



Integrity Management System Regulation

2nd Knowledge Sharing Workshop
for CGD Entities
Adani Total Gas Ltd|| 14th Feb 2022



Agenda

1. Scope & Objective of IMS
2. Key Element of IMS
3. IMS Implementation Plan
4. Potential Threats & its management
5. Latest Amendment
6. ATGL few key initiatives

Objective & SCOPE

Objective:

Developing and implementing an effective and efficient integrity management plan for city gas distribution networks through

- Evaluating the risk associated with city gas distribution networks and effectively allocating resources for prevention, detection and mitigation activities;
- Improving the safety of city gas distribution networks so as to protect the personnel , property, public and environment
- Bringing more streamlined and effective operations to minimize the probability of CGD network failure.

Scope:

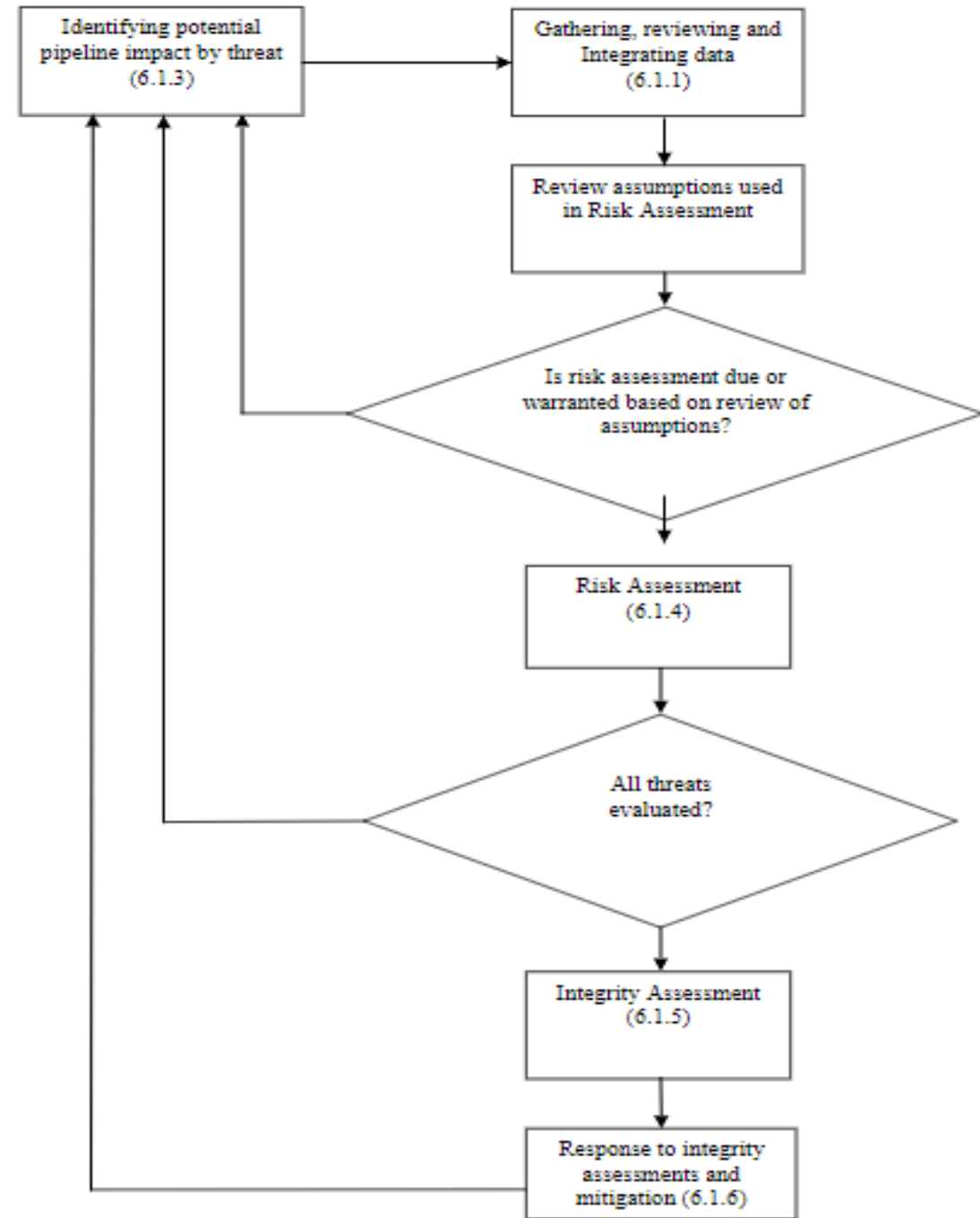
- Sub Transmission Pipeline (STPL)
- City Gas Station (CGS)
- Odorization System
- Steel pipeline networks
- Secondary PE networks
- Tertiary networks, PE, GI and/ or copper
- District Regulating Station (DRS)
- Isolation Valves (Steel, PE)
- CNG station-Mother, Online, Daughter Booster Station (DBS)
- **LNG / LCNG & Associated equipment**
- Individual Pressure Regulating Station (IPRS), Common Pressure Regulating Station (CPRS), Metering Station (MRS)
- **Cascade & CVT, LNG tank & vehicle**
- Control room and/or Master Control Station (if any)
- Instrumentation and Electrical systems
- Supervisory Control and Data Acquisition (if any)
- Safety Equipment
- Customer base (PNG, CNG, Industrial and Commercial)

