



TECHNICAL SCOPE OF WORK

FOR PE-PNG O&M SERVICES ACROSS GGL

Document No: GGL/TS/PE-PNG/SERVICES/PE-PNG O&M/SOW

TABLE OF CONTENT

PART-1: INTRODUCTION	6
1.0. INTRODUCTION.....	6
2.0. GLOSSARY/ DEFINITIONS.....	7
3.0. OPERATION & MAINTENANCE POLICY STATEMENTS.....	10
3.1. O&M Policy Implementation Statements.....	11
3.2. Natural Gas Composition & Properties	12
4.0. SCOPE OF THIS TENDER DOCUMENT.....	13
PART-2: CGD SYSTEM FACILITIES / NETWORK	15
1.0. CITY GAS DISDRIBUTION SYSTEM (CGDS).....	15
1.1. GENERAL / INTRODUCTION	15
2.0. LAWS – CODES – RULES & STANDARDS	16
2.1. GENERAL	16
3.0. DESIGN PHILOSOPHY	16
4.0. BRIEF DESCRIPTION OF CITY GAS DISTRIBUTION NETWORK.....	17
4.1. NATURAL GAS PIPELINE NETWORK	17
5.0. City Gate Distribution System	18
5.1. CITY GATE STATION	18
5.2. DISTRIBUTION MAINS & SERVICES	18
5.3. DISTRICT REGULATING STATION (DRS).....	19
5.4. INDUSTRIAL METERING SKID (IMS)	19
5.5. SERVICE REGULATOR (SR).....	19
5.6. NETWORK ISOLATION VALVE (SV)	19
5.7. DOM. /COM. / IND. INSTALLATION	19
5.8. CATHODIC PROTECTION	20
5.9. ODORANT SYSTEM & STORAGE FACILITY / ODORANT HANDLING MANAGEMENT	20
6.0. Utilities / Others.....	21
PART-3 : CONTRACTOR'S SCOPE OF WORK	22
1.0. OPERATION & MAINTENANCE	22

1.1.	CONTRACTOR’S SCOPE OF WORK.....	22
1.2.	IMPLEMENTATION OF AUTOMATION & DIGITIZATION INITIATIVES:	23
1.3.	AOMP RELATED ACTIVITIES :.....	24
1.4.	OPERATION MANAGEMENT	25
1.5.	ADMINISTRATIVE MANAGEMENT.....	27
1.6.	O&M OFFICE / SET-UP.....	28
1.7.	RECONCILIATION / GAS SUPPLY MANAGEMENT	29
1.8.	OTHERS	29
2.0.	CONTROL PHILOSOPHY	30
2.1.	PHILOSOPHY OF CONTROL IN AN OPERATING AREA.....	30
2.2.	JOB DESCRIPTION / RESPONSIBILITIES.....	31
2.3.	GENERAL INFORMATION	34
2.4.	COMPETENCY & TRAINING	35
2.5.	BASIC RESPONSIBILITIES OF CONTRACTOR.....	35
3.0.	PATROLLING OF DISTRIBUTION / SERVICE LINE	35
3.1.	GENERAL	36
3.2.	ACTIVITY STEPS FOR PATROLLING	36
3.3.	ACTIVITIES TO BE CARRIED OUT BY PATROL PERSON	37
3.4.	ITEMS TO BE CHECKED, NOT LIMITED TO THE FOLLOWINGS;.....	37
3.5.	LIAISON WITH OTHER AUTHORITIES.....	38
3.6.	LEAKAGE SURVEYS ON TRANSMISSION /STPL/ DISTRIBUTION / SERVICE LINES.....	38
4.0.	EMERGENCY RESPONSE / NETWORK DAMAGE REPAIR/LPT/LDT	38
4.1.	LPT/LDT, GAS LEAK CLASSIFICATION AND ACTION CRITERIA	38
4.2.	EMERGENCY / BREAKDOWN / SHUTDOWN	39
5.0.	MONITORING OF OPERATIONS	41
5.1.	CITY GATE STATION (CGS).....	42
5.2.	DISTRICT REGULATING STATION (DRS) /DPRC (DOMESTIC PRESSURE REDUCTION CHAMBER) COMMON PRESSURE REDUCTION STATION (CPRS)	43
5.3.	SERVICE REGULATORS	43
5.4.	ODORIZATION UNIT	44
5.5.	VALVES.....	45

5.6. INDUSTRIAL METERING SKID (IMS) FOR INDUSTRIAL CONSUMERS / CONNECTIONS	45
6.0. MAINTENANCE.....	45
6.1. GENERAL	45
6.2. DISTRIBUTION MAINS / SERVICE LINES (PE PIPELINE) NETWORK MAINTENANCE	46
6.3. WORK INSTRUCTIONS FOR CLEANING / REPLACEMENT OF FILTER ELEMENTS OF CPRS / DRS / DPRC/IMS.....	51
6.4. WORK INSTRUCTION FOR ROUTINE MAINTENANCE OF CPRS / DRS /DPRC	52
6.5. INDUSTRIAL METERING AND REGULATING STATION (IMS)	52
6.6. NETWORK ISOLATION VALVE (PE BALL VALVE)	52
6.7. ATTENDING GAS SMELL / LEAK COMPLAINT IN DOMESTIC CONNECTION	54
6.8. GI WALL PIECE REPLACEMENT IN GAS INSTALLATION	55
6.9. EMERGENCY RESPONSE VEHICLE (ERV).....	55
6.10 INSTALLATION PHILOSOPHY OF SS TUBE IN ISLAND KITCHEN.....	59
7.0. CONSUMER SERVICES / COMPLAINT HANDLING	62
7.1. GENERAL	62
7.2. COMPLAINT HANDLING	64
7.3. DISCONNECTION (DC) / RE-CONNECTION (RC).....	65
7.4. NEW CONNECTION	Error! Bookmark not defined.
8.0. Waste management	66
9.0. STATUTORY COMPLIANCE	67
9.1. STATUTORY COMPLIANCE	67
9.2. STATUTORY COMPLIANCE FOR O&M.....	68
10.0. REPORTING.....	69
11.0. QUALITY CONTROL / INSPECTION	70
11.1. GENERAL	70
11.2. INSPECTION.....	70
11.3. GUARANTEES AND WARRANTEES.....	71
11.4. OTHERS	71
12.0. SITE FACILITIES.....	72
ANNEXURE-1	73

MINIMUM TOOLS, EQUIPMENTS & RESOURCES TO BE MADE AVAILABLE BY THE CONTRACTOR	73
ANNEXURE-3	78
FORMAT OF REPORTS.....	78
ANNEXURE-4 ENCLOSURE -1 of SCHEDULE – 1E (T4S issued by PNGRB)	99
ANNEXURE-5 MATERIAL SAFETY DATASHEET	100

PART-1: INTRODUCTION

1.0. INTRODUCTION

GUJARAT GAS is a Gujarat State Government-undertaking Corporation involved in Piped Natural Gas Distribution to industrial, commercial, transportation, residential segments of major cities / towns of Gujarat state and outside of Gujarat as per authorization received by PNGRB. GUJARAT GAS is rapidly

developing a multi-dimensional operational framework that fulfils the India's energy needs by exploring, developing and harnessing newer energy services.

PNG is a mixture of hydrocarbon gases and vapors consisting of principally methane in gaseous form. The PNG network consist of receiving natural gas from suppliers at city gate station (CGS), steel mains, pressure regulating installations (PRI), poly ethylene (PE) mains and supply system to end users.

Natural Gas (NG) is today increasingly gaining popularity over as alternate auto fuel primarily because it is environment friendly, economical and more efficient as compared to other conventional auto & kitchen fuels. Emission of harmful oxide and other polluting particulates is minimal in case of NG.

GUJARAT GAS intends to appoint contractor for the comprehensive activity based "Operation & Maintenance" of City Gas Distribution Network, PNG Installations, Equipments and associated facilities in the region to provide uninterrupted supply with due compliance of all the PNGRB standards, GGL technical specifications, prevailing statutory & HSE norms keeping in view of the customer satisfaction.

2.0. GLOSSARY/ DEFINITIONS

City Gate Station or CGS	"City Gate Station" means the point where the custody transfer of natural gas from natural gas pipeline to the CGD network takes place.
Transmission / Sub transmission Line	Carrying high pressure gas at above 49 bars it is under scope of Transporter.
Primary Network	"Primary network" means a part of CGD network that operates at pressure above 100 psig (7 bar) and below 711 psig (49 bar) and pipelines forming part of this network called Gas Main or Distribution Main or Ring Main shall be designed to ensure uninterrupted supply of gas from one or more City Gate Stations to supply gas to the secondary gas distribution network or service lines to bulk customers through service lines. Can also be defined as steel pipeline network.
Secondary Network	"Secondary network" means a part of CGD network that operates at a pressure below 100 psig (7 bar) and above 1.5 psig (100 mbar) and pipelines forming part of this network shall be called low-Pressure Distribution Mains which shall be designed to ensure uninterrupted supply to tertiary network or to industrial consumers through service lines. It can be defined as PE (MP) distribution network. "Tertiary network" means a part of the CGD Network that operates pressure less than 1.5 psig (100 mbar) and pipelines forming a part of this network to service pressure distribution mains shall be designed to ensure uninterrupted Gas supply to service lines. It can be defined as PE (LP) distribution network.
Tertiary Network	

Standard Dimension Ratio it is the ratio of nominal OD to nominal wall thickness of PE pipe as define in IS-14885, with latest edition.

Such method of construction that does not need an open trench.

SDR	A meter that measures gas delivered to a consumer at the consumer's premises.
Trench less	A relief valve installed to relieve over pressure caused by creep in the downstream system that discharge maximum 1% of the equipment flow capacity
Consumer meter	A joint made in thermo plastic piping by passing the current through the electrical coil provided in the fitting and heating the parts sufficiently to permit adequate flow and fusion of the materials between the two surfaces put in contact.
Creep relief valve	
Electro fusion joint	
CPRS, DRS, DPRC	It receives gas from steel distribution line and carries out filtration, pressure reduction of 1.5- 4 barg and dispatches to PE distribution network.
Domestic Customer Connection	Consist of regulator, meter, GI / copper pipeline and wire braided rubber tube. Gas flow downstream of regulator at 21-24 mbar and consumed at hot plate.
Commercial Customer Connection	Consist of regulator, meter, GI / copper pipeline and wire braided rubber tube. Gas flow downstream of regulator at 75-100 mbar and consumed at hot plate.
Industrial Customer Connection	Consist of filter, regulator, meter, PE / CS pipeline and consumed at Gas equipment like boiler, furnace, etc.
Transition Box / Service Regulator	Receives 0.5 to 5 bar pressure gas through PE network and supply 110 mbar pressure gas to downstream PE network after pressure reduction.
Odorising Unit / Facility	Adequate odour / smell is imparted to piped natural gas by continuous dosing controlled quantity of odorant chemical, in the flowing gas supply.
Office / Control Room	For carrying out round the clock for 24 hours and 365 days operational activities of CGD.
IMS	Integrity Management System comprising of ISO 9001:2015, ISO 14001:2015 and ISO 18001:2007
Other Utilities	Office Equipment, Furniture, UHF Wireless Communication, Emergency Vehicle, Condensate Pits, Fire Protection / Fighting & Leak Detection Equipment, Telephone connection, etc...as per enclosure.
Portable Gas Detectors	

Emergency Response Vehicle(ERV)	For detecting / measuring gas presence during leaks / escape / maintenance jobs. A vehicle for attending regular and emergency activities/ maintenance
Tools / Tackles	For repair / maintenance of leaking / damaged PE pipes / fittings on PE network, on line functional testing of PE valves and service regulators and customer connection.
Personal Protection Equipments (PPE)	For personal protection during normal and critical jobs.
Fire Extinguishers	For extinguishing fire accident during routine job.
Signage / Caution / Information Boards and Mobile phones / Wireless Sets	For display of information / caution, quick and effective transmission of information, even when away from control room.
Public Announcement System	For making public announcement to customer during gas supply stoppage, resumption, disaster, earthquake, fire hazards etc.
Computer System / Printer / log Books	For record / reports and logging daily information's and parameters / customer complaints handling and status per shift including attendance.
PNG	Natural Gas produced from Gas wells, Gas condensate wells or Oil wells and the residue Gas remaining after conditioning being metered, regulated / controlled, odorized & distributed through pipelines for various applications, i.e. for industrial, commercial, domestic, etc. as a Fuel.
Equipment	Gas Transmission Pipelines (Steel), Distribution mains (PE), City Gate Station, DRS / CPRS, Transition Box / service regulator, GI Installations, Meter / Regulators, Safety / Regulating / Control valves & associated facilities includes Flow Meter, Filters, Odourizer and accessories owned by OWNER for PNG distribution.
Safety Procedures	The Procedures, Direction, Guidelines and Measures as communicated from time to time by OWNER to the CONTRACTOR for safe / reliable handling, distribution & usage of PNG.
Vehicle	A Light Motor Vehicle (Cars & Three Wheelers) and Heavy Motor Vehicle (Bus) as defined under the Motor Vehicle Act, 1988.
MIS	Management Information System
AOMP	Annual Operation & Maintenance Plan
HSE	Health, Safety, Environment

PPE	Personal Protective Equipment
SRV	Safety Relief Valve
SSV	Safety Shut-off Valve
PRV	Pressure Reducing Valve
LDT	Leak Detection Test
LPT	Lock Pressure Test
TR Unit	Transformer Rectifier Unit
MDPE	Medium Density Polyethylene
MS	Mild Steel
BA Set	Breathing Apparatus Set
CP	Cathodic Protection
IJ	Insulating Joint
AJB	Anode Junction Box
TLP	Test Lead Point
CJB	Cathode Junction Box
MP	Medium Pressure
QAP	Quality Assurance Plan
SOP	Standard Operating Procedure
LP	Low Pressure

3.0. OPERATION & MAINTENANCE POLICY STATEMENTS

GUJARAT GAS is committed to carry out management of operation & maintenance of its city gas distribution systems, at all location, with the prime objective of ensuring safe and reliable gas supply to its customers, integrity of network, prevention of accidents to minimize loss of life or bodily injury to contractors' and his own employees and damage to company's physical assets.

