

# PETROLEUM AND NATURAL GAS REGULATORY BOARD

## NOTIFICATION

New Delhi, \_\_\_\_\_, November, 2020

**F.No.INFRA/IMP/CGD/1/2013**-In exercise of the powers conferred by section 61 of the Petroleum and Natural Gas Regulatory Act, 2006 (19 of 2006), the Petroleum and Natural Gas Regulatory Board hereby makes the following regulations, further to amend the Petroleum and Natural Gas Regulatory (Integrity Management System for City or Local Natural Gas Distribution Networks) Regulations, 2013., namely: -

### 1. Short title and commencement.

- (1) These regulations may be called the Petroleum and Natural Gas Regulatory Board (Integrity Management System for City or Local Natural Gas Distribution Networks) Amendment Regulations, 2020.
- (2) They shall come into force on the date of their publication in the Official Gazette.

### 2. In the Petroleum and Natural Gas Regulatory Board (Integrity Management System for City or Local Natural Gas Distribution Networks) Regulations, 2013: -

- (1) for Regulation 2,

- (i) in sub-regulation 1;

- (a) for clause (d), the following shall be substituted, namely: -

“"risk" means the measure of potential loss in terms of both the incident probability (likelihood) of occurrence and the magnitude of the consequences;”

- (b) clause (e) shall be omitted and clause (f) and (g), shall be re-lettered as clause (e) and (f),

- (c) for clause (e), the following shall be substituted, namely: -

““risk assessment” means a systematic process in which potential hazards from facility operation are identified, and the likelihood and consequences of potential adverse events are estimated. Risk assessments can have varying scopes, and can be performed at varying levels of detail depending on the operator’s objectives;”

- (d) for clause (f), the following shall be substituted, namely: -

“"risk management" means an overall program consisting of identifying potential threats to an area or equipment; assessing the risk associated with

those threats in terms of incident likelihood and consequences; mitigating risk by reducing the likelihood, the consequences, or both; and measuring the risk reduction results achieved;”

(e) after clause (f), the following clauses shall be inserted, namely:

(g) “Subject Matter Expert (SME)” means an individual who possesses knowledge and experience in the process or discipline he represents as per ASME B 31Q;

(h) “Shall” indicates that the provision in which it occurs is mandatory;

(i) “Should” Indicates that the provision in which it occurs is recommendatory but not mandatory;

(ii) after sub-regulation (1), the following shall be inserted, namely:

“(2) Other definitions or terminologies used for integrity assessment like anomaly, defect, MAOP etc. not defined above, shall be as defined in ASME 31.8S”

(iii) sub-regulation (2) shall be re-numbered as sub-regulation (3).

(2) in regulation 3, after the words, “all the entities”, the words, “engaged in”, shall be inserted.

(3) in regulation 5, the paragraph beginning with the words, “These Regulations outline”, and ending with the words, “distribution networks through” shall be substituted by the following, namely: -

“These Regulations outline the basic features and requirements for developing and implementing an effective and efficient Integrity Management Plan (IMP) for making them reasonable and prudent operator of city gas distribution networks to manage its integrity and to continue providing safe and reliable delivery of natural gas to its customers through”.

(4) in regulation 6, the words, “Entity operating and maintaining CGD networks shall have the qualified manpower as indicated in Appendix III.”, shall be omitted.

(5) for regulation 7,

(i) in sub-regulation (1), the words, “through implementation schedule” shall be omitted and in place of the words, “and Schedule-8”, the words “Schedule-8 and Schedule-9”, shall be substituted;

(ii) in sub-regulation (2),

(a) after the words, “implementation”, the words, “schedule and compliance”, shall be inserted;

- (b) in clause (i), the words beginning with the words, “within the time” and ending with the words, “Act shall apply;” shall be substituted by the following, namely:-

“with time schedule and make good all short comings within the time schedule. If the entity fails to complete activities within the specified time schedule, relevant penal provisions of the Act shall apply;

- (6) in regulation 8, the words, “comply with all”, shall be substituted by the following, namely: -

