



सत्यमेव जयते



पी एन जी आर बी
PNGRB

PETROLEUM AND NATURAL GAS
REGULATORY BOARD

PETROLEUM AND NATURAL GAS REGULATORY BOARD

AUDIT REFORMS

Strengthening Safety, Integrity and
Regulatory Assurance in India's
Petroleum and Natural Gas Sector



Pipelines



LPG Installations



CNG Infrastructure



Refineries



Retail Outlets



STRONGER
AUDITS



GREATER
ACCOUNTABILITY



BETTER
ASSURANCE



SAFER
TOMORROW

TECHNICAL DIVISION

PNGRB DAY - 1 OCTOBER 2026



SAFE OPERATIONS



ENVIRONMENT PROTECTION



CONSUMER WELFARE



NATIONAL INTEREST

Executive Summary

The Petroleum and Natural Gas sector has grown significantly in scale, complexity, and geographical reach, making robust systems for ensuring safety, technical integrity, and regulatory compliance increasingly important. Audits constitute a key instrument for PNGRB to obtain assurance regarding compliance with applicable Technical Standards and Specifications (T4S), Integrity Management Systems (IMS), ERDMP requirements and other regulatory provisions.

However, the effectiveness of an audit cannot be judged merely by its completion or submission of a report. A meaningful audit must objectively assess the actual condition of an installation, identify deficiencies and systemic weaknesses, ensure appropriate corrective actions, and generate lessons for improving safety and preventing recurrence of failures. Besides, audits must also point out areas of strength so that entities can build upon it.

Experience gained from audit reports, inspections, incident investigations and interactions with stakeholders highlighted the need for greater consistency and strengthening of the audit ecosystem. Variations in audit duration, team competence, audit practices, reporting quality and follow-up could affect the level of assurance derived from the audit process.

The PNGRB Audit Reform Programme has therefore been developed to strengthen the entire audit cycle—from planning and selection of auditors to audit execution,



reporting, review, compliance monitoring and institutional learning. The objective is to move from an approach focused primarily on completion of audits towards one focused on the quality, credibility, and effectiveness of assurance.

The reforms include initiatives relating to minimum man-days and audit effort, eligibility and competency criteria for Lead Auditors, remuneration guidelines, quality-based selection of TPIAs, strengthening of internal audits, standardisation of checklists and reporting formats, improved review and follow-up mechanisms, publication of audit-related information, dissemination of incident case studies and safety learning material, capacity building of auditors, engagement of domain experts and increased use of digital tools and MIS systems. These initiatives are not isolated measures. They form a connected assurance framework:

The central philosophy of the PNGRB Audit Reform Programme is simple: the objective is not merely to conduct more audits, but to make every audit more meaningful, consistent, credible, and effective.

Through these reforms, PNGRB seeks to establish a stronger, competency-driven, and outcome-oriented audit ecosystem that contributes to improved compliance, early identification of risks, prevention of recurring deficiencies and continuous enhancement of safety and technical integrity across India's petroleum and natural gas infrastructure.

INDEX

Chapter / Section No.	Content	Page No.
1.0	Governance, Regulatory Architecture & Accountability	7
1.1	Why Reform was Necessary	7
1.2	Regulatory Assurance Architecture	8
1.3	Accountability Chain	9
1.4	High Level Expert Committee (HLEC) Alignment	9
2.0	Audit Inputs, Competence, TPIA Quality & Commercial Governance	10
2.1	Audit Man-Days Matrix	10
2.2	Lead Auditor / Competency Criteria	11
2.3	Remuneration and QCBS	12
2.4	TPIA Empanelment and Auditor Eligibility	14
2.5	Reporting Discipline	20
2.6	Reform Transformed	21
3.0	Standardization, First-Party Assurance, Transparency & Digital Audit	22
3.1	Standardized Audit Formats	22
3.2	Typical Site Audit Checklist	23
3.3	Internal / First-Party Audit Interface	24
3.4	IEFCV / EFCV – From Requirement to Lifecycle Control	25
3.5	Webhosting of Audit Reports	27
3.6	Digital Audit & Data Analytics	29
3.7	PNGRB Regulatory Framework: Governing Audits	29
4.0	Independent Review, Incident Learning, Training & Knowledge Sharing	33
4.1	Expert Panel for Technical Review	33
4.2	Incident Investigation and Case Studies	35
4.3	Safety Films and Visual Learning	36
4.4	Auditor Interaction & Competency Building	37

4.5	Institutional Learning Objective	37
5.0	Outcome Assurance and Journey Towards Responsible Self-Regulation	46
5.1	The Imperative for Transition towards Self-Regulation	46
5.2	The Assurance Journey	47
5.3	Regulatory Interface	47
5.4	Conditions Precedent for Credible Self-Regulation	48
6.0	Consolidated Reform Review & Forward Roadmap	49
6.1	High Level Expert Committee Report	50
6.2	Forward Roadmap 2026–2030	52
7.0	Messages from the Technical Division	53

CHAPTER 1

Governance, Regulatory Architecture and Accountability

Define who owns safety, who independently checks conformity, who provides regulatory oversight, and how the accountability chain is closed.

An effective audit system begins with a clear understanding of who is responsible for safety, who provides independent assurance, and how regulatory oversight is exercised. Chapter 1 establishes the governance and regulatory architecture underlying the PNGRB audit framework and explains the respective responsibilities of regulated entities, internal assurance functions, Third-Party Inspection Agencies (TPIAs), auditors and PNGRB.

The chapter highlights the need to view an audit not as an isolated inspection activity, but as part of a broader assurance chain extending from ownership of risks at the entity level to independent verification and regulatory oversight. It also examines the accountability mechanisms required to ensure that audit observations are supported by objective evidence, corrective actions are tracked and recurring or systemic deficiencies receive appropriate attention.

The chapter therefore provides the governance foundation for the reforms that follow, with emphasis on clear accountability, independent assurance, regulatory oversight and systemic learning.

1.1 Why Reform was Necessary.

The Technical Division identified that variability in audit duration, team competence, audit practice, reporting quality and follow-up could reduce the level of assurance derived from audits. The reform programme therefore addresses the audit system as an assurance chain rather than as an inspection event. Following concern were noticed and prompted for audit reforms.

- TPIAs could use different audit formats, making reports difficult to compare and analyze.
- Audit team formation could be influenced by cost and logistics rather than domain competence.
- Audit duration needed a common basis linked to the size and complexity of the installation, facility, or network.
- Lead Auditor seniority and domain expertise required a minimum regulatory threshold.

- Audit findings required stronger tracking, accountability, and analysis of repeated non-conformities.
- PNGRB required an independent technical review layer for TPIA outputs.
- Lowest-quote engagement of TPIA could create pressure on audit quality and auditor availability.
- Reports required better standardization, timely submission, and clearer recommendations.
- Audit findings needed stronger tracking and accountability at entity level.
- Repeated non-conformities required analysis across entities rather than being treated as isolated observations.
- Auditor competence required continuous development, assessment, and knowledge sharing.

1.2 Regulatory Assurance Architecture

The PNGRB regulatory framework is built around T4S, ERDMP, IMS and TPCA. T4S establishes mandatory technical and safety requirements; ERDMP establishes emergency preparedness and response requirements; IMS establishes a structured approach to asset integrity; and TPCA provides the framework for independent third-party conformity assessment.

Assurance layer	Primary responsibility	What it must demonstrate	Regulatory value
Entity / management	Own and operate the asset safely.	Controls are designed, implemented, tested and maintained.	Primary ownership of risk.
Internal / first-party assurance	Test own compliance and control effectiveness.	Regulatory and safety controls are periodically assessed.	Early detection and self-correction.
TPIA	Independent conformity assessment.	Conformity is independently established with objective evidence.	Independent assurance.
PNGRB	Regulation, oversight, and intervention.	Systemic risks and material failures are identified and addressed.	Public-interest regulatory assurance.

1.3 Accountability chain

Actor	Core accountability	Expected evidence / output
Auditor	Evidence-based field verification and technical judgement.	Observation, regulatory reference, evidence, and recommendation.
Lead Auditor	Team direction and report quality.	Consistent approach, challenge of weak evidence and defensible conclusions.
TPIA Technical Manager	Technical review and quality control.	Internal review before finalization and competent deployment.
Entity Nodal Officer	Closure tracking and compliance reporting.	Updated status, action plans and evidence of completion.
Entity Top Management	Ownership of safety and compliance gaps.	Resources, mitigation, closure, and management attention.
PNGRB	Regulatory oversight, review, and systemic learning sharing.	Intervention, guidance, trend analysis and regulatory improvement and knowledge sharing.

