



CONFERENCE INSIGHTS

MEGA
CONFERENCE

ACHIEVING
"EXCELLENCE IN SAFETY"
IN MARKETING OPERATIONS

28-29th April 2025
Kochi, Kerala

Safety First
&
Always



Mission
Zero Incidents



THEME: TACKLING THE EMERGING COMPLEXITIES IN DOWNSTREAM MARKETING BUSINESS

The Mega Conference on Achieving “Excellence in Safety” in Marketing Operations, jointly organized by the Petroleum and Natural Gas Regulatory Board (PNGRB) and Indian Oil Corporation Limited (IOCL), is a strategic initiative to cultivate a robust safety culture across India’s downstream petroleum sector. This high-level platform is designed to facilitate meaningful dialogue between regulators, oil & gas marketing companies, domain experts, and academic institutions on strengthening safety practices in Petroleum, Oil, and Lubricants (POL), Liquefied Petroleum Gas (LPG), and Retail Outlet (RO) operations.

In an era marked by rapid energy transitions, network expansions, and growing consumer demands, the downstream sector has experienced unprecedented growth. With over 230 million tonnes of petroleum products consumed annually, and a steadily expanding network of fuel stations (over 95,000), LPG bottling plants (over 350), and Petroleum installations (over 300), the scale and complexity of marketing operations have risen dramatically. This expansion, while essential for national energy security, also heightens the urgency for robust safety systems, cryogenic-specific risk frameworks, and strengthened regulatory oversight.

Marketing locations from POL terminals to LPG bottling plants, and retail dispensing stations are dynamic operational environments where human, technical, and environmental variables intersect, creating complex safety challenges. If not addressed proactively, incidents at these locations can lead to severe consequences impacting not just infrastructure, but also public safety and environmental sustainability.





THEME: TACKLING THE EMERGING COMPLEXITIES IN DOWNSTREAM MARKETING BUSINESS

The conference aims to address these challenges by fostering a culture of safety innovation and proactive risk management. The key objectives include:

- Facilitating cross-industry knowledge sharing among practitioners, regulators, researchers, and safety professionals
- Promoting best practices in operational safety, emergency preparedness, and crisis response
- Identifying critical risks and evolving threats in POL, LPG, and RO segments, and developing comprehensive mitigation strategies
- Encouraging integration of technology and digital tools such as IoT-based monitoring, AI-driven risk prediction, and automated safety systems
- Reinforcing regulatory frameworks and compliance mechanisms, aligned with national energy and sustainability goals
- Highlighting successful case studies and innovations that have improved safety outcomes across both conventional and cryogenic marketing operations

By bringing together thought leaders and stakeholders from across the downstream ecosystem, the Mega Conference will not only spotlight current safety practices but also help define the next-generation roadmap for achieving zero-incident operations.

It reaffirms the sector's commitment to operational integrity, regulatory alignment, and public confidence the bedrock of a resilient, secure, and future-ready petroleum marketing network.





INAUGURAL SESSION

Mr. M B Lal

Ex- CMD
HPCL



Special Address

Mr. Gajendra Singh

Member
PNRB



Innaugral Address

Mr. Prasad K Panicker

Exec. Chairman
Nayara Energy Ltd.



Keynote Address



INAUGURAL SESSION

The opening session of the conference set a clear direction: safety must be embedded into the DNA of operations across the oil and gas industry. Excellence is not about isolated success, but about the ability to sustain incident-free performance year after year.

Speakers underscored the need for strong leadership, deeper accountability, and a culture that encourages learning from failures. Vision Zero is achievable, but only through consistent effort, empowered teams, and clear safety ownership at all levels.

There was a strong push for updating Integrity Management Regulations to include hydrogen blending, conducting risk assessments in urbanizing areas, and tackling issues related to ageing pipeline infrastructure. Emphasis was also placed on addressing cybersecurity vulnerabilities, improving incident data accessibility, and ensuring appropriate fire safety measures for a diverse fuel mix.