“identify and comply list of applicable”

- (7) in SCHEDULE 1,

- (i) the words, “also minimize business”, shall be substituted by the words, “minimize”;
- (ii) the word, “maximum”, shall be substituted by the word, “optimal”;
- (iii) the words, “to attain them”, shall be omitted;
- (iv) after the words, “Integrity Management System”, the words, “shall be”, shall be substituted by the words, “should aim to”;
- (v) the word, “Ensuring”, shall be substituted by the word, “ensure”;
- (vi) the word, “Promoting”, shall be substituted by the word, ‘promote”;
- (vii) the word, “increasing”, shall be substituted by the word, “enhance”;
- (viii) the word, “optimizing”, shall be substituted by the word, “enhance”.

- (8) in SCHEDULE 2,

- (i) the word, ‘maximum”, shall be substituted by the word, “optimal”;
- (ii) the sub-regulation 2.3 and the content thereof shall be omitted.

- (9) in SCHEDULE 3,

- (i) under heading, “Physical description”,

- (a) after sub-para no.3.1.2, a new sub para shall be inserted, namely: -

“3.1.3 LNG or LCNG dispensing stations or LNG Vaporisation skid.”

- (b) Sub-para nos. 3.1.3, 3.1.4, 3.1.5, 3.1.6, 3.1.7, 3.1.8 and 3.1.9, shall be renumbered as sub paras no. 3.1.4, 3.1.5, 3.1.6, 3.1.7, 3.1.8, 3.1.9 and 3.1.10.

- (c) after sub-para no.3.1.10, new sub paras. shall be inserted, namely:

“3.1.11 Compressor at CNG stations

3.1.12 Cascade and Cascade Transport Vehicle (CTV) or LNG Tank truck”

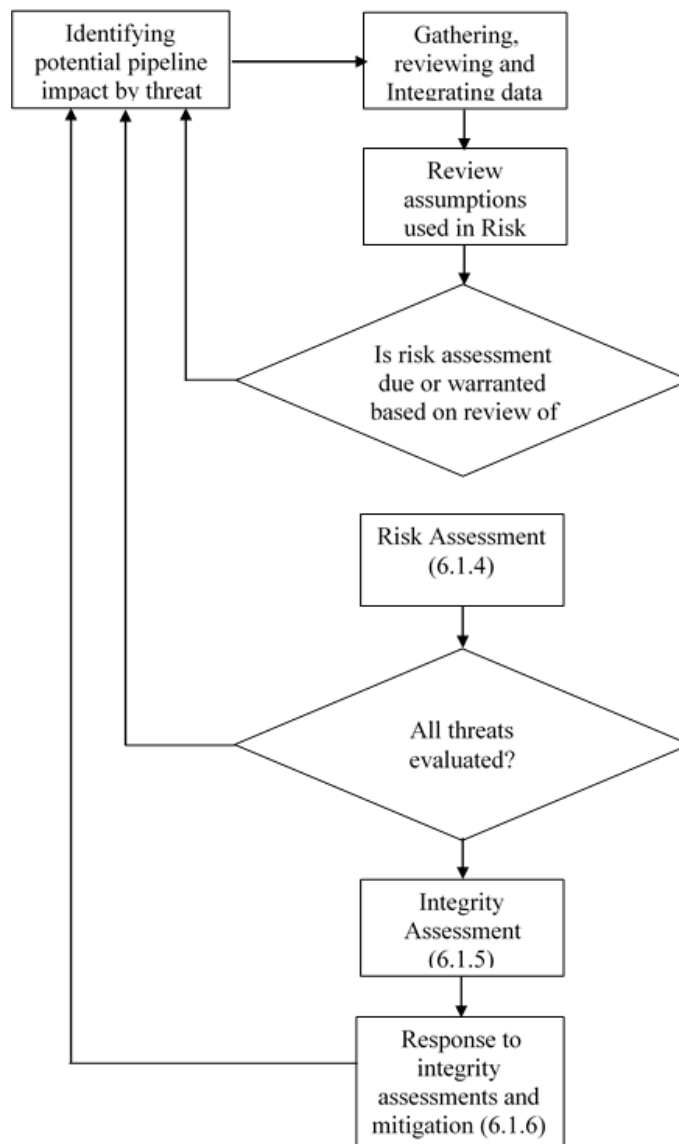
- (d) after the words, “Industrial and Commercial”, the word, “installations”, shall be inserted.

