safe performance which includes monitoring of timely and satisfactory conformation to the statutory provisions.

Emergency management in the existing transport operations are minimal and has not been well defined or acted upon to bring in help from off-site responders including district authorities spontaneously or in a structured manner. Similarly, the record of revalidation of statutory approvals of the POL tankers as well licensing of drivers deployed for transportation are not very satisfactory which result in a poor linkage of safe and secure operations due to number of identified gaps and lacunae. The existing regulatory framework and operational mechanism for transportation of POL tankers were revisited and gaps were identified to improve thereupon. Some of the important gaps in various critical sectors requiring immediate attention are discussed below.

4.1 Regulatory Framework

The analysis of existing regulatory framework revealed following gaps:

a) More Specific roles and responsibilities of consignor, consignee, transporters, drivers and authorities are required to be addressed.

b) Transport routes for HAZCHEM from the storage site to the delivery point with SOPs for transportation are not defined in detailed manner.

c) The safe stoppage points with the safe parking areas and an appropriate time of transportation are presently not completely indicated in the route plans.

d) The system of communication and training of persons involved

in HAZCHEM transportation are grossly inadequate.

e) Highways are prone to numerous chemical emergencies due to bulk transportation of HAZCHEM but still no appropriate highway DM Plan exists. It needs to be comprehensively addressed specially for road conditions, road signals for speed breakers, diversion, dividers, etc.

f) Modification/ harmonisation of legislations with respect to Disaster Management Act 2005 to reduce the probability of occurrence of chemical transport emergencies are lacking.

g) The awareness material on the specific highways stretches with heavy traffic density of HAZCHEM carriers and other national/state highways is deficient.

h) A national and state-wise directory of chemical/technical experts is not available for ready reference of traffic police and other service providers. It should be like Red Book published by MOEF.

i) Emergency response guidance for first responders and highway DM Plans are not available.

j) Compulsory maintenance of GPS and VTS systems for detailed tracking of the vehicles and proper recording of this should also be maintained and mechanism for periodic checking of proper functioning are not adopted yet

k) The guidance with respect to strict provisions on the part of state governments / district administration to identify specified parking places with full safety and security in their respective areas of control are not available. These places should be available after regular intervals during travel.

4.2 Infrastructure and Capacity Development

The reviewing of operational mechanism of transportation through POL tankers revealed the following gaps in infrastructure and capacity development:

a) PESO functionaries are overburdened with statutory responsibilities and mandates without corresponding manpower and other capacities.

b) RTOs in various states, who have also been working overtime in discharge of responsibilities with regard to all sorts of vehicles engaged in

other activities than transportation of hazardous materials and dangerous goods.

c) The monitoring of POL tankers as well as other hazardous material carriers is very arduous activity for which RTOs are not well equipped with technical gadgets besides not having trained manpower to execute their functions on day to day basis.

d) RTOs especially help in maintaining highest standards of safety in transport vehicles according to the prescribed standards in the CMV rules. Statutory functioning on monitoring and over- viewing transport activities under various other regulations suffer because the area is not isolated for concentrated action / supervision.

e) In spite of comprehensive regulations in place, for POL tankers, side by side for transportation of hazardous materials / dangerous goods, the compliance status is dismal.

f) Responsibilities of transporters are scantly defined and they are not included in the main stream of functioning with regard to up keep of the vehicles, deployment of trained and educated drivers, maintaining dedicated vehicles as well as drivers which most of the time have neither accountability nor are taken on permanent employment for enjoying the comforts and benefits derived from the type of service they are expected to deliver.

4.3 Implementation

Presently road transport is a very weak area under prevention and management of chemical disasters and therefore needs to be adequately addressed by MoST, with MoEF in fine tuning the present legislative frame work. Introduction of fresh rules, guidelines and facilities for the prevention and management of transportation emergencies through a focused approach of all the responders including the community in the proximity of transport routes are also not progressing at the required pace. Based on the identified gaps, the subsequent section provides various recommendations on preparedness / mitigations strategies and implementation mechanism.