1.4 High Level Expert Committee (HLEC) alignment

The reform direction is consistent with the High Level Expert Committee (HLEC) emphasis on stronger TPIA governance, auditor competence and training, expert review of TPIA reports, surprise / risk-based audits, Board-level visibility of audit outcomes and greater PNGRB involvement in the assurance process. The present booklet treats these as components of a larger assurance architecture.

HLEC report: https://www.pngrb.gov.in/pdf/TPIAs/HLC_20241206.pdf

CHAPTER 2

Audit Inputs, Competence, TPIA Quality and Commercial Governance

Strengthen the quality of the inputs to an audit before the site team starts work: adequate time, competent people, proper supervision, and a commercial model that recognizes technical quality.

The quality of an audit is significantly influenced by the quality of its inputs. Adequate time, competent auditors, appropriate supervision and a selection process that recognizes technical quality are essential for obtaining credible assurance from an audit. Chapter 2 focuses on strengthening these fundamental inputs before the audit team begins its field assessment.

The chapter presents the Audit Man-Days Matrix as a common basis for determining audit effort according to the size and complexity of installations, facilities and networks. It further addresses Lead Auditor competency, individual auditor eligibility, TPIA empanelment, technical supervision and the importance of actual field verification.

The chapter also describes the shift from predominantly price-driven TPIA selection towards Quality and Cost Based Selection (QCBS), together with minimum remuneration and professional charges. Collectively, these measures seek to ensure that audit quality is supported by adequate resources, appropriate technical competence, effective supervision and a commercial framework that recognizes professional audit effort.

2.1 Audit Man-Days Matrix

The Technical Division formulated and implemented an Audit Man-Days Matrix for T4S/IMS/ERDMP audits based on the capacity and size of the installation, facility, or network. It provides a common baseline for planning, resource deployment and review of audit duration.

Man-days matrix were introduced for site visits/audits with effect from 01.01.2025

Issue	Reform response	Assurance value	Implementation discipline
Variable audit duration	Minimum man-days linked to size/complexity of the installations.	Defines adequate audit effort.	Site time can be checked against a common baseline.
Planning difficulty	Common resource basis for TPIA.	Improved audit planning.	Opening/closing records accompany the audit report.
Team oversight	Prior approval of audit teams/site visits.	Better match between scope and competence.	TPIA Technical Manager/supervisor reviews the team and PNGRB approve.
Report quality	Internal TPIA review before final entity discussion.	Reduces avoidable technical/reporting errors.	Technical review becomes part of the audit process.

PNGRB Audit Man-Days Matrix: https://pngrb.gov.in/pdf/TPIAs/AMM_20241210.pdf

2.2 Lead Auditor / Competency Criteria

Minimum Lead Auditor designation criteria were introduced for site visits/audits with effect from 01.01.2025. The criteria establish a minimum leadership level for different sectors, while competence remains wider than designation alone.

Competence dimension	Evidence expected	Why it matters
Sector experience	Relevant operating / field experience in the audited scope.	Domain-specific judgement.
Audit experience	Demonstrable T4S/IMS/ERDMP audit experience.	Methodological competence.
Regulatory knowledge	Current PNGRB and statutory requirements.	Correct interpretation.

Competence dimension	Evidence expected	Why it matters
Technical judgement	Ability to identify material deviations and risk significance.	Quality of findings.
Reporting	Clear, actionable, and evidence-based observations.	Management can act on findings.
Independence	No conflict/commercial relationship with auditee.	Objective assessment.

PNGRB Lead Auditor criteria: https://pngrb.gov.in/pdf/TPIAs/LAD_20241210.pdf

2.3 Remuneration and QCBS

To improve the quality of audits, it has been decided to fix minimum remuneration for auditors and professional charges for TPIAs for audits carried out for entities under various scope sectors as per PNGRB Technical Regulations. It has been decided that entities should award the job of Audit to PNGRB empaneled TPIA based on Quality and Cost-based selection criteria (QCBS).

The 17.06.2025 Public Notice changed the remuneration and selection methodology for T4S/IMS/ERDMP audits. The final guidelines became effective from 01.08.2025. Minimum remuneration and professional charges were specified, and entities were directed to use Quality and Cost Based Selection rather than purely lowest financial quote selection.

2.3.1 Fixed Cost

i. Remuneration for Auditors:

Sr. No.	Designation	Minimum Remuneration Per day of site visit audit (INR)
1	Lead Auditor	10,000
2	Associate Auditors	8,000

ii. Professional charges for TPIAs:

Sr no	Sectors	Minimum Professional charges per day for site visit audit (INR)	
		T4S Audit	ERDMP or IMS Audit/ Certification
1	Refinery/GPU/LNG Terminal	15,000	17,000
2	CGD/NGPL/PPPL/LPG/POL	12,000	14,000
3	RO/Road Transport	10,000	12,000

Note-1: Values of above-mentioned Fixed Charges is valid for FY 2025-26 & FY 2026.

2.3.2 Variable Cost:

Cost with respect to Travel, Boarding, Lodging, Local Conveyance etc. may be decided between Entities and TPIA.

2.3.3 Selection/Tendering Process

It was formulated in the guidelines that Entities shall award the job of T4S/IMS/ERDMP Audits to PNGRB empaneled TPIAs based on Quality and Cost based selection (QCBS) criteria instead of purely based on lowest financial quote basis. QCBS shall be comprising on technical criteria as well as financial criteria as decided by respective entities and minimum weightage for technical criteria should be 70% of the total weightage/evaluation Criteria.

Note-2: Technical criteria for QCBS is being decided by the entities as per their requirements, considering risks & hazards etc. associated with their Installation/Facility/Network. Due weightage is being accorded for selection/engagement of well experienced and quality Auditors by the TPIAs, over and above the minimum qualification/experience prescribed by PNGRB.

Component	Provision as per guidelines	Purpose
Lead Auditor	Minimum remuneration of INR 10,000 per site-visit audit day.	Support deployment of experienced leadership.
Associate Auditor	Minimum remuneration of INR 8,000 per site-visit audit day.	Recognize professional audit effort.
TPIA professional charges	Sector-specific minimum charges for T4S and ERDMP/IMS audits.	Maintain viable technical service quality.
QCBS	Minimum 70% technical weightage.	Give technical quality greater weight than price alone.
Technical criteria	To reflect entity-specific risk/hazard and value experienced auditors.	Improve selection for complex facilities.

Public Notice, 17.06.2025: https://www.pngrb.gov.in/pdf/public-notice/20250617_PN.pdf

<https://pngrb.gov.in/eng-web/guideline.html#bm16>

2.4 TPIA Empanelment and Auditor Eligibility

Empaneled TPIA maintain independence and impartiality, demonstrate scope-specific competence and maintain adequate organizational controls. The credibility of the system ultimately depends on the individual auditor who performs the site assessment. While empanelment, following is being ensured:

- Empanelment must be backed by real organizational competence and supervision.
- Individual auditors must have relevant experience commensurate with the audited scope.
- Supervisors/ Technical Manages must provide technical oversight and witness auditor performance.
- Generic audit experience alone should not be treated as equivalent to sector/ domain competence.

- Site audit evidence must be established independently; entity-provided photographs or documents are not a substitute for field verification where physical verification is required.

2.4.1 TPIA Empanelment, Auditor Eligibility and Site-Audit Framework

TPIA empanelment is a competence-based approval Under the Petroleum and Natural Gas Regulatory Board (Third Party Conformity Assessment) Regulations, 2015, as amended, a Third-Party Agency (TPA/TPIA) is required to meet the PNGRB requirements as well as ISO/IEC 17020 requirements and other requirements/guidelines specified by PNGRB or the Accreditation Body. The TPA is essentially required to function as a Type-A inspection body, maintaining independence, impartiality, integrity, and confidentiality.

The basic eligibility requirements include:

- The TPIA must be a legal entity in India, or a reputed international inspection body having an office in India.
- It must demonstrate competence of its inspectors and supervisors, Technical Managers for the specific scope/sector for which empanelment is sought.
- It must have adequate financial capability. Its net worth must be positive, and it should not have incurred losses in any two consecutive financial years during the preceding three years.
- It must have an effective organization, monitoring, and control mechanism for carrying out inspection/audit functions.
- It must have adequate inspection/audit experience—normally not less than three years in the relevant Oil & Gas sector for which approval is sought. PNGRB retains discretion to consider agencies with lesser organizational experience where adequate qualified Oil & Gas personnel are available.
- Audits must be conducted through appropriately qualified supervisors and inspectors/auditors meeting the applicable competence requirements.
- Other requirements as per Petroleum and Natural Gas Regulatory Board (Third Party Conformity Assessment) Regulations, 2015,

2.4.2 Minimum manpower

The TPA is required to have on its regular rolls, at least:

- 5 Inspectors/Auditors, and
- 1 Supervisor with relevant experience for the applied scope,
- Supervisor: Inspector ratio of 1:5.