Key Element of IMS

- a) **Integrity Management Plan (IMP):** This encompasses collection and validation of data, assessment of spectrum of risks, risk ranking, assessment of integrity with reference to risks, risks mitigation, updation of data and reassessment of risk;
- b) **Performance evaluation of Integrity Management Plan:** This is a mechanism to monitor the effectiveness of integrity management plan adopted and for further improvement;
- c) **Communication Plan:** This covers a structured plan to regulate information and data exchange within and amongst the internal and external environment;
- d) **Management of Change:** This is the process to incorporate the system changes (technical physical, procedural and organization changes) in to integrity management plan to update the integrity management plan;
- e) **Documentation, Records and Control:** This is the process to establish the requirements of quality in execution of the processes defined in the integrity management plan.

Integrity Management Plan

- Initial data gathering, review and integration
- Identification of Threats
- Consequence and Impact Analysis
- Identification of High Consequence Area (HCA)
- Risk Management and Risk Assessment
- Integrity Assessment
- Responses and Mitigation



Integrity Management Plan

Time Dependent Threats

- 1) External Corrosion
- 2) Internal Corrosion
- 3) Stress Corrosion Cracking

- Defective pipe seam
- Defective pipe
- Defective pipe girth weld
- Defective fabrication weld
- Wrinkle bend or buckle
- Stripped threads /broken pipe /coupling failure

Stable Threats

- 4) Manufacturing related defects
- 5) Welding /fabrication related
- 6) Equipment

- Gasket O-ring failure
- Control/relief equipment malfunction
- Seal pump packing failure
- Miscellaneous

Time independent Threats

- 7) Third party /mechanical damage:
- 8) Incorrect operational procedure
- 9) Weather related and outside force:

- Previously damaged pipe (delayed failure mode)
- Vandalism
- Rat bites
- Electric ArchingLightning
- Heavy Rains or Floods
- Earth Movements

Applicable based upon the land pattern

- Creek Area effects
- Muddy Land effects
- River bed movements

Consequence and Impact Analysis

“Appendix- III (An illustrative 6*6 matrix)”

Potential Consequence/Impact / Severity					Frequency / Likelihood					
					1	2	3	4	5	6
Cat	People	Asset	Environment	Reputation	Rare	Remote	Unlikely	Seldom	occasional	Likely
					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 ⁻⁶ Per Year	10 ⁻⁶ <10 ⁻⁴ Per Year	10 ⁻⁶ <10 ⁻⁴ Per Year	10 ⁻⁴ <10 ⁻² Per Year	>1 per Year	
6	Catastrophic	- 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	Severe	- 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	Major	- 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	Moderate	- 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	Minor	- Minor injury - Minor Assault	- Minor damage	- Minor effect - Public complaint	- Limited impact - Local public concern					
1	Incidental	- 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					