- (e) Sub-para nos. 3.1.10, 3.1.11, 3.1.12, 3.1.13, 3.1.14 and 3.1.15, shall be renumbered as sub paras no. 3.1.13, 3.1.14, 3.1.15, 3.1.16, 3.1.17 and 3.1.18.
  - (ii) under heading, “Other description”, Sub-para nos. 3.2.2 and 3.2.4 shall be omitted and the sub-para no. 3.2.3 shall be renumbered as 3.2.2.
- (10) for SCHEDULE 4,
  - (i) in sub para no. 4.2, after the words, “Integrity Management System data.”, the following words shall be inserted, namely;

“However, the industry can adopt the performance based type of Integrity Management System based on analysis of the baseline data and subsequent trends.”
  - (ii) under paragraph 4.3, the words beginning with, “Management Plan, Management of Change”, and ending with the words, “Integrity Management System for CGD Networks”, shall be omitted and after the words, “development of Integrity”, the following shall be inserted, namely: -

“Management Plan and Management of Change process pertaining to technical aspects. However, Entity may adopt more rigorous IMP within a prescriptive IMP based on their in-house assessment.”
- (11) in Schedule 5, the words beginning with, “Integrity Assessment Tools” and ending with the words, “above mentioned ones”, shall be omitted.
- (12) in Schedule 6,
  - (i) under heading, “CGD networks integrity management plan.”. the figure inserted after the words, “further detailed hereunder:”, shall be substituted by the following, namely-

“



”

- (ii) under sub-heading, “Initial data gathering, review and integration.”, after the words, “sources to a common location”, the word, “(GIS)”, shall be inserted.
- (iii) under sub-heading, “Identification of Threats:”,
  - (a) the figure, “21”, shall be omitted;
  - (b) after the word, “threats”, the words, “including electric arching, joint failures and AC/ DC interference”, shall be inserted;
  - (c) under sub-paragraph heading, “Time independent Threats”,
    - (i) after the words, “v. Electric Arching”, the following shall be inserted, namely: -

“vi. Joint failures (particularly in PE pipeline)

vii. AC / DC Interference.”

- (d) under sub-paragraph heading, “Weather related and outside force:, the words beginning with, “iii. Heavy Rains or Floods”, and the words ending with, “iii. River bed movements”, shall be substituted by the following, namely: -

“iii. Hydro technical: water-related threats including, but not limited to, liquefactions, flooding, channeling, scouring, erosions, floatation, breaches, surges, inundations, tsunamis, ice jams, frost heaves, and avalanches, creek area effects, river meandering, river bed / bank movement

iv. Geotechnical: earth movement threats including, but not limited to, subsidence, extreme surface loads, seismicity, earthquakes, fault movements, mining, and mud and landslides, muddy land effects

v. High wind”.

- (iv) under sub-heading, “Consequence and Impact Analysis:”, the words beginning with, “Consequence estimation”, and the words ending with, “consequence modelling”, shall be omitted and the words beginning with, “Identification of High”, and ending with the words, “Areas are identified.”, shall be substituted by the words, “Potential Impact Area –”.

- (v) under sub-heading, “Risk Management and Risk Assessment”,

- (a) in sub para heading, “Consequence rating –”, after the words, “The rating shall be ascending for increasing impact.”, the following shall be inserted, namely: -

“An illustrative 6\*6 matrix attached as Appendix III may be used to carry out the risk assessment. A typical risk register is attached as Appendix IV.”