The session called for continuous training, upskilling of manpower, and appointing dedicated HSE leadership within organizations. It was also highlighted that most incident investigations reveal the events were preventable making it all the more important to strengthen systems before failures occur.

Above all, the session conveyed a grounded yet ambitious message: real excellence begins with accepting current realities and committing to deliberate, sustained improvement.



CONFERENCE KEY INSIGHTS





SESSIONS

Panel Discussion 1:

Creating a Safety Culture for Achieving Excellence in Marketing Operations

Panel Discussion 2:

Challenges, Risks & Mitigation Measures in LPG Business

Panel Discussion 3:

Accident Prevention and Learnings from Major Incidents / Accidents in POL/ LPG Operations /Retail Outlets

Panel Discussion 4:

Emergency Handling and Role of Emergency Response Centre



SESSIONS

Panel Discussion 5:

Developing SMS & KPIs for Safe & Smooth Marketing Operations Including Cryogenic Operations

Panel Discussion 6:

Strengthening Safety through Regulations vis-a-vis effective role of Third-Party Audits

Panel Discussion 7:

Road Safety – Challenges in Bulk Oil & Gas Transportation and Role of Regulators

Panel Discussion 8:

International Best Practices in Safety Management



PANEL DISCUSSION 1

Creating a Safety Culture for Achieving Excellence in Marketing Operations

Context: Despite significant upgrades in infrastructure and automation, safety lapses continue to pose serious risks to operations, public life, and property. These incidents also lead to reputational damage, erode organizational credibility, and shake workforce and public confidence.

A robust safety culture is essential not only for incident prevention but also for ensuring long-term sustainability in high-risk industries. Studies show that organizations with mature safety cultures experience significantly fewer incidents.

Safety should be a value embedded, non-negotiable, and enduring not just a priority that shifts with changing business pressures. True safety culture is not confined to rules and procedures; it encompasses values, behaviors, continuous learning, and strong leadership.

For safety to become a shared organizational trait, it must be integrated into business roles, led by Visible Felt Leadership (VFL), and nurtured through systems that reward transparency, data-driven decisions, and psychological safety. Employees should feel empowered to report unsafe behaviors or near misses without fear of reprimand, shifting the question from "Who is at fault?" to "What went wrong?"



PANEL DISCUSSION 1

Creating a Safety Culture for Achieving Excellence in Marketing Operations

Key Discussed Points:

- The definition of an effective and sustainable safety culture in hazardous operational environments
- Embedding safety as a core value, not just a priority
- Role of leadership, Visible Felt Leadership (VFL), and behavioral safety interventions
- Creating psychologically safe work environments where safety reporting is encouraged without fear
- Transitioning from blame-based to systems-based incident investigation
- Integration of smart technologies (IoT sensors, real-time audits, control systems) for proactive monitoring
- Leveraging historical data and predictive analytics to prevent future incidents
- Establishing feedback-driven systems, near-miss reporting frameworks, and safety performance benchmarking
- Importance of continuous training and education to build capacity at all levels.



PANEL DISCUSSION 2

Challenges, Risks & Mitigation Measures in LPG Vertical

Addressing Critical Vulnerabilities in LPG Storage, Bottling, and Fire Fighting Systems

Context: The LPG sector plays a pivotal role in India's energy landscape, catering to over 230 million customers across households, industries, and commercial establishments. However, LPG is a highly flammable substance stored under pressure, making its safe handling across storage terminals, bottling plants, and transportation networks an ongoing challenge particularly as demand continues to rise.

As operations scale up to meet national energy goals, the risks associated with LPG handling also increases. This makes it essential to adopt a risk-based approach, backed by robust design, strict regulatory compliance, frequent audits, and enhanced automation to protect lives, assets, and the environment.

Pipelines remain the safest mode of LPG transport, and transitioning from road to pipeline transport can greatly reduce associated risks. Vulnerabilities in areas like LPG cylinders, road transport safety, and inconsistencies in audit practices need urgent attention. Building a strong safety ecosystem requires data-driven interventions, periodic reassessments, and collaborative learning from past incidents.



