Training Report

Capacity Building Program on Emergency Response and Disaster Management Plan (ERDMP)

A Joint Initiative of Petroleum and Natural Gas Regulatory Board (PNBRG) and Gujarat Institute of Disaster Management (GIDM), Government of Gujarat

06-08 January2026

Enhancing Safety, Preparedness and Capacity in India's Oil and Gas Sector

BACKGROUND

A three-day capacity-building programme on the Emergency Response and Disaster Management Plan (ERDMP) was jointly conducted by the Petroleum and Natural Gas Regulatory Board (PNGRB) and the Gujarat Institute of Disaster Management (GIDM) at the GIDM campus in Gandhinagar from 06 to 08 January 2026. The programme was organized under the existing Memorandum of Understanding (MoU) between PNGRB and GIDM, with the objective of enhancing safety consciousness, emergency readiness, and institutional resilience across India's oil and gas value chain.

The programme formed part of a broader national effort to strengthen institutional and technical capacities in emergency response and disaster risk management within the energy sector. In the context of the growing scale and operational complexity of oil and gas infrastructure, emphasis was placed on systematic emergency planning, effective coordination among concerned agencies, and strict adherence to PNGRB's ERDMP Regulations, 2010, to ensure robust preparedness and response mechanisms.

A total of 29 participants representing public sector undertakings (PSUs), refineries, oil and gas companies, city gas distribution networks, and safety and environment departments participated in the programme. Through expert-led sessions, case discussions, and table-top exercises, participants enhanced their understanding of risk assessment, hazard identification, emergency response systems, and resilience-building measures. The programme provided a comprehensive platform for knowledge sharing, practical learning, and alignment with national regulatory requirements and internationally accepted best practices in disaster management for the oil and gas sector.

The detailed programme note along with the participant list is enclosed herewith. **Annexure- 1** and **Annexure-2**, respectively.

WELCOME ADDRESS

The inaugural session of the three-day (**Capacity Building Program on Emergency Response and Disaster Management Plan, ERDMP)** began with a warm welcome by the (**Gujarat Institute of Disaster Management, GIDM)** team on **06th January 2026** at the GIDM Campus, Gandhinagar. Representatives from GIDM extended greetings to all dignitaries, expert speakers and participants, outlining the objectives of the program and emphasizing its importance in strengthening disaster preparedness and emergency response capacities in the oil and gas sector. Participants were encouraged to make the most of the interactive sessions and share their professional experiences to enrich collective learning.

Following this, **Mr. Gagan Agarwal, Dy. Director (Technical), Petroleum and Natural Gas Regulatory Board (PNGRB)**, addressed the gathering and delivered the **welcome address** virtually. In his remarks, Mr. Agarwal extended his warm greetings to all participants and highlighted the significance of this joint initiative under the MoU between PNGRB and GIDM. He noted that India's rapidly expanding oil and gas infrastructure brings both immense growth potential and heightened safety challenges, underscoring the critical importance of structured preparedness, trained manpower, and coordinated response mechanisms.

Mr. Agarwal elaborated on the role of **PNGRB's ERDMP Regulations, 2010**, describing them as a vital framework for ensuring safety, resilience, and sustainability across petroleum and natural gas operations. He emphasized that ERDMP should be viewed not merely as a compliance document but as a dynamic and evolving mechanism to safeguard lives, protect

assets, and ensure business continuity. Encouraging active participation, he urged all attendees to engage in discussions, share field experiences, and apply the lessons learned to

strengthen safety culture and emergency readiness within their respective organizations.

SESSION PROCEEDINGS AND KEY HIGHLIGHTS

Session 1: Understanding Disaster Risk Management and Current Trends

The first technical session of the programme was delivered by **Mr. Nisarg Dave, Director (Disaster Management), GIDM**. This session offered a detailed perspective on the principles, frameworks, and emerging developments in Disaster Risk Management (DRM), with particular emphasis on their relevance to the oil and gas sector.

Mr. Dave commenced the session by explaining the core elements of hazard, vulnerability, exposure, capacity, and risk, and demonstrated how their interaction shapes disaster outcomes. He then presented an overview of the Disaster Management Act, 2005, including its 2025 Amendment, and explained the institutional mechanisms and functional arrangements governing disaster management in India. The session also covered the Sendai Framework for Disaster Risk Reduction (2015–2030) and the Hon'ble Prime Minister's 10-Point Agenda on DRR, clearly linking these international and national policy frameworks to safety and preparedness obligations within the energy sector. Using data from CRED 2025 and UNDRR, the presentation highlighted global and Indian disaster patterns, noting a significant rise in climate-induced events such as extreme rainfall, heatwaves, and increased cyclonic activity in

the Arabian Sea and the Indian Ocean region. Mr. Dave elaborated on how these evolving hazard trends intensify risks to the petroleum and natural gas industry, particularly NaTech (Natural Hazard–Triggered Technological) incidents including pipeline failures, fires, and chemical releases. He demonstrated how natural events can lead to cascading technological accidents, underscoring the importance of incorporating climate risk considerations, early warning mechanisms, and resilient infrastructure into ERDMP planning. The session concluded with a strong emphasis on proactive risk reduction and preparedness as the most


economical and effective means of reducing the impacts of industrial disasters

Sessions 2: International Best Practices in Emergency Management

Shri Dixit Chauhan, Safety Expert, underscored the importance of aligning current industrial emergency management practices with globally accepted regulatory frameworks such as the EU's SEVESO-III Directive, the UK's COMAH regulations, and the USA's OSHA Process Safety Management system to strengthen safety performance and reduce the likelihood of major industrial accidents. Referring to landmark incidents such as Seveso, Flixborough, and Bhopal, he explained how failures in leadership, early warning recognition, and structured emergency planning led to the evolution of robust international standards. He emphasized that these frameworks mandate identification of major accident hazards, formulation of a Major Accident Prevention Policy (MAPP), establishment of comprehensive Safety Management Systems, and transparent communication of hazardous substance information to nearby communities. Such practices, he noted, not only enhance compliance with Indian regulatory requirements but also build public trust and community preparedness.