In fulfilling this commitment, which is as essential and equally important as objectives, GUJARAT GAS will provide and maintain a comfortable, safe and healthy work environment and protect environment and public against foreseeable hazards resulting from operations.

3.1. O&M Policy Implementation Statements

3.1.1. Compliance with operation and maintenance requirements

The application of the best operation and maintenance practices, for the city gas distribution system, to ensure safe and uninterrupted gas supply, integrity of network, minimizes risk to personnel and property. The contractors will meet requirements of operation and maintenance of facilities and equipment, as practiced by GUJARAT GAS, and as covered in this document including engineering standards.

3.1.2. Operating Standards and Instructions

Compliance with O&M standards including relevant PNGRB standards and instructions will be consistently enforced for both GUJARAT GAS operations personnel and Contractors alike, as it is proved that flaws/ risks that cannot be eliminated through design are controlled by operating standards and instructions.

3.1.3. Deployment of Contractor

Gujarat Gas will engage the competent contractor for O&M management of city gas distribution system to ensure safe operations, integrity of network and protection of those involved, protection of environment and public at large. The Contractor selection will be solely based on Bidder Qualification Criteria (BQC) / experience in the similar job and have required resources and capabilities.

3.1.4. Inspection

Inspections to detect and correct unsafe practices and conditions will be conducted by GUJARAT GAS representative. Inspection of Contractor supplied material will be carried out by GGL authorized representative as per GUJARAT GAS technical specification and procedure.

3.1.5. Education and Training

Working on commissioned network is critical and hence it is responsibility of Contractor to deploy competent work force at site. Activity wise all involved work force shall be provided with ongoing education and training as well as help to develop those skills that are required to perform, supervise and manage assigned tasks without mishap at Contractors own expenses. The training will be exhaustive including various job skills and HSE management, especially, on the job and off the job safety, emergency handling, PPEs, etc. Training to be imparted by contractor at his own cost. In case GGL is providing training for some of the activities, the same will be imparted at contractors own cost.

3.1.6. Resources, Basic facilities, infrastructure and motivation

The Contractor will provide required resources including tablets / mobiles, basic facilities and infrastructure as per contract term, to enable its work force to carry out O &M activities in a safe environment. The company understands that good communications, a viable suggestion system and the recognition of good O&M performance, encourages contractor / employee in participation, in effective O&M management program.

3.1.7. Job Placement

The GUJARAT GAS will ensure that contractor and its resources will only be assigned to tasks that are consistent with their capacities and job skills; this enable employees / contractor to work safely and effectively.

3.1.8. Response to Accidental Occurrences

The site specific effective emergency will be handled as per GUJARAT GAS ERDMP and as per the guidelines given in this document. These should include measures to contain or control an emergency or disaster when an accident occurs to minimize the loss of resources and reporting & investigation system to determine the cause of the accident, and the adoption of corrective actions to avoid a recurrence.

3.1.9. Contractors' work force Safety

The company's personnel, will monitor operation and maintenance management, to ensure that activities are performed in conformity with this O&M policies, statements and practices and do not violate the set safe practices and procedures.

3.1.10. Accountability

Contractor and all their work force shall be held accountable for personal and functional O&M performance. An important factor in a contractor's overall job performance evaluation will be, how well the contractor meets their skill and safety responsibilities.

3.2. Natural Gas Composition & Properties

3.2.1. General

When handled properly Natural Gas is a safe fuel. It is a non-poisonous, non-toxic combustible source of energy.

Natural Gas is composed essentially of methane with minor quantities of ethane, propane, carbon dioxide and traces of higher hydrocarbons and oxygen. It has a specific gravity of about 0.6, which means it is only 60% as heavy as air and it will rise under normal atmospheric conditions. Thus, it disperses in to air very easily, if leaked.

Natural Gas within the distribution system will be given a distinctive odour, which will be designed to be detectible by the nose at concentrations of 2 ppm gas in the atmosphere.

Natural Gas will burn within the range of 5% and 15% of gas in air (by volume), and it is readily ignited by spark or other forms of ignition within this range. Thus, it is safer due to wide flammability limit.

3.2.2. Natural Gas can be hazardous in the following ways

From Asphyxiation - through over exposure to natural gas, usually in a confined space, caused by inadequate ventilation or mechanical or accidental failure of equipment.

From Explosion - through an accumulation of escaping gas, also usually in a confined space, being ignited when mixed with air.

From Fire - through the uncontrolled burning of gas, usually after an explosion.

From Over Pressure - through submitting gas facilities such as regulators, valves, gauges, etc, to pressures in excess of their maximum working pressure.

The typical Natural Gas composition & properties are given below

Normal Gas Composition

Methane	82% -99% Mole
Ethane	1% to 5% Mole
Propane	1% to 5% Mole
Butane	0.1% to2% Mole
Pentane	0% to 1% Mole
Hexane	0% to 1% Mole
CO ₂	0% to 1% Mole
Nitrogen	0% to 1% Mole
Properties	
Specific Gravity (air – 1.0)	0.56% to 0.67%
Boiling Point	-161deg C
Melting Point	-182deg C
Flash Point	-161deg C
Auto Ignition Temperature	560deg C
Flammable Limit	5% to 15% by volume in air.

Note: Gas composition / characteristic may vary subject to source available from time to time

MATERIAL SAFETY DATA SHEET – NATURAL GAS & ETHYL MERCAPTAN (Refer Material Safety data Sheets enclosed in the tender.)

4.0. SCOPE OF THIS TENDER DOCUMENT

The scope of this tender document is to set down the minimum day to day operational and maintenance requirements for City Gas Distribution Network. The adoption of prudent operation and maintenance practices shall facilitate delivery of a safe and secure gas supply to end users.

Maintain all resources to perform the activities 24 x7 x 365 days including fully equipped emergency response vehicle. Arrangement of deploying resources at locations from where first response at incident site can be done within 30 minutes after receiving call from Gujarat Gas.

This document lays down the minimum safety requirements for PNG distribution in cities / towns. It covers the equipment, pipelines, accessories etc. installed between Up-stream inlet isolation valve of city gate station (CGS) to end users customers.

City Gas Distribution Network is limited to downstream of primary network consisting of steel pipeline commissioned from City Gate Station, DRS, PE 100/80 polyethylene pipe line network, associated facilities like Service Regulators and industrial, commercial and domestic consumers installations.

Operating conditions given herein are indicative and may be rectified during actual operation depending on site conditions, experience gained during commissioning, operation and system requirements / design conditions for detailed O & M instruction for equipment, vendor's / manufacturer manuals for respective equipment should be required in the event of any discrepancy between this tender document specifications and the vendor's / manufacturer's recommendations the latter shall take precedence.

PART-2: CGD SYSTEM FACILITIES / NETWORK

1.0. CITY GAS DISDRIBUTION SYSTEM (CGDS)

1.1. GENERAL / INTRODUCTION

City Gas distribution network is a facility or set- up developed for distribution of piped natural gas, mainly as a fuel to domestic, commercial and industrial customers. The system receives high pressure and unodorized gas from gas transporters / Suppliers, through transmission/sub transmission line and supplies the same to the customers after filtration, pressure reduction/ regulation, odorization and check metering.

The pressure reduction/ regulation may be in four/three stages depending upon the network design selected. The first pressure reduction is carried out at CGS, second at CPRS / DRS / DPRC, third at Service Regulator and fourth and final at customer premises. The odorization for imparting smell to gas is installed at City Gate Station (CGS). The system consist of City Gate Station (CGS), underground steel pipeline distribution network, CPRS / DRS / DPRC, MP PE pipeline network, service regulators, LP PE pipeline network, and customer connections. The size, rating and type of

the major and sub assets are selected based on the pressure rating, capacity and other applicable criteria considered for whole city gas distribution system for meeting the current and future customer potential, health and safety of employees, customers and public at large, environment protection, and complying the statutory, legal requirements, national and international technical and safety standards/ practices. The main objective of the distribution company is to ensure safe and uninterrupted gas supply to customers for 24 hours, 365 days round the clock, by deploying resources, for handling various customer complaints about gas leak/ escape, customer queries and carrying out planned operation and maintenance activities, as per annual operation and maintenance plan for ensuring safe and uninterrupted gas supply and integrity of network.

Basic CGD system flow diagram (schematic) is enclosed with this document.

2.0. LAWS – CODES – RULES & STANDARDS

2.1. GENERAL

BIDDER shall carry out operation and maintenance of CGD-PNG network based on following Codes / Standards, but not limited to;

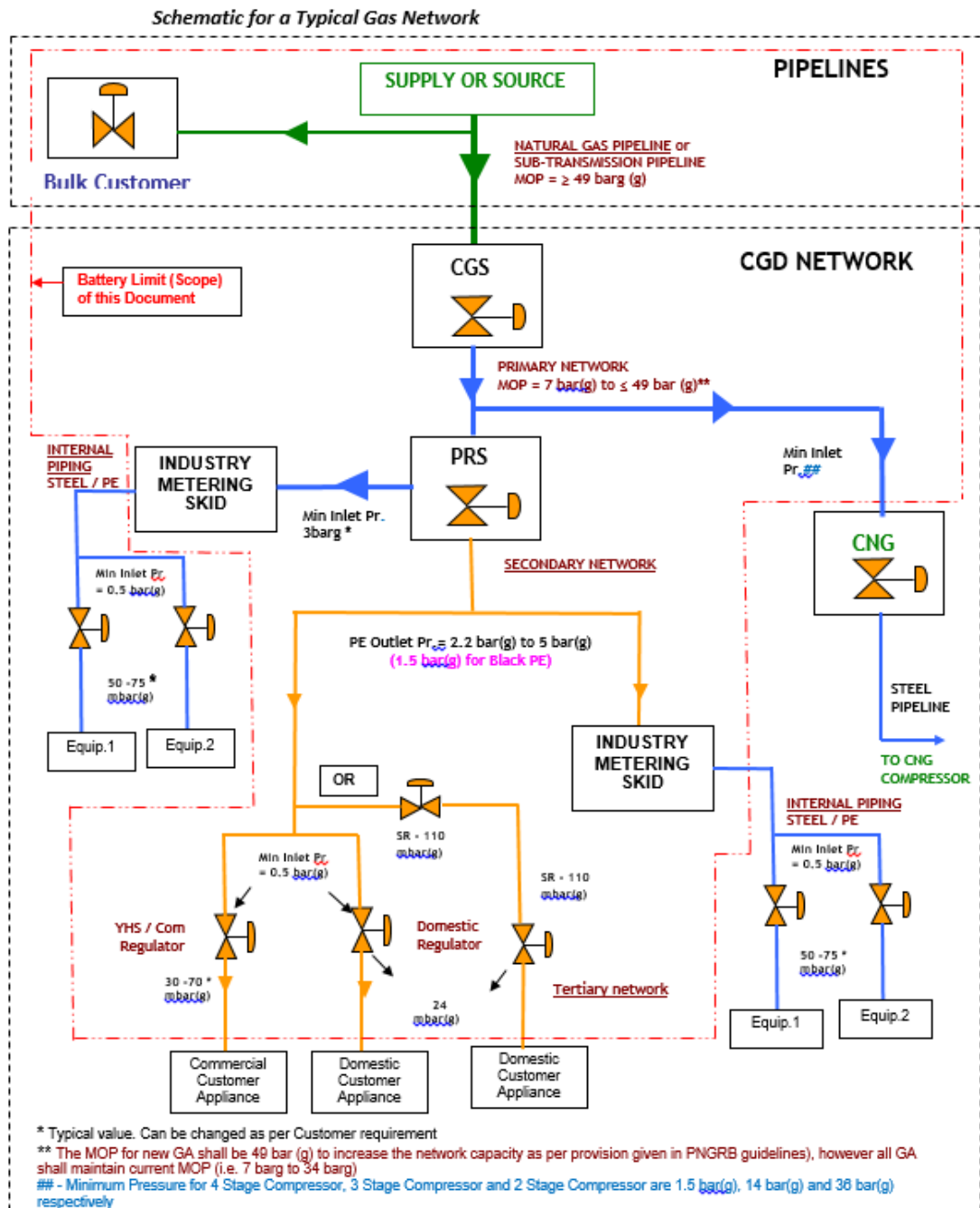
- Laws, Codes, Rules & Standards as mandatory under the legislation of Gujarat and India
- ASME B 31.8, OISD STD 226 & PNGRB T4S and other relevant regulations issued by PNGRB with latest edition.
- The complete set of which are part of the present technical volume as well as SOPs that are developed as a part of IMS system.
- The “Rules of good Practice” commonly used by the worldwide gas industry.
- The “Rules of Art” and “Sound Practices” of the engineering.
- Original equipment manufacturer’s installation, operation & maintenance manual.