PANEL DISCUSSION 2

Challenges, Risks & Mitigation Measures in LPG Vertical

Key Discussed Points:

- Common root causes of incidents in LPG bottling, storage, and road transport
- Structural integrity, interlocks, and safety design of LPG storage vessels and pipelines
- The role of flameproof fittings, gas leak detection systems, and automation in bottling plants
- Safety gaps in road transport particularly trucks carrying LPG cylinders must be evaluated and addressed through enforceable safety regulations
- Promoting pipelines as a safer and more reliable mode of LPG transport
- Audit-driven safety frameworks: Addressing gaps between internal and external safety audits; turning audit insights into actionable safety improvements
- The continued vulnerability of LPG cylinders: Campaigns and public safety initiatives are necessary to improve cylinder handling and safety awareness
- Importance of increasing automation in bottling plants to reduce human error
- Leveraging incident learnings to update Standard Operating Procedures (SOPs) and enhance training programs



P R E V E N T

PANEL DISCUSSION 3

Accident Prevention and Learnings from Major Incidents / Accidents in POL/ LPG Operations / Retail Outlets

Context: Each major incident in the downstream oil and gas sector serves as more than just a warning, it exposes systemic blind spots that often go unnoticed until it's too late. Whether at POL terminals, LPG bottling plants, depots, or retail outlets, these incidents frequently stem from gaps in standard operating procedures (SOPs), inadequate training, poor supervision, or a false sense of security that dulls vigilance over time.

What's alarming is that nearly 50% of these incidents trace back to deficiencies in safety culture. In many cases, incidents occur not due to technical failures alone, but due to a lack of awareness, complacency, and an absence of robust root cause analysis (RCA) frameworks. Moreover, the industry suffers from a shortage of skilled incident investigation professionals, leading to incorrect RCAs and recurring mistakes.

This session emphasized the urgent need to convert hindsight into actionable foresight by institutionalizing cross-industry learning and building a common, anonymized incident data repository, supported by dashboards and analytics. Such systems can feed back into design-stage risk studies like HAZOP and ensure safer future operations.



PREVENT

PANEL DISCUSSION 3

Accident Prevention and Learnings from Major Incidents / Accidents in POL/ LPG Operations / Retail Outlets

Key Discussed Points:

- Real-world case studies of major incidents across marketing operations and their hidden causes
- Addressing the false sense of security and complacency among personnel in routine operations
- Recognizing that incidents can be asset-related, process-related, or human-related, each demanding a different RCA lens
- Enhancing the depth and quality of RCA by investing in skilled investigation professionals and structured methodologies
- Importance of making employees fully aware of each step of their work, the associated risks, and the consequences of deviations
- Creating a centralized, anonymized incident data repository accessible across the industry, with masking protocols to protect identities and sensitive information
- Leveraging this data to support dashboard-based analytics, pattern recognition, and predictive safety interventions
- Using incident learnings as inputs to HAZOP studies during the design and planning stages
- Strengthening the role of third-party audits, internal safety review boards, and continuous training in closing the loop from incident to improvement.



LIVE CASE STUDIES PRESENTATION

Theme: Building a Safer Future Through Retrospective Learning

In high-risk sectors like downstream oil and gas, every incident offers a profound opportunity for systemic learning if investigated, documented, and acted upon with integrity and rigor. This session, "Case Studies by PNRB", served as a critical platform for presenting actual field-level incidents that occurred at POL terminals, LPG installations or during retail dispensing operations. These cases examined in-depth to extract root causes, evaluate gaps with PNRB safety regulations, and highlight corrective and preventive actions recommended or taken.

As India's energy marketing infrastructure grows more complex with high throughput, overlapping operational risks, and expanding coverage of hazardous fuels regulatory clarity and ground-level preparedness must work hand-in-hand. The Petroleum and Natural Gas Regulatory Board (PNRB), through enforcement of the Technical Standards and Specifications including Safety Standards (T4S), is uniquely positioned to drive data-backed safety reforms grounded in real-world learnings.