Mr. Chauhan highlighted that a well-prepared Pre-Incident Plan is a critical component of effective emergency management, enabling industries to systematically identify credible worst-case scenarios, define preventive and mitigative barriers, and prepare responders before an incident occurs. He explained that these plans support first responders by ensuring command clarity, rapid mobilization of resources, and coordinated action through systems such as the Incident Command System (ICS). The session also emphasized the growing role of technology as an enabler of emergency preparedness, with discussions on the application of AI-based sensors, predictive analytics, drones, robotics, and digital decision-support systems for early warning, real-time situational awareness, and informed decision-making under stress. In his concluding remarks, Mr. Chauhan stressed that every employee must understand potential failure scenarios within their operational area, recognize weak signals early, and appreciate how safety barriers function. He concluded by highlighting that maintaining the integrity and effectiveness of these barriers, supported by strong leadership and practiced systems, is essential for preventing major incidents and chemical disasters.

Sessions 3 & 4: Introduction to PNGRB's ERDMP Framework and Learning from Real-World Good Practices

The post-lunch technical sessions on Day 1 were conducted by **Shri Hirak Dutta, Expert Advisor, Petroleum and Natural Gas Regulatory Board (PNGRB)**, and former Executive Director, Oil Industry Safety Directorate (OISD). Adopting a strongly case study–driven approach, Shri Dutta explained the conceptual foundations as well as the practical implementation of the Emergency Response and Disaster Management Plan (ERDMP) in high-risk oil and gas operations. His sessions emphasized bridging the gap between regulatory intent and on-ground execution by integrating disaster risk reduction principles with operational safety, emergency preparedness, and response planning.

Shri Dutta presented detailed analyses of major industrial incidents, including the Styrene Gas Leak at LG Polymers, Visakhapatnam (2020), the Jaipur IOC Terminal Fire (2009), and the Tatipaka Natural Gas Pipeline Leak and Explosion. Through these real-world examples, he illustrated how disasters often evolve from weak signals such as corrosion, abnormal

operating conditions, ageing assets, and deviations from standard operating procedures that remain unaddressed over time. He highlighted that delayed isolation, inadequate emergency drills, poor communication, and lack of coordination frequently contribute to escalation and magnification of consequences. A key focus of the session was the role of Quantitative Risk ssessment (QRA) as a critical element of ERDMP. Shri Dutta explained that systematic QRA enables identification and quantification of credible accident scenarios, including fire, explosion, and toxic release events, by assessing failure probabilities, leak frequencies, and escalation pathways. Using case examples, he demonstrated how effective QRA could have highlighted risks related to internal and external corrosion, equipment integrity failures, valve operability issues, and third-party damage, thereby enabling timely preventive and mitigative actions.

He further emphasized that QRA should not be treated as a one-time compliance exercise but as a dynamic decision-support tool that informs design choices, maintenance planning, emergency response strategies, and resource allocation. The session also highlighted the

importance of integrating QRA outcomes with ERDMP components such as emergency organization structures, incident response systems, isolation and evacuation procedures, mutual aid arrangements, and regular mock drills.

The discussions reinforced that robust emergency preparedness depends on strong safety management systems, trained personnel, effective communication mechanisms, and continuous learning from past incidents. Shri Dutta concluded by stressing that proactive risk identification, disciplined operations, and effective implementation of ERDMP provisions are essential to preventing escalation of incidents and minimizing loss of life, property, and environmental damage in the oil and gas sector.

The first day of the programme concluded with a series of well-structured technical sessions led by experts from GIDM, PNGRB, and the oil and gas industry. The sessions enhanced participants' understanding of disaster risk management, emergency leadership, ERDMP regulations, and international best practices. Through case studies of major industrial incidents, participants gained practical insights into risk assessment, early warning signals, and escalation control. The discussions emphasized the importance of preparedness, coordination, and proactive safety management. Overall, the sessions were interactive, application-oriented, and well appreciated by the participants.

Day 2 of the training programme began with a technical session on "Learning from Near Miss Reporting," establishing the direction for a day centered on practical PSU case examples, experience-based learning, and leadership during emergency situations. The session was structured to reinforce the core concepts discussed on Day 1 and to enable participants to appreciate how progressive practices, emerging technologies, and strong organizational leadership can strengthen the effective implementation of the ERDMP framework.

Session 5 & 6: Learning from Near-Miss Reporting and Scenario Based Group Work: Quantitative Risk Assessment

During the session, **Mr. Prakash Dashputre, HSE Expert**, focused on the importance of organizational learning from early failure indicators, with particular emphasis on a strong

Near-Miss Reporting mechanism. He contextualized this need through real-life Public Sector Undertaking (PSU) examples, notably the Indian Oil refinery fire at Koyali on 4 August 1995. The incident led to the loss of two large storage tanks, major financial damage to IOCL, prolonged production shutdowns due to safety concerns, and serious environmental impacts involving air emissions and soil and water contamination. Using this case, Mr. Dashputre explained that while major accidents usually trigger immediate reviews of safety systems, it is often the smaller warning signals and near-miss events that provide the earliest opportunity for prevention. Capturing, analysing, and acting upon these signals was highlighted as a cornerstone of proactive safety management.