3.0. DESIGN PHILOSOPHY

In a typical City Gas Distribution network, Underground Carbon Steel (CS) network is major asset / component of total installation. It can be categorized as Transmission Pipeline and Distribution Pipelines.

The fundamental design objective is the provision of a safe and reliable gas distribution system.

The design philosophy of City Gas Distribution system is based on three pressure levels till the gas reaches the end consumer. Typical pressure methodology till the These pressure levels are given in the following section.



4.0. BRIEF DESCRIPTION OF CITY GAS DISTRIBUTION NETWORK

Construction, including testing and commissioning, generally carried out in accordance with the requirements of PNGRB standards and ASME B31.8. The typical CGD network comprise of one or more or all of the following: criterias is mentioned below-

4.1. NATURAL GAS PIPELINE NETWORK

- Primary Network - 7 to 49 bar g
- Secondary Network. - > 0.5 bar g < 5 bar g
- Tertiary Network - < 0.110 bar g

4.1.1 High-Pressure Network

This applies to the pipelines laid by transporters for connecting the Gas transmission to the "City Gate Station".

4.1.2 Primary Network

Primary Network is generally constructed by using Carbon Steel pipelines of API-5L Grade – B, X42 or X-52 material specification and sizes varies from 4" to 12" in distribution network. The 3 Layer PE/FBE coated pipes are welded, NDT tested, laid underground at normally 1.2 m cover and finally hydro tested to 1.5 times design pressure. The underground steel network is protected against corrosion by coating the pipes and applying impressed current Cathodic protection. Special care is taken during installation, operation and maintenance for rail, road and nala, canal crossings. The scope of primary starts after City Gate Station (CGS) and spreads across the city or local distribution zone (LDZ) up to inlet of CPRS, DRS, DPRC and CNG Station and it operates at pressure range from 7 to 49 bars (MOP as per actual demand and pipe specification). Major industrial consumers and CNG mother stations are as directly fed through connection in Primary network.

4.1.3 Secondary Network

Operating pressure fluctuating between 0.5 barg and 4.6 barg based on the minimum pressure (Pmin) necessary at the inlet of End-Users / guaranteed MGP to end-users.

Large and Small Commercial consumers will be fed through connections in Secondary network.

4.1.4 Low Pressure Network (Pressure below 0.110 bar g/ 110mbar g) / Tertiary Network

LP network caters gas from central DRS stations to individual commercial or domestic consumers. The design presented relies on a low pressure network operated at 5 barg until the ultimate customers whether commercial or individual.

However, in a context of low individual consumption of most of the users (small individual users for domestic consumption only), the use of simpler pressure reducing system in the 21 mbarg at end-user connection is provided. For both steel & PE network, looping of network is used, wherever possible in order to optimise pipeline size & provide uninterrupted supply in the event of major line damage.

5.0. City Gate Distribution System

5.1. CITY GATE STATION

“City Gate Station” means the point where the custody transfer of natural gas from natural gas transporter to the CGD network takes place.

CGS generally comprises of Filters, Pressure Regulating & control devices, metering & Odorization system, Pressure Gauges, Heating system (if any), Canopy (may or may not be) & other allied accessories. A control panel with instrumentations is also provided / installed for data acquisition, back-up & monitoring purpose.

5.2. DISTRIBUTION MAINS & SERVICES

Medium density grade PE 100/PE 80 polyethylene (PE) pipelines in various sizes from 63 to 160 mm OD has been laid for all distribution mains with all jointing by the electro fusion process for mains & services as well. As built network drawings will be provided post award of contract.

Distribution services running from the PE mains to the customers appliance(s) are constructed of polyethylene for their underground section (from main to a PE / GI transition fitting, situated adjacent to the outside of the customers premises), and then installed galvanised iron (GI) pipe thereafter. The size of services pipes is standardised to 90, 63, 32 and 20 mm. As built network drawings will be provided post award of contract.

5.3. DISTRICT REGULATING STATION (DRS)

DRS consists of filtration system, regulator system & metering system (optional). Generally DRS is designed & supplied as a single compact (twin stream) skid. For flow range 500 to 5000 SCMH pilot operated are generally used. DRS reduces the gas pressure from 7 – 49 barg to 1 - 5 bar g and also works as gas measuring facility if required.

5.4. INDUSTRIAL METERING SKID (IMS)

IMS consists of filtration system, regulator system (if required) & metering system. Generally IMS is designed & supplied as a single compact skid. All piping is rigidly supported and adequate pipe supports are provided for the filters, meters & regulators. These are bolted to the skid structure, designed and located with due regards to weight distribution and operational pipe stress.

5.5. SERVICE REGULATOR (SR)

Service Regulator is a pressure regulating station that interfaces a MP network with a LP network. Presently Service Regulator are fitted in CGD system of Gujarat Gas having capacity varies from 10 m³/hr to 200 m³/hr. Service Regulator are continuous operating type for natural gas regulating system. It regulates / reduces inlet pressure of 0.5 bar g to 5 bar g at to 0.11 bar g. This skid is having single stream pressure control valves for over pressure safety shut off, under pressure safety shut off & pressure relief valves at the outlet of the Service Regulators.

5.6. NETWORK ISOLATION VALVE (SV)

In the operation of a PE pipe system gas flow can be stopped through the use of valves, plugging devices, squeezing in an emergency situation with a manual or hydraulic device to form a seal, where it is imperative the flow be stopped and where it cannot be achieved in another manner. PE Ball valves are provided / installed as per PNGRB Guidelines and also looking to the parameters such as population density, critical locations, etc...The sizes of such valves varies from 32 to 160 mm diameter. As built network drawings will be provided post award of contract.

Necessary valve pits / chambers are constructed to protect / safe guard the isolation valve, which is made of RCC Precast chamber/Masonry work with Slippers.

5.7. DOM. /COM. / IND. INSTALLATION

The existing Dom. / Com. installations consists of the following equipments/ components:

- UNDER GROUND PE: It is pipe generally laid at one-meter depth to ensure its safety / security. This line carries PNG at about 110 mbar g for Domestic Connection.
- REGULATOR: It is an important component of Dom./Com. installation which regulates the natural gas pressure coming to the consumer's kitchen at about 22-24 mbar g. For industrial consumers the natural gas pressure at their consummation points is as per requirement of the end users.
- GAS METER: It measures the quantity of gas consumed by the customer.
- GAS TAP / APPLIANCE VALVE: It is used to stop gas supply to burner and is installed near the customer's stove.
- MAIN CONTROL VALVE: It is installed normally outside the consumer's house and before the regulator and meter at safe and easily accessible location but not reachable by children.
- PE pipes, GI pipes, wire braided rubber hose are used to transport PNG from underground main to consumer's stoves.

5.8. CATHODIC PROTECTION

Cathodic protection is a method of inhibiting corrosion to steel pipes. The technique is to connect the pipe line to anode bed and to make the pipe behave as cathode by impressing a direct current voltage so that the anode bed corrodes and not the pipe. Cathodic protection is particularly important for coated pipes to overcome the effect of pinholes or accidental breaks in the coating which would permit local corrosion cells to form which are highly active and can rapidly penetrate the pipe line.

Cathodic protection system consists of –

- Impressed current system: Impressed current systems are generally installed where alternating current is available for the rectifier unit.
- Permanent (direct) current system: Permanent Cathodic systems are generally installed where alternating current is not available for standard rectifier units. For this system direct current is provided by a transformer-rectifier combination.
- The existing cathodic protection is utilised for the protection of carbon steel pipeline from corrosion.

5.9. ODORANT SYSTEM & STORAGE FACILITY / ODORANT HANDLING MANAGEMENT

General

The natural gas is odorless and colour less. The natural gas supplied to customers through, the City Gas Distribution System is odorized for facilitating the early detection of gas, when it leaks, before it causes hazards like fire / explosion and asphyxiation. Adequate odor / smell is imparted to piped natural gas by continuously dosing controlled quantity of odorant chemical, in the flowing gas supply.

Generally Ethyl Mercaptan chemical is used as odorant. The dosing is such that it is safe for human as well as materials and equipment used in CGD system. The adequacy of sulphur content in dosing can be periodically verified by Dragger tube test or other odorant detection instrument at the remote active consumption points.

Similarly the adequacy of smell of odorant in gas supply has been regularly checked by equipment / standard nose method, by trained and competent persons by smelling gas at various points in the network, by carrying out special smell survey or during attending customer complaints, and declaring / deciding and recording the sufficiency of odorant smell in the gas at a particular dosing rate.

The Ethyl Mercaptan, being noxious smell nuisance producing chemical, the Pollution Control Board, local authorities and public in general, are very sensitive, for various odorant related activities like, Import, Transportation, Storage, Dosing and Waste disposal of the empty odorant barrel. Hence to meet the statutory requirements and to eliminate / handle the related problems, it requires a comprehensive odorant handling management. Especially the activities which comes in our purview like, Storage, Local / internal transport, Dosing and Waste Disposal.

A typical odorant facility will comprise of a gas metering device, storage tank, metering pumps (duty and standby) and control system to achieve the desired concentration of odorant in natural gas. The pumps are often powered by natural gas, which is exhausted to atmosphere via a carbon canister.

In this odoriser, a very small amount of mainstream natural gas is by-passed through the odorising unit. In its journey through the odorising unit, the by-pass gas absorbs enough odorant to provide the desired odour intensity for the entire gas stream. Subsequently the resulting odorant laden gas is returned to the mainstream.

Bulk storage facility for gas Odorant, as per the norms & optimum resources available, includes, Hazardous Chemical & waste storage separately, PPEs', RCC rooms, Lifting tackles, Security fencing, Pneumatic Transfer pump, collection arrangement, etc.

6.0. Utilities / Others

Condensate from knock out drum is drained to a condensate pit which is designed/ constructed to comply with the norm of Pollution control board.

CGS may or may not have canopy to protect the Entire skid from Rain and Sun
Foundation of all the steel skids is normally concrete foundation.

The CGD PNG distribution system is having Signages facilities along the pipeline route, which mainly comprises of:

Warning Marker	Valve Chamber Marker
Village marker	Route Marker
Work In Progress	Crossing marker

City Gate Stations above equipped with Fire Fighting equipment at the site for saving CGS from preliminary fire hazards. This mainly comprises of fire extinguishers, sand buckets, PPE's etc.

PART-3 : CONTRACTOR'S SCOPE OF WORK

1.0. OPERATION & MAINTENANCE

The main operation area for the Contractor would be to monitor gas receipt, odorization and pressure reduction (including heating of gas, if required) and providing services for Operation and Maintenance of district regulating station, field regulators and gas metering and also commissioned Steel/PE pipeline and Dom., Com. and Industrial installations for uninterrupted gas supply to all kinds of customers such as domestic, commercial and industrial.

1.1. CONTRACTOR'S SCOPE OF WORK

In order to provide uninterrupted services, CONTRACTOR shall make necessary resource including tablets/mobiles available to operate the facility as per specified scope in 24 x 7 by 365 days. For all the installations / equipment's / associated facilities / uninterrupted consumer services at the direction of OWNER & by applying best engineering practices, so that the facility runs most economically and efficiently without adversely affecting the life of the facility, to enhance productivity with due adherence of HSE aspects, PNGRB T4S and other regulations and statutory compliance thereof.