5. Recommendations

As a composite exercise for improvements in the safety and security aspects during transportation of POL tankers, responsibility squarely rests on all the stakeholders / service providers. It is well known that many accidents to POL tankers or storage tank farms occur during loading / unloading stages, here static charge also play devastating role and if it is overlooked accidents are bound to take place. Therefore, it is necessary to understand and improve safety aspects during storage, loading and unloading operations before augmentation of safety is considered during transportation as discussed.

5.1 Regulatory Framework

The various provisions need to be included in the existing regulatory framework for enhancing safety and security of the transportation of POL tankers. The organization, PESO is the nodal technical authority in the country approving design and safety features of the POL tankers conforming to specifications under the Petroleum Act. The organization is also engaged in critical evaluation/ approval of submissions made by the industries/ transportations with regard to storage, handling and transportation of other chemicals (list of 684 chemical under MSHC rules). Therefore, it would be beneficial if the functioning of PESO with regard to overall work load it handles in the country is reviewed and if need be the organization is further strengthened by providing additional qualified and technical man power and any other facility requiring up- gradation to provide its services with improved efficiency and time management in the changed scenario of accelerated industrial growth.

(A) Safety Aspects of Storage, Loading and Unloading Operations

Potential Hazards associated with Storages:- Generally tank farms are designed and installed to ensure safe storage of petroleum & other hazardous products. However any disruption/ breakdown poses a great risk to the environment and general public if due care is not taken during operation and maintenance of the tank farms including various manifolds which may prove to be weak safety links in triggering accidents.

a) **Cleaning of the tank:** The cleaning of a tank having contained a flammable material presents specific hazards. If a flammable mixture of vapor and air exists inside a tank, then the introduction of a source of ignition may cause a fire and/or explosion. Appropriate SOPs should be developed and included as a part of safety checklist.

b) **Electrostatic ignition of tank farms**. Electrostatic discharge has long been known as a hazard associated with the handling of petroleum products. The National Fire Protection Association (NFPA) states, in NFPA 77 "Static Electricity", that "Static electrification and the various effects that result from the positive and negative charges so formed may constitute a fire or explosion hazard. The generation of static electricity cannot be prevented absolutely, because its intrinsic origins are present at every interface" but it can be prevented by adopting suggested measures (for implementation) as a part of check list given below:
   a) Putting the tank inside DYKE.
   b) Treatment of base soil of DYKE so that it can prevent mixing of chemical to the subsoil surface and it turning to environment
   c) Fire protection as per NFPA
   d) Operating procedures that prevent oil spills
   e) Control measures installed to prevent a spill
   f) Counter measures to contain clean-up and to mitigate the effects of an oil spill
   g) Proper manual should be prepared to avoid any chemical, mechanical, biological and development of other hazard during cleaning and maintenance work of the storage tanks.

c) **For ensuring safe loading for** transportation**, the following should be provided:**
   a) Leak detection System to check any spillage during loading
   b) Auto alarm system on detecting leakage/ spillage
   c) Auto start of fire fighting system i.e. deluge valve controlled sprinkler system
   d) Interlocking of MOVs with fire alarm system/ leak detection system
   e) Generally the inter locking should not be disturbed for taking the system on the manual operation, if it's done, time and reasons should be recorded
   f) All displays should be in the control room

(B) Design Improvement: promoting new generation tank trucks

New generation vehicles with advanced safety features are available in the market now. Some of the outstanding features of the new generation tank trucks which oil industry has deployed for transportation of petroleum products at select few locations are:

a) Bottom loading facility - Ensures safer filling, less vapor loss/static current or charges and pollution to the environment

b) Vapor recovery system provided on the vehicle not only enhances safety but it also reduces pollution.

c) Over fill protection.

d) Operating valves are pneumatically controlled making the operations more efficient and safer.

e) Emergency shutdown push button cutting off bottom master valves instantly while loading / unloading.

f) Pneumatically controlled instrumentation making the system more reliable

g) Anti Lock Braking System.

h) Camera provided in the driver cabin for viewing rear side of the TT.

i) Crawler gear makes easy maneuvering and prevents slipping.

j) Multi axle chassis with low turning radius.

k) LCD panel with digital speedometer for accuracy of parameters.

l) Self diagnostic tests through ECU.

m) Hydraulic power steering of collapsible type.

n) Multi gears help easy hauling during steep gradients.