He further explained systematic approaches for investigating near-miss and incident data, highlighting structured Root Cause Analysis techniques such as Bowtie Analysis and Fault Tree Analysis. Bowtie Analysis was described as a visual risk assessment tool that links hazards, threats, the central event, and potential consequences, while clearly mapping preventive and mitigation barriers on either side. Fault Tree Analysis was presented as a deductive, top-down method that uses logical gates to trace how combinations of failures can lead to an undesirable event. These methodologies, when applied effectively, help identify weak points in systems, understand complex hazard pathways, and design robust control measures.

Mr. Dashputre also stressed that effective learning from near-misses goes beyond technical tools and requires addressing organizational systems and human factors. He emphasized the

need for a non-punitive reporting culture that encourages openness, trust, and continuous improvement. The session also highlighted behavioural aspects of safety, including training, risk perception, workforce competence, supervision of field activities, legal compliance, and administrative controls. He concluded by noting that understanding human behaviour, cognitive limitations, and workplace culture is essential for building resilient safety systems capable of preventing major industrial accidents.

Session 7: Industrial Emergency Management and Lessons Learned

The session was conducted by **Mr. Rajesh Nigam, Former Executive Director, Indian Oil Corporation Ltd.** focused on deriving practical operational and regulatory insights from real industrial emergency situations in the oil and gas sector. The session commenced with a structured presentation of a major industrial incident, tracing the chronology of events, response actions taken at various stages, and the consequent impacts on human safety, assets, and the environment. This case-based introduction helped participants clearly understand the dynamics and challenges of managing emergencies in complex industrial environments. The session examined the effectiveness of Emergency Response and Disaster Management Plan (ERDMP) implementation across key phases, including preparedness, response, coordination, communication, and post-incident recovery. Particular attention was given to the roles of on-site and off-site agencies, clarity of command structures, decision-making under pressure, and the adequacy of communication systems during crisis situations.

Further discussions identified critical gaps observed during the incident, especially in risk assessment practices, availability and deployment of resources, training levels, and compliance with regulatory requirements. Participants analysed how weaknesses in hazard identification, emergency planning, and monitoring systems contributed to escalation of the event.

The session concluded with key learnings focused on preventing recurrence of similar incidents. Emphasis was placed on strengthening ERDMP planning, improving inter-agency coordination, enhancing workforce competency, and ensuring strict regulatory compliance. The session reinforced the importance of continuous learning, regular drills, and resilience-focused design to improve emergency preparedness and facility-level resilience.

Session 8: Advance Interpretation of Pre-Emergency Planning and (Reg.: 10) Emergency Response Measures (Reg.: 13) under PNGRB ERDMP Regulation 2010

The session was delivered by **Dr. Rakesh Dubey, Former Director, Disaster Management Institute (DMI), Bhopal.** The session focused on explaining the regulatory intent and practical application of emergency management requirements in the oil and gas sector in a clear and structured manner. Dr. Dubey explained the importance of pre-emergency planning, emphasizing proper hazard identification, realistic emergency scenarios, availability of resources, and preparedness measures to prevent escalation of incidents.

The interpretation of Regulation 13 covered emergency response actions across Level 1, Level 2, and Level 3 emergencies. Participants were guided on decision-making protocols, roles and responsibilities, communication flow, and escalation criteria.

The session discussed response strategies for fires, gas leaks, explosions, and pipeline incidents, highlighting timely isolation, firefighting, evacuation, and coordination with district authorities and external agencies. Special focus was given to Emergency Control Centre (ECC) operations, including command and control functions, information management, and documentation during emergencies. The importance of inter-agency coordination and mutual aid arrangements was emphasized to ensure effective response during major incidents. The session also addressed post-incident activities such as root-cause analysis, regulatory reporting, and corrective actions. Dr. Dubey stressed continuous improvement of ERDMP through learning from incidents, near-misses, and mock drills to strengthen preparedness, compliance, and overall emergency response capability.

Day 3 of the training programme commenced with technical sessions that extended the key learnings from the earlier days, with a strong focus on post-emergency recovery planning, sustainability approaches, and climate resilience measures to strengthen organizational readiness. The sessions emphasized converting knowledge into actionable practices and reinforced the importance of continuous improvement in emergency management within the oil and gas sector.

Session 9: Post-Incident Recovery and Business Continuity Planning (BCP)

The day 3 First technical session on "Post-Incident Recovery and Business Continuity Planning (BCP)" was delivered by **Mr. Rajesh Nigam, Former Executive Director, Indian Oil Corporation Ltd.** Drawing on his extensive operational experience and in reference to the PNGRB ERDMP Regulations, 2010, Mr. Nigam highlighted that emergency preparedness extends beyond incident control and must include structured recovery, restoration, and continuity of operations. He explained that ERDMP and BCP are closely linked frameworks, where ERDMP addresses immediate emergency response while BCP ensures the timely resumption of critical business functions with minimal operational and reputational impact.