Broadly the Contractor's scope of work shall include but not limited to

- Operation and maintenance of PNG distribution network / City Gas Distribution System from downstream of DRS to the consumer (domestic commercial, Non-commercial-YHS and Industrial) for uninterrupted Gas supply. The scope excludes O&M of steel pipelines. However, the first response to any emergency on steel distribution network and CGS is to be carried out by contractor
- Monitoring of CGS and steel pipeline network operating parameters as per the direction of GGL EIC.
- Mobilization of all resources 24 x 7 x 365 days to handle any type of emergency and first response at incident site within 30 min. after communication received from Gujarat Gas.
- All required resources as per tender scope with fully equipped emergency response vehicle to be deployed at predefined nodal points within working area from where first response at incident site can be done within 30 minutes
- Emergency handling in PNG distribution network (Steel & PE-PNG) and rectifying leakages in PE, Dom., Com. and Industrial installations.
- Administration of the available resources, meter reading for domestic, commercial / Non-commercial & Industrial and all associated operations as instructed by EIC.
- Supply and inventory management of contractor scope of supply of materials and consumables as per GGL technical specification along with test certificates wherever specified.
- Modification / shifting / dismantling / decommissioning / repair /alteration of existing PE, Dom., Com. and Industrial installations up to meter inlet and for threaded connections only.
- New Dom., Com. and Industrial installations as directed by EIC if needed for meeting any emergency by GGL as per the prevailing rates of PNG installations work for particular GA.
- Compliance of statutory and safety requirements in accordance to law and GGL requirements.
- Collection of data and operational parameters and reporting to GGL as per management information system (MIS) and communication systems / training to O & M manpower including operational software directed by GGL. Health safety and Environment including compliance of regulatory measures shall be a part of the responsibility of the CONTRACTOR.
- Monitoring TR unit of Cathodic protection system as per GGL EIC instruction.
- CONTRACTOR shall meet the requirements of operation and maintenance of facilities and equipment, as practiced by the OWNER, and as covered in this tender.
- Operation and maintenance of industrial connections up to Metering skid and its safety, meter reading etc.
- Collection, recording of hazardous/non-hazardous waste deposition of the quantity to GGL stores/material management system established by GGL/ GGL authorized waste disposal agency and submit records.

1.2. IMPLEMENTATION OF AUTOMATION & DIGITIZATION INITIATIVES:

- GGL has implemented and will implement various initiatives towards automation and digitization of the activities and processes with an aim of having high efficiency work, to reduce manual efforts, to improve communication and collaboration. Accordingly, CONTRACTOR shall implement the same including but not limited to digital attendance reporting, online documentation and transaction monitoring, online document review and approval, online data uploading and updating, online material management etc. with no additional cost to GGL. Time to time, CONTRACTOR shall ensure the required resources like smart phones, computers, internet connectivity etc. to implement the app based/web-based process including training of the manpower for the same.
- OWNER has implemented Vendor Invoice Submission Application (VISA) for office automation, digitization and transparency in processing of vendor invoices. CONTRACTOR shall upload the invoices and other specified supporting documents on VISA before submitting physical set of

Invoice & documents along with covering letter generated from application to respective GGL Offices. Additional reports/documents (not specified on VISA portal), may be directly submitted to concerned GGL- Contract Owner / EIC as per requirements. The onus of selecting relevant name of GGL Contract Owner & GGL GA/Office (where physical invoice is to be submitted by vendor) is on the CONTRACTOR for timely processing of invoices and for further certification / payment.

- OWNER has initiated QR code based online Pay-Attendance-Leave Management (PALM) System in order to capture attendance of man power hired by Contractors, where applicable. The online attendance data will be integrated with the pay and leave module to get manpower billing and pay-remuneration process done without any manual intervention. CONTRACTOR shall be responsible to ensure compliance to any such attendance, pay & leave system.
- OWNER has initiated implementation of GPS (Global Positioning System) based Vehicle Tracking Operations and Payment (V-TOP) system on IT platform provided by the OWNER. The System will analyze GPS data of COMPANY used vehicles to ascertain various details of vehicle operations in terms of mileage, geo-locations, route deviations, operational hours, unscheduled stops, delays, breakdowns, fuel use, operational efficiency etc. V-TOP system will provide alerts and notifications in order to guide and to ensure the vehicle operations as per standard operating procedures. V-TOP system will be integrated with PALM system to capture attendance of drivers and manpower deployed with the vehicles. Further, V-TOP system will automatically process the GPS and attendance data for billing and payment of fuel use, manpower use and services of the vehicle provider without any manual intervention. CONTRACTOR shall be responsible to ensure compliance to any such vehicle tracking system, where applicable.

1.3. AOMP RELATED ACTIVITIES :

The following activities have to be covered as per the AOMP of Gujarat Gas by the Contractor Updating of AOMP from time to time shall be communicated to contractor which shall be applicable to contractor. Non- performance of any of the activities will be liable for penalties specified in the tender including termination of the contract if needed. Contractor has to ensure up-dation of all the data of the activities performed by his team are to be updated in data master / documents / SAP or any other systems as per GGL instruction. Main activities covered under the tender but not limited to are given below-

- Emergency Response / Network damage repair and customer technical complaints like gas smelling, Pressure-flow related, meter related
- Service for Emergency Control room management for receiving 24 X 7 customer complaints on GGL emergency number, walk-in complaint, maintaining customer complaint records (log book), intimation to ERV (site response work force) and to GGL authorised incharge, taking feedback from ERV for closing the complaint and maintaining records of the same etc.
- LPT / LDT
- Patrolling on PE and Steel pipeline routes & Utility co-ordination
- Leak Detection & Housekeeping of CGS/DRS/DRPC/CPRS/MRS/SR
- Leakage repair of PE, PNG, DRS/DPRC/CPRS/SR/Valve Chamber PE
- Alteration and modification of PNG connection
- Monitoring/Readings of CGS, DRS, DPRC, CPRS, Odorant skid, TR unit
- Support services during any other maintenance / shutdown activities taken up by other OEM/Agency in area
- Shifting / replacement / Extension of existing PE line maximum up to 500 meters length, Cleaning and Maintenance of PE Valve chamber
- Customer Request like gas tap-Suraksha hose installation, Temporary Disconnection/FD and RC, Permanent Dis-connection from service

- AMC of Domestic / commercial conn and vertical / horizontal riser; Threaded & Welded Risers. In case of customer house is found lock / closed, re-visit is to be done with No extra cost to GGL. Rubber tube replacement activity preferably to be clubbed with Domestic AMC activity, if required second visit to be done with no extra cost to GGL.
- For Rubber tube replacement activity in AMC/Alteration/Any site visit Contractor Manpower shall carry GGL supplied Rubber tubes of multiple sizes(i.e. 1 meter/0.7 meter/1.5 meter) in sufficient quantity as per requirement.
- Riser/Approach (threaded /welded) maintenance to be carried out as per AOMP. Riser/Approach AMC includes cost of Color touchup. In case if entire Riser/Approach to be painted than GI painting rates in M2 to be provided from (Section-B in case of Hired manpower).
- Replacement of SR / Valve Chamber/ Meter / regulator etc.
- Civil works needed to do for meeting the jobs specified in the tender document.
- AOMP activities as per EIC instruction
- Wherever separate contract is awarded for Alteration and modification activities, planned Alteration / Modification work shall be carried out by Contractor for Alteration / Modification work and any Emergency Alteration / Modification work like leakage repairing, repairing of pipeline installation damage, dismantling of installation for house renovation and any other urgent pipeline dismantling, refitting or extension are to be performed by PE-PNG O&M Contractor.

Note: Barricading needed for safe execution of job is included in the scope of the contractor

1.4. OPERATION MANAGEMENT

- There can be one or more O&M setup in one O&M contract in any GA / Cluster.
- O&M Set up shall as per SOR quantity/ pre-decided by GGL while tendering / During Kick off meeting / During monthly review meeting etc and mobilization period shall be provided as per tender terms.
- GGL shall decide the work philosophy of O&M Set-up and contractor has to implement the same.

Planning, scheduling, coordination and ensuring required resources at site or Gujarat Gas office. Job includes documents management including drawings/ sketch / work permit etc.

CONTRACTOR shall attend Weekly / Monthly review meetings and all other meetings called by the OWNER and submit monthly summary & performance review to OWNER.

CONTRACTOR shall provide relevant training to the work force deployed for the operation & maintenance of CGD Network including Patrolling of charged Steel pipeline network, PE Distribution mains & services (comprising Isolation Valves chamber, GI installation, Gas Meter & Regulator, Other accessories), Service regulator, Interconnecting Piping / Tubing, Valves, Fittings, associated facilities and accessories. The training will be exhaustive including various job skills and HSE management, especially on job and off job safety, emergency handling, disaster / risk management etc.

LPT / LDT of steel pipeline network/ PE pipeline network as per approved AOMP of Gujarat Gas.

Documentation for legal compliance defined by GGL & Statutory Approvals related to the CONTRACTOR's scope of work.

Co-ordination with Gujarat Gas and consumers for smooth operation

Co-ordination with Statutory, Local authorities, Service Provider, etc.

CONTRACTOR shall adhere to implement Health, Safety and Environment (HSE), Emergency handling & Security Management for the entire operations as per the specification of this tender document.

CONTRACTOR has to ensure the safety of Man and Machine all the times. The CONTRACTOR shall remain at all times liable to OWNER for any loss or damage caused to any building plant, machine, installations of OWNER / Consumers due to carelessness, negligence, inexperienced act of default of the CONTRACTOR, his agents, representative or employees. OWNER shall be the sole judge as regards the quantum of loss or damage and the said amount shall be deducted from the amount payable hereunder to the CONTRACTOR the cost of repairs or the amount of loss or damages.

CONTRACTOR shall make his own arrangement to provide all facilities like Accommodation and Transport, Canteen, Tea / Refreshments, Food, etc. to his employees.

CONTRACTOR shall not carry out any business at the premises / establishment / consumer base of the OWNER other than that mentioned in the Bid. CONTRACTOR will safeguard the OWNER's property and any damage will have to be reimbursed to the OWNER.

CONTRACTOR shall provide emergency response vehicle for providing first response at the site of emergency for making the site safe within 30 minutes from the time of receipt of information. Fuel & driver, preventive / breakdown maintenance of vehicle is in the scope of the Contractor. This vehicle will be equipped with required tools and tackles that are in the scope of the Contractor, wireless communication equipment along with public address system supplied by Gujarat Gas. Any accident occurred to the vehicle shall be repaired by the CONTRACTOR at his cost & risk including insurance claims. Emergency vehicles shall meet all statutory requirements and it is under scope of Contractor. Also ensure that all statutory documents are available in emergency vehicle.

- **Use of "Call Before You Dig (CBuD)" App for digging**

Department of Telecommunications (DoT), Government of India has developed a Mobile App named "Call Before You Dig (CBuD)". This app has been developed with an aim to provide an interface to digging agencies to enquire about the availability of existing underground utility assets and to inform utility asset owners about proposed digging activities, so that both can coordinate to safeguard existing underlying utility assets like Gas Pipelines, Optical Fibre Cables, Water Pipelines, Electric Cables, etc. from third party damages.

CONTRACTOR to ensure following with respect to use of "Call Before You Dig" App:

- a)** CONTRACTOR to ensure that their Work-In charge/Manager/Supervisor of a particular location/site to download the "Call Before You Dig (CBuD)" and register themselves with their mobile number / email ID on the app
- b)** CONTRACTOR to ensure that their Work-In charge/Manager/Supervisor mandatorily raise New Digging Request with all necessary & correct information for each digging activity in the CBuD app, well in advance of starting the digging activity
- c)** CONTRACTOR to report the Unique ID generated for the request raised in the app, to GGL EIC / Construction Supervisor.
- d)** CONTRACTOR to maintain a log of the Unique ID with required details and shall monitor the same. CONTRACTOR to submit the same to GGL EIC / CS daily along with the Daily Progress Report.

e) CONTRACTOR to ensure co-ordination through the app and/or other means, with all underground asset owners as applicable but not limited to the ones mentioned in app so as to prevent damage to third party asset/pipeline/cable etc. or GGL asset/pipeline

1.5. ADMINISTRATIVE MANAGEMENT

1.5.1. House Keeping

CONTRACTOR shall be responsible for the house keeping of Odorant Storage Facilities, CGSs', DRS / CPRS / DPRC/ IMS, SRs, TR unit, Valve chambers, Equipment / Accessories, drain pit, canopy, surrounding premises and all under his scope / battery limit at his risk and cost.