From the above, it may be noted that these new generation tank trucks are not only having much superior safety features / gadgets compared to the conventional trucks but are also more efficient as well as cost effective. Incidental releases from them causes less environmental

pollution as compared to existing ones and they would yield higher savings to national exchequer by way of energy conservation. On experimental basis Oil industry is operating approx 4 to 5 TTs of capacities 35/40 KL and performance of the tank trucks has been found satisfactory. In view of the various advantages detailed above, induction of higher capacity new generation vehicles with latest safety features should be encouraged for transportation of POL products. However, prevailing Petroleum Rules, 2002 restrict carrying capacity of petroleum products to maximum of 25 KL Oil Industry has been taking up the matter with the Ministry of Industries for making necessary amendment to Petroleum Rules, 2002 to permit higher capacity tank trucks. Necessary inputs and data sought by the Ministry have already been furnished. The approval should be expedited. Appropriate review of the road conditions should also be undertaken before issuing permits to operate trucks of bigger capacity and therefore at initial stages, only express highways should be considered for permitting higher capacity tank trucks

(C) Bottom Loading: Safer Approach to reduce accidents caused due to static charges

Bottom loading is safer compared to top loading because of reduction in static charge generation. Bottom loading also reduces the vaporization losses. In view of the stated inherent safety features, bottom loading should be promoted for extensive usage. OMCs have already introduced bottom loading facility for volatile products at few select locations. Ministry of Environment & Forests has also made it mandatory to provide bottom loading facility on all tank trucks carrying volatile products through Environmental (Protection) Amendment Rules, 2008. However, the same is not getting implemented as the amendments to that effect have not been made in Petroleum Rules 2002 and CMV rules, 2009.

Provision of bottom loading facility on all tank trucks proposed to be utilized for carrying volatile products needs to be made mandatory through statute for all new as well as existing tank trucks. It must be made compulsory to make necessary modifications to the existing tank trucks also. Suitable amendment in Petroleum Rules 2002 and CMV rules, 2009 must be made to that effect so that bottom loading facility is a prerequisite for issuing / renewing license and should ensure the compliance of Environment (Protection) Amendments Rules, 2008.

(D) Design of Manhole and Bottom fittings – Pilfer proof designs

Analysis of accidents reveals that many times root cause of accidents is tampering with the bottom valve fittings with an intention to pilfer the product. Some oil companies have taken initiatives for implementing tamper proof manhole covers and bottom valve fittings. The top manhole is so designed that the hinges are inside making opening the hinges not possible. Suitable amendments to OISD 167 and petroleum rules, 2002 may be made making it compulsory to adopt pilfer proof design.

(E) Inspection of tank trucks through third party inspecting agencies:

Presently the tank trucks are inspected by transport authorities once in a year for fitness. It is therefore essential that the TTs are checked thoroughly at least once in a year by one of the reputed third party inspecting agencies since the tank trucks are utilized for carrying hazardous petroleum products. Checking should also include opening the manhole cover.

During the analysis of a tank truck accident, it is noted that the fill pipe is short by almost 450 millimeter hort. As per OISD 167, the fill pipe should extend almost upto to the datum and just 25 mm clearance is permitted between the datum plate and tip of the fill pipe. The same should be implemented.

Third Party Inspections must be made mandatory and should form part of the license issued to the tank trucks by PESO. Conditions stipulated while granting / renewing license for the tank truck should contain that the TT shall be inspected by an approved Third Party agency once in a year failing which validity of license ceases. Petroleum Rules, 2002 shall be suitably amended making the Third Party Inspection mandatory for issue / renewal of license. Appropriate penalty clause for non compliance / violation should also to be stipulated.