- (b) the words beginning with, “A company should carry out the following” and ending with the words, “can also influence prioritization.”, shall be substituted by the following, namely: -

“Entity to Prepare, maintain and update a register of known risks to assets, including their risk rating.

(a) For Stable threats

(b) For Time Dependent and time Independent threats,

Stable threats are normally threats which have fixed mitigation measures mostly are policy and procedural based and mostly global/generic in nature whereas Time dependent and time independent are dynamic in

nature also they are specific to a section of pipeline or to the specific equipment. A typical risk register is attached as Appendix IV.

Prioritization involves sorting risk ratings in decreasing order. For initial efforts and screening purposes, risk results could be evaluated simply on a “high–medium-low” basis or as a numerical value. Identified high risk activities may be taken up as part of Annual improvement plan (Also called asset integrity improvement plan) for close monitoring.”

(vi) under the sub-heading, “Integrity Assessment”,

(a) the words beginning with, “A plan shall be developed”. And ending with the words, “Schedule 5 of these regulations”, shall be substituted by the following, namely:

“6.1.5.1 Integrity Assessment Tools:

Some of the tools for Integrity assessment are provided below. The operator may use either of the methods (a) or (b) for integrity assessment techniques and as many monitoring tools support systems necessary from (d) to (i) to achieve the Integrity Management Plan for CGD networks, maintaining the compliance with PNGRB T4S regulations. It may be noted that the baseline data for specific measurement should be available with the operator as a ready-reckoner:

(a) Direct assessment and evaluation

Direct assessment is an integrity assessment method utilizing a structured process through which the operator is able to integrate knowledge of the physical characteristics and operating history of a pipeline system or segment with the results of inspection, examination, and evaluation, in order to determine the integrity.

External Corrosion Direct Assessment (ECDA) can be used for determining integrity for the external corrosion threat on CGD network segments. The entity may use NACE SP0502 to conduct ECDA. The ECDA process integrates facilities data, and current and historical field inspections and tests, with the physical characteristics of a pipeline. Nonintrusive (typically aboveground or indirect) inspections are used to estimate the success of the corrosion protection. The ECDA process requires direct examinations and evaluations. Direct examinations and evaluations confirm the ability of the indirect inspections to locate active and past corrosion locations on the pipeline. Post-assessment is required to determine a corrosion rate to set the reinspection interval, reassess the performance metrics and their current applicability, and ensure the assumptions made in the previous steps remain correct. The External Corrosion Direct Assessment process has the following four components, namely:

(a) Pre-assessment;

- (b) Inspections;
- (c) Examinations and evaluations; and
- (d) Post-assessment

While implementing External Corrosion Direct Assessment and when the pipe is exposed, the company is advised to conduct examinations for threats other than that for external corrosion also (like mechanical and coating damages).

(b) Pressure testing

Pressure testing is appropriate for integrity assessment when addressing certain threats, at the pre-commissioning stage and subsequent testing after a pipeline has been put in service. Pressure testing shall comply with the requirements of applicable Petroleum and Natural Gas Regulatory Board regulations.

(c) Other Integrity Assessment Methodology:

Other proven integrity assessment methods for pipeline may exist for use in managing the integrity of pipeline. For the purpose of these regulations, it is acceptable for an operator to use these inspections as an alternative to pressure testing or direct assessment.

#### 6.1.5.2 Monitoring Tools (O&M)

(d) Thickness assessment and periodic review against baseline values:

Periodic thickness assessment for all CGD network skids, station piping and pressure vessels and comparison to baseline values shall be done once a year. In absence of baseline data first recorded data or design data shall be taken as baseline value with a sound engineering judgment to ensure that the data are within the specified limits as per the design.

Whenever a pipeline is exposed, the entity shall take opportunity to examine the coating and pipe condition by conducting Visual examination, thickness testing and other NDT methods as suitable which can be recorded in GIS/SAP or as suitable. The examination may not be repeated for a similar pipeline segment (but after long time gap, if opportunity exist on same segment then examination can be repeated). The preparation of segments may be carried out as per Table 5 Example of Integrity Management Plan for Hypothetical Pipeline Segment (Segment Data: Line 1, Segment 3) of ASME B31.8S.