CONTRACTOR shall provide housekeeping materials at site at his own cost, but not limited to; Detergent, Water, Phenyl, Hand Soap, Sanitary Items, Bucket, Cotton Waste, Broom, etc. needed for executing of job defined on this tender document. Disposal of waste material / effluent should be carried out as per the environmental norms. Records of disposal to be maintained for further review.

1.5.2. Communication

Contractor shall provide one Landline telephone connection (dedicated for complaint handling). OWNER will provide UHF wireless communication Base Station with all accessories where ever possible. Wireless tariff charges shall be borne by the OWNER, including maintenance of the radio. CONTRACTOR shall provide mobile telephone set (suitable for the region) to their work force and its tariff charges / maintenance cost shall be managed on their own. CONTRACTOR shall ensure the proper & minimum usage of this facility and up keep in reasonable condition.

1.5.3. IT FACILITY

CONTRACTOR shall provide the Computer system, Tablets (considering company's software like ASMS, GIS etc. it should be provided by GGL) / smart mobiles with internet facility with all teams performing O&M related activities and IT related accessories and personnel to report GGL as directed by EIC on his own cost. The necessary maintenance of the instruments shall be taken care by Contractor. CONTRACTOR shall ensure the security of the Data (information & electronic). All O&M activities are to be digitized to reduce paper work and data security.

- a. CONTRACTOR shall provide IT related materials at site at his own cost, but not limited to; CDs, Computer Stationery, Printer Cartridge, etc.
- b. CONTRACTOR shall up keep all the data pertaining to O&M including billing and submit the data backup in Soft copies (preferably on CDs), as per MIS.
- c. CONTRACTOR to provide Internet connection facility at his own cost for day-to-day reporting.
- d. CONTRACTOR shall provide Tablet for updating of technical work in GGL SAP system at his own cost as per instruction by the Owner. OWNER will provide SAP application. Contractor to update real time technical work performed at site in the SAP application.

The minimum requirement of tablet and Accessories is mentioned as under

- Screen Size of the tablet should be minimum 7.”
- Tablet should be provided with Back Cover.
- Tablet should be provided with Screen Guard.
- It should be operated on Android or IOS Platform.

- It Should support
 - Apple iOS versions 10.x, 11.x & upto latest versions
 - Android versions (Tablet) 6.x, 7.x" & upto latest versions

1.6. O&M OFFICE / SET-UP

- a. O&M office is defined as an office from where Emergency Services are handled, shift manpower reports at this office for delivering shift duties (24x7 basis), reporting of emergency response vehicle; storage of minimum required material / tools for attending emergency work, day to day complaint / service document submission etc.
- b. O&M office/ set up is to be decided by GGL considering operational ease. GGL may run the O&M activities from the GGL GA office / Call Centre office / CNG Station office or any other GGL owned / GGL rented premises. If office of required space / facility is not available, GGL can avail through SOR line item of the O&M Contract. It is sole discretion of GGL to select the option of O&M Office / Set up.
- c. In O&M Contract, provision of Office / Base Station is one of the SOR line item and said service to be provided by contractor on instruction from the GGL EIC only. Contractor cannot insist GGL for this SOR line item.
- d. Contractor's personal office / Ware house / Pipe Yard / Store / Accommodation facility / storage of GGL issued or contractor procured materials required for various services including AMC etc cannot be considered as O&M Office / Set up mentioned in SOR line item and GGL will not do reimbursement for the same. Contractor can set-up the same as per his convenience & requirement (considering operation ease).
- e. If GGL ask contractor to establish O&M Office / Set up, following criteria are to be fulfilled.
 - Location is to be decided jointly by GGL EIC and Contractor.
 - Approval of office rent amount in GGL is to be carried out by GA EIC through Zonal head and such pre-approved rent paid by contractor will be reimbursed by GGL.
 - Office premises shall have seating arrangement for GGL O&M Engineer / representative. However, GGL O&M Engineer / re-presentative may be or may not be sitting at this office, as it depends upon the operational philosophy of particular location / cluster (in both the scenario, GGL has to do reimbursement to contractor).
 - Preapproved rent paid by contractor will be reimbursed by GGL with an escalation of 5% per year
 - No extra payment shall be provided by GGL for various charges including building maintenance charges, authority taxes, housekeeping staff payment, utility bills (like electricity, water) etc.
- f. Following are the basic requirement in O&M office premises
 - Office premises preferably at Ground Floor and not beyond first floor based on joint selection by GGL and contractor
 - Approx. min 500 - 1000 Sq Feet carpet area with all required utilities including wash room facility, Electricity supply, Internet connectivity, Parking for emergency vehicle etc.
 - Office shall be equipped with all required basic furniture, IT Facilities, seating arrangement; Storage Rack for emergency materials and tools.

- Uninterrupted communication facility between GGL Control Room and Emergency Team in charge on 24 x 7 basis for Emergency Response and Post Commissioning Services (24x7x365)
- Proper hygiene to be maintained in office on regular basis with no extra cost to GGL.

1.7. RECONCILIATION / GAS SUPPLY MANAGEMENT

- a. Gas Reconciliation
CONTRACTOR has to assist Owner for reconciliation of gas purchase and sold and shall assist in analyzing if allowance of gas reconciled is beyond the permissible tolerance - due to leakage, venting loss & other allowances.
- b. Spares & Consumables / Asset / Equipment
CONTRACTOR shall be responsible for safe handling of Spares / Consumable items / Assets / Equipment's handed over by the Owner. Any loss / damage / malfunctioning of equipment due to negligence of the Contractor's staff shall be recovered from the invoices of Contractor.
- c. Spares / Consumables under Contractor's scope
CONTRACTOR shall maintain minimum inventory of spares and consumables needed for attending any emergency, customer complaint and any other O&M requirement at any time but not limited to the list provided with this tender document. In addition, Contractors should identify the needs for Equipment, Tools / tackles and Spares and procure the same after reviewing the availability against list provided. The CONTRACTOR shall submit reconciliation statement of all Spares / Consumable / Equipment's / Tools & Tackles to OWNER once in every month. Painting & white wash material shall be part of contractor's scope
- d. Uninterrupted Supply
The management of the CGD operations covers, Quantity of Gas supply management without interruption, effective patrolling / monitoring of network for any excavation, damages, etc. by authorities, ROW, control on leakage including PNG service connections.

1.8. OTHERS

- i) CONTRACTOR shall maintain and upkeep of the facility as per the prescribed OWNER's requirement and ensure that the site / ROU is at all times kept free from any encroachment. & keep records of the same for further communication to GGL EIC
- ii) CONTRACTOR shall not make any modifications within the facility / premises or layout of the CGD without prior approval of OWNER.
- iii) CONTRACTOR shall at his own cost, provide & maintain the additional facilities to consumers, if any with prior approval of OWNER.
- iv) CONTRACTOR must maintain Dress Codes and Personal Protective Equipment to all workers. No worker shall be allowed to work without proper uniform and PPE's.
- v) CONTRACTOR shall be responsible for the security at storage under his scope, Installations / Equipments, worksite, etc.
- vi) CONTRACTOR shall ensure proper upkeepment of utility system / services, such as, Emergency Vehicle, OWNER's supplied Tools / Tackles and other accessories.

- vii) CONTRACTOR shall co-ordinate & assists for the services related to the Operations, e.g. electricity, telephone, water supply, IT, billing, testing & calibration, statutory issues, etc. and visit from time-to-time.
- viii) CONTRACTOR shall ensure and manage the traffic especially vehicular at worksite during the work & in case of emergency as well.
- ix) No overtime, fuel & conveyance, food, commission, incentive, etc. shall be paid by OWNER other than the mentioned in SOR.
- x) CONTRACTOR shall intimate to the OWNER for any statutory problem, supply stoppage / interruption, break down / emergency shut-down, etc. for better planning & functioning of the facility.
- xi) Since, the entire Premises, Installations, Facility of CGD is a restricted zone; CONTRACTOR shall ensure that no through fare will be entertained without OWNER's written permission that including Plant visit, Photography, Video Shooting or any Interview.
- xii) CONTRACTOR shall facilitate new enquiries pertaining to PNG, Consumer services from time-to-time. However, he should not provide any specific information to such enquiry and not accept any payments or whatsoever on behalf of OWNER or its representatives. OWNER reserves the right to take necessary actions in this regard, if found.
- xiii) CONTRACTOR shall provide printing & stationary materials at site at his own cost, but not limited to; Log Book, Registers, Files, Note Book / Pad, Eraser / Ink, Sketch Pens, Tag / Stickers, Hole Guard, Stamp Pad, Envelope, Rubber Band, Staples, Punch, Pen, Pencil, Refill, Highlighters, Photocopy / Xerox, etc.
- xiv) CONTRACTOR shall provide adequate First-Aid, Equipments / Tools & Tackles such as, Electrical Extension Board with accessories, Instrument for measuring earthing resistance, Multi-meter, Emergency Light, etc. from time-to-time. Also, consumables like Araldite, M-Seal, Grease, Emery Papers, Cutting / Cleaning Fluid.
- xv) CONTRACTOR shall ensure the availability of sufficient water (Potable / Drinking purpose) at site at his cost.

2.0. CONTROL PHILOSOPHY

2.1. PHILOSOPHY OF CONTROL IN AN OPERATING AREA

2.1.1. Deployment of work force for O&M activities

CONTRACTOR shall deploy adequate numbers of skilled / unskilled resources, to carry out the entire work effectively in scheduled time, under the scope. CONTRACTOR will submit the CV of personnel's to OWNER for approval of recruitment on his role till the end of the tenure.

- Team rates in SOR are inclusive of reliver cost.
- Month is equal to : Actual working days in a month - Sunday or weekly off
- Uniform/Dress fabric shall be of cotton material (Formal Pant-Shirt) and same is to be decided by the contractor in coordination with the GGL EIC.

2.1.2. Indicative Qualification & Experience of CGD O&M shall be as follows

Sr No	Manpower	Qualification	Experience
1	O&M In-charge	BE / DE (Mech. / Elect.)	Experience in CGD Industry 2 Years for BE / B.Tech 3 Years for Diploma Engineer
2	Engineer	BE / DE (Mech. / Elect.)	Experience in CGD Industry 1 Years for BE / B.Tech 2 Years for Diploma Engineer
3	Technician /Plumber	Literate	2 Years
4	PE Welder	SSC with Competency Certificate	2 Years
5	Driver	SSC / Literate with Valid Driving Licence	3 Years
6	Patrolman	SSC with Driving License	NA
7	Helper / Labour	NA	NA

It is preferred that **CONTRACTOR** should depute the manpower which are trained and certified for the relevant activities preferably by the Government recognized training schemes and institutes like PRADHANMANTRI KAUSHAL VIKAS YOJNA FOR TECHNICAL INSTITUTES (PMKVY-TI), NATIONAL SKILL DEVELOPMENT MISSION (NSDM), HYDROCARBON SECTOR SKILL INSTITUTE (HSSC), NATIONAL SKILL TRAINING INSTITUTE (NSTI) etc.

2.2. JOB DESCRIPTION / RESPONSIBILITIES

- CONTRACTOR shall deploy the above specified work force, with relevant educational qualifications & professional experience in similar field, as described below (but not limited to).

2.2.1. O&M In-charge

- O&M In-charge shall be overall In-charge of entire O&M activities. He shall be qualified engineer BE / Diploma Holder with relevant experience. He will be a coordinator to interact / interface with the OWNER / its representative.
- O&M In-charge will be responsible for execution of all relevant work such as Manning / establishment of O&M activities, Patrolling & monitoring of Operation, Maintaining Record, Reporting and periodic / emergency maintenance.
- O&M In-charge has to ensure the smooth & trouble-free operation (fit for use-purpose) of all the equipments, installation & associated facilities, gas supply, administrative functions, HSE, consumer service, Liaisoning, etc...includes assisting OWNER in Gas Reconciliation. Also, he shall be responsible for stores / assets management, co-ordination for major job with OWNER / its representatives. O&M in charge shall plan all the activities according to approved AOMP and shall monitor the same.
- He will be responsible for inventory management, especially for essential spares / assets management. He will be attending periodic review meeting on behalf of owner including CPAR & responsible for MIS & contract management.
- Owner has to provide letter of authorization to overall incharge for taking actions on his / her behalf as directed by GGL.

2.2.2. Engineer

- Shift Engineer should have adequate knowledge / skill to supervise / monitor day-to-day activities effectively pertaining to emergency handling, Alteration and Modification of PNG installation, O&M activities, consumer complaints / services with relevant experience in city gas distribution operations & maintenance.
- Apart from above, he shall be responsible for day-to-day reporting, data logging for the activities performed as per MIS. He shall also be responsible for liaising with local authorities, etc.
- Shift engineer should maintain require minimum tools & tackles including consumable items in ERV & update inventory list regularly.

