



Petroleum and Natural Gas Regulatory Board

Audits & Inspections: Importance and its Relevance Regarding CGD Safety

Satish Geda
Expert-PNGBR
Former Executive Director, GAIL

January
2025

An Outline

2

1

- PNGRB Regulations for CGD

2

- Importance & Salient Features of Audit and Inspection

3

- System Integrity through Inspection & Monitoring

4

- Key Observations in Inspection & Audits of CGDs

5

- Expert's Recommendations

PNGRB and its Regulations for CGD

3

PNGRB Act, 2006

- PNGRB was constituted by **PNGRB Act, 2006** for regulating midstream and downstream petroleum sector and natural gas

Technical Regulations for City or Local Natural Gas Distribution Networks

Technical Standards and Specifications including Safety Standards
(**T4S Regulations 2008**)

Integrity Management System
(**IMS Regulations 2013**)

Emergency Response and Disaster Management Plan
(**ERDMP Regulations 2010**)

Importance of Safety Audit

4

- A safety audit is a process that evaluates the health and safety of an organization.
- To check the **compliance to the defined Policies and Procedures** in the **PNGRB Regulations**
- **Adherence to Safety Standards.**
- Provides a **clear picture of Implementation of the Safety Management System** within an organization.
- Safety Audits to be carried out as per the **prescribed checklists and guidelines** of PNGRB Regulations.
- Audits to be conducted in defined intervals mandated in PNGRB Regulations:
 - Internal Audit** - Every year by the Audit-Team formed by the Head of the entity
 - External Audit** – Every 3 years by Third Party Agency (TPA) empaneled by the Board.
- **Intensive training of auditors on the Safety Management System & Process Safety Management.**
- **Detailed Audit schedule** to be made for all installations to cover an entire cycle of audits.

Safety Audits & Inspections: Benefits & Advantages

- **Preventing Accidents and Injuries:** Identify potential hazards/ risks and taking proactive mitigation measures
- **Reducing Incidents:** Addressing safety concern on Likelihood of accidents before they become major issues.
- **Ensuring Compliance:** to Statutory Rules/Regulations & Acts and reduce the risk of non-compliance penalties.
- **Certification and Accreditation:** help organizations to maintain certification and accreditation.
- **Promoting a Safety Culture** within organization
- **Raising Employees Awareness** about the importance of safety protocols and responsibility for safety.
- **Encouraging Employee Participation** by involving in the audit and inspection process with a sense of ownership.
- **Enhancing Reputation and Brand:** by demonstrating the organization's commitment towards safety.
- **Building Trust:** A strong safety record builds trust & confidence amongst the employees, customers, and stakeholders.

Essential Features of Safety Audits

The key features of Safety Audits is to Ensure & Verify:

- **Baseline Plan** is being updated including **baseline inspections**.
- **Activities are performed** in accordance with the **PNGRB Regulations and Guidelines**
- **Annual performance measures** have been evaluated
- **Timely Closure** of all action items or non-conformances of **Previous Audits**.
- **The risk criteria** have been **reviewed and documented**
- **Prevention, mitigation and repair criteria** have been established, met and documented.
- **Required Qualifications & Training** of CGD O&M personnel in the relevant area.
- **Availability & Accessibility** of documentation.
- **Implementation and effectiveness of Emergency Preparedness Plan**.

System Integrity through Inspection & Monitoring

- **Adherence to SOPs, Work Permit System** compliances in SAP, **Job Safety Analysis, MOC, Quality Control Plan** etc.
- **Availability & Periodic review of Critical Standard Operating Procedures (SOPs)** of CGD Operations
- **Regular Workplace Inspection:** Housekeeping, Clear accesses to workplace, Windssocks, First aid box availability, Display of Hazardous area classification, Display of MSDS
- **Pipeline Health Monitoring:** Thickness assessment, Leakage Surveys, CP surveys ROU Maintenance.
- **Pipeline Surveillance and Inspection:** Foot Patrolling, Drone surveillance, Pipeline exposure/washout, Encroachments etc.
- **Adherence to Pipeline Integrity Management Plan-** Annual Maintenance Plan
- **Fire Prevention & Fire Protection system:** Maintenance & functional testing to ensure 24x7 availability and reliability.
- **Effective Communication System,** Siren Testing, Manual call points, Fire/Emergency Alarm System, PA System