The TPA must also have a Technical Manager with overall responsibility for technical conformity-assessment activities. The Technical Manager is required to be a permanent employee of the TPA and must possess relevant Oil & Gas sector competence and knowledge of applicable PNGRB regulations.

Contract manpower is permitted, but the regulations require appropriate control over such manpower; the empanelment documentation specifies that contractual manpower should ordinarily be supported by a binding agreement of not less than one year, ensuring availability for TPIA work.

The TPIA must demonstrate that it has a real, controlled, and competent audit organization behind the name.

2.4.3 Eligibility of individual auditors for site visits

The credibility and effectiveness of the TPIA system ultimately depend on the competence, qualification and relevant field experience of the Inspector who visits the installation, carries out the inspection, verifies compliance with the applicable regulations, standards and codes, and signs the audit report.

Accordingly, an Inspector shall be appropriately qualified and competent for the specific scope of inspection. The Inspector is required to possess adequate domain knowledge, demonstrated capability to conduct field inspections, knowledge of applicable PNGRB regulations, standards and codes, and familiarity with relevant Quality Control systems, procedures, documentation, and Oil & Gas safety requirements. The competency of the Inspector shall be commensurate with the nature, complexity and risk profile of the installation and the scope of inspection.

Further, as stipulated under the applicable PNGRB Third Party Conformity Assessment (TPCA) Regulations, the Inspector shall have a minimum of five years of relevant working experience in operation and maintenance in the respective area/scope. The Inspector shall personally undertake the

field verification and shall be accountable for the observations, findings and compliance certification recorded in the audit report.

2.4.4 Supervisor, role & responsibility

A Supervisor shall first meet the qualification and competency requirements prescribed for an Inspector and shall thereafter possess at least one year of relevant inspection/examination experience in the specific area(s) for which he/she is responsible for supervision. The Supervisor shall have adequate knowledge of the applicable PNGRB regulations, standards and referenced codes, and shall be competent to evaluate the technical adequacy and quality of inspections carried out by the Inspectors under his/her supervision.

The Supervisor shall be responsible for the technical supervision and performance of the Inspectors, including ensuring that inspections are carried out in accordance with the approved scope, applicable PNGRB regulations, standards, codes, and prescribed procedures. Proper records of Inspector deployment, field assignments, supervisory activities, observations, and follow-up actions shall be maintained.

The Supervisor shall periodically evaluate and document the performance and competency of each Inspector, including conducting at least one on-site witness assessment of each Inspector every year. Additional witness assessments shall be undertaken wherever warranted based on the Inspector's performance, scope of work, nature and complexity of the installation, audit findings or other identified requirements.

2.4.5 Site visit /physical verification

The purpose of a PNGRB Third Party Conformity Assessment is to independently assess and establish conformity of the installation with the applicable PNGRB regulations, standards, codes, and prescribed requirements. The assessment shall be based on objective evidence obtained through document review, examination of records and procedures, interaction with concerned personnel and physical verification of the installation, equipment, and systems, as applicable to the scope of assessment.

During the site visit, the TPIA/Inspector shall, as applicable:

- Examine and verify relevant documents, records, logs, and procedures, including records relating to critical processes, inspections, testing,

maintenance and statutory/regulatory compliance.

- Physically verify the installation, process facilities, equipment, safety systems, firefighting systems and other relevant infrastructure covered under the applicable scope, including their condition, availability, and functionality, wherever required.
- Verify each applicable checklist requirement against objective evidence and record the compliance status only after the requirement has been duly verified through appropriate documentary and/or physical evidence.
- Undertake physical verification wherever the requirement relates to the actual condition, availability, installation, operation or implementation of infrastructure, equipment, safety systems, emergency preparedness, integrity management, operational practices, or procedures.
- Photographs, documents, or information provided by the entity may be considered as supporting evidence, wherever appropriate, but shall not be treated as a substitute for mandatory physical verification where the applicable requirement necessitates site assessment.

The responsibility of the TPIA is therefore not limited to checking documents or completing the checklist; it includes independent examination of objective evidence and appropriate field verification to establish whether the installation conforms to the applicable PNGRB requirements.

2.4.6 Frequency of TPIA audits

The TPCA Regulations prescribe the maximum periodicity for third-party audits.

S. No.	Name of Installation	Periodicity for T4S Audit (Years)	Periodicity for ERDMP Review and Certification (Years)
1	Refinery	3	3
2	Gas Processing station	3	3
3	LNG Re-gasification Installation	3	3
4	Natural Gas Pipelines	3	5
5	Propane/ Butane Pipelines	3	5
6	Liquid Petroleum Product Pipelines	3	5
7	Petroleum Storage Facilities	3	5
8	Gas Storage Facilities and terminals including storage facilities at LNG Regasification terminals	3	5
9	Hydrocarbon gas bottling Installations having receiving, storage and handling facilities including storage for LPG, propane and butane;	3	5
10	City or Local Natural Gas Distribution Network	3	5
11	Dispensing Stations and retail outlets	3**	5
12	Transportation of Petroleum Products by road	3***	5
13	Any other installation as may be notified by the Board from time to time	#	#

To be decided by the Board from time to time

**based on self-certification by the entity.

***to be verified along with the T4S inspection of installations or plants or depots or terminal or like other places.

The regulations expressly permit earlier audit/review where there is a major change, modification, debottlenecking, expansion, and change in technology/automation, ageing of the facility, changes in surrounding demography or other factors affecting the risk profile.

2.4.7. Previous non-compliances verification:

Every TPIA audit is required to include verification of actions taken against non-conformities raised during the previous inspection/audits.

Corrective action independently verified by the auditor against objective evidence and, wherever applicable, physical/site evidence.

Where a non-compliance is still outstanding, the entity is required to prepare a time-bound mitigation plan, agreed with the TPIA audit team, and submitted to PNGRB. The entity must thereafter submit quarterly progress reports on audit observations.

2.5 Reporting discipline

- The submission of reports, Flash Audit report, Mock drill reports, Opening and closing meeting report and previous audit compliance status reports within 48 hours of audit.
- Other reports like Check list, Audit summary and supporting annexures within 72 hours of the site visit.
- The entity nodal officer should track corrective actions and submit periodic compliance status.

2.5.1 Accountability chain

Actor	Accountability
Auditor	Evidence, observation, regulatory reference, and technical judgement.
Lead Auditor	Team direction, consistency, and report quality.
TPIA Technical Manager	Technical review and report quality control.
Entity Nodal Officer	Closure tracking and periodic compliance submission.
Entity Top Management	Ownership of material safety and compliance gaps.
PNGRB	Regulatory oversight, review, intervention, and systemic learning.

Public audit-report repository https://pngrb.gov.in/eng-web/t4s_audit_ngp.html

2.6 Reform transformed.

Earlier position / concern	Reform measure	Expected result
Audit time could vary.	Man-Days Matrix.	Minimum, risk-linked audit effort.
Team leader without adequate technical depth.	Lead Auditor criteria and competence expectations.	Stronger technical leadership.
Price could dominate TPIA selection.	Minimum remuneration + QCBS.	Higher emphasis on quality.
Organization-level competence could mask auditor-level gaps.	Auditor eligibility, supervision and witnessing expectations.	Accountability reaches the individual auditor.

CHAPTER 3

Standardization, First-Party Assurance, Transparency and Digital Audit

Create a common evidence trail, strengthen entity-owned assurance, improve closure visibility, and convert audit records into a usable regulatory dataset.

Consistency is essential for an audit system operating across diverse installations, facilities and networks. This chapter focuses on creating a common and comparable audit framework through standardized formats, typical checklists, strengthened first-party assurance, greater transparency and increasing use of digital tools.

The chapter explains how standardized audit documents and checklists establish a common evidence trail while retaining the requirement for professional judgement and physical verification. It also describes the strengthening of internal or first-party audits, including defined audit effort, senior-management accountability and mechanisms to reduce duplication of assurance activities.

The chapter further examines initiatives for greater transparency through web-hosting of audit reports and compliance status, as well as the progressive adoption of digital audit management, data analytics and MIS. These measures enable audit information to move beyond individual reports and become a usable regulatory dataset capable of identifying recurring observations, trends, anomalies and areas requiring further intervention.

3.1 Standardized Audit Formats

The reform standardized the principal audit documents check list while retaining the requirement for professional judgement and actual field verification.

Standard format	Purpose
Desk Review / Manual Adequacy Report	Identify documentary gaps before the site visit.
Opening & Closing Meeting Report	Record audit start/end, participation, and accountability.
ERDMP / T4S / IMS Checklists	Provide structured regulatory verification.