(F) Vehicle Tracking System (VTS)

Oil and Manufacturing Companies shall implement Vehicle Tracking System (VTS) on all tank trucks for delivered POL supplies for overall monitoring through Global Positioning Satellites (GPS) as per directives from MoP&NG. The vehicle tracking system facilitates tracking movement of the vehicle. Following features are available in the vehicle tracking system:

- Live tracking and ascertaining current position of TT
- Tracking deviation from the standard route
- Tracking of en route unauthorized stoppage

- Tracking of tampering with dome cover and bottom fittings
- Generation of exception reports of all locations by e-mail on daily basis. The main parameters e.g. route deviation and unauthorized halts shall be generated on daily basis by the consigner (IOC) and action taken as per Industry Transport Discipline Guidelines (ITDG)
- Access to all transporters for tracking the vehicles plying in their contract for better fleet management & effective controls over their tank truck crew
- Consignees (Retail Outlet Dealers) shall have password access to VTS website to monitor the movement of their TTs

Necessary amendments in the Petroleum Rules, 2002 and CMV rules, 2009 are required to be made to ensure that all tank trucks shall mandatorily be fitted with VTS.

(G) Antilock Braking System (ABS system)

Antilock Braking System provided on the trucks improves stability of the vehicles and the ABS mechanism protects the tank trucks from skidding / overturning while suddenly applying brakes during emergencies. The Government of India vide Gazette notification 1234, made it mandatory for provision of ABS on tank trucks carrying hazardous goods. According to the Gazette notification dated16.09.2005, all the N2 (Gross Vehicle weight between 3.5 T to 12 T) and N3 (Gross Vehicle weight more than 12 T) category vehicles other than tractor-trailer combination manufactured on and after the Ist day of October 2006, meant for carrying hazardous goods and liquid petroleum gas shall be fitted with Antilock Braking System conforming to IS: 11852 : 2003 (part 9). Applicable date for N3 (Gross Vehicle weight more than 12 T) category vehicles having tractor-trailer combination is on or after the I st day of October 2007.

It has come to the notice of oil companies that the transporters are not disclosing the purpose for which the chassis is purchased at the time of purchase and a regular chassis without ABS is bought by declaring the utility as transportation of general goods. Subsequently, tank is mounted and necessary approvals / licenses are taken from PESO and other statutory bodies. The loop hole should be plugged by amending petroleum and CMV rules so that the transporters are forced to comply with the mandatory requirement. Otherwise, it should be mentioned that license from PESO would not be granted.

Suitable penal clauses should also be incorporated for violation of the statutory requirement. Implementing authorities responsible under M V Act must ensure that the vehicle owners strictly comply with the regulation pertaining to provision of ABS on vehicles.

(H) Tank Truck Crew:

Tank truck crew play a vital role in the transportation of POL products. It is essential that the following minimum standards are stipulated and made mandatory with respect to educational qualifications and physical fitness for the TT crew:

a. Minimum qualifications
b. Mandatory Health check up including check up of eye sight
c. Training to TT crew
d. Experience of driver with normal goods or hazchem, if any
e. Certification of driver's profiled to hazchem based on authorized agency's recommended tests

Majority of the transportation of POL products is carried out through contractor tank trucks. While the OMCs take care of the health check ups and medical requirements of tank truck of the company owned TTs. In case of private TTs, it is the responsibility of the transport contractor for the crew engaged by them.

Necessary mechanism has also to be put in place to ensure that Medical facilities like ESI coverage etc., are properly extended to all contractor crew. A database of registered drivers and other tank truck crew of POL tankers should be developed / maintained. A certification course should be developed to identify qualified drivers with skills to undertake this responsibility.

5.2 Oil Companies

Oil companies have to formulate a failsafe mechanism of check listing of each regulation when starting the procedure of loading petroleum products in the tankers.

- As already covered, it is essential to maintain the basic principle of safety that the system should not be bypassed with regard to interlocking of various operations, as well as converting the operations to manual mode from remote operations or from control room operations without assigning / recording reasons thereof.

- The oil companies should ensure that on-line monitoring of transfer of products at the consignee's place is maintained at the consigner place, especially with regard to earthing provisions of the vehicle so that there is no static charge that can create spark and explode the vehicle or consignee place which also has stored petroleum products.