System Integrity through Inspection & Monitoring

- **Incident Reporting & Investigation**, Root Cause Analysis, Recommendations and updating Regulations/SOP as required.
- **Surprise Inspection of all Critical Activities by Senior Management**
- **Continuous Supervision** of all O&M Activities by CGD Executives.
- **Personnel Safety Management System**: use of PPEs, adherence to SOP & Safe practices, behaviour-based safety (BBS)
- **Regular Testing & Calibration** of PSVs/TSVs, Field LEL Detectors, Portable LEL Detectors etc.
- **Checking & Functional Testing of Emergency Shutdown Devices**
- **Inspection/Checking of Odorization System** and Sniff Test at Remote Location
- **Inculcate Safety Culture, Zero Tolerance on Safety Deviations**
- **Emergency Preparedness Exercise**: Conducting regular **Onsite & Offsite Mock Drills**

Key Observations in Inspection & Audits of CGDs

Critical Observations during Review of Audit Reports; ERDM/IMS Manuals Review and Review of Incident Analysis Reports of CGDs

- **Safety Commitment by Leadership:**
 - **IMP review** has not been done within schedule: **Lack of Compliance monitoring mechanism**
 - **Offsite mock drills** are not being yearly - **Lack of Compliance monitoring mechanism**
 - **ERDMP Certification** expired- **Lack of Compliance monitoring mechanism**
 - **Long pending T4s/ERDMP/IMS** audit point -**No monitoring Mechanism.**
 - **Non-availability** of Fire NOC, Air/Water Consent, Factory license- **No monitoring Mechanism.**
 - **Periodic Emergency Preparedness Exercise** in **odd hours**
 - **Safety Committee Meetings & Review of MOM of SCM** not found
- **Non-Adherence to SOP:**
 - **Wind direction** to be checked before **operating Fire Extinguisher** by O&M Team
 - **Fire Extinguishers** in **Improper Condition** and **No Validity Date** was mentioned.
 - LCV, ERV and O&M Vehicles **without Spark Arrester.**
 - **Non-Sparking Tools** not used to arrest gas leakage during Mock Drills.

Key Observations in Inspection & Audits of CGDs

- **Review of ERDMP manual and non-compliance/ deviations:**
 - **The Seven Checklists and Nine schedules** not filled/enumerated in line with **PNGRB ERDMP Regulations**
 - No **Mutual Aid Plan** along with **Mutual Aid Agreement** in few CGDs
 - **Lead Time for Response** not mentioned in the **Mutual Aid Agreement**.
 - **Details of hospitals** along with **Infrastructure Availability** not given.
 - **Siren Code of Level 1,2 &3 Emergencies** is not as per PNGRB ERDMP Regulations.
 - Provision of **Manual Siren** to be ensured.
 - **ERV** are not equipped with necessary tools and tackles & First-Aid box
 - **Availability of Resources** with CGD & **External Agencies/Mutual Aid Members** is not given.
 - Transport Emergency Card (**TREM Card**) should be in English, Hindi and local language
 - **Quick closing valve (with Remote operation)** for isolation of the CGS to be provided.
 - **Emergency Zones** are not identified & notified for Incident prone areas

Key Observations in Inspection & Audits of CGDs

- **Comments on Mock Drills:**

- **Offsite mock drills** are not being conducted as per yearly schedule (Schedule 1-E)
- **Proper Signals/Flags** (Red & Green) not used for handling road traffic
- **Proper means** for shifting the casualty through Stretcher not followed.
- **Head Count** to be ensured before and after incident
- **Mutual Aid did not come** in Level 2 Emergency Mock Drills
- **Medical Team & Ambulance** not reported.