The session offered a detailed overview of post-incident recovery procedures, outlining the roles and responsibilities of management, the constitution of recovery committees, and the key coordinating role of the Location In-Charge (LIC) in managing restoration activities. Mr. Nigam described two distinct recovery scenarios: incidents confined within the installation

(Level-I and Level-II emergencies) and incidents with off-site consequences (Level-III emergencies), which require coordination with district administration and external support agencies. He also discussed the standard ERDMP recovery checklist, covering salvage and clean-up operations, accounting of personnel, damage and loss assessment, root cause analysis, media handling, and environmental rehabilitation. The participants were guided through the termination process of emergencies, which includes notifying statutory authorities, conducting detailed root cause analyses, preparing comprehensive incident reports, and disseminating lessons learned across organizational units. Mr. Nigam underscored the importance of timely reporting to PNGRB and other regulators, along with meticulous record-keeping of mock drills, audits and follow-up actions.

The session also touched upon environmental recovery measures, such as ambient air and effluent water monitoring, soil testing and decontamination before resuming operations, to ensure compliance with pollution control norms.

Emphasizing the integration of digital monitoring, mutual aid mechanisms and insurance coordination into BCP, Mr. Nigam noted that effective continuity planning minimizes downtime, protects supply chains and safeguards public trust. He concluded that a robust BCP—rooted in safety culture, accountability and continual improvement—is indispensable for achieving organizational resilience. Participants were encouraged to embed BCP within their ERDMP framework, ensuring that response, recovery and business continuity evolve together as part of a unified risk management strategy.

Session 10: ESG Integration and Emergency Preparedness

The third day second session was delivered by **Mr. Aditya Gurudanti, Founder and Managing Partner of The Verdant Paradigm**, and focused on aligning Environmental, Social, and Governance (ESG) considerations with the ERDMP framework in the oil and gas sector. Mr. Gurudanti explained that an effectively structured ERDMP functions not only as a critical safety tool but also as an important enabler of strong ESG performance. He clarified the distinction between sustainability, which represents an organization's broader environmental and social impact strategy, and ESG, which comprises measurable parameters used by investors and regulators to assess long-term performance, risk, and accountability.

The session discussed major ESG priority areas for the oil and gas industry, such as de-carbonization through methane emission reduction, increased use of renewable energy, and the transition towards integrated energy systems. It also covered investments in cleaner technologies and the adoption of carbon capture and storage solutions to address emissions that are difficult to eliminate. Mr. Gurudanti highlighted ERDMP as a critical operational bridge between emergency risk management and ESG outcomes. He explained how ERDMP addresses environmental risks through leak detection and containment, social risks through employee safety and community protection, and governance risks through regulatory compliance, regular mock drills, and audits. He further noted that ERDMP performance indicators, including response effectiveness, drill outcomes, and system reliability, directly contribute to ESG reporting under frameworks such as GRI and TCFD. The session concluded by emphasizing the importance of building a strong social license to operate through community engagement, awareness initiatives, and transparent communication. It reinforced

that robust ERDMP implementation not only improves safety but also strengthens ESG credibility, resilience, and long-term organizational sustainability.

Session 11&12: Enhancing Climate and Disaster Resilience in Oil & Gas Sector along with Group Exercise

The afternoon sessions of Day 3 were delivered by **Dr. Rakesh Dubey, Former Director, Disaster Management Institute (DMI), Bhopal,** and focused on building climate and

disaster resilience as well as the practical development of ERDMPs for certification. Dr. Dubey emphasized the increasing impact of climate-related risks on energy infrastructure and the importance of integrating climate adaptation measures into both disaster management systems and routine operational planning.

He discussed the rising occurrence of climate hazards such as floods, cyclones, extreme heat, and intense rainfall, and explained their potential consequences for refineries, terminals, and cross-country pipeline networks. These hazards, he noted, can disrupt operations, damage critical assets, and trigger cascading failures across the supply chain. The session highlighted practical adaptation measures, including cyclone-resistant systems, heat mitigation strategies, structural strengthening, and emergency water management planning. Participants took part in a group exercise to design a climate-resilient oil terminal, applying principles of hazard mapping, risk reduction, and resilient infrastructure planning. This activity promoted innovative thinking and sector-specific approaches to enhancing adaptive capacity against climate and disaster risks.

Dr. Dubey also conducted a detailed group exercise on ERDMP preparation and certification to reinforce understanding of the PNGRB regulatory framework. Participants were divided into three groups representing key segments of the petroleum and natural gas sector—Refineries, LPG Bottling Plants, POL Terminals, City Gas Distribution (CGD) Networks, and Cross-Country Pipelines. Each group prepared a draft ERDMP for their assigned facility, addressing core components such as risk assessment, command and control structure, communication protocols, resource mapping, and coordination arrangements. The exercise further required participants to outline ERDMP certification processes, including documentation, audits, and third-party assessments. Group presentations showcased practical understanding of ERDMP planning and certification. The interactive format enabled experience sharing, identification of common challenges, and deeper appreciation of ERDMP implementation under PNGRB regulations. In his concluding remarks,

Dr. Dubey appreciated the active participation and stressed that climate resilience, effective ERDMP implementation, and continuous capacity building are critical to ensuring long-term safety and sustainability of India's oil and gas sector.