Key Points Of The Session:

- Presented detailed case studies of actual incidents from sectors across POL, LPG, and retail outlets.
- Demonstrated how Root Cause Analysis (RCA) was carried out using techniques such as 5 Whys, Fault Tree Analysis, or Event & Causal Factor Charting.
- Identified T4S clause violations that were observed during investigation and link them to safety management system (SMS) gaps.
- Discussed organizational and operational corrective actions.
- Encouraged cross-company adoption of these learnings by promoting transparency, sectoral benchmarking, and regulatory accountability.



LIVE CASE STUDIES PRESENTATION

A review of PNRB and third-party audit data from recent years indicates that a significant proportion of incidents were preventable, had early warning signs been acted upon or had T4S clauses been adequately enforced. From improper hazardous area classification and delayed preventive maintenance, SOP deviation and more importantly Job Security Assessments within work permit systems during emergency handling patterns have emerged that call for knowledge-sharing, not knowledge-silos.

This session served as a reflection point for entities to reaffirm their commitment to safety and align their operations with regulatory mandates, technical standards, and guidelines ensuring safer and more resilient marketing infrastructure.



PANEL DISCUSSION 4

Emergency Handling and Role of Emergency Response Centre

Context: India's rapidly expanding oil and gas sector faces rising safety risks due to aging infrastructure, the inherent flammability of petroleum products, and increasing operational complexity. Despite comprehensive safety protocols, major incidents remain a recurring concern with 55 accidents and 34 fatalities reported in 2023-24 alone.

The catastrophic Jaipur Terminal Fire (2009) was a turning point, leading to the M.B. Lal Committee's recommendation for specialized Emergency Response Centres (ERCs) capable of managing Level-3 emergencies, events beyond the control of in-house facilities that require off-site, high-capacity intervention.

Over the past decade, the ERC concept has evolved through industry studies, pilot models, and stakeholder consultations. A 2025 sectoral review has re-emphasized the need for cluster-based ERCs, strategically located to provide firefighting response within 30 minutes, equipped with mobile, high-capacity firefighting assets and multidisciplinary response teams.

But to move from concept to implementation, there must now be a coordinated shift from planning to action supported by regulations, risk-based planning, and inter-agency collaboration.



PANEL DISCUSSION 4

Emergency Handling and Role of Emergency Response Centre

Key Discussion Points:

- The current readiness level of ERCs in India's oil and gas infrastructure
- Mock drills as critical tools for identifying hidden vulnerabilities and testing real-time system resilience
- The cluster-based ERC model: exploring shared ownership, cost optimization, outsourcing feasibility, and geographic positioning based on risk analysis
- Water availability and travel time: persistent operational challenges that must be addressed through planning and logistics optimization
- Making all ERC equipment fully mobile to maximize flexibility and speed of deployment
- ERCs as multidisciplinary units with high fire suppression capability "designed to kill the fire"
- Skilled ERC personnel can be leveraged for regular safety audits and training within their cluster
- ERCs should work in tandem with district authorities and local disaster response teams through periodic audits and joint exercises
- International best practices, pilot learnings, and high-level committee insights shaping India's ERC roadmap
- Regulatory backing is essential to enforce ERC establishment, ensure inter-agency alignment, and enable long-term sustainability
- The evolution phase is over—execution must begin. Industry stakeholders must now translate frameworks into operational ERCs across key clusters.



PANEL DISCUSSION 5

Developing SMS & KPIs for Safe & Smooth Marketing Operations Including Cryogenic Operations

Context: In India's downstream oil and gas sector, safety must transcend being merely a value it requires formalization through defined metrics for evaluation. A comprehensive Safety Management System (SMS), integrated with well-defined Key Performance Indicators (KPIs), enables organizations to transition from reactive compliance to proactive risk management. This structured approach fosters accountability in safety performance across operations, from conventional POL terminals to emerging cryogenic facilities.

As marketing operations evolve, particularly in handling cryogenic materials, there's an increasing need for digitized SMS frameworks. These frameworks should incorporate predictive safety analytics and industry specific KPIs that accurately reflect operational risks. Emphasizing leading indicators, such as near-miss reporting rates, allows for proactive interventions to prevent incidents before they occur.