- **Review of IMS Manual and non-compliance/ deviations**

- **Periodic Testing of DG** to ensure Reliability of Emergency power back
- **Improper Support** of Piping & Tubing including IJ Joints
- Improper condition & upkeep of **Earthing system**, Electrodes, earthing strips, earthing clamps
- **Insulation Joint (IJ)** not provided for incoming Steel lines in CNG & CGS
- **CNG Storage System Cascade hydrotesting** not done
- Yearly **Thickness Checking** for Piping, Skids and Pressure Vessels to be done with comparison to baseline values

Key Observations in Inspection & Audits of CGDs

- **Odorization System:**
 - **PPM level of Odorant** at Domestic/Industrial/Commercial users is not maintained
 - **Odorization** at the CGS stations is not being done in **Auto Mode**
 - **Spillage Handling of Odorant** shall be provided.
 - **SOP not displayed** near the Odorization dosing system
- **Other Observation Unsafe Practices which can lead to accident/ affect Public Safety:**
 - **Leakage Surveys** are not being done using Gas Detectors at Highly Congested Area
 - **Gas Leak Monitoring Panel** is not working at CGS stations
 - **Yearly Assessment of location class** not done to carry out leak test surveys and patrolling accordingly.
 - **Gas Detector** is not provided at strategic locations
 - **Venting line height** is less than 3 meters from working level
 - **Mobile phones /naked flame** shall not be used in hazardous area.
 - **CO2 Flooding System** was found locked with lock pin and same is not in Auto-Mode

Expert's Recommendations

- Ensure Health & availability of **Emergency Alarm System, FW System, C02 Flooding, Fire/Smoke detection, Fire Extinguishers**
- **Audit Report Rating:** Introduce a rating system for audit reports to assess the thoroughness and quality of the audits. This will help in maintaining high standards and to meet the required quality benchmarks.
- **Incorporation of Lessons Learnt in Audit Report:** helping in continuous improvement and enhancing the overall safety.
- **HSE Indexing System** to review and measure the HSE Performance of CGD Network.
- **OFC based Pipeline Intrusion Detection System (PIDS) / Pipeline Leak and Intrusion Detection System (PLIDS)** can be considered in pipeline sections passing through densely populated areas.
- **Pro-Active Audits** by **Inter & Intra-Unit Audit Teams** to ensure compliance of PNGRB Regulations (T4s, ERDMP, IMP)
- **Job Safety Analysis** of each activity should be prepared and approved for implementation.
- **GPS Based Foot Patrolling** of the Pipeline
- **Leakage survey using Gas Detectors** for Highly congested areas in accordance with the requirements of T4S

Expert's Recommendations

- **Management of Change** with proper change management procedures including HAZOP study, quality issues, training etc.
- **Community Awareness Programs:** The CGD Entity shall undertake a comprehensive awareness program for Consumers, Public and Stakeholders about the potential hazard and respond during emergency situations..
- **Safety Commitment by the Management:**
 - Ensure implementation of "Safety Management", "Quality Management" and "Integrity Management" of the system.
 - Ensure adequate resource deployment with defined roles, responsibilities and accountability
 - **Observance of Monthly Safety Day:** review of compliances of Safety Observations and Safety Briefing by CGD In-charge.
 - **Regular Site visit by CGD In-Charge:** for Safety Observations & necessary mitigation actions.
 - **Surprise Visit by CGD In-Charge** in odd hours at least once in three months to check the **Emergency Preparedness.**
 - **Observance of Monthly Audit Day:** Review the timely liquidation/compliance of the audit observations (T4S, IMS, ERDMP etc).

Expert's Recommendations

- **Employees Participation:**
 - Reporting of Unsafe Condition/ Unsafe Act
 - Observance of National Safety Week, Fire Services Week with Safety Quizzes, Awards and Recognition
 - Reporting of Incident/Accident/Near miss
 - Safety Committee Meeting
 - Safety Suggestion Schemes
- **Zero (deviation) Areas:**
 - **Zero** Accidents / Incidents.
 - **Zero deviation** to Safety Management System
 - **Zero deviation** in Statutory compliances
 - **Zero deviation** in compliance with Standard operating Procedures (SOP)
 - **Zero deviation** in consistency in practices
 - **Zero deviation** in health monitoring of Safety System
 - **Zero deviation** in implementing Organizational Safety Policies

Thank You