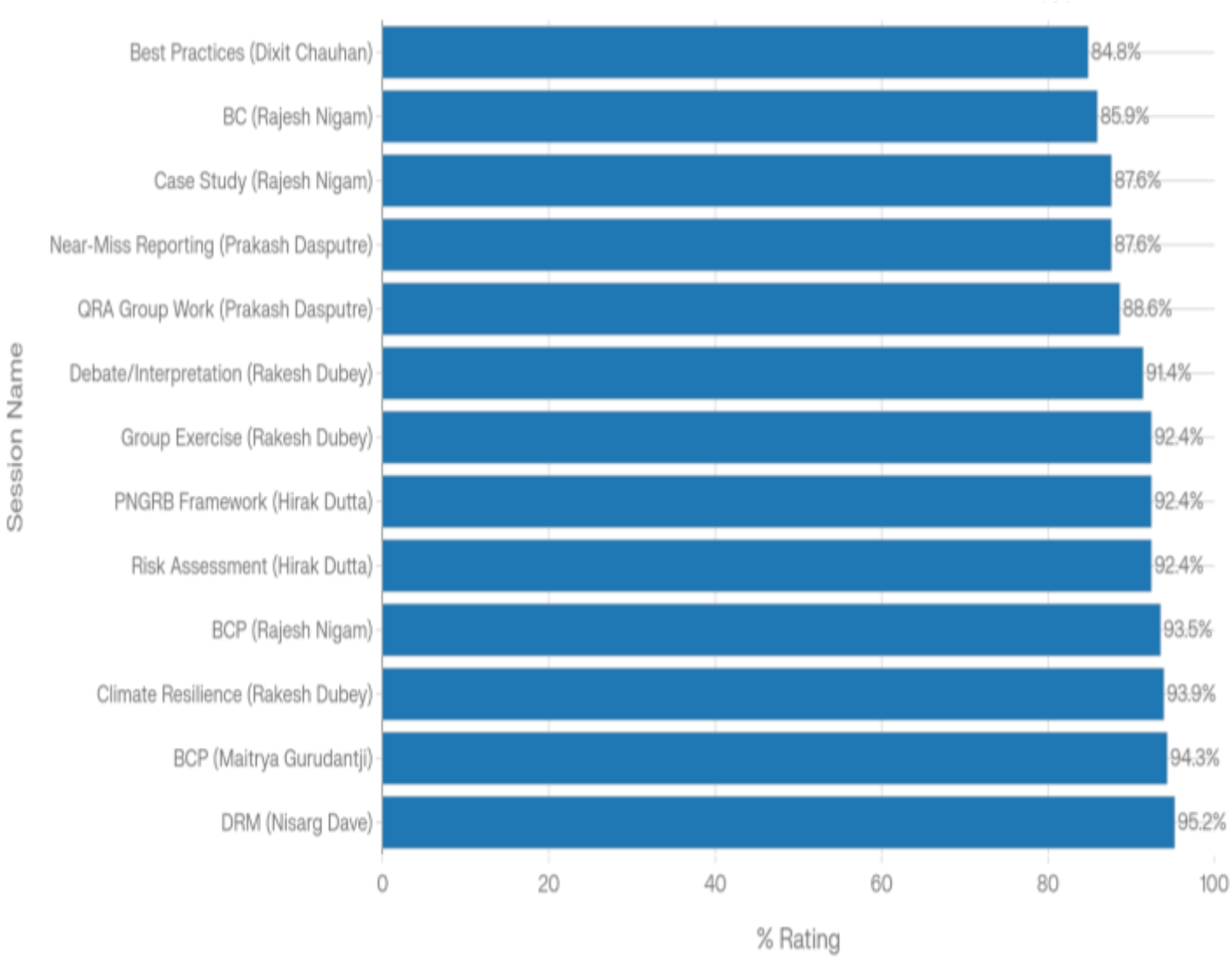
CLOSING OF THE PROGRAM

The three-day Capacity Building Programme on the Emergency Response and Disaster Management Plan (ERDMP) formally concluded on 08 January 2026 with a closing session held at the GIDM Campus, Gandhinagar. GIDM team conveyed their appreciation to the resource persons and participants for their active participation and sustained engagement throughout the programme. The concluding remarks highlighted the need to apply the knowledge and insights gained to strengthen emergency preparedness, risk reduction, and resilience across the oil and gas sector.

As part of the closing session, participant feedback was obtained, indicating a high degree of satisfaction with the programme's content, delivery approach, and overall learning value. Participants particularly appreciated the practical focus, interactive group activities, and discussion of real-life case studies, which helped deepen their understanding of ERDMP implementation and regulatory compliance.

Participant Assessment of Training Sessions:

Participants assessed each session on parameters such as the quality of content delivered, its relevance to the safe transportation of hazardous goods, clarity and depth of explanation, and the usefulness of the information for practical application. The feedback offered meaningful insights into how effectively each session addressed participant expectations and learning needs. The session-wise percentage ratings, highlighting key strengths as well as areas for possible improvement, are illustrated in the graph below.



ANNEXURE 1: PROGRAM NOTE

1. Background

India's petroleum industry is expanding, with a total of 23 refineries across the country, boasting a combined refining capacity of 256.816 MMTPA as of April 2024. India's petroleum industry is a comprehensive sector encompassing exploration, production, refining, distribution, and marketing of petroleum and its by-products. This includes upstream, midstream and downstream activities. This includes upstream activities that cater to the extraction of crude oil and natural gas, midstream activities such as transportation and storage, and downstream processes that include refining and distribution of fuels like petrol, diesel, LPG, and kerosene. India ranks among the top five refining nations globally, thanks to its robust infrastructure and strategic geographic location. The country is the seventh-largest exporter of refined petroleum products. Facilities like the Jamnagar refinery, one of the world's largest, underscore India's dominance in the refining sector. India's refining capacity is expected to grow to 300 MMTPA by 2028 as per estimates, with 58% of the increase coming from brownfield expansions, while the remaining growth, totaling 18 MMTPA from greenfield projects.This global standing enhances India's energy security and positions it as a key player in international energy markets. The International Energy Agency (IEA) in February 2024 assessed that India will become the largest source of global oil demand growth between now and 2030. India is the second-largest economy in biofuel blending, following Brazil.