2.2.3. Technician (Mech./Civil)

- Technician should have adequate qualification with an adequate experience in the gas distribution field for PNG Plumbing, installation, Erection, leak detection, commissioning, operation & maintenance of all equipment / installations / utilities for gas distribution.
- He shall be responsible for periodic / emergency / break down maintenance and day-to-day reporting to the Site Engineer / In-charge.
- By regular check, he should ensure working of tools, tackles, essential for his job, similarly should also ensure the availability of minimum stock of GI pipes and fittings as per minimum inventory level of each consumable for emergency repair / maintenance.
- He should respect / follow the company's HSE signage's and use the PPEs as per job.

2.2.4. PE Welder

- PE Welder shall be responsible for the electro fusion jointing of PE pipes for Distribution mains / Services. He is responsible for execution of LPT / LDT and should have good working knowledge on execution of LPT / LDT.
- He should have relevant work experience and necessary qualification certificate from recognized agency for PE welding / Electro fusion.
- PE Welder shall have the trouble shooting knowledge of EF welding machine / LPT / LDT. He should always carry his competency card and should produce the same on demand and ensure the validity of his competency certificate after attending required training for the same. He should respect / follow the company's HSE signage's and use the PPEs as per job.

2.2.5. Driver

- Driver should have necessary valid relevant driving license from regional transport office. He shall be responsible for driving the emergency vehicle.
- He should have basic knowledge of automobile for maintenance.
- He shall be responsible for driving of vehicle & assistance to Technical group in case of any emergency arises.
- He shall clean & upkeep the vehicle in good working condition. He will be responsible for driving the emergency vehicle.
- He should ensure the ever readiness of maintenance van, public announcement system and wireless equipment and mobile phone according to check list on daily basis.
- Apart from driving of vehicle, he will provide assistance to technical group at site.

2.2.6. Helper cum Labour

- Literate & physically fit helper / labourers shall be deployed for the activities.
- He shall be responsible for excavation of trenches, pits, cutting of excessive grass / housekeeping

in vicinity of SR,DRS/DPRC/CPRS, IMS, CGS, Valve Pit, Vehicle, etc.in case of gas leakage, emergency.

- He shall also carry out the housekeeping, office assistance and assistance to Technician / Site Engineer for any job pertaining to control room / O&M.

2.2.7. General requirement

- a) Contractor must comply and carry out entire scope of work as per Gujarat Gas Technical specification as well as Original Equipment Manufacturers (OEM) manual.
- b) CONTRACTOR must ensure that his resource deployed for O&M are well behaved, consumer oriented, non-alcoholic or prohibited drugs addict. Any misbehave with consumer as well as OWNER's representative shall be liable to be punishable and even to the extent of removal of that personnel from duties. CONTRACTOR shall not engage or employ any person with a criminal record / background.
- c) CONTRACTOR's resource shall be educated, trained and experienced in Gas Distribution operation & maintenance with due aware of the prevailing codes / standards applicable to the activities from time to time. CONTRACTOR's personnel should possess good communication for consumer call attendance, site communication.
- d) CONTRACTOR shall provide relevant & adequate safety & personnel protective equipments / appliances (PPE) like Ladder, Safety Belts, Fall Arrester, PETZL harness, Hard Helmets, Safety & Rainy Shoes, Ear Plug / Muffs, Rubber / Cotton Hand Gloves, Electrical Shock proof Hand Gloves, Protective Goggles, Respiratory Protectors, Nose Mask, Gas Mask, Face Shield, Welding Glass, Flame proof Coverall, Reflective traffic Jacket, etc. to personnel deployed for the job.
- e) CONTRACTOR shall provide relevant trainings (Technical / Fire & Safety, etc.) to his resources from time to time for better functioning of the O&M at his cost and risk, without affecting Operations. OWNER may provide special training, to be required; hence, CONTRACTOR shall deploy his resource for such trainings.
- f) CONTRACTOR shall, at its own cost, provide uniforms and identity card to its work force deployed for O&M activities and shall ensure that such uniforms / identity card are worn by his work force while on duty & especially for consumer services / site works. To enable OWNER to maintain the identity, the CONTRACTOR shall follow the identity card & dress code prescribed by OWNER.
- g) CONTRACTOR shall be responsible for maintaining harmonious relation with his work force and shall inform OWNER of any stoppage of work or other dispute whether actual or threatened and which is likely to affect the supply / operations. In the event of any stoppage of activities, OWNER shall have an unconditional right to depute and deploy its representatives and CONTRACTOR shall not have any right of objection for entry of OWNER / OWNER's representative. In such case, OWNER shall recover the cost from CONTRACTOR at actual to be payable therein.
- h) CONTRACTOR's resources, who will be working on site, should have thorough knowledge of gas line & geography of the area so that any spot / customer house can be quickly located.
- i) CONTRACTOR shall train his resources for reporting HAZARD and NEARMISS if any happened in their working area.
- j) CONTRACTOR shall comply with all required statutory norms.

2.3. GENERAL INFORMATION

Apart from specific job related responsibilities and requirements, there are certain general rule and regulations that must be followed by all working resources with O&M work force of Contractor.

- a. Smoking is strictly prohibited and use of any match, lighter or other means of producing, flames, spark or articles of similar nature is prohibited, at terminal, control room, everywhere on gas network and installations of Gujarat Gas.
- b. Dress / Uniform / I-Card shall be wear by all individual during the entire duration of shift – inside / outside office premises.
- c. Report promptly any situation affecting the safety of self or fellow team member or property and public in general.
- d. Work force should train themselves to be on the lookout for regulatory safety signs and should observe them all the time.
- e. In case of any injury on the job, no matter how small, should report for first aid / medical treatment.
- f. Horseplay or fooling around while on duty is strictly forbidden.
- g. Jumping on or off the trucks, automobiles or other vehicles are prohibited.
- h. Work force must stay within their working zone and shall not roam around the other installation of or any other area.
- i. Running, jumping or throwing material on job site is prohibited.
- j. Where walkways are provided use them. Don't use short cuts or make pathways through equipment.
- k. Drive cautiously near the gas installation and gas rich area. Stick to speed limits and other instructions, e.g. No parking, Vehicle Entry Prohibited, etc. vehicles shall be parked in parking places only.
- l. While working for GGL purpose, Tool Tax is shall be paid by the GGL
- m. In case of breakdown of EMV or any patrolling vehicles, contractor has to do immediate arrangement of equivalent vehicle and get the EMV repaired at earliest.
- n. Compressed air shall not be used to clean the clothing they are wearing.
- o. Shall not wear clothes made of highly combustible synthetic fibres such as nylons, polyesters etc. while doing hot job or working near open fire
- p. Wearing of jewellery ornaments should be avoided while working at site.
- q. Only authorized resource may turn valves or operate any equipment or machinery on any installation.
- r. No personnel should interfere with, remove, displace, damage or destroy any safety devices or other appliances installed for protection of personnel and plant equipment.
- s. Cleanliness is necessary for a safe plant. Wastage like used papers, plastic etc. should be collected and deposited at GGL stores/material management system established by GGL and record of the same to be maintained.
- t. Every team members should study safety orders thoroughly and make proper use of all safety devices and equipment furnished for his protection and the protection of others.
- u. Every team members must familiarize himself with location and usage of safety devices and fire fighting system.
- v. Be sure you understand emergency instructions. Anticipate what you will do in case of emergency. Above all, be clam and alert for instructions.
- w. Report on work incurred injuries or illnesses immediately to your In charge
- x. It is prohibited to light *Agarbatti / Diya / Mombatti* at work area.
- y. Report immediately to GGL control room, if there is any abnormal burning smell from A.C. system or electrical system.

2.4. COMPETENCY & TRAINING

The term competency is synonyms to capability, ability. Similarly the training is the teaching, giving guidance, instructions and exercises, either in classroom, or in-plant, by oration, written test or simulation is carried out to develop the competency. Thus both the terms are interrelated. Every job in a business is carried out to get some specific end result, in scheduled time with safety and quality requirements. Hence the Contractor shall employ resources who is to perform this job must have certain qualifying requirements in terms of qualification. Knowledge, skill, behavior to achieve the job end results. New recruitments for proposed job / duty, should be trained, educated, tested, certified and made and declared competent to perform the job effectively, in scheduled time with safety, quality and statutory compliances. Competency training and test should be regularly conducted. The training may be in-house or out-house and it starts with the induction, for new recruits, and refresher or need based training for existing work force, to check, maintain their competency level. The training may be in class room for understanding theory and in plant training or simulation for practical purpose. Competency training needs for resources are identified and provided as per Gujarat Gas requirements. Charges for Training related to Technical Competency, HSE, First-Aid treatment, etc. which will be provided by GGL through outsourced agencies shall be debited to contractor. Training frequency and Training matrix is enclosed with this document.

In operation maintenance, of city gas distribution system, many activities are critical due to working on highly flammable natural gas charged installation and network. Critical activities need more stringent competency.

2.5. BASIC RESPONSIBILITIES OF CONTRACTOR

CONTRACTOR shall be responsible to carry out entire CGD activities in 24 x 7, 365 days. The successful CONTRACTOR shall submit schedule for meeting AOMP before commencing the O&M activities as per SLAs defined GUJARAT GAS.

3.0. PATROLLING OF DISTRIBUTION / SERVICE LINE

- a. On receipt of O&M contract, CONTRACTOR shall take specification / detail of distribution network, as-built drawings, testing reports and other construction records from Gujarat Gas.
- b. Villagers / public along the right of way shall be adequately made aware of the possible consequence of gas leaks and this shall be included as a part of regular audit.
- c. CONTRACTOR shall visit overall site to make themselves aware about route, type of laying, special crossing, and size of pipeline
- d. CONTRACTOR shall ensure updation of As built drawings / schematic etc. of network by Gujarat Gas with repairs / modifications carried out over a period of time.
GGL shall provide GIS / AutoCAD / PDF drawings of gas network for reference to O&M contractor.
- e. CONTRACTOR shall identify Emergency and interconnection valve chambers in consultation with Gujarat Gas as per requirement of flow curtailment / emergency stoppage of Gas supply. The one copy of same is handed over to GGL control room for information and coordination.
- f. Emergency response vehicle shall be equipped with all necessary valve keys to operate valves, pipe piece for attending leakages, leak clamps, tools tackles and consumables to handle the gas leak or fire emergency on gas network
- g. Based on the findings of monitoring and patrolling activities, CONTRACTOR shall plan necessary action in consultation with Gujarat Gas and same shall be implemented / executed to maintain the overall safety and integrity of network.

- h. In case of breakdown of valve chamber or valve, CONTRACTOR shall repair / recondition the same.
- i. CONTRACTOR shall arrange for patrolling to inspect the areas of construction activities & physical deterioration if any of exposed pipes and supports, which could cause damage to the pipe & result in gas leakage & subsequent hazard to public safety.
- j. CONTRACTOR shall divide the total network route in sub-route / section such that total network can be patrolled as per the instruction of Gujarat Gas EIC.
- k. The patrolling team members shall inspect pipeline at critical sections / locations / Chainage, such as rail crossing, waterways road crossing, etc. at periodicity advised by Gujarat Gas EIC in order to ensure good, no leaks condition, general construction activity, or any other factors, which may affect the safe / uninterrupted operation of gas distribution system.
- l. CONTRACTOR shall depute resource separately as advised by Gujarat Gas EIC in order to safe guard gas pipeline against any kind of third party excavation threat & other utility / ROW work.
- m. CONTRACTOR's scope shall also include patrolling of Steel / PE Pipeline / Distribution Mains (network) and associated facilities for entire CGD network established in various villages / townships, main roads including MP and LP Pipelines.
- n. For monitoring the vehicle movement, Contractor should fit the vehicle (any vehicle used for patrolling purpose) with Owner provided Vehicle Tracking System (VTS).
- o. Contractor shall ensure that the instrument remains installed in the vehicle without damage. If vehicle is changed then the Contractor shall inform GGL a week in advance so that the vehicle tracking instrument can be uninstalled from old vehicle and installed in new vehicle.
- p. Any cost incurred for reinstallation/damage/repair to the VTS system shall be borne by the contractor

3.1. GENERAL

Pipeline patrolling and leak survey are carried out along the ROU on the road, street or open fields. The patrol is carried out to find and keep track of damaging activities, mostly by other utilities, customers, public and some time by nature. Similarly leak survey is carried out to find out the hidden / unnoticed underground gas leaks. Thus both the activities of patrol and leak survey are important for preventing reducing the damage to the network and gas leaks on the network which in turn prevent / reduces potential hazards of gas leak like, asphyxiation, fire and explosion. This activity has direct effect on company's operation, network integrity & safety management.