5.3 Regional Transport Officers (RTOs)

The primary responsibility of RTOs is to ensure compliance status of rules under CMV from 129-137 for which a check list should be duly signed by officer on duty and also signed by driver for ready reference. The other recommendations include:

a) Operationalising and harmonizing network responsibility during transportation by POL tankers with the help of uninterrupted records of VTS and GPS available to them.

b) To organize safe parking areas in their jurisdiction regions which is very important from security point-of-view as well

c) Possession and checking of transport approvals by transport authorities

d) Tracing of any loss of GPS /VTS signal based on notification by consigner to ensure that the vehicle is safe and back to main route

RTOs shall remain nodal authorities

RTOs are nodal point for information exchange of any change in route due to natural hazards or congestion of traffic. If the vehicle is not traceable for more than six hours, the primary responders including police, fire and medicos should be alerted through emergency information and alert signals as planned.

a) To ensure that vehicle passing through the district 'A' should be pre-informed to district 'B' in receiving or in point of crossing.

b) To coordinate with all the oil companies in their sectoral region such that during emergencies, their emergency plan can be activated.

c) For activation, off-site emergency plan (notification of accident) should ideally be initiated at this juncture itself.

The new amendments to develop a format for 'Off-Site Link Plan' for transportation through POL tankers should be included in the given Petroleum rules.

5.4 District Authorities

District authorities have been mandated under DM Act to ensure disaster prevention, preparedness and mitigation / response activities in their respective sectors. The responsibilities envisaged to them through national guidelines released by NDMA and included under MSIHC rules to develop Off-Site emergency plans for POL tankers as a component of Chemical Disaster Management Plan of the District. This should be based on consultative and participatory approach involving all the stakeholders mentioned above especially oil companies, RTOs and Regional Controller of Explosives in their states. The plan should complement highway disaster management plan and also in line with transportation emergency preparedness through single window approach recommended and discussed in subsequent section.

6. Mechanism for Implementation

The present section describes the model to implement the existing regulations and recommendations as guidance directives discussed in previous section.

6.1 Single Window Approach

It is the considered opinion of experts that the area of command of transportation of POL tankers, which has very large dimension of functioning in the country (long distance travel of highly inflammable goods on highways side by side with all other type of transportation vehicles) require single window control mechanism which can only be provided by a high powered regulator on the similar lines as regulators function for telecom, power distribution, pipeline network etc.

Petroleum and Natural Gas Regulatory Board (PNGRB) based on their existing mandate and statutory backup shall work as a regulator. PNGRB shall coordinate, monitor and ensure the implementation of rules, regulations and SOPs for POL tankers. It should develop an adequate mechanism to put up a check on functioning of various stakeholders / service providers with respect to safety and security aspects of PoL Tankers. Some of the salient features of the Act are given below:

a) Petroleum & Natural Gas Regulatory Board Act, 2006 enacted through Parliament on 31st March, 2006 to provide for the establishment of Petroleum & Natural Gas Regulatory Board(PNGRB) to regulate the refining, processing, storage, ***transportation,*** distribution, marketing and sale of petroleum, petroleum products and natural gas excluding production of crude oil and natural gas so as to protect the interest of consumers and entities engaged in specified activities relating to petroleum, petroleum products and natural gas and to ensure uninterrupted and adequate supply of petroleum, petroleum products and natural gas in all parts of the country and to promote

competitive markets and for matters connected therewith or incidental thereto.

b) As per Section 11(i) of the PNGRB Act, 2006, PNGRB shall lay down, by regulations, the technical standards and specifications including safety standards in activities relating to petroleum, petroleum products and natural gas, including the construction and operation of pipelines and infrastructure projects related to downstream petroleum and natural gas.

Petroleum and Natural Gas Regulatory Board (PNGRB) shall coordinate, monitor and ensure implementation of the following activities:

1. Infrastructural requirements to upgrade the transportation of POL tankers will be identified with respective stakeholders and developed thereupon.
2. Training and retraining of various stakeholders /service providers based on module(s) defined by respective ministries/ departments/industries/institutions and duly approved by PNGRB for necessary compliance.
3. A list of various institutions defined under the arrangements of oil companies; DGFASLI, Ministry of Labor (MoL); PESO, Ministry of Industry; Transport Departments of States / District; Safety Institutions; National /State Highway Disaster Management Authorities; District /State Disaster Management Authorities; and other Ministries /Departments concerned shall be developed as a comprehensive database. The functions of such institutions shall be coordinated in task-oriented manner pertaining to Safety and Security of POL tankers.
4. Preventive Approach towards designing, approval, monitoring, over viewing by PESO; implementation of Emergency Response and Disaster Management Plan (ERDMP); safety and security aspects from the place of loading to destination {consigner to consignee place} shall be complied with adequate mechanisms by RTOs. The proper implementation of such mechanisms shall be monitored by PNGRB.
5. The implementations of suggested modifications / development of rules and regulations (as given in