This industry also provides direct and indirect employment to millions, spanning exploration, refining, distribution, and retail sectors. The industry's value chain supports ancillary industries such as petrochemicals, logistics, and manufacturing. The sector enhances socio-economic stability by fostering skill development and offering diverse career opportunities. The petroleum industry's expansion has multifaceted implications. Economically, it boosts GDP, foreign exchange earnings, and industrial growth. Politically, energy independence strengthens India's global standing and reduces strategic vulnerabilities. Socially, the industry's growth promotes rural development through improved energy access and employment.[1]

Chemicals, being an integral component of modern industrial systems, have garnered significant attention within the government, private sector, and broader community regarding disaster management. The frequency and severity of chemical disasters have surged in recent

[1] https://www.pib.gov.in/PressReleasePage.aspx?PRID=2096817

years, exemplified by the Bhopal Gas Tragedy with leak, being the most prominent and devastating till the L G Polymers incident with Styrene gas leak during the COVID- 19 pandemic in 2020 known as Vizag gas leak. The resulting vapour cloud spread over a radius of around 3.0 km (1.9 mi), affecting the nearby areas and villages. Few major chemical incidents that took place during the last 25 years include an explosion in IPCL Gas Cracker Complex at Nagothane in Maharashtra (1990); fire in an oil well in Andhra Pradesh (1995); vapour cloud explosion at HPCL refinery at Vishakhapatnam (1997); MS Tank Fire broke out in Digboi Assam (2003); IOCL Fire Tragedy of Jaipur (October 2009) and IOCL Hazira Tank Fire (2013). This rise can be attributed to the rapid expansion of chemical industries across various sectors, including manufacturing and formulation, other-chemicals, pharmaceuticals, agro-chemicals (fertilisers, pesticides), industrial chemicals, and facilities dedicated to handling hazardous chemicals such as oil depots, exploration/mining operations, and others. The expansion of plant sizes, storage capacities, and carriers, particularly in densely populated areas, has heightened the risk and vulnerability to such disasters.

In light of this, a comprehensive legal and institutional framework exists in our country. Several regulations governing safety in transportation, liability, insurance, and compensation have been enacted. The relevant provisions on chemical disaster management in our country include [2]:

- The Petroleum and Natural Gas Regulatory Board Act 2006
- The Explosives Act 1884
- The Petroleum Act 1934
- The Factories Act 1948
- The Insecticides Act 1968
- The Environment Protection Act 1986
- The Motor Vehicles Act 1988
- The Public Liability Insurance Act 1991
- The Disaster Management Act 2005
- The Disaster Management (Amendment) Act 2025.

Government of India has further reinforced the legal framework on chemical safety and management of chemical accidents by enacting new rules such as Manufacture, Storage, and Import of Hazardous Chemicals (MSIHC) Rules 2009; The Chemcial Accidents (Emergecy Planning, Preparedness and Planning (EPPR)) Rules 1996; Static and Mobile Pressure Vessels

[2] https://nidm.gov.in/pdf/modules/chemical.pdf

(Unfired) (SMPV) Rules, 2016; The Central Motor Vehciles CMV Rules 1989; The Gas Cylinder Rules 2016; Hazardous Waste Management Rules; The Dock Workers (Safety, Health & Welfare), Regulations 1990 and by way of amendments to them.

With a focus on sustainability and energy efficiency, India is poised to maintain its leadership in the global energy landscape while aligning with its climate commitments. As the downstream petroleum and gas infrastructure expands rapidly across the country, the need for enhanced risk management capabilities, emergency response systems, and safety standards is greater than ever.

1.1 Introduction

The Disaster Management Act 2005, the Disaster Management Amendment Act 2025, and the Petroleum and Natural Gas Regulatory Board (PNGRB) Regulations (Codes of Practice for Emergency Response and Disaster Management Plan (ERDMP) Regulations, 2010) have mandated the implementation and preparation of disaster management/emergency plans. Despite the existence of these acts and policies, there are ongoing challenges regarding coordination, planning, and the implementation of these duties. The primary cause of these challenges is the lack of adequate understanding and skills among relevant stakeholders. In response to these challenges, it is proposed to organise a series of training programs on ERDMP. The current focus aligns with the principles of "zero tolerance" and "extended producer liability," which address risks throughout the lifecycle of a hazardous material.

Emergency Response and Disaster Management Plan (ERDMP) is applicable to following :-

a) hydrocarbons processing installation (refinery, gas processing, LNG Re-gasification installations etc.);
b) pipeline such as natural gas, propane, butane etc. and the hydrocarbons products which remain in gaseous state at NTP;
c) petroleum and petroleum product pipeline;
d) petroleum storage facilities including POL depot, installations and terminals;
e) hydrocarbons gas bottling Installations having receiving, storage and handling facilities including storage for LPG, propane and butane;
f) city or local natural gas distribution facilities;
g) retail outlets dispensing like Petroleum, Auto LPG, LNG, CNG and like other retail outlets;
h) transportation of petroleum products [LNG, CNG etc.] by road;
i) any other installation as may be notified by the Board from time to time;

Therefore GIDM has developed the programme for the capacity development to cover all entities as noted above from (a) to (i).

1.2 Aim

The aim of the training and capacity building programs is to update the knowledge and skills of the participants to multi-dimensional aspects of disaster risk management and emergency incident response, effective planning, integration and coordination delaing with petroleum and natural gas.