Standard format	Purpose
Flash Audit Report	Provide rapid visibility of significant site observations.
Mock Drill Report	Record evidence of drill performance and gaps.
Previous Audit Compliance Status	Verify closure and recurrence of earlier observations.

PNGRB Typical Site Audit Checklists: <https://pngrb.gov.in/eng-web/TypicalSiteAuditChecklists.html>

3.2 Typical Site Audit Checklists

Typical Site Audit Checklists are publicly hosted references for auditors and regulated entities. They cover process and facility arrangements, fire protection and fire-water systems, emergency control rooms, emergency drills, safety training, statutory approvals, earthing, gas detection, ESD, work permits, maintenance, safety-system testing and previous audit compliance.

3.2.1 Typical checklist coverage

- Process and facility arrangements.
- Fire protection and fire-water systems.
- Emergency control room and emergency response arrangements.
- Mock drills and on-site/off-site emergency response drills.
- Safety training and general safety awareness.
- PESO approvals, statutory licenses, and approved layouts.
- Earthing, gas detection and ESD systems.
- Work permits and job safety analysis.
- Maintenance records and safety-system testing.
- Previous audit compliance and outstanding recommendations.
-

The typical checklists also contain a detailed sample audit format, including checks for QRA, HAZOP, safety audits, safety committee meetings, work permits, training, fire protection, emergency systems, maintenance, SOPs, statutory licenses, earthing, ESD, visitor briefing and general safety awareness.

These checklists have been developed ensuring all regulatory provision of T4S/IMS/ ERDMP regulations.

Typical Site Audit Checklists: <https://pngrb.gov.in/eng-web/TypicalSiteAuditChecklists.html>

Example: Typical T4S LPG checklist: https://pngrb.gov.in/pdf/TSACL/TSACL_T4S_LPG.pdf

3.3 Internal / First-Party Audit Interface

To improve the quality and effectiveness of Internal Audits, reduce duplication of audits, promoting ease of doing business, and to ensure uniformity & adequacy of Internal Audits under Regulation 6(2)(a), of the PNGRB TPCA Regulations 2015, a guideline has been issued for Internal Audits. Internal Audits to be carried out in accordance with the following requirements:

- i. Internal Audits shall be conducted using the typical checklists for relevant PNGRB Regulations, as made available on the PNGRB website.
- ii. Internal Audits shall be conducted with minimum man-days as specified by PNGRB.
- iii. In view to reduce duplication in the audit process, OISD audits, if conducted during any financial year, will be treated equivalent to internal audit and will be accepted as fulfilment of the Internal Audit requirement under PNGRB TPCA Regulations for the corresponding financial year.
- iv. Non-conformities of High-High (HH) and High (H) criticality levels shall be submitted to PNGRB within one week of completion of the site visit.
- v. Designated Business Head / Executive Director / Vice President of the entity shall plan and ensure that Internal Audits are undertaken as per relevant PNGRB Regulations and shall submit a consolidated compliance status of all non-conformities to PNGRB on quarterly basis.
- vi. Director nominated to ensure compliance of relevant PNGRB Technical Regulation(s), shall submit compliance status along with action plan for all non-conformities to PNGRB, on Annual basis.

The above measures are intended to strengthen the effectiveness of Internal Audits, enhance identification & timely mitigation of safety-critical non-conformities, and ensure accountability at senior management level. Standardization of Internal audit methodology and acceptance of OISD audits as internal audits are expected to reduce duplication while improving focus on safety, integrity, and regulatory compliance.

First-party assurance requirement	Purpose / assurance value
Use PNGRB typical checklists.	Create a common regulatory coverage baseline.
Meet prescribed minimum internal-audit man-days.	Ensure adequate effort.
Accept qualifying OISD audits as internal audit where applicable.	Reduce duplication of assurance effort.
Report HH and H non-conformities within prescribed timeline.	Escalate critical safety issues.
Senior management to plan and monitor internal audits.	Strengthen ownership and accountability.
Periodic consolidated compliance status.	Create a management-level view of open findings.

Internal Audit guidelines: <https://pngrb.gov.in/eng-web/guideline.html#bm17>

3.4 IEFCV / EFCV: From Requirement to Lifecycle Control

Technical Standards and Specifications including Safety Standards for LPG Storage, Handling and Bottling Facilities Regulations, 2019, has mandated that each liquid or vapor pipeline and pressure gauge nozzle of LPG Mobile Pressure Vessels (LPG Tank Trucks) shall be provided with an Internal Excess-Flow Check Valve (IEFCV) duly type-approved by the Petroleum and Explosives Safety Organization (PESO).

In the regulation, it is mandated that each IEFCV shall be replaced after completion of 10 years of service life, and earlier in case the valve is found defective during operation or inspection. The provision is regulatory and intended to mitigate risks associated with ageing and potential failure of safety-critical components in LPG Mobile Pressure Vessels

IEFCVs are critical safety fittings installed in LPG mobile pressure vessels to automatically restrict flow of LPG in the event of hose failure, pipeline rupture, or other emergency situations. Periodic inspection, testing, and replacement of IEFCVs are essential to minimize its failure in case of any leakage/emergency.

PNGRB's web-hosted guideline dated 18.03.2026 addresses replacement and

testing of Internal Excess-Flow Check Valves (IEFCVs) in LPG mobile pressure vessels. It is a concrete example of a safety reform moving from regulatory requirement to operational control.

Lifecycle control	Regulatory / operational action
Identification	Check identification number, make and size against certificates before loading/unloading.
Records	Maintain fitment, testing, installation, and replacement records.
Annual examination	Operational fitness / differential pressure testing by approved competent person/TPIA.
Five-year examination	Operational fitness and closing-flow measurement / physical examination.
Ten-year replacement	Replace every ten years or earlier if defective.
Coupling integrity	Check with calibrated ring/plug gauges during prescribed inspection.
Pre-loading control	Stop filling where the IEFCV/coupling is insecure or loose.

3.4.1 Salient feature of the guideline.

1. Entities shall visually check IEFCVs fitment details (Identification No., Make & Size) and match such details with certificates issued by Competent person / TPIA under Rule 18 and 19 of SMPV (U) Rules, 1981, before loading/unloading any LPG Mobile Vessel.
2. Entities shall maintain the record of IEFCV fitment details (Identification No., Make & Size) and its testing/installation/replacement date of all LPG Mobile Vessels handled all their locations/installations.
3. IEFCV for LPG Mobile gas Tankers shall be examined by PESO approved competent person/TPIA, for its operational fitness/tests for differential pressure at closing flow rate including physical examination & adequacy of the size in relation to the vessel etc., annually, as per Rule 18 of SMPV (U) Rules.
4. IEFCV for LPG Mobile gas Tankers shall be examined by PESO approved competent person/TPIA, for its operational fitness/tests for differential pressure at closing flow rate & closing flow measurement including physical examination & adequacy of the size in relation to the vessel etc., every five years, as per Rule 19 of SMPV (U) Rules. Note: The record of such

inspections as per Rule 18 and Rule 19 of SMPV (U) Rules, 1981 shall be checked by entities before loading / unloading of LPG into the mobile pressure vessel.

5. Each IEFCV shall be replaced by a new IEFCV every ten years and if found defective during operation or any of the earlier inspection, it shall be replaced at that time itself i.e., earlier than ten years as per PNGRB T4S for LPG Storage/Handling Regulation, 2019.
6. Compliance to PESO Circular PV(T) General/2022, dated 08.10.2025, shall be ensured as per following:
 - a. IEFCV and IEFCV coupling functionality shall be checked by competent persons / TPIAs, approved by PESO during annual and periodic inspections of Mobile pressure vessels under Rule 18 and Rule 19 certification respectively.
 - b. While issuing Rule 18 and Rule 19 certification, IEFCV and IEFCV coupling welded to mobile tankers shall be checked by use of calibrated ring gauge and plug gauge. If the thread of IEFCV is found not fit for use, then such IEFCV shall be rejected and replaced with new IEFCV.
 - c. In case of thread of coupling is not fit for use, such mobile pressure vessel shall be advised for replacement of coupling at fabrication shop approved by PESO.
 - d. Before filling LPG (or compressed gas) into the mobile pressure vessels, Oil marketing companies (OMCs)/Entities, shall visually inspect the IEFCV and if the joint is found insecure / loose, filling of compressed gas must be stopped.

PNGRB issued Public Notice dated 18.03.2026, wherein guidelines have been stipulated to enhance safety in LPG transportation and handling considering the major road incidents happened in recent past.