(e) Patrolling:

Patrolling along the Right of Use which includes valve locations and other pipeline facilities, helps to observe pipeline markers,



surface conditions, construction activity performed by external agencies, encroachments, soil washouts and any other factors affecting the safety and operation of the pipeline and other specific indication marks along the pipeline.

(f) Leakage Surveys:

Operating company must have an effective method to identify and locate leakages in the system. Any one or combination of methods described in ASME B 31.8, Appendix M can be adopted based on their effectiveness for the specific areas

Leakage Surveys using gas detectors shall be done in accordance with the requirements of ASME B 31.8. Gas detectors, duly calibrated, shall be available at all times in ready use conditions for emergency surveys and use.

(g) Cathodic protection system surveys:

Cathodic Protection adequacy survey shall be carried out so as to cover the entire steel network of pipelines so as to detect insufficient Cathodic Protection levels and other irregularities and anomalies in the steel pipeline. Suitable procedures shall be established by the operator to account for adequate Cathodic Protection levels to pipeline extensions and new projects.

(h) Annual maintenance plan

The annual maintenance plan covers the following activities, namely:

- i. PNG maintenance
  - a. Service regulators
  - b. Domestic connections
  - c. GI Riser maintenance
- ii. CNG/LNG/ LCNG Maintenance
  - a. Compressors
  - b. Pumps
  - c. Dispensers
  - d. Cascade cylinder testing (inline with gas cylinder rule)
- iii. Network Maintenance
  - a. Functional testing of CPRS or DPRS or DRS (Periodic stream changeover)
  - b. Calibrations of critical inspection, measuring and test instruments (Entity to identify a set of their own safety critical equipment's)
  - c. Valve and valve chamber Maintenance
  - d. Greasing and operations of valves

- e. Operation and maintenance of Odorant system
- f. Cathodic protection monitoring and maintenance
- g. Inspection of casings at crossings
- h. Monitoring of Anode Junction box, cathode junction box, Transformer rectifier unit, Insulation Joint
- i. Monitoring of HT crossing, river crossing, foreign pipeline crossing.
- j. On or Off PSP monitoring of the CP

(i) Incident Investigations and Root cause analysis

Entity shall record high potential asset damage and failures to identify repetitive failures leading to initiation of investigation/RCA such failures can be recorded in GIS/SAP or as suitable. Performance indicators can be used as a source to identify these failures. Other proven integrity assessment methods for pipeline may exist for use in managing the integrity of pipeline. For the purpose of these regulations, it is acceptable for an operator to use these inspections as an alternative to pressure testing or direct assessment. Such other methods for integrity assessment may be also adopted by the CGD entity as it thinks fit, apart from the above-mentioned ones.

(vii) under the sub-heading, “Response and Mitigation”,

- (a) the words beginning with, “This section covers” and ending with the words, “on the inspection outcome”, shall be substituted by the following, namely:

“This section covers the schedule of responses to the abnormalities identified during inspections and maintenance activities as defined in the schedule 6.1.5. A tracker sheet may be developed to capture the abnormalities, response plan and schedule for the closures remedy or eliminate an unsafe condition, and establishment of the future inspection intervals. Such responses may be classified into the following categories, namely:

- Immediately implemented;
- Scheduled over a period of time; and
- Simply monitored based on the inspection outcome.”

- (b) after the sub-clause (c), the words, “A typical tracking sheet is attached as Appendix V”, shall be inserted.

(viii) Under heading, “Performance Plan”, the words beginning with, “Periodic internal audits” and ending with the words, “integrity management program” shall be substituted by the following, namely:

“9) Periodic internal audits shall be conducted to evaluate the effectiveness of the integrity management plan. The findings of this audit shall be used to further upgrade the integrity management plan to enhance its effectiveness.”