3.2. ACTIVITY STEPS FOR PATROLLING

- For planned patrol, to decide the network patrolling area and frequency based on the past experience and records, criticality of network, activities carried out by other utilities
- To assist GGL in preparing annual and monthly patrol plan for actual execution.
- Train and educate resources for network geography, effective patrolling procedure, emergency communication for leakage and preparing report & record
- To carry out emergency patrol, for the section / network vulnerable to damage due to sudden development of activities by other utilities.
- To check the condition of vehicle like, fuel, tyre pressure, breaks, light, oil level, side light etc. before starting patrolling
- To ensure availability of drinking water, first aid and other specific requirement if any
- To wear PPEs like safety shoes, cotton dress and reflective jacket
- To carry out patrolling by driving the vehicle along the pipeline route, as per, as-built drawing, markers and valve chamber position, observing activities on pipeline as per check list, like excavation, construction, encroachment,

- To coordinate and monitor with external agencies working on charged network of Gujarat Gas as per permissions issued on pipeline route.
- To understand their work, extent of excavation and its potential hazard to underground gas pipeline
- To explain them, about the gas pipeline network / route and precautions to be taken to prevent damage to gas pipelines.
- To provide / update them with contact number and other details of Gujarat Gas authorised EIC for assistance.
- To collect details of their supervisor like contact number, address etc for further coordination
- To prepare report in standard format

3.3. ACTIVITIES TO BE CARRIED OUT BY PATROL PERSON

- A patrol person plays an important role and is the front line defence against hazards which the safety and security of the system. This important role should be recognized by management and care taken to ensure patrol persons are provided with the appropriate skills and facilities to perform their duties. One of the basic skills required by a patrol person is the ability to read plans. It is also important the patrol person can communicate in a verbal and written form, and accuracy is to be encouraged as an essential feature. It may be necessary for training courses to be held for the development of patrol persons.
- Mentioned above is the likelihood that the appointment of specific patrol persons will not be necessary until the distribution system reaches a later stage of development.
- Inspect the work of other authorities and private organisations carrying out work in the vicinity of a transmission/distribution pipeline.
- Report immediately any unusual developments or occurrences along a pipeline route which may have some effect on the normal operation or maintenance of the pipeline.
- Supervise any maintenance personnel under his control.
- In case of encroachment on / near gas pipeline, report it to concerned authority.
- Maintain liaison with other authorities and bodies who are concerned with works which could affect pipelines. Further, maintain good relations with the owners of properties traversed by pipelines. Good communications and in particular keeping people informed on the location and importance of pipelines is a primary defence against interference being caused by third parties.
- Prepare and forward routine reports, as required by OWNER.
- Guide the third parties excavator to safeguard the pipeline from damages during excavation
- If any excavation is going on without intimation to GGL O&M team, Patrolman/Contractor O&M in-charge shall Report unauthorized excavation through Call before you Dig(CBuD) app after consultation with GGL EIC. In case of excavation is going on near high pressure steel pipeline or Medium pressure MDPE pipeline, Patrolman to ensure that Third Party has barricaded the area, warning signs are placed and all possible hazards of probable sparks are eliminated from nearby area/ vicinity.

3.4. ITEMS TO BE CHECKED, NOT LIMITED TO THE FOLLOWINGS;

The following items are required to be inspected on a regular basis or as per AOMP. Many of the items listed do not require daily inspection, and judgement is required as to the regularity of inspection of each individual item. The patrol frequency will be daily or weekly depending on the location, size of the pipeline, operating pressure, general construction activity, and other factors;

- a. Excavations close to pipelines and associated facilities.
- b. Service Regulator enclosures and vaults / canopy.
- c. Valve enclosures and vaults / canopy.

- d. ROW fences and gates.
- e. Evidence of erosion.
- f. Evidence of any subsidence.
- g. Crossings of waterways.
- h. Railway crossings, including vents.
- i. General surface conditions.
- j. Cathodic Protection units, anode beds, test points, etc.
- k. Pipeline markers.
- l. Any permanent survey marks.
- m. Any bridge crossings.
- n. Pipe coating, when a pipeline is exposed.

3.5. LIAISON WITH OTHER AUTHORITIES

- a. CONTRACTOR along with OWNER should develop a co-operative relationship with other Authorities, particularly Authorities responsible for public construction work. Other Authority personnel should, where practical, be provided with District Plans, and be regularly reminded of the location of strategically important mains.
- b. They should also be acquainted with the hazardous properties of gas and the potential effect of escaping gas on the safety of the public. It should be emphasized and encouraged that in the event of an emergency that prompt co-operative action would be required.
- c. Apart from the essential day to day contact with other Authorities, CONTRACTOR / OWNER shall formally correspond with the appropriate other Authorities on a yearly or periodically.

3.6. LEAKAGE SURVEYS ON TRANSMISSION /STPL/ DISTRIBUTION / SERVICE LINES

- a. Leakage survey to be done as per AOMP of GUJARAT GAS Limited.
- b. A leakage survey, using suitable gas detection apparatus, shall be conducted annually / as per AOMP in principal business districts and the area surrounding schools, hospitals and similar community installations. The survey shall include tests of the atmosphere at utility manholes, other collection points and at openings (cracks) in pavement.
- c. Leakage survey, and leakage investigation and action should be carried out as specified in PNGRB Standards /ASME B 31.8, together with procedures for the pinpointing of leaks and other useful / proven techniques.

4.0. EMERGENCY RESPONSE / NETWORK DAMAGE REPAIR/LPT/LDT

4.1. LPT/LDT, GAS LEAK CLASSIFICATION AND ACTION CRITERIA

Activity Steps for Leak Survey

- To prepare annual and monthly leak survey plan for covering the whole network in line with the AOMP for actual execution.
- For planned Leak Survey, to decide the network leak survey area and frequency based on the past experience and records, Post LPT data, criticality of network, activities carried out by other utilities
- To identify the person and train / educate them for network geography, effective leak survey procedure, emergency communication for heavy leakage and preparing report & record

- To carry out emergency leak survey, for attending smell complaints and for the section / network vulnerable to damage due to sudden development of activities by other utilities.
- To ensure that the gas detector with at least 1% LEL least count is working, calibrated & with fully charged batteries. Contractor to ensure issue the batteries from GGL and to keep the spare batteries available at site depending upon the job to be carried out.
- To wear PPEs like safety shoes, cotton dress, reflective jacket and I-card and ensure your personal safety from vehicle and building under construction, electrical installation, stray animal like dog
- If leak is observed during LPT, then to carry out leak survey by walking along the pipeline route as per as-built drawing, markers and valve chamber position with gas detector keeping probe just 2" above the ground
- To observe / hear the detector findings carefully and record the same.
- To monitor the gas leak in drainage manhole or other such chambers / vaults also
- Survey surrounding area, manholes, vaults for measuring extent of leakage. To record the leak % and area / location
- In case of gas leak more than 20% LEL, to cordon the area and call emergency team to attend it immediately
- To switch the gas detector when not in use and ensure the security of detector.
- To prepare survey report in standard format
- In case of pressure drop is more in a particular section, pressure drop test in sub-sections (small sections of particular big section) either through valve chambers or squeezing of section shall be conducted. Pressure drop in particular small section shall be found out / located

4.2. EMERGENCY / BREAKDOWN / SHUTDOWN

CONTRACTOR shall be responsible to attend emergency / breakdown maintenance works at any time with the shortest resolution time as and when required round the clock & seven days of week.

All activities defined in this document except breakdown / shutdown are with defined SLAs and so can be scheduled and planned along with GGL. Since breakdown and shutdown activities are to be performed on charged network it has to be performed without any interruption

CONTRACTOR shall be responsible to arrange adequate & suitable materials / spares / items / consumables required for carrying emergency maintenance works, including equipments, vehicles, generator set, welding machine, labours, fire fighting apparatus, PPE's, communication sets, etc. at site stores for all the time. A list of minimum tools tackles & spares required is enclosed in this bid.

All the manpower in EMV shall have Fire Retardant suit and shall use it as per HSE requirement.

CONTRACTOR shall be fully responsible for emergency management with full attention and correct and effective measures / remedies for breakdowns / emergencies.

CONTRACTOR shall provide necessary training to his emergency response team members on first aid for injuries, damages, fire extinguishing methods and equipments / appliances, operations & maintenance action plans, etc.

The damages & leakages shall be first attended by squeezing the pipelines and in case of unsafe conditions as per the assessment of site engineers, pipeline network will be isolated.

CONTRACTOR's personnel should be well experienced and trained to handle the emergency maintenance of natural gas distribution pipelines (mains and services lines). They should always be very much vigilant in monitoring the process condition on field instrument and they should be very

much open to any calls / information from field personnel natural gas consumers or any third parties relating to any emergency of major leak, damage of pipe line or fire / explosion in the pipe lines gas distribution system, which forces the Emergency Shut Down (ESD) of the distribution system.

In case of any accident on CGD Network or at the consumer's premises, the site engineer / technicians should immediately rush to the affected site, assess the situation, coordinate with CONTRACTOR / OWNER Incharge and initiate the ESD in their relevant area, if required. They should close / shut off the upstream isolation valve / control valve installed on the network or from CGS / DRS/DPRC/CPRS / SR if essential.

CONTRACTOR shall also be responsible for coordination with other utilities or agencies like police, fire brigade, and hospital / dispensaries etc. in case of emergency break down for emergency/ breakdown help / rescue.

CONTRACTOR shall train their personnel in Owner approved emergency handling procedures and guidelines. However, OWNER has a full-fledged ERDMP approved by the competent district authority, which can be useful for any emergency arises on the CGD Network including consumer premises.

CONTRACTOR shall plan frequent meeting for improvements / suggestions through learning from experiences. This meeting will also be attended by OWNER representatives / coordinator for review of emergency handling / management.

CONTRACTOR shall shut down the pipeline inlet system at isolation valves in case of fire and major gas leak, excess odorant smell, stoppage of supply from gas source or supplier. However, OWNER shall be intimated & consulted in such shut down / emergency.

CONTRACTOR shall not neglect even a small leak, if detected. He shall immediately act upon to check / arrest the leak, which may result into disaster, if the gas catches fire. In case of heavy leakage or burst pipes the exposed gas jet becomes potentially hazardous; hence, the area should be isolated, vent safely and replace the affected portion of the affected area. They should also inform to all the concerned.

CONTRACTOR Must be in contact with GGL Engineer during handling emergency complaints, In gas Leakage complaints/LDT visits where Natural Gas concentration is equal or above 100 ppm and no leakage is pin pointed then CONTRACTOR Must inform GGL EIC immediately for further actions.

CONTRACTOR shall be very much vigilant in monitoring this type of situation. If this kind of situation arouses then CONTRACTOR shall inform to the OWNER. Only one thing must be kept in mind while taking any emergency action that human life has the top most priority, followed next by safety of the permanent installation.

CONTRACTOR O&M team member should immediately inform to the responsible authorities (CONTRACTOR's or OWNER's representative, police, fire brigade, etc.) to take immediate and proper action to control the emergency accident hazard / fire / earthquake or blast and save man and machine / gas distribution pipelines, and public utilities in vicinity of the affected area.

The contractor shall prepare call note for each complaint, which will be kept & preserved as record.

In the event of stoppage of supply or shutdown or breakdown, CGS may be affected and in such situation, emergency plan shall be activated by OWNER. CONTRACTOR's personnel must be prepared for handling of such scenario.

In case of excess odorization / dosing, action shall be initiated as per the plan by CONTRACTOR's personnel, includes effective public / mass announcement, control of situation, safe venting of gas, attending consumer complaints door to door.

The operator shall protect the CGS and pipelines by monitoring extra high and low pressure of gas through the operation of gauges, indicators, switches, alarms and trips by taking corrective action to bring the line / equipment to safe condition. The operator should inform the other terminals and consumers of this emergency condition in order to allow them to take a safe action.

In case of power failure, the CONTRACTOR's operator should ensure alternate arrangement of power supply at site, if required. However, for OWNER's premises, this should be solved in coordination with OWNER / its representative.

CONTRACTOR shall strictly adhere to the ERDMP of OWNER to tackle any emergency arising out of any Accident / Mishaps / Leak / Fire & Explosion / Heavy Rain / Earthquake / Floods, etc...

CONTRACTOR must follow the On-site Emergency Plan. This document must be thoroughly read, understood and practiced during mock-drills. Every individual's role must be clear to all concerned. All the personnel must remember that.