PNGRB IEFCV guideline: <https://pngrb.gov.in/eng-web/guideline.html#bm18>

3.5 Webhosting of Audit Reports

PNGRB has taken an initiative to web-host Third-Party Inspection reports of downstream oil and gas installations along with their respective compliance status. This proactive measure is aimed at reinforcing transparency, accountability, and public confidence in the downstream petroleum and natural gas sector. Through this initiative PNGRB seeks to address:

- a. Transparency and Good Governance – Webhosting of TPIA audit reports

along with their compliance status, on the public platform will enable open, verifiable, and traceable disclosure of compliance outcomes. This initiative promotes the principles of good governance by ensuring that any non-conformities are attributable to the respective entities, thereby enhancing deterrence, accountability, and both legal and ethical responsibility across the sector. It also meets the transparency objective of the regulatory function of PNGRB.

- b. **Public Awareness of Compliance Status – Making TPIA reports publicly accessible** allows consumers, nearby communities, Investors, and other stakeholders to stay informed about the compliance status of entities and the corrective actions implemented. Such transparency fosters informed decision-making, strengthens regulatory credibility, and builds trust among all stakeholders.
- c. **Public Safety Awareness – Disclosure of TPIA audit outcomes** reassures residents living near operational facilities that prescribed technical and safety standards are being adhered to. This enhances public awareness of safety measures and reinforces confidence in the safe and environmentally responsible operation of downstream oil and gas installations.
- d. **Knowledge Sharing and Speedy Compliance – Webhosting of audit reports and compliance status** promotes sector-wide knowledge sharing of best practices, while simultaneously encouraging entities to address non-conformities promptly. The visibility of corrective actions accelerates compliance and motivates adherence to higher standards of diligence, safety, and service delivery across the sector.

The Public Notice dated 30.10.2025 records PNGRB's initiative to webhost TPIA reports of downstream oil and gas installations together with compliance status.

Issue	Reform response	Outcome intended
Limited public visibility	Webhost TPIA Audits reports and compliance status.	Traceable compliance information.
Repeated gaps difficult to compare	Common public repository.	Sector-wide visibility and learning.
Closure status not easily visible	Publish compliance status with reports.	Stronger accountability.
Transparency without audit quality could amplify poor findings	Strengthen upstream competence, standardization and review.	Public transparency built on credible evidence.

Public Notice, 30.10.2025 –https://pngrb.gov.in/pdf/public-notice/20251030_PN.pdf

LPG reports: https://pngrb.gov.in/eng-web/t4s_audit_lpg.html

3.6 Digital Audit & Data Analytics

The PNGRB is progressively using audit-management software and data analytics to identify trends, anomalies, repeated non-conformities and areas requiring regulatory intervention.

3.6.1 Digital audit chain

Stage	Digital control
Empanelment	Digital application, competency, and document verification.
Audit allocation	Structured job and scope information.
Team approval	Auditor details and prior approval.
Site audit	Standardized formats and evidence.
Report submission	Digital reporting.
Compliance	Finding-wise closure tracking.
Analytics	Repeat observations, sector trends and anomaly detection.
Regulatory action	Expert review and amendment/clarification pipeline.

Digital site: <https://eportal.pngrb.gov.in/app/>

3.7 PNGRB Regulatory Framework: Governing Audits

The PNGRB regulatory framework for safety and compliance is built around Technical Standards & Specifications including Safety Standards (T4S), Emergency Response & Disaster Management Plan (ERDMP), Integrity Management System (IMS), and Third-Party Conformity Assessment (TPCA). These are notified regulations and are applicable to entities/facilities falling within their respective scope.

3.7.1. T4S – Technical Standards & Specifications including Safety Standards

Regulatory Name: Petroleum and Natural Gas Regulatory Board (Technical Standards and Specifications including Safety Standards) *Regulations, IMS and ERDMP applicable to respective sectors.*

Purpose: Prescribes mandatory technical, operational and safety requirements for PNGRB-regulated infrastructure.

Coverage includes:

- a) Petroleum and Natural Gas Regulatory Board (Technical Standards and Specifications including Safety Standards for City or Local Natural Gas Distribution Networks) Regulations, 2008.
- b) Petroleum and Natural Gas Regulatory Board (Technical Standards and Specifications including Safety Standards for Natural Gas Pipelines) Regulations, 2009.
- c) Petroleum and Natural Gas Regulatory Board (Technical Standards and Specifications including Safety Standards for Petroleum and Petroleum Products Pipelines) Regulations, 2016.
- d) Petroleum and Natural Gas Regulatory Board (Technical Standards and Specifications including Safety Standards for Liquefied Natural Gas Facilities) Regulations, 2018
- e) Petroleum and Natural Gas Regulatory Board (Technical Standards and Specifications including Safety Standards for [dispensing of Automotive Fuels]) Regulations, 2018.
- f) Petroleum and Natural Gas Regulatory Board (Technical Standards and Specifications including Safety Standards for LPG Storage, Handling and Bottling Facilities) Regulations, 2019.
- g) Petroleum and Natural Gas Regulatory Board (Technical Standards and Specifications including Safety Standards for Petroleum Installations) Regulations, 2020.
- h) Petroleum and Natural Gas Regulatory Board (Technical Standards and Specifications including Safety Standards for Petroleum Refineries and Gas Processing Plants) Regulations, 2023.

The applicable T4S /IMS regulations are sector-specific, and compliance is subject to regulatory audit/inspection.

3.7.2. ERDMP – Emergency Response & Disaster Management Plan

Regulatory Name: Petroleum and Natural Gas Regulatory Board (Codes of Practices for Emergency Response and Disaster Management Plan) Regulations, 2010 (as amended).

Purpose: Establishes the regulatory framework for emergency preparedness, response, disaster management and mitigation for PNGRB-regulated entities.

It covers requirements for emergency planning, preparedness, response organisation, resources, communication, emergency control, drills/exercises, and disaster management arrangements. The current PNGRB page lists the consolidated ERDMP regulations up to 23.07.2025, with subsequent amendment notified on 07.08.2026.

3.7.3 IMS – Integrity Management System

IMS regulations provide a systematic and risk-based framework for maintaining the integrity of pipelines and networks throughout their operating life.

PNGRB has notified separate IMS regulations for:

- Natural Gas Pipelines: *PNGRB (Integrity Management System for Natural Gas Pipelines) Regulations, 2012 (as amended)*.
- City Gas Distribution Networks: *PNGRB (Integrity Management System for City or Local Natural Gas Distribution Networks) Regulations, 2013 (as amended)*.
- Petroleum & Petroleum Products Pipelines: *PNGRB (Integrity Management System for Petroleum and Petroleum Products Pipelines) Regulations, 2021*.

IMS addresses integrity assessment, inspection, monitoring, risk identification, mitigation and management of threats to pipeline/network integrity.

3.7.4. TPCA – Third-Party Conformity Assessment

Regulatory Name: *Petroleum and Natural Gas Regulatory Board (Third Party Conformity Assessment) Regulations, 2015 (as amended)*.

Purpose: Provides the framework for independent third-party conformity assessment and auditing of compliance with PNGRB regulations.

TPIAs are required to meet prescribed competence and accreditation requirements, and audits are to be conducted by qualified personnel within the approved scope of the TPIA.

CHAPTER 4

Independent Review, Incident Learning, Training and Knowledge Sharing

Build a continuous learning system in which audit evidence, incidents, expert review, training and regulatory improvements reinforce each other.

A mature assurance system must not end with the submission of an audit report. Audit findings, incident investigations and management-system reviews need to be critically examined, interpreted and converted into actionable learning. This Chapter addresses this important dimension by establishing a framework for independent technical review, incident learning, competency development and knowledge sharing.

The chapter introduces the role of external technical experts in reviewing TPIA audit reports, incident investigation reports and IMS/ERDMP documentation. The expert review mechanism provides an additional layer of technical scrutiny, supports consistent interpretation of requirements, identifies recurring or systemic gaps and provides inputs for regulatory improvement.

The chapter also describes the conversion of incident experience into case studies, safety films, training programmes and knowledge-sharing initiatives. Through auditor interactions, capacity-building programmes and engagement with sector experts, the reform programme seeks to create a continuous feedback loop in which field experience and incidents strengthen audit methodology, training, safety practices and regulatory requirements.

4.1 Expert Panel for Technical Review

The Technical Division identified the need for a dedicated external technical review layer because large volumes of TPIA reports, incident reports and IMS/ERDMP documents require specialized scrutiny.