Last Amendments - Inclusion

Schedule #	Description	Inclusion
Schedule 3 Section 3.1	Physical Description	<ol style="list-style-type: none"> 1. LNG / LCNG Dispensing Station / LNG Vaporization Skid 2. Compressor at CNG Stations 3. Cascade and Cascade Transport Vehicle / LNG Tank Truck
Schedule 4 Section 4.2	Prescriptive and Performance based Integrity Management	Adoption of performance-based integrity assessment based on analysis of baseline data and subsequent trends
Schedule 6 Section 6.1.1	GIS	Integration of discrete data sources to a common location (GIS)
Schedule 6 Section 6.1.2	Identification of Threats	<ol style="list-style-type: none"> 1. Inclusion of AC / DC Interference 2. Joint Failures (PE Pipeline)
Schedule 6 Section 6.1.4	Risk Management	<ol style="list-style-type: none"> 1. Illustrative 6 x 6 Matrix attached in Appendix iii 2. A typical risk register & response /mitigation tracker attached in Appendix iv &V
Schedule 6 Section 6.1.5.1	Integrity Assessment - 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.

Last Amendments - Inclusion

Schedule #	Description	Inclusion
Schedule 6 Section 6.1.5.2	Monitoring Tools	<ol style="list-style-type: none"> 1. Thickness Assessment and Periodic Review 2. Annual operation & maintenance plan covering the following activities PNG Maintenance: Service regulators, MRS of Commercial/Industrial connections, GI Riser maintenance, CNG/LNG/ LCNG Maintenance Compressors,, Dispensers, Cascade leakage checking, Cascade cylinder testing
Schedule 7 Section 7.1	Management approval	<ol style="list-style-type: none"> 1. 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 2. Submission of approved IMS document along with confirmation from entity of its implementation to PNGRB.
Schedule 8	Preparation of Integrity Management Program	1 year from the date of first gas commissioning of the GA*
Schedule 8	Approval from PNGRB for implementation by entity	Within 3 months from the conformity assessment by Third Party Inspection Agency (TPIA).
Schedule 8	Submission of Compliance Statement to PNGRB	For new geographical areas, compliance statement shall be complied within one year of date of commissioning.
Appendix ii	Domestic Customer	Network Integrity inspection system for Galvanized Iron and copper piping forming part of tertiary network and the Last Mile Connectivity for domestic customers - Every 6 Months
Appendix ii	Commercial and Industrial Customer	Integrity inspection system for IP line Connectivity for 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 a year

Last Amendments – Exclusion / Replacement

Schedule #	Description	Inclusion
Schedule 6 Section 6.1.4	Risk Management	Carrying out CP Studies and periodic analysis has been excluded from this section and moved to section 6.1.5.1
Schedule 6 Section 6.1.5.1	Integrity Assessment - Pressure Testing	Removal of Cathodic Protection surveys from integrity assessment tools and included as monitoring tool
Schedule 7 Section 7.1	Management approval	Acceptance by Petroleum and Natural Gas Regulatory Board.
Schedule 6 Section 6.1.5.1	Integrity Assessment - Pressure Testing	1 year from date of notification of the Petroleum and Natural Gas Regulatory Board (Integrity Management System for City or Local Natural Gas Distribution Networks) Regulations, 2013

IMS Implementation Steps/Schedule

Carry out T4S Audit : Compliance with T4S Regulations

Prepared & Checked by In-house team or Consultant

Approval by Head of Operation or Maintenance team of the entity - *1 year from the date of first gas commissioning of the GA**

Conformity of IMS document with regulation by TPIA - *3 months*

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 – ~~1 month~~ 3 months

Start of Implementation

Submission of IMS document to PNGRB -1 month

Submission of Compliance Statement to PNGRB -every year or As when required

ATGL few key initiatives

MDPE Network – Integrity Management Plan

- MDPE pipe and fitting are compliance with PNGRB Requirement Pipe - & Fitting-
- MDPE Laying at 1 meter as per guideline
- Pneumatic testing at Project stage– 6.2 Bar & interval as per length

After Commissioning of network

- Walk survey on Pipeline by GMI machine– at set frequency
- Lock Pressure test – at set frequency
- Dial before Dig and awareness session

Portable Leak detection instruments

1. RMLD-CS (Remote Methane Leak Detection Complete Solution)
2. DP-IR+ (Detecto Pak-Infrared Plus)



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Gas



खुदाई से पहले डायल करें

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VTS Installation & Geofencing