- (ix) under heading, “Management of Change Plan”, after the words, “systems and their integrity.”, the following shall be inserted, namely:

“Change should also include the changes in specification of materials used for either network or equipment’s.”

- (x) in the heading, “Quality Control Plan”,

- (a) the heading, “Quality Control Plan”, shall be substituted by “DOCUMENTATION, RECORDS AND CONTROL” and point no.3 shall be substituted by the following, namely:”

“Prepare standard operation operating procedures and guidelines for critical processes including Non-routine, maintenance, projects etc.”.

- (b) after the words, “Internal audits aim”, the word, “is” shall be inserted.

- (c) in point (b), the words and bracket, “(Appendix III)”, shall be omitted.

(13) in Schedule 7,

- (i) under the heading, “Approval of Integrity Management System (IMS)”, the word, “etc.”, shall be substituted by the words, “and all those who will be directly or indirectly affected by our activities,” and the words, “constantly and systematically”, shall be substituted by the word, “periodically”.

- (ii) under heading, “Management Approval”,

- a. in step#3, after the words, “operation”, the words, “or Maintenance”, shall be inserted;

- b. content in step#4, shall be substituted by the following, namely:

“Verification of Conformity of Integrity Management System document with the Regulation by Third Party Inspection Agency (TPIA) and duly approved by CEO or Full time Director of the Entity.”

- c. After step#4, the following shall be inserted, namely:

“Step#5: Approval of Integrity Management System document for implementation by the Board of the entity for the first time and approval of subsequent periodic review by CEO or Full-time Director of the entity.

Step#6: Approved IMS document along with confirmation from entity of its implementation shall be submitted to the Board.”

(iii) the sub heading 7.2, 7.3, the Note at the end and the content therein shall be omitted.

(14) in Schedule 8,

(i) in Sr.No.1 of column heading, “Time Schedule”, the words beginning with, “YES/NO confirmation”, and the words ending with, “regulations, 2013”, shall be substituted by the words, “Confirmation to be submitted to PNGRB along with submission of approved IMS document.”.

(ii) in Sr.No.2 of column heading, “Activities”, after the word, “Operation”, the words, “or Maintenance”, shall be inserted.

(iii) in Sr.no.2, under column heading, “Time Schedule”, the words beginning with, “1 year from the date of notification”, and ending with the words, “Regulation, 2013”, shall be substituted by the following, namely:

“1 year from the date of first gas commissioning of the GA\*.”

(iv) in Sr.no.3, under column heading, “Time Schedule”, after the words, “Head of Operation”, the words, “or Management”, shall be inserted.

(v) Sr.No.4 shall be omitted.

(vi) Sr.No.5 and 6 shall be re-numbered as Sr. No. 4 and 5.

(vii) in Sr.no.5,

(a) under column heading, “Activities”, the words, “Approval by Petroleum and Natural Gas Regulatory Board for implementation by the entity”, shall be substituted by the following, namely:

“Approval for implementation by the Board of the entity for the first time and approval of subsequent periodic review by CEO or Full-time Director of the entity.”

(b) under column heading, “Time Schedule”, the words, “Within 3 months from submission of Integrity Management System document to Petroleum and Natural Gas Regulatory Board”, shall be substituted by the following, namely:

“Within 3 months from the conformity assessment by Third Party Inspection Agency (TPIA).”

(viii) after Sr.No.5, the following shall be inserted, namely:

“

<b>Sr.No.</b>	<b>Activities</b>	<b>Time Schedule</b>
6	Submission of Integrity Management System document to	1 month from the approval as

	Petroleum and Natural Gas Regulatory Board	mentioned at Sr. No. 4 above.
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”

- (ix) Sr.No.6, shall be re-numbered as Sr.No.7, and under column heading, “Time Schedule”, the words, “Immediately after approval at Sr. No. 4 above”, shall be substituted by the following, namely:

“Shall be submitted every year to Petroleum and Natural Gas Regulatory Board.”

- (x) in the note, after the words, “in Schedule-7”, the following shall be inserted, namely: -

“\* - For new geographical areas, the above shall be complied within one year of date of commissioning.”