The compliance to Technical & Safety Regulations is being monitored mainly through Third Party Inspection Agency (TPIA) Audits. During 2025-26, 8855 audits were undertaken under relevant PNGRB technical/safety regulations which may further increase in the coming time. Extensive review of these reports is required to check compliance status and effectiveness of Audit System. Apart from this, Incident Investigation Reports, ERDMP & IMS documents submitted to PNGRB also requires review. Considering the need, pool of External Technical Experts institutionalized with the sole task of critically reviewing all the technical/audit

reports and recommend measures for short/medium/long term actions.

The experts provide their observations/comments after scrutinizing the audit report/incident investigation reports/IMS/ERDMP Manuals. The deliverables of the experts are as follows:

4.1.1 Review of Audit Reports:

- Review of non-compliances and segregation of NCs based on their criticality namely – High-High, High, Medium, Low.
- Providing recommendation/suggestions based on best practices/standards adopted in the Oil & Gas sector both at the national and international levels.
- Any other observations on the report that can lead to accident or affect public safety.

4.1.2 Review of Incident Investigation Reports:

- Review the Root Cause arrived by the Investigation Committee.
- Providing recommendations/suggestions to prevent the recurrence of the incidents based on best practices/standards adopted in the Oil & Gas sector both at the national and international levels.
- Highlighting lapses/gaps in the investigation report mainly from observations, root cause & recommendations.
- Review whether recommendations are covering all the facts, observations and root cause, to prevent recurrence of the incident.
- Specifying various violations of PNGRB Technical Regulations.

4.1.3 Review of IMS/ERDMP Manuals:

- Review of IMS/ERDMP manual to check non-compliance/deviations from PNGRB IMS /ERDMP Regulations.
- Checking if proper QRA/HAZOP/HIRA are carried out and all the risks are in ALARP category.
- Checking if an effective workable emergency handling organogram is in place.
- Review the tests/checks/schedules/procedures mentioned in the IMS manual to ensure integrity of the system.
- Any other recommendation to improve the overall emergency preparedness/integrity management of the entity/assets based on best practices/standards adopted in the Oil & Gas sector both at the national and international levels.

4.1.4 Role of the expert review layer

- Peer review of TPIA reports.
- Calibration of interpretation of regulatory requirements.
- Identification of repeated or systemic gaps.
- Review of ERDMP/IMS manuals and incident investigation reports.
- Identification of subjects requiring regulatory clarification or amendment.
- Knowledge sharing with the Technical Division and, where appropriate, entities/TPIAs.
- Suggest best national and international practices.
- Suggest Regulatory changes required based on audit finding and Incident investigation report analysis.

Review domain	Key expert responsibility	Expected institutional value
TPIA audit reports	Review NCs and criticality; identify technical/public-safety concerns.	Independent calibration of findings.
Incident reports	Challenge root cause, lapses, and recurrence-prevention recommendations.	Stronger learning from failures.
IMS / ERDMP manuals	Review compliance, QRA/HAZOP/ HIRA, emergency arrangements and integrity controls.	Better management-system assurance.
Regulatory learning	Identify repeated/systemic gaps and subjects requiring clarification/ amendment.	Input into future regulatory improvement.

4.2 Incident Investigation and Case Studies

To disseminate the learning, PNGRB web hosted the case studies in PNGRB website are based on real events and are intended for academic/learning purposes only. The purpose of case studies sharing is strictly for knowledge dissemination and shared to promote learning & to enhance safety practices and to reduce the risk of similar incidents in the downstream Oil & Gas sector.

4.2.1 Case-study mechanism

- Major incident investigation identifies immediate causes, underlying causes, lapses and recommendations.
- Selected incident learnings are converted into public case studies.

- Case studies allow auditors and entities to test whether similar vulnerabilities exist at other locations.
- Incident findings would lead to enhancement in audit checklists, training content and regulatory amendments.

Learning chain	Expected action
Incident	Identify immediate causes, underlying causes, lapses, and recommendations.
Case study	Convert lessons into a structured learning product.
Audit translation	Create or strengthen relevant audit questions/checks.
Training	Use the case in auditor/entity/frontline learning.
Regulatory feedback	Consider checklist, guideline, or regulation improvement where recurring/systemic.

PNGRB Case Study – NGPL incident: https://pngrb.gov.in/pdf/CaseStudies/20250630_CSR_CS6.pdf

PNGRB Case Study – CNG cylinder incident: https://pngrb.gov.in/pdf/CaseStudies/20251023_CSR_CS10.pdf

PNGRB Case Study – Retail Outlet incident: https://pngrb.gov.in/pdf/CaseStudies/20260220_CSR7.pdf

4.3 Safety Films and Visual Learning

The PNGRB maintains a public Safety Films / Video Gallery intended for knowledge dissemination and enhancement of safety practices. Visual learning makes incident sequences, unsafe acts, correct practices, and emergency response more memorable and accessible to frontline and contractor personnel. The purpose of Films/ Videos / Animated films sharing is strictly for knowledge dissemination and to promote learning & to enhance safety practices and encourage adherence to best practices in the downstream Oil and Gas sector.

4.3.1 Why visual learning belongs in audit reform.

- Audit findings are easier to retain when converted into visible unsafe acts, incident sequences or correct practices.

- Safety films can be used before audits, during training and during entity-level safety meetings.
- Visual case learning can bridge the gap between regulatory language and field behavior.
- Films would support contractor and frontline-worker awareness where long regulatory documents may not be effective.

PNGRB Technical Division Safety Films – Video Gallery: <https://pngrb.gov.in/eng-web/video-gallery.html>

PNGRB Knowledge Sharing: <https://pngrb.gov.in/eng-web/knowledge-sharing.html>

4.4 Auditor Interaction and Competency Building

The Technical Division has undertaken various workshops and virtual interactions with TPIAs, auditors and sector stakeholders on audit methodology, quality, reporting, ERDMP, incident learning, mock-drill evaluation and related safety subjects.

Initiative / forum	Focus documented in the booklet
TPIA / auditor interactions	Audit methodology, quality, evidence-based reporting, and recurring observations.
GIDM programmes	Safe road transportation, journey risk management, emergency response and disaster management.
DMI programme	Safety, emergency response, risk assessment, HAZOP, QRA and ERDMP.
AMPP/ NACE interaction	Corrosion control on mounded LPG bullets and auditor competency building.
Knowledge-sharing workshops	Continuous exchange between entities, TPIAs, auditors and Technical Division.

4.5 Institutional learning objective

The PNGRB objective is to move beyond a one-way regulatory compliance approach towards a structured institutional learning framework, where audit and incident experience is systematically converted into improved safety practices and regulatory effectiveness.

During the various workshops and interactions, TPIAs are provided with clear expectations regarding competency, methodology, scope and quality of conformity assessment, regulated entities gain greater clarity on their responsibility for first-party assurance and sustained compliance and technical experts provide independent technical review and challenge. The findings emerging from audits, inspections and incidents are to be systematically analyzed and used to strengthen checklists, identify recurring areas of non-compliance, improve training and competency development, refine audit practices and support evidence-based regulatory improvements.

The focus is on ensuring that lessons from audits and incidents are captured, analyzed, disseminated, and translated into preventive actions, thereby creating a continuous feedback loop between field experience, audit findings, training, industry practices and regulatory development.

4.5.1 Auditor Interaction, Training & Knowledge Sharing

Audit reform is incomplete without auditor engagement. PNGRB has used workshops, virtual interactions, and capacity-building programmes to discuss audit methodology, audit quality, reporting, incident learning, ERDMP and related safety subjects.

4.5.2 Engagement Details

Date	Engagement
24.02.2025	Knowledge Sharing Workshop on Capacity Building of TPIAs, New Delhi.
29.05.2026	Capacity-building training programmes with GIDM, Gandhinagar.
29.05.2026	Capacity-building training programmes with DMI, Bhopal.
25.07.2026	Virtual knowledge-sharing interaction with empanelled TPIAs on audit methodology, audit quality and audit reporting.

4.5.2.1 TPIA / Auditor Interaction: 15.07.2026

A virtual meeting / interaction with the empaneled Third-Party Inspection Agencies (TPIAs), their Technical Managers, supervisors and auditors engaged in conducting audits under various PNGRB Regulations was held on

15 July 2026 at 1500 hrs. The meeting was convened to deliberate on audit methodologies, audit quality, reporting practices and common deficiencies observed during the review of audit reports submitted under various PNGRB Regulations. The objective of the interaction was to promote uniformity, objectivity, and technical excellence in audits and to strengthen compliance with the regulatory framework governing the Petroleum and Natural Gas sector.

During the meeting recurring observations noticed during the scrutiny of audit reports and emphasized the need for technically sound, evidence-based, and impartial audits to improve regulatory compliance and enhance safety performance across the Petroleum and Natural Gas sector.