1.3 Objectives

The objectives of the program on 'Capacity Building on Emergency Response and Disaster Management Plan (ERDMP)' are to enable participants to assess and deliver the respective aspects and roles about emergency/disaster management, delineate strategies for risk mitigation, and implement effective response and preparedness activities.

The objectives of the training and capacity-building program are to enable participants to:

- Understand the scenario and challenges associated with disaster risks and the consequences associated with oil and natural gas.
- State various legal/regulatory frameworks, provisions, guidelines, and institutional arrangements concerning activities.
- Enumerate various tools, technologies, and methods in chemical disaster management, including GIS, ICT, and web-enabled systems.
- Accident reporting, investigation, risk assessment, and root cause analysis.
- Capacity building in disaster risk management, safety, and emergency preparedness.
- Training, skill development, and knowledge sharing for oil and gas professionals.
- Documentation and development of ERDMP.
- Technical support and guidance to industry stakeholders for aligning with regulatory and international safety norms.

1.4 Training Content

The training shall cover the following aspects of ERDMP, and will be drawn looking to the target participants, resources and contexts of the particular batch and course programme:

- Understanding the Basics of Disaster Risk Management
- Deep understanding on hazards involved in oil and gas sector
- Disaster Response and Incident Response System in India
- Mechanism of Emergency Response with respect. ERDMP Regulations
- Sectoral Recovery and Resilience Building
- Disaster Recovery in the Energy Sector
- Development of ERDMP

- Resilience building in Energy Sector

1.5 Training Approach

The training approach will be selected based on the specific topic of ERDMP, from a range of the following options:

- Documentary/film followed by question-and-answer sessions based on real-life incidents
- Lecture followed by query-and-answer sessions
- Presentation (slides) and discussion
- Group discussion
- Group work/assignment - GIDM's 5-hour course on DRM
- Study exposure visits followed by discussion
- Mock exercises/drills/simulation/tabletop exercises

1.6 Target Group

The training programme is designed to meet the specific requirements of middle-level officials dealing with petroleum and natural gas in Public Sector Undertakings (PSUs), industries/factories and various aspects of disaster management, environmental development, and other relevant fields.

- HSE Officers
- Safety Officers
- Fire and Safety Personnel
- Middle-level officials from PSUs, industries and factories handling petroleum and natural gas operations.

1.7 Expected Results

- Better assessment of chemical disaster (oil and natural gas) related risks and vulnerabilities
- Systematic approach in planning, preparedness and mitigation of such disasters
- Improved coordination amongst various agencies and organisations
- Integration of onsite and offsite plans with Disaster Management Plans and holistic DRR framework
- Equipped to Develop and get an audited ERDMP document in line with the regulations

1.8 Training Duration and Location

The training will be conducted over 3 days at the **GIDM Campus, Village Raisan, Gandhinagar- 382007.**

1.9 Monitoring and Evaluation

- Pre- and post-training assessments to evaluate knowledge and skill improvement
- Feedback sessions to gather participant insights

Agenda of the Program

DAY 1 || 06 JANUARY 2026

Time	Session	Speakers
10.00 – 10.30	Welcome & Registration	GIDM
10:30 - 11:00	Opening Ceremony and Introductory Remarks **Welcome Address by Dy. Director, PNGRB**	**Mr. Gagan Agarwal,** Dy Dir. (Tech.) PNGRB, New Delhi
11:00 - 12:00	**Understanding of Disaster Risk Management (DRM)** Key Concepts: Hazard, Risk, Vulnerability, Resilience National Disaster Management Act (2005 & Amendment 2025) Global Frameworks on DRM	**Mr Nisarg Dave** Director (DM), GIDM
12:00 – 12:15	*Tea/ Coffee Break*	
12:15 – 13:30	**International Best Practices in Emergency Management** CO COMAH (UK), OSHA (US), API Standards ICS ICS (Incident Command System) Structure Use Use of AI, sensors, and smart alerts in ERDMPPredictive analytics, real-time data analysis, automated decision-making, and optimized resource,allocation, Use of AI-powered Drones and Robotics.	**Shri Dixit Chauhan**, Safety Professional, Gujarat
13:30 – 14:30	*Lunch*	
14:30 – 15:30	**Introduction to PNGRB ERDMP Framework** Salient Points of PNGRB Regulations 201 (Annexures, Checklists and Schedule), Classification of Emergencies (Level I–III), Onsite/Offsite Hazards + Use of MSDS and AnnexureI, Risk Matrix, ALARP Concept, Threshold Criteria	**Shri. Hirak Dutta**, Expert Advisor, PNGRB
15.30 – 15.45	*Tea/ Coffee break*	
15.45 – 17.00	**Risk Assessment in Action: Learning from Real-World Good Practices** Tatipaka NG pipeline Catastrophic Incident of GAIL; Styrene Gas Leak Incident; Richmond Refinery Major Fire incident at California; Jaipur & Buncefield terminal catastrophic Incidents.	**Shri. Hirak Dutta**, Expert Advisor, PNGRB