Section 5.1) regarding – a) Safety aspects of storage, loading and unloading operations; b) Design improvement : promoting new generation tank trucks; c) Bottom loading: safer approach to reduce accidents caused due to static charges; d) Design of manhole and bottom fittings; e) Inspection of tank trucks through third party inspecting agencies; f) Vehicle Tracking System (VTS); g) Anti-lock Braking System (ABS System) and; h) Tank Truck Crew shall be complied.

6. The up gradation of monitoring and ensuring implementation of all safety and security aspects pertaining to oil companies, regional transport officers and district authorities as per existing rules and regulations as well as the recommendations given in previous section shall be complied by the suggested high powered regulator.
7. The district authorities in consultation with oil companies and other stakeholders shall develop 'Off-Site Plans` for various critical points identified on the route of POL tankers in their respective areas. The role of other emergency functionaries and oil companies with technical manpower to respond to such situations shall be included in these plans. These plans so developed shall be tested by respective authorities through mock exercises under the active monitoring of PNGRB.
8. Oil industry ought to review, standardize and strengthen the provisions of safety and security in the contract agreements of POL transporters. As a commercial and legal agreement, a contract is an effective tool to achieve implementation of best practices which go beyond the statutory compliance. The regulator shall overview the implementation of this mechanism at the ground level.

The overall preparedness approach discussed in subsequent paragraphs shall be complied through a systematic mechanism to be laid down by PNGRB itself.

6.2 Preventive and Preparedness Approach

Transportation Disaster Management Planning requires resource mobilization for road transport emergency (Taken from

PNGRB notification GSR39 (e) on codes of practices for emergency response and disaster management plan ERDMP regulation 2010) as an important aspect. The road transport of Petroleum product has significant presence and needs special attention. Complete details of treatment for handling emergency arising out of road transportation have been provided below:

6.2.1 Resource mobilization for road transport emergency

Resource mobilization for road emergency shall be as per the schedule-viii.

a. In order to handle emergencies, which may arise due to incident involving Petroleum Product Transportation, it is required that a comprehensive Emergency Management Plan is readily available with the industry as well as with other related authorities all along the routes. The ERDMP should be clearly understood by its users so that the emergencies can be handled in a systematic manner with minimum response time in accordance with the prescribed procedure.
b. Copies of the ERDMP shall be made available by the industry to all the field locations i.e. installations, POL Depots. Terminals/ Installation, Refineries , Gas Processing Plants, Dispatch units etc, concerned District Administration, Police Station, Fire Brigades en-route and within vicinity of specified tank truck routes , oil industry sales personnel of concerned area as may be required.
c. Location specific availability of Emergency Response Vehicle shall be mentioned in the ERDMP.

6.2.2 TREM Card (Specific to Road Transportation)

TREM Card format including sample as per details shown in Schedule-ix and Route Map shall be provided to the tank, truck, crew which should be referred in case of an emergency.

6.2.3 District Administration

On receipt of information, District Administration may take the following actions as per Schedule – V, derived from the National Disaster Management Guidelines Chemical Disasters (Industrial) Disaster Management (2007). The important aspects include:

a. To keep watch on the overall situation.
b. To rush ambulance to the incident site if casualties are reported.

c. To direct cranes or any other such equipment to carry out rescue operations.
d. To issue warning messages to people through public address system, if any evacuation is required.
e. To arrange emergency vehicles for evacuation purposes.
f. To provide basic amenities, e.g. , water, electricity, food and shelter to the affected people as required.