While several downstream installations have taken steps to adopt digitized Safety Management Systems (SMS), the industry still faces challenges in transitioning from fragmented safety mechanisms to fully integrated systems with measurable KPIs. There is a growing need for structured, digital safety frameworks that enable real-time monitoring, predictive analytics, and actionable insights.

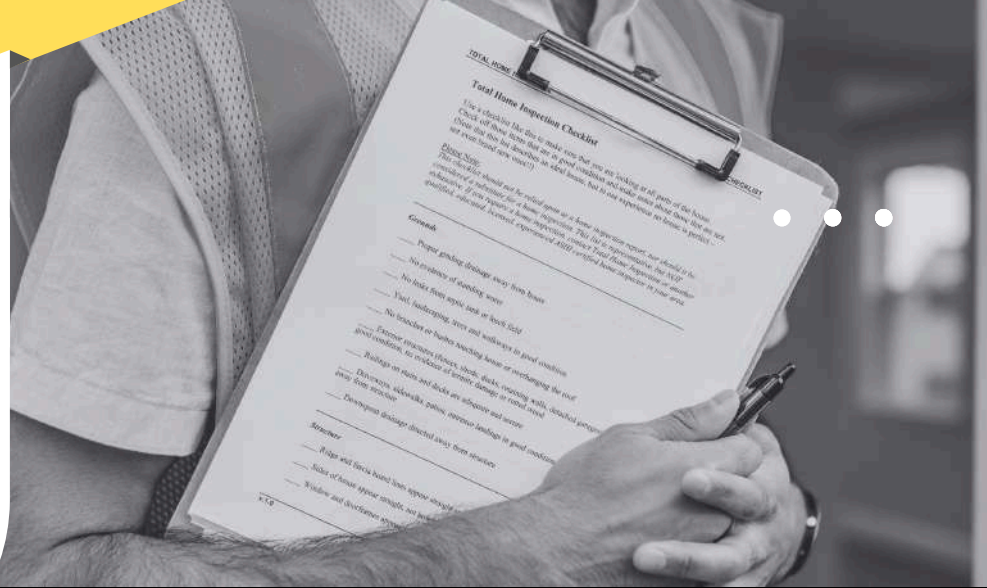


PANEL DISCUSSION 5

Developing SMS & KPIs for Safe & Smooth Marketing Operations Including Cryogenic Operations

Key Discussed Points:

- **Development of Leading KPIs:** Focus on metrics like near-miss rates, time-bound closure of Non-Conformity Reports (NCRs), and incident frequency rates to proactively manage safety risks
- **Integration of Digital Platforms:** Utilize real-time monitoring, safety dashboards, and predictive analytics to enhance safety performance and ensure regulatory compliance
- **Cryogenic Operation Safety:** Address specific challenges such as boil-off gas management, loading/unloading protocols, and maintaining temperature/pressure safety limits
- **Adoption of Global Best Practices:** Learn from international standards and adapt them to the Indian downstream context to elevate safety protocols
- **Continuous Improvement:** Emphasize the importance of ongoing enhancements to the SMS, ensuring it evolves with operational changes and emerging risks
- **Customization of Safety Practices:** Encourage entities to learn from prevalent best practices in the industry and adopt strategies that best fit their specific operational needs



PANEL DISCUSSION 6

Strengthening Safety through Regulations vis-a-vis effective role of Third-Party Audits

Context: Regular inspections are essential for maintaining safety compliance across petroleum marketing locations. However, the effectiveness of inspections depends on the technical competence, independence, and accountability of those conducting them.

The growing role of Third-Party Inspection Agencies (TPIAs) brings both opportunities and challenges in ensuring standardization, credibility, and continuous improvement. A robust inspection ecosystem backed by regulatory oversight, digital innovation, and feedback loops is key to evolving a resilient safety framework.

This session brought together regulatory bodies, certifying agencies, and safety experts to deliberate on how inspection systems can be made more competency-driven, transparent, and responsive to industry needs.