During the interaction it was emphasized that audits should not merely verify documentary compliance but should critically assess implementation of safety management systems, operating practices, maintenance procedures, emergency preparedness, statutory compliance, and field conditions. Auditors were advised to objectively identify systemic deficiencies, unsafe practices, deviations from Standard Operating Procedures (SOPs), deficiencies in contractor management and other factors having a bearing on process safety.

Key Deliberations and Directions: Following issues were deliberated during the interaction and appropriate directions were issued:

- PNGRB Regulations and statutory provisions.
- Safety and compliance architecture.
- ERDMP framework.
- Audit methodology.
- Incident reporting and investigation, learning from root-cause analysis.
- Guidelines, Public Notices and SOPs relating to IEFCV, Road Transportation and Compensation were discussed in length and its essence were described.

Key focused areas as mentioned below deliberated in length:

- Regulatory Compliance and Audit Methodology
- Improvement in Audit Quality
- Audit Documentation
- ERDMP Audit Observations
- Mock Drill Evaluation
- Suggestions received from TPIAs/ Expert panel.
- Future Initiatives



PNGRB Knowledge Sharing archive: <https://pngrb.gov.in/eng-web/knowledge-sharing.html>

4.5.2.2 Capacity Building & Knowledge Sharing Programmes by Gujarat Institute of Disaster Management

Safe Road Transportation of Hazardous Goods:

A three-day Capacity Building Program on Safe Road Transportation of Hazardous Goods was jointly conducted by the Petroleum and Natural Gas Regulatory Board (PNGRB) and the Gujarat Institute of Disaster Management (GIDM) during 29–31 January 2026 at the GIDM Campus, Gandhinagar. The program was organized with the objective of strengthening safety awareness, operational preparedness, and institutional resilience across the oil and gas sector.

The program was aligned with national efforts to enhance regulatory and operational capacities related to the safe movement of hazardous goods by road. In view of the expanding oil and gas infrastructure and increasing transport demands, focused attention was given to key operational areas such as vehicle safety systems, driver safety practices, and journey risk management to minimize transportation-related risks.

The training included expert-led technical sessions, practical case discussions, and good practices, enabling participants to strengthen their understanding of journey risk assessment, application of technologies such as Vehicle Tracking System and Geographic Information System, and issues related to tanker truck drivers.





4.5.2.3 Emergency Response and Disaster Management Plan (ERDMP)

A three-day Capacity Building Program on Emergency Response and Disaster Management Plan (ERDMP) was jointly organized by the Petroleum and Natural Gas Regulatory Board (PNGRB) and the Gujarat Institute of Disaster Management (GIDM) from 11th to 13th November 2025 at the GIDM Campus, Gandhinagar. The program was conducted with a aim to promote a culture of safety, preparedness and resilience across India's oil and gas value chain.

This initiative formed part of a broader national effort to strengthen institutional and technical capacities for emergency response and disaster risk management within the energy sector. Considering the growing complexity and scale of oil and gas infrastructure, the program emphasized the need for systematic emergency planning, inter-agency coordination and strict adherence to PNGRB's ERDMP Regulations, 2010, to ensure effective preparedness and response mechanisms.

Through expert-led sessions, case studies and table-top exercises, the participants enhanced their understanding of risk assessment, hazard identification, emergency response mechanisms and resilience-building measures were undertaken during training programme. The program provided a comprehensive platform for knowledge sharing, practical learning, and alignment with both national safety regulations and international good practices in disaster management for the oil and gas sector.





4.5.2.4 Safe Road Transportation of Hazardous Goods

A three-day Capacity Building Program on Safe Road Transportation of Hazardous Goods was jointly organized by the Petroleum and Natural Gas Regulatory Board (PNGRB) and the Gujarat Institute of Disaster Management (GIDM) from 26th to 28th November 2025 at the GIDM Campus, Gandhinagar. The program was aimed at promoting a culture of safety, preparedness and resilience across India's oil and gas value chain.

This initiative formed part of a broader national effort to strengthen institutional and technical capacities for the safe road transportation of hazardous goods. Considering the growing complexity and scale of oil and gas infrastructure, the program emphasized the need for improvement in vehicle safety management, driver safety management, journey risk management, etc., to ensure safe transportation of hazardous goods.

Through expert-led sessions, case studies and mock-drill, the participants enhanced their understanding of journey risk assessment, use of advanced technology like VTS, GIS, etc. and TT driver issues were undertaken during training programme. The program provided a comprehensive platform for knowledge sharing, practical learning, and alignment with both national safety regulations and international good practices in disaster management for the safe transportation.





4.5.2.5 Emergency Response and Disaster Management Plan (ERDMP)

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 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.

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 were undertaken during training programme. 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.





4.5.2.6 National training program of capacity building on safety, emergency response and disaster risk management organized by DMI by Disaster Management Institute, Bhopal.

Disaster management and industrial safety have become increasingly important in today's rapidly developing industrial environment, particularly in sectors such as oil and gas where operational risks and potential hazards are significant. Effective disaster preparedness, safety management, and emergency response planning are essential to minimize risks, protect human life, safeguard the environment, and ensure sustainable industrial operations. Recognizing this need, the Disaster Management Institute (DMI), Bhopal, organized a National Training Program on "Capacity Building on Safety, Emergency Response and Disaster Risk Management for Oil and Gas Sector Industries" in collaboration with the Petroleum and Natural Gas Regulatory Board (PNGRB).

The training program was conducted on 9–10 March 2026. The program aimed to strengthen the knowledge and capabilities of professionals working in the oil and gas sector by focusing on regulatory frameworks, hazard identification, risk assessment, emergency preparedness, and environmental management. The training sessions, delivered by experienced experts and practitioners, provided valuable insights into industry standards, safety practices, and disaster risk reduction strategies.

Training program with DMI highlights the importance of collaboration between regulatory bodies, industries, and disaster management institutions in building a safer and more resilient industrial environment. It is hoped that the information presented in this report will contribute to improving safety awareness, enhancing emergency response capabilities, and promoting best practices in disaster risk management within the oil and gas sector.

The training programme was focused to enhance the knowledge and capacity of participants regarding safety management and disaster risk management in the oil and gas sector and covered following aspects.

- Regulatory framework and guidelines issued by the Petroleum and Natural Gas Regulatory Board (PNGRB) for safe operations in oil and gas industries.
- To provide an understanding of hazard identification techniques such as HAZOP, and safety audits for identifying potential industrial risks.
- To develop skills in consequence analysis and quantitative risk assessment (QRA) for effective risk management.
- To strengthen participants' ability to prepare and implement Emergency Response and Disaster Management Plans (ERDMP).
- To promote awareness about environmental protection, hazardous waste management, and environmental impact assessment related to oil and gas industries.

PNGRB Knowledge Sharing archive: <https://pngrb.gov.in/eng-web/knowledge-sharing.html>



Disaster Management Institute, Bhopal
National Training Program of Capacity Building on Safety, Emergency Response
and Disaster Risk Management for Oil And Gas Sector Industries in Collaboration with PNGRB
6-10 March 2016

Disaster Management Institute, Bhopal
Paryavaran Park, E-5 Arera Colony, Bhopal- 462016

CHAPTER 5

Outcome Assurance and Journey towards Responsible Self-Regulation

Move progressively from regulator-dependent compliance checking towards responsible self-regulation by entities, without diluting statutory oversight or independent assurance.

The ultimate purpose of audit reform is not simply to increase the number of audits or strengthen procedural compliance, but to achieve credible and sustainable assurance of safety, integrity and regulatory compliance. Chapter 5 examines how the strengthened audit ecosystem can progressively support a transition towards responsible self-regulation by regulated entities.

The chapter recognizes that entities are the first parties responsible for identifying hazards, maintaining controls, monitoring asset condition, managing personnel and contractors, and correcting deficiencies. At the same time, responsible self-regulation does not imply reduced safety obligations or withdrawal of regulatory oversight. It requires entities to demonstrate that their internal controls and assurance processes are effective, supported by reliable evidence and subject to independent verification where required.

The chapter therefore presents the assurance journey from prescriptive regulatory compliance and first-party assurance to independent verification, risk-based regulatory oversight and, ultimately, responsible self-regulation. The emphasis remains on maintaining transparency, accountability and PNGRB's ability to review, challenge and intervene where risk or performance warrants.

5.1 The Imperative for transition towards Self-Regulation.

In a sector with a large and geographically dispersed asset base, continuous regulator-led verification of every operational control is neither the most efficient nor the strongest assurance model. The entity that owns and operates the asset is the first party responsible for identifying hazards, maintaining controls, monitoring degradation, training personnel, managing contractors, and correcting deficiencies.