DAY 2 || 07 JANUARY 2026

Time	Session	Speakers
10:30 - 11:45	**Learning from Near-Miss Reporting** Real-world PSU case examples Root cause discussion using Bowtie/ Fault Tree methods, Organizational learning from failure signals, Behavioural (Human) Aspects	**Mr. Prakash Dasputre** HSE Expert
11.45 – 12:00	*Tea/ Coffee Break*	
12:00 – 13:15	**Scenario-Based Group Work: Quantitative Risk Assessment (QRA)** Case Exercises: bowtie concept based risk assessment Pipeline rupture, tank truck fire Risk estimation, zone mapping, consequence modelling	**Mr. Prakash Dasputre** HSE Expert
13:15 – 14:15	*Lunch*	
14:15 – 15:30	**Case Study Session: Industrial Emergency Management and Lessons Learned** Understand real-world industrial incidents and derive operational and regulatory insights. Overview of a major incident Analysis of overall ERDMP implementation: planning, coordination, communication, and recovery, Discussion of gaps in risk assessment, resource management and regulatory compliance Key learnings: how to prevent recurrence and strengthen facility resilience	**Shri Rajesh Nigam** Former ED, IOCL.
15.30 – 15.45	*Tea/ Coffee break*	
15.45 – 17.00	**Advanced Interpretation of Pre-Emergency Planning and (Reg.: 10) Emergency Response Measures (Reg.-13) under PNGRB ERDMP Regulations, 2010** Regulatory Intent and Strategic Framework, Interpretation of Level 1–3 emergencies and decision-making protocols. Advanced strategies for fire, leaks, explosions and pipeline incidents. ECC operations, inter-agency integration and mutual aid management. Root-cause analysis, regulatory reporting and continuous, ERDMP improvement.	**Dr. Rakesh Dubey** Former Director DMI, Bhopal

DAY 3 || 8 JANUARY 2026

Time	Session	Speakers
10:30 - 11:45	**Post-Incident Recovery and Business Continuity Planning (BCP)** BCP alignment with ERDMP Logistics & vendor readiness Environmental, financial, and public trust recovery	**Mr. Rajesh Nigam** Former Executive Director, Indian Oil
11.45 – 12:00	*Tea/ Coffee Break*	
12:00 – 13:15	**ESG Integration and Emergency Preparedness** ESG expectations in oil & gas KPIs and ERDMP synergy Community and regulator engagement strategies Public information management & Media management	**Mr. Aditya Gurudanti** ESG Expert
13:15 – 14:15	*Lunch*	
14:15 – 15:15	**Enhancing Climate and Disaster Resilience in Oil & Gas Sector** Climate hazards and infrastructure exposure Adaptation measures: flood protection, heat resilience Group activity: Design a climate-resilient terminal	**Dr. Rakesh Dubey** Former Director DMI, Bhopal
15.15 – 15.30	*Tea/ Coffee break*	
15.30 – 17.00	**Group Exercise and PPT** Group (Refinery) - I (Making ERDMP and process of getting Certification) Group (LPG Bottling Plant)- II (Making ERDMP and process of getting Certification) Group (POL) - III (Making ERDMP and process of getting Certification) Group (CGD) - IV (Making ERDMP and process of getting Certification) Group (Cross country pipelines) - V (Making ERDMP and process of getting Certification)	**Dr. Rakesh Dubey** Former Director DMI, Bhopal
17:00 – 17:15	Tea/Coffee Break	
17.15 – 18.00	**Closing Session** Summary of key learnings Feedback Certificate distribution and vote of thanks	GIDM/ PNGRB

ANNEXURE 2: PARTICIPANT LIST

#	Participant Name	Designation and Organization
1	Harish Babu D B	General Manager (Operations), MRPL, Mangalore
2	Athuljith PJ	Senior officer (Fire and Safety),GAIL India Ltd.
3	Mridul Sinha	Senior Manager, IOCL
4	Ajay Kumar	Chief Manager H,S&E,IOCL
5	Narendra Kumar	Chief Manager (Fire & Safety), IOCL
6	Gaurav Nagar	Senior Engineer, GAIL India
7	Mohana Dharani R M	Officer, CPCL
8	Prakash D Chahande	Senior Manager(Fire & Safety),IOCL
9	Ankur Bharat	Manager HSE-Fire, Nayara Energy Ltd.
10	Utsav Verma	Assistant Manager, HPCL
11	Jitendra Sharma	DTM,RIL
12	Vivek Krishna Das	Area Manager, Sr. General Manager, Reliance Ethane Pipeline Ltd.
13	Manoj Waskel	Senior Manager, GAIL India
14	Naman Chourasia	Officer, HPCL
15	Sandeep Verma	Assistant Manager Health and Safety, HPCL
16	Krishna Bhagwan Jadhav	Shift in charge, Nayara Energy Ltd.
17	Ashvin Valani	D.G.M., Nayara Energy Ltd.
18	Anil Sarkhedi	Deputy General Manager (FIRE), Nayara Energy Ltd.
19	Devarsh Acharya	Lead Process Safety, RIL
20	Anil Kumar Choudari Rimmalapudi	Senior Lead Operations, RIL
21	Alpesh R Vaghasiya	Senior General Manager , RIL
22	N. Veluchamy	DGM, Nayara Energy Ltd.
23	H S Rajeev	Group General Manager (HSE),MRPL

#	Participant Name	Designation and Organization
24	Satvirsingh Kamalsingh Dhakre	Plant Manager- LPG Bottling Plant, Reliance PML.
25	Ajit Singh Jaloriya	Assistant Manager- Health Safety & Environment Department, IOCL
26	Mohan Pushparaj	Senior Manager, GAIL India Ltd.
27	Sunil Kumar Maurya	Assistant Manager, Mittal Energy Ltd.
28	Jwala Sharma	Dy. head HSEF - Adani Total Gas
29	Gurav Kumar	SM (F&S)

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