A well-functioning third-party inspection ecosystem acts as a critical check-and-balance system in petroleum safety governance. However, its true effectiveness depends on technical proficiency, regulatory alignment, auditor accountability, and continuous learning not just box-checking.



PANEL DISCUSSION 6

Strengthening Safety through Regulations vis-a-vis effective role of Third-Party Audits

Key Discussed Points:

- Role of TPIAs in ensuring unbiased, high-quality compliance checks, with emphasis on technical rigor and field relevance
- Evolving PNGRB frameworks for inspection protocols, follow-up action, and auditor rotation
- Interface between PNGRB, PESO, NABCB, and NSC in standardizing inspection criteria and auditor accreditation
- Independent benchmarking and categorization of auditors based on technical capabilities
- Industry insights on audit fatigue, variability in report quality, and the need for continuous training and refresher programs
- Promoting digital platforms for TPIA selection, auditor rotation, and real-time compliance tracking
- Incorporating auditor feedback mechanisms to improve regulatory frameworks
- Adoption of QCBS (Quality and Cost Based Selection) for selecting inspection agencies
- Need for sample-based review audits and compliance verification visits to enhance quality assurance
- Reinforcing the principle that no single auditor should conduct consecutive audits at the same location, to avoid familiarity bias



PANEL DISCUSSION 7

Road Safety – Challenges in Bulk Oil & Gas Transportation and Role of Regulators

Context: Road transport forms the logistical backbone for POL and LPG movement in India, especially for last-mile connectivity. However, this mode of transport continues to represent a significant safety concern due to the inherent hazards of flammable materials, aging tanker fleets, varied driving practices, and limited on-road preparedness.

Despite strong SOPs laid out for hazardous goods movement, on-ground implementation often lags. Gaps in driver behavior, route monitoring, and emergency preparedness continue to contribute to on-road risks.

This session aimed to assess the risk landscape and examine how regulators, transporters, and enforcement agencies can collaboratively enhance on-road safety standards, adopt modern monitoring tools, and strengthen implementation of safety protocols.



PANEL DISCUSSION 7

Road Safety – Challenges in Bulk Oil & Gas Transportation and Role of Regulators

Key Discussion Points:

- Current safety trends and accident data involving petroleum and LPG tankers
- Role of PESO, PNRB, and state authorities in monitoring, enforcement, and coordinated action
- Responsibilities of transport unions and fleet operators in maintaining compliance with safety regulations
- Use of modern safety technologies: GPS tracking, fatigue detection systems, rollover sensors, brake interlocks, and centralized control systems
- Two-way communication capabilities between vehicles and central control rooms for emergency handling
- Importance of driver training, licensing audits, sensitization exercises, and route risk mapping
- Institutionalizing driver and transporter rating systems to encourage safety performance
- Communicating Journey Management Plans clearly to drivers and supervisory personnel
- Recognition and incentivization of good driving practices across fleet operators
- Learnings from IRTE (Institute of Road Traffic Education) and international road safety frameworks



PANEL DISCUSSION 8

International Best Practices in Safety Management

Context: As the downstream oil and gas sector expands, ensuring consistent safety standards across a wide variety of installations is paramount.

This session served as a platform for leading oil marketing companies to present innovations and frameworks that have helped to improve their safety performance worldwide. This session offered practical models that other entities can adapt, enabling wider industry alignment with PNRB's regulatory vision and India's energy transition goals.

Key Discussed Points:

- Adoption of digital tools in safety management: drone surveillance, AI-powered anomaly detection, digital twins, and smart sensors
- Recognition and incentive-based frameworks such as internal safety awards, audit excellence programs, and whistleblower channels
- Linking safety with environmental and social governance (ESG) goals for integrated risk management
- Engagement of ground-level staff in shaping safety culture – training, feedback loops, and leadership visibility

Industry experience suggests that structured implementation of the Plan-Do-Check-Act (PDCA) safety cycle can lead to significant reduction in incidents. Many companies across sectors have reported measurable safety improvements when adopting this systematic approach, emphasizing its effectiveness in enhancing operational integrity and organizational discipline.

MEGA CONFERENCE ON ACHIEVING
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