The other provisions under ERDMP notified by PNGRB should also be followed in strict conformity. The foremost requirement is to define responsibilities under emergency response disaster management plan (ERDMP) for transportation of POL tankers for i) District authority (ii) Police (iii) Fire service (iv) Revenue department (for coordination with other agencies for evacuation, establishment of shelters and provision of food etc v) Department of transport (for the evacuation purpose) (vi) Health department (for immediate medical attention on the site as well as in the hospitals / health care facilities) (vii) Pollution control boards (for ascertaining severity of the emergency) (viii) NDRF and SDRF (Specialized forces to manage the emergencies)

7. Annexures

Annexure 1

List of representatives of ministries/departments and oil companies actively deliberated on Safety and Security of POL tankers

SNo.	Name	Designation	Organization
1.	Lt Gen (Dr) Bhardwaj	Hon'ble Member	NDMA
2.	Lt. Col (Retd) S Verma	Vice President	Reliance Industries Ltd
3.	Mr. Manu Sharma	Addl. Manager (Fire & Safety)	Indraprastha Gas Ltd
4.	Dr. S Kamal	Dy. Chief Controller of Explosive	PESO, Faridabad
5.	Mr. Surender Kumar	Advisor	FICCI
6.	Mr. B S Negi	Member (J)	PNGRB
7.	Mr. Rajnath Ram	JA (D), PNGRB	PNGRB
8.	Mr. K Muralidharan	President & Coordinator	Reliance Industries Ltd
9.	Mr. RK Kashyap	Executive Director	GAIL (India) Ltd
10.	Mr. Manhas	Manager (HSC)	GAIL (India) Ltd
11.	Mr. Anand Prakash	Director (Road Transport)	Ministry of Road Transport & Highways
12.	Mr. KC Gupta	Director General (Retd)	National SAFETY Council
13.	Mr. M T Simon George	Chief Manager (Fire & Safety	BPCL Kochi Refinery
14.	Mr. SP Maniktala	Sr. Manager (Health and Safety Security & Environment)	BPCL

15. Mr. Aditya Singhal	Chief LPG Manager Northern Region	IOCL
16. Mr. SS Mishra	General Manager (Ops)	IOCL
17. Mr. S Ray	Controller of Explosive	PESO
18. Dr. R K Sharma	Head, CBRN Defence	INMAS, DRDO
19. Mr. KS Rao	Sr. Manager Operations	HPCL
20. Mr. HC Mehta	General Manager O&D	HPCL
21. Mr. A Misrha	Director	OISD
22. Dr. Raman Chawla	Scientist 'C'	INMAS, DRDO
23. Capt. H Khat	Deputy Director General (Tech)	Director General Shipping
24. Mr. Surender Kumar Verma	Sr. Astt. Director	FICCI
25. Dr. Jayakumar	Sr. Specialist	NDMA
26. Dr. Rakesh Dubey	Director	Disaster Mitigation Institute, Bhopal

Annexure II

Core Group for Strengthening of Safety and Security for Transportation of POL Tankers

S.No	Name	Designation/ Organization	Core Group
1	Lt Gen (Dr) J. R. Bhardwaj	Hon'ble Member, NDMA	Chairman
2	Dr. Rakesh Dubey	Director DMI	Coordinator
3	Mr. S. P Manitala	Senior Manager (HSC) BPCL	Member
4	Mr. H. C Mehta	GM, HPCL	-do-
5	Mr. Ambrish Mishra	Director, OSID	-do-
6	Mr. Anand Prakesh	Director, MoRTS	-do-
7	Mr. K.C Gupta	Former DG NSC	-do-
8	Mr. Surendra Kumar	Consultant, FICCI	-do-
9	Dr. Raman Chawla	Scientist, CBRN Defence, INMAS, DRDO	-do-
10	Dr. Jayakumar C	Senior Specialist, NDMA	-do-
11	Representatives of RIL, multinational companies Shell & Petronet	Names to be received	-do-

Contact Us

For more information on these Guidelines for Minimum Standards of Water Supply,

Please contact:

Lt Gen (Dr.) J.R. Bhardwaj

PVSM, AVSM, VSM, PHS (Retd)

MD DCP PhD FICP FAMS FRC Path (London)

Member,

National Disaster Management Authority

Centaur Hotel, (Near IGI Airport)

New Delhi-110 037

Tel: (011) 25655004

Fax: (011) 25655028

Email: jrbhardwaj@ndma.gov.in; jrb2600@gmail.com

Web: www.ndma.gov.in