(15) in Schedule 9,

- (i) in sub heading, “Periodicity of review of Integrity Management System”, the words beginning with, “Entities shall review” and ending with the words, “various departments”, shall be substituted by the following, namely: -

“Entities may review their existing Integrity Management System from time to time but not exceeding an interval of every 3 years and update the same if required in accordance with the provisions of Schedule 7 based on the performance of Integrity Management Program and /or changes if any in the statutory / regulatory requirements. However, changes of dynamic nature such as addition, deletion, modification of assets, key personnel, interfaces with other utilities etc. may not require revision in the IMS and the same can be kept updated periodically by the concern entity”.

- (ii) after the sub heading, “Periodicity of review of Integrity Management System”, a new heading shall be inserted namely:

“9.2 Integrity Management System Audit

Audit of the CGD network Integrity Management System shall be performed on a regular basis. The purpose of the audits is to ensure compliance with the policies and procedures as outlined in these regulations. Recommendations and corrective actions taken shall be documented and incorporated into the CGD network Integrity Management System. The following essential items will be focused for any internal and external audit of the entire Integrity Management System, namely:

- (a) IMS document is developed, approved and is valid;
- (b) Activities are performed in accordance with the Integrity Management System;
- (c) Verify if annual performance measures have been evaluated;

- (d) All action items or non-conformances are closed in a timely manner;
- (e) The risk criteria used have been reviewed and documented; and
- (f) Prevention, mitigation and repair criteria have been established, met and documented.

(iii) for the sub para heading, “Review of Internal and External audit”,

- (a) in the heading, the word, “Review”, shall be substituted by the word, “Frequency” and shall be re-numbered as 9.3.
- (b) the words beginning with, “(a) Internal audit”, and ending with the words, “every 3 years”, shall be substituted by the following, namely;
  - “(a) Internal Audit - Every year.
  - (b) External Audit - Every 3 years in-line with the approved IMS by third party empaneled by the Board.”

(16) in Schedule 10, the words beginning with, “Entity will have to” and ending with the words, “Conform to Appendix III” shall be substituted by the following, namely:

“Entity shall have a written plan or philosophy of manning the installations based on activities required for compliance to this regulation and shall address the requirement of manpower for different stages of project, namely: Design, construction, commissioning, operation and maintenance in the above plan.”

(17) in APPENDIX-I, after the point no.8, the following shall be inserted, namely:

- “9) ASME B16.34 - Valves - Flanged, Threaded, and Welding End
- 10) API 6D – Specification for Pipeline valves
- 11) Gas Cylinders Rules, 2016
- 12) NACE requirements for Direct Assessment –
  - a. SP0206-2016-SG, Internal Corrosion Direct Assessment Methodology for Pipelines Carrying Normally Dry Natural Gas (DG-ICDA); and
  - b. SP0502-2010, Pipeline External Corrosion Direct Assessment Methodology
- 13) OISD 179 – Safety requirements in compression, storage, handling & refueling of natural gas (CNG) for use in automotive sector
- 14) OISD 226 – Natural gas transmission pipelines and city gas distribution networks
- 15) ISO 11120 - Gas cylinders - Refillable seamless steel tubes of water capacity between 150 I and 3000 l - Design, construction and testing
- 16) ISO 4437 – Buried Polyethylene (PE) pipes for the supply of gaseous fuels

17) ISO 1239 – Steel tubes, tubulars and other steel fittings - specification”

(18) for APPENDIX-II, under the column heading, “Critical infrastructure/ activity/ processes”, after the words, Last Mile Connectivity”, the words, “for domestic customers”, shall be inserted and after Sr.No.6 the following shall be inserted, namely

“

<b>Sr.No.</b>	<b>Critical infrastructure/ activity/ processes</b>	<b>Time period for implementation</b>
7	Commercial and Industrial customers to identify unsafe installation and communicate customers for taking necessary action to make the installation good for carrying gas	Once in 12 months

”

(19) Appendix-III shall be omitted.