Home Vehicle Reports Vehicle and Driver Maintenance Logistics Analytics

Export Print Group: All


vehicle Moving OverSpeed vehicle Idling vehicle Halted Not Reachable

Show Positions Show Route RoutePlayBack DetailRouteReport HaltReport SpeedReport RouteReport SummaryDistance

MonthlyDistanceReport Driving Hours Report

vehicle	vehicleInfo	UpdateDate	UpdateTime	Location
<input type="checkbox"/> GA 04 T 6337	67079 91234567890	08/02/2022	10:52:10 AM	Gopiballavpur Road, Badasol - 757021, Mayurbhanj, Odisha
<input type="checkbox"/> GJ 01 DX 1569	67268 91234567890	08/02/2022	10:52:25 AM	Gujarat State Highway 4, Kasindra - 382210, Ahmedabad, Gujarat
<input type="checkbox"/> GJ 01 DX 1771	67275 91234567890	08/02/2022	10:48:54 AM	Gujarat State Highway 7, Malvan - 382745, Surendranagar, Gujarat
<input type="checkbox"/> GJ 01 FT 6245	MXT VAD 150017 3000 915756200312557 V AIS	08/02/2022	10:52:04 AM	ATGL Vadodara, Vadodara, Vadodara, Guj

100 % Geofencing of CNG stations



GJ 02 ZZ 6679

Status Vehicle Halted,

Speed 0 Km/h

Info ABE SUN 150267 4500 915754202755316 B AIS

Date 23/10/2021, 12:21:47 PM

Address IOCL Umiya Petroleum, Surendranagar, Surendranagar, Guj

Lat,Lng 23.084042,71.872925

Centralized Control for Real Time Vehicle Tracking & Monitoring :-



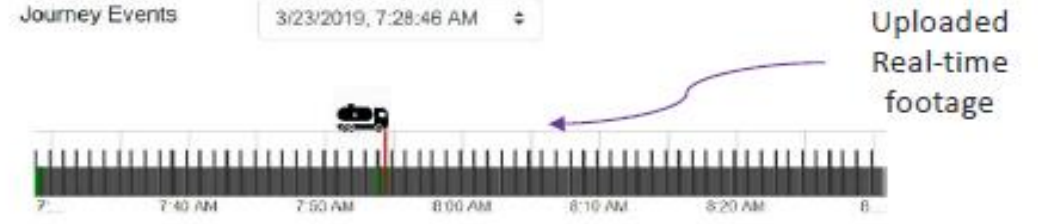
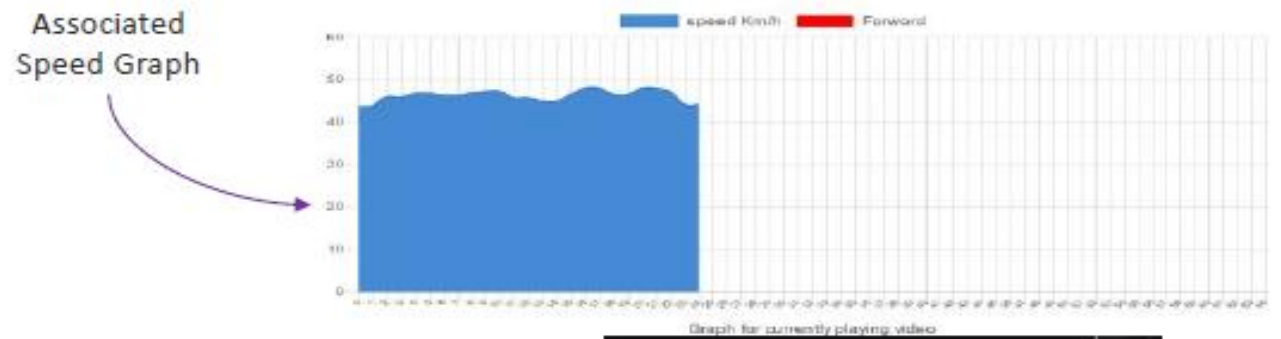
Currently team monitoring total 05 Parameters from control Room

- Over Speeding
- Stoppage Alerts
- Night Driving
- Continuous Driving
- Panic Alert

Pilot Project for DMS (Driver Management System)

Integrated Event Video Analyser

Vehicle No: From Date: To Date:



Thank You