Self-regulation, however, should not be interpreted as reduced safety obligations or withdrawal of regulatory oversight. Responsible self-regulation means that the entity develops the capability and discipline to assure itself, produces reliable evidence of that assurance, and accepts that PNGRB can independently evaluate, challenge, or intervene where the evidence, risk, or performance warrants.

5.2 The assurance journey

Stage	Regulatory / assurance position	Reform foundation	Maturity expected
Stage 1 — Prescriptive compliance	Requirements are defined and conformity is checked.	T4S, ERDMP, IMS and TPCA framework.	Minimum statutory and technical baseline.
Stage 2 — First-party assurance	Entity checks its own compliance and control effectiveness.	Internal-audit requirements, typical checklists, senior management accountability.	Management owns recurring assurance.
Stage 3 — Independent assurance	Third party independently verifies conformity.	TPIA competency, man-days, QCBS, standard reporting.	Regulatory confidence based on evidence.
Stage 4 — Risk-based oversight	Regulator uses audit, incident, and compliance information to target attention.	Expert review, analytics, case studies and public reporting.	Regulatory resources focus more on material risk.
Stage 5 — Responsible self-regulation	Mature entities demonstrate reliable internal controls and transparent first-party assurance while remaining subject to independent checks and risk-based intervention.	Entity maturity, data transparency, periodic independent assurance, and risk triggers.	Reduced duplication with stronger accountability.

5.3 Regulatory Interface.

- PNGRB continues to prescribe mandatory technical and safety requirements.
- Annual/internal assurance remains an entity responsibility and does not replace independent TPIA conformity assessment where required.
- Independent verification remains necessary for critical or material findings.
- PNGRB retains the ability to review, inspect, require information, require corrective action, and intervene based on risk and compliance performance.
- Public reporting, digital analytics and expert review strengthen rather than weaken regulatory visibility.

5.4 Conditions precedent for credible self-regulation

Condition	Actionable
Management ownership	Senior management owns safety, integrity, and closure of findings.
Competent first-party audit	Internal auditors have relevant technical and audit competence.
Standard methodology	PNGRB typical checklists and minimum effort are used appropriately.
Evidence discipline	Findings are supported by objective evidence and field verification.
Transparent reporting	Material non-conformities are reported without suppression or dilution.
Closure discipline	Corrective action is time-bound and independently verified where required.
Learning	Incident and repeated-finding lessons are fed into procedures, training, and audit plans.
Data integrity	Entity can demonstrate a traceable history of findings, action, and recurrence.

CHAPTER 6

Consolidated Reform Review and Forward Roadmap

The preceding chapters describe individual components of the PNGRB Audit Reform Programme. Chapter 6 brings these initiatives together to provide a consolidated assessment of the reform journey and a forward-looking roadmap for strengthening the audit and assurance ecosystem.

The chapter reviews the major reform interventions across auditor competence, audit effort, TPIA selection, methodology, first-party assurance, independent technical review, incident learning, transparency, digital intelligence, risk-based regulation and responsible self-regulation. It considers both the improvements already introduced and the areas where further institutional strengthening is required.

The forward roadmap for 2026–2030 provides a phased direction for continued improvement, including competency assessment and renewal, TPIA performance monitoring, digital audit systems and analytics, structured incident learning, independence controls, expert review, greater transparency, continuous training and an integrated assurance model.

The chapter thus brings the reform programme together around a common objective: moving from audit as a periodic compliance activity towards a credible, evidence-based, risk-informed and continuously improving assurance system.

6.1 High level expert-committee report: The following structure presents the reform programme as per High level expert-committee report.

Sl. No.	Aspect	Issue / Observation	Reform Response	Residual Gap / Way Forward
1	Audit competence	Auditor competence and sector knowledge could vary.	Lead Auditor criteria, TPIA eligibility, training, and expert review.	Move from minimum eligibility to formal competency assessment and renewal.
2	Audit effort	Audit duration required a consistent risk/scale basis.	Audit Man-Days Matrix.	Use man-day compliance as an auditable quality metric.
3	TPIA selection	Pure lowest-price selection could affect quality.	Minimum remuneration and QCBS with 70% technical weightage.	Calibrate technical scoring and monitor outcomes.
4	Methodology	Different formats reduced comparability.	Standard audit reports and typical checklists.	Maintain version control and update coverage with regulation changes.
5	First-party assurance	Internal and external assurance could overlap.	Internal-audit guidelines and qualifying OISD recognition.	Develop entity assurance maturity assessment.
6	Technical review	High report volumes require specialist review.	External expert panel.	Document disposition of expert observations.
7	Incident learning	Incident findings could remain isolated.	Case studies, films, training, and feedback to checklists.	Map every major recurring failure to an audit control or learning module.

Sl. No.	Aspect	Issue / Observation	Reform Response	Residual Gap / Way Forward
8	Transparency	Limited visibility of audit outcomes.	Webhosting of reports and compliance status.	Improve metadata, closure ageing and sector analytics.
9	Digital intelligence	Large datasets to be analyzed manually.	Digital audit management and MIS/analytics.	Create a single longitudinal assurance dataset.
10	Risk-based regulation	Periodic audits alone do not capture changing risk.	Use incidents, repeated findings, ageing, expert advice and analytics.	Formalize risk triggers for earlier review/intervention.
11	Self-regulation	Entity ownership needs to increase without weakening regulatory control.	Internal assurance, transparent evidence, independent verification and PNGRB oversight.	Create an explicit maturity model for responsible self-regulation.

6.2 Forward Roadmap 2026–2030

Sl. No.	Priority	2026–27	2027–28	2028–30
1	Auditor competence	Formal competency framework.	Periodic assessment.	Renewal / certification cycle.
2	TPIA performance Rating	Baseline and calibration.	Transparent methodology.	Careful use of performance information in QCBS jobs allocation.
3	Digital audit	Single audit dataset.	Analytics dashboards.	Risk-based / predictive oversight.
4	Incident learning	Map cases to audit clauses.	Recurring-failure library.	Regulation / checklist feedback loop.
5	Independence	Assignment-history tracking.	Rotation controls.	Automated conflict flags.
6	Expert panel	Structured review workflow.	Thematic reviews.	Regulatory intelligence function.
7	Web transparency	Standard metadata.	Closure ageing analytics.	Public safety/ compliance dashboard.
8	Training	Regular TPIA interactions.	Competency modules.	Continuous professional learning.
9	Internal audit	Clarify first-party assurance.	Entity maturity assessment.	Integrated assurance model.

7.0 Messages from the Technical Division

The oil and gas downstream sector is continuously evolving, driven by advances in technology, changing operational practices, expanding infrastructure and emerging risks. In such a dynamic environment, a regulatory framework must remain equally responsive and progressive.

At the Technical Division of PNGRB, our endeavour is to ensure that the technical and safety regulations remain relevant to the changing needs of the industry. We continuously review and update the regulatory framework in line with industrial requirements, technological advancements, operational experience, emerging risks and evolving good practices across the oil and gas downstream sector. Our objective is not merely to prescribe requirements, but to ensure that the regulations remain practical, contemporary and capable of supporting safe and reliable operations.

A key strength of this process is the involvement of technical committees constituted by PNGRB's Technical Division. These committees bring together experienced professionals and domain experts from across the oil and gas downstream industry. Their collective experience provides valuable insight into emerging technologies, field-level challenges, operational practices and areas where existing requirements may need clarification, strengthening or revision. The ideas and recommendations emerging from these expert interactions provide an important feedback mechanism for the continuous improvement of PNGRB's regulatory framework.

The audit and assurance ecosystem further strengthens this process. Audit findings, recurring non-compliances, incident investigations, expert reviews and lessons from the field provide valuable inputs for identifying systemic gaps and areas requiring regulatory intervention. In this manner, regulation, implementation, audit, incident learning and technological development become part of a continuous cycle of improvement.

PNGRB, together with its Technical Division, remains committed to working collaboratively with industry, technical experts, auditors and other stakeholders to build a downstream sector that is safer, more reliable, resilient and secure. Our approach is founded on the belief that effective regulation is not static; it evolves with technology, experience and the changing risk landscape.

The journey towards excellence in safety is continuous. Every audit, every incident, every technological advancement and every lesson learned provides an opportunity to make the system stronger.

“Regulation sets the direction, technology enables progress, and collective learning makes the industry safer. Our shared responsibility is to ensure that every step forward makes the oil and gas sector safer, stronger and more resilient.”

— **Technical Division, PNGRB**



PETROLEUM AND NATURAL GAS REGULATORY BOARD
Government of India

**E-400, 4th Floor, Tower-E, World Trade Center,
Nauroji Nagar, New Delhi - 110029
E-mail: e-coordination@pngrb.gov.in
Telephone No.: 011-24060151**