(20) after APPENDIX-II, the following shall be inserted, namely:

### Appendix- III (An illustrative 6\*6 matrix)

Potential Consequence/Impact / Severity					Frequency / Likelihood						
					1	2	3	4	5	6	
					Rare	Remote	Unlikely	Seldom	occasional	Likely	
Cat	People	Asset	Environment	Reputation	Extremely Unlikely	Very Unlikely	Unlikely	Improbable	Probable		
					Less than once per 10,00,000 years	Between once per 10,00,000 to 10,000years	Between once per 10,00,000 to 10,000years	Less than once per 10,000 years to 100 years	Greater than once per Year		
					<10 <sup>-6</sup> Per Year	10 <sup>-6</sup> <10 <sup>-4</sup> Per Year	10 <sup>-6</sup> <10 <sup>-4</sup> Per Year	10 <sup>-4</sup> <10 <sup>-2</sup> Per Year	>1 per Year		
6	<b>Catstrophic</b>	- Multiple Fatalities - Kidnap & Ransom	- 100% Site shutdown - Site Access prohibited - Total loss of production	- Persistent damage - Severe nuisance over large area - Constant breach of statutory or prescribed limits	- Major international impact - International public attention - Extensive negative international media attention						
5	<b>Severe</b>	- Single Fatality - Shooting / Firearms incident	- Major site shutdown - Substantial site access restriction	- Severe damage - Extended breach of statutory or prescribed limits	- Major National impact - National public attention - Excessive negative national attention						
4	<b>Major</b>	- Major Injury - Lost Time Injury - Occupational illness - Burglary - Violent Assault	- Local damage - Partial shut down of site - Limited Access restriction	- Local effect - Significant damage - Repeated breach of statutory or prescribed limits	- Considerable regional impact - Regional public concern - Regional media attention						
3	<b>Moderate</b>	- Restricted Work Day - Medical Treatment	- Disruption to production - Isolation of Equipment for repair - Theft	Single breach of statutory or prescribed limits	- Local media attention - Local political attention						
2	<b>Minor</b>	- Minor injury - Minor Assault	- Minor damage	- Minor effect - Public complaint	- Limited impact - Local public concern						
1	<b>Incidental</b>	- First Aid	- Negligible damage - No disruption to production	- Slight effect	- Slight impact - Public Awareness						
Qualitative		Extreme Risk area	High Risk area	Medium Risk area	Low Risk area						
Quantitative Score		21 to 36	13 to 20	5 to 12	Less than 4						



**Appendix-IV**  
**(Typical risk register)**

AI RISK REGISTER																	
Sr. No.	Date of Reporting	Asset / Section Description	Description of the Risk	Hazard / Probable Failures	Probability	Impact/Consequence				Overall Risk	Decided Mitigation/ Control Measures		Action Taken	Target date for Closure	Completion Status	Photo/ Evidence	Remarks (Risk after action taken, risk at acceptable level)
						People	Asset	Environment	Reputation		SHORT TERM (Soft controls supervisory/monitoring)	LONG TERM ( Physical changes/ Engineering Changes)					
1		DRS	Low thickness of the piping	Rupture of the pipe													
2		PE pipeline Section from ??? To ???	Exposed in the drainage Chamber line by PWD department	Gas leakage into the drainage chamber													
3		Isolation valve nos ???	Valve Hard to operate inspite of greasing	Quick isolation not possible													
4		Burial of valve chamber by third party	Will lead to delay in identification and operation of valve	Loss of gas due to delay in valve closure in the pipeline													
5		Domestic Connection	Unauthorised extension by the customer nos ???	Improper installation , poor selection of material, Lack of testing procedure													

Review Date :

Team members involved in Review :



**VANDANA SHARMA, Secy.**

**[ADVT.- ]**

Foot Note: Principal regulations were notified vide no. **F.No. INFRA/IMP/CGD/1/2013** dated 16<sup>th</sup> May, 2013.