- 15% natural gas in air creates dry feeling.
- 17% natural gas in air gives oxygen deficiency

5.0. MONITORING OF OPERATIONS

MINIMUM GUIDELINES FOR OPERATION AND CONTROL OF CGS / DRS / DPRC/CPRS/SERVICE REGULATOR:

a. Each Station shall be visited as per AOMP of Gujarat Gas & check/recording made of the following

- Site security
- Condition of supports
- Check the condition of all gauges and ensure they are all operating as normal
- Drainage and general cleanliness
- Check the differential pressure across the filters
- Inspect painting for damage and rectify where required
- Check vents for clearance and correct operation of flap provided on the venting line.
- Critical parameters such as inlet and outlet pressures, flow, etc.
- Evidence of any odorant escape

b. In addition to above the following also need to be observed and recorded

- A check on site security
- A check on access
- A check on drainage and general cleanliness
- Inspection of condition of gauges
- Assessment of the condition of protective paint
- A check on CP installations
- A check on supports
- Inspection of control and sensing lines for conditions which could lead to failure

- The operation of the regulating streams, i.e. the Active / standby stream are operating as per the settings made during last AOMP and vice-versa
- Inspection of condition of Odorant storage, monitoring and injection equipment.
- Testing for leaks on fittings, piping, accessories, valves, etc. using soap and water solution

c. Pressure Variation

To accommodate load changes downstream of regulating system, testing requirements or pressure reduction for mains work, it is necessary to alter outlet pressure as and when required as per the Gujarat Gas policy.

d. Performance Monitoring

Performance monitoring is a continual process over all aspects, for the life of the distribution system. Records are to be kept, and these are to be summarised at periodic intervals. The elements monitored shall include the items listed below. The Performance Indicators listed in the following table will require careful review after each full year of operating experience, and modified as necessary to enhance both the monitoring process and performance of the O&M Plan;

- Number of times supply has been interrupted due to City Gate / DRS /DPRC/ CPRS/ Service Regulator malfunction,
- Number of Gas escapes due to corrosion,
- Number of Gas escapes due to causes other than corrosion,
- Number of times gas supply to customers have been disrupted due to supply problems,
- Number of times OWNER or its representative has failed to respond to a gas escape / emergency situation,
- Number of times customers have experienced inadequate pressure for reasons other than City Gate / DRS /DPRC/CPRS/ SR malfunctions.

5.1. CITY GATE STATION (CGS)

CONTRACTOR shall be responsible for the safe, trouble free & uninterrupted operation of City Gate Station, which includes monitoring of parameters (pressure, temperature, gas flow etc...), leak detection, customer meter reading, data logging, visual inspection, odour / gas smell, etc...on following major equipments / installations;

The skid at CGS comprises of filter with accessories like safety relief valve for release of pressure in case of over pressure.

- The Site Engineer shall maintain all relevant records and activities (testing, inspection, calibration, operation & monitoring) carried out on the CGS.
- Generally, following work activities / events / incidents are noted in the log book :
 - Reports of unsafe fittings, conditions & appliances.
 - Data pertaining to the parameters as per AOMP / MIS.
 - Flow meter readings, composition of gas as per source available & updating with the help of flow computer and gas chromatograph.
 - Inspections performed.
 - Checks and surveys performed.
 - Failures & defects found & rectification actions taken by the concerned.
 - Incidents involving the failure of any fittings and control valves of CGS installation.
 - Any incident relating to fire or break down of the equipment and their maintenance / correction procedures in details.

- Contractor must coordinate with Owner to ensure the safe, reliable & uninterrupted gas supply, installation and operation of all the equipments, pipelines, fittings, valves, etc.
- While venting the pipelines, the Contractor shall strictly adhere to the HSE norms specified in the bid.

5.2. DISTRICT REGULATING STATION (DRS) /DPRC (DOMESTIC PRESSURE REDUCTION CHAMBER) COMMON PRESSURE REDUCTION STATION (CPRS)

Pressure regulating skid is installed with pressure control valve (active-monitor type), for reducing high supply pressure ranging between 7 – 49 bar (g) in the primary network to 1 – 5 bar (g) in the secondary network upstream of SR / PNG connection. This unit is provided with pressure safety valve to relieve excess pressure in case of contingency along with safety shut-off devices. Regular Pressure monitoring on the skid is very much essential for uninterrupted supply of gas.

District regulation station located at various demand centres for domestic / commercial / Industrial users typically consist of:

- Gas filter at inlet of DRS.
- Pressure reduction skid comprising active and monitor combination with 100% redundancy with stream discrimination arrangement, including slam shut valve for over pressure protection.
- Inlet and outlet isolation valves.
- metering system (if required)
- venting facility

CONTRACTOR shall carryout the housekeeping, visual inspection, security measures, caution boards, etc. from time to time.

Some major components & their technical specification is described in the below mentioned table;

(i)	DRS	
A	Capacity	500 SCMH to 5000 SCMH
B	Inlet Pressure	7-49 barg
C	Design Pressure	Before PRV 49 barg (300#), After PRV 19 barg (150#)
D	Outlet Pressure	1-5 barg
C	Design Temperature	-20 to 65 ⁰ C
D	Operating Temperature	0 to 40 ⁰ C
E	No of streams	2 (1working + 1 Hot standby)

5.3. SERVICE REGULATORS

CONTRACTOR shall be responsible for the uninterrupted supply of Gas to PNG customer by monitoring operation, & maintenance of various Service Regulators installed on CGD Network. Range / Capacity of Service Regulators varies from 10 M³/Hr to 200 M³/Hr. Service Regulators are provided with regulating systems for reducing secondary network pressure ranging between 0.5-5 bar (g) to 110 mbar (g) in the tertiary network and are provided with in-built safety relief & shut-off devices.

- This skid is having single stream pressure control valve provided with over pressure safety shut off (OPSO), Under Pressure Safety Shut off (UPS0) and pressure relief valves at the outlet.
- CONTRACTOR shall be responsible for inspection and monitoring of smooth operation & maintenance of Service Regulator, which is very critical as it has no redundancy.

- c) CONTRACTOR shall also ensure & carryout the leak testing, housekeeping, visual inspection, security measures, caution boards, etc. from time to time.

5.4. ODORIZATION UNIT

A typical odorant facility will comprise of a gas metering device, storage tank, metering pumps (Active and standby) and control system to achieve the desired concentration of odorant in natural gas. The pumps are often powered by natural gas, which is exhausted to atmosphere via a carbon canister.

CONTRACTOR's scope of work shall include but not limited to the following:

- CONTRACTOR to monitor odorant operation and odorising management system for the natural gas to ensure a safe, adequate dosing in natural distribution system. The sulphur based odorant Ethyl Mercaptan (C_2H_5SH) or equivalent is added at the outlet of the CGS at concentration needed for getting 2 ppm at farthest point in the network.
- OWNER shall obtain consent from concerned statutory authorities as & when required for the system at its cost & risk.
- Contractor shall be responsible for the routine checks of odorising unit / items, which require regular inspection to ensure that it is operating in a safe manner. Contractor shall carry out the following specific operations, maintenance procedures in addition to the routine checks as per AOMP of Gujarat Gas but not limited to;

Item	Description
General Housekeeping	Check for flammable materials, paper, rubbish or equipment lying around. Check for position of fire extinguishers. Check for signs of tampering by unauthorized person. Check for signs of corrosion or equipment deterioration.
Leaks	Check all gas and odorant connections for leaks.
Valves	Check all valves are in their normal operating position.
Tanks / Vessel	Check blanket pressure is correct. Check odorant level.
Pressure gauges	Check all gauges are reading normal operating level as per the set pressures on the design P&ID.
Odorant Filters	Check for pressure drop across the odorant filter.
Statutory	Check & intimate OWNER for any compliance for consent, audit, monitoring, etc. is required.

- Odorant levels should be monitored on a regular basis.
- Contractor shall ensure that sufficient/required odorant smell of 2 ppm is existent up to farthest network end. Sample to be collected and checked as per the frequency defined in AOMP and record.
- Scope of work may change / updated / modified as per GGL requirement or change of material / unit, process etc and contractor shall follow as per instruction of GGL Engineer in-charge

5.5. VALVES

Various types of valves are installed on U/G & A/G Network for CGD mainly comprises of Ball valves, Globe valve, check valve shall perform according to their function. CONTRACTOR shall be responsible for the proper operation of the valves installed and the CONTRACTOR's shall inspect / check all valves installed at periodic intervals.

- CONTRACTOR shall be responsible to provide training to his technical personnel with correct procedure of valve operations.
- CONTRACTOR's operator shall open the valves gradually and cautiously stopping after every two or three turns to observe any unusual effect before opening it full. Valve shall not be forced opened so that it cannot be closed easily.
- All valves in piping of natural gas skid, PE Pipeline, Network PE valve assembly shall be checked before putting into operation.
- CONTRACTOR shall be responsible for the valve security to prevent service interruption, tampering, etc. as required. CONTRACTOR should also ensure tagging of valve such as "ON", "OFF", "DO NOT DISTURB", "UNDER MAINTENANCE", etc. For the precautions, as & when required.

5.6. INDUSTRIAL METERING SKID (IMS) FOR INDUSTRIAL CONSUMERS / CONNECTIONS

Metering & regulating station is located at the premises of an individual industrial customer. Regulator may or may not be part of IMS.

Contractor shall carry out operation & maintenance of IMS as per Gujarat Gas requirement/AOMP. CONTRACTOR shall also ensure & carryout the housekeeping, visual inspection, security measures, caution boards, etc. from time to time.

6.0. MAINTENANCE

6.1. GENERAL

The purpose of maintenance of CGD Network & its facility is to optimise the productivity with due adherence of HSE aspects / norms and facilitate easy availability / uninterrupted supply so as to delight consumers. Maintenance also minimise the hazards on the network, equipments etc...that results in to station utilization, revenue, increase the life of equipments etc.

To facilitate the maintenance services to be rendered in a planned manner, a preventive maintenance schedule covering necessary work to be done, mentioning the periodically i.e. daily, weekly, monthly, half yearly and yearly schedule shall work out as per AOMP of Gujarat Gas and adhered. This should also include procedures for repair, by clamping, removal and replacement of pipe etc. adherence to work permit system in line with approved Work permit system shall be followed.

The maintenance of CGD network shall be carried out by the Contractor according to the original equipment manufacturers installation, Equipment operation & maintenance manual / AOMP of Gujarat Gas.

The maintenance activity shall cover the maintenance and upkeep of the city gate stations, district regulating stations, field pressure regulating stations and end consumers facilities. This inter-alia will evolve regular maintenance, route patrolling to contain third party damages and maintenance of safety provisions including offsite emergency plan, mutual aid and disaster management plan.

The successful CONTRACTOR has to submit the "Operation & Maintenance Plan" in line with AOMP of Gujarat Gas to the OWNER. The major scope of work for maintenance includes but not limited to the following;

6.2. DISTRIBUTION MAINS / SERVICE LINES (PE PIPELINE) NETWORK MAINTENANCE

CONTRACTOR is responsible for any maintenance on PE mains & service lines such as pipeline damage, gas leakages, fire & explosions, failure of joints and associated maintenances as well by applying best engineering practices & with due adherence of prevailing norms. CONTRACTOR shall carryout the periodic Leak detection / Lock Pressure Tests (during non-peak hours or night hours) to ensure "ZERO" leakages as per AOMP. Some of the typical maintenance to be performed on PE network is as follows but not limited to;

6.2.1. Procedure for attending Gas leakage / Gas Escape on PE distribution network:

6.2.1.1. Repairs for Pipe Damage / Gas Leakage or Escape

- For the leakages from the PE pipe lines either through damages or from any other source which includes,
 - Damage of PE pipe lines.
 - Unknown leakage from PE pipe lines through leak detection survey or / and lock pressure test.
- Carrying out the pipe lines installations repair and recharging the gas supply as per the technical scope of this document.
- Following is a guidelines for rectification of unknown leakages from the PE pipelines through leak detection survey or / and lock pressure test (if required) and following steps to be carried out;
 - To prepare pit as per site requirement with a provision of space for additional squeeze tool if required.
 - To squeeze PE line at both ends.
 - To cut and scrap of existing line.
 - To check with soap solution for passing of squeeze on charged network.
 - Connection of new pipe with charged PE line & installation of electro fusion fitting. Electro fusion welding & cooling of joint.
 - Removal of squeeze tools / charging of new laid line and checking the Electro fusion welding with the help of soap solution / gas detector equipment.
 - To backfill, compact and remove excess soil.
- CONTRACTOR shall arrange Excavation / Pits or trenches, PE Electro fusion fittings, Consumables items like Teflon tap, PE Welder (approved by OWNER), Tools & Tackles, Dewatering pump, Generator set, PPE's, Fire Extinguishers, Electro fusion Machine, etc. OWNER shall provide PE pipes, PE Ball valves as per company scope of supply.
- CONTRACTOR shall ensure that his dedicated supervisor having required experienced is present at site till completion of work as per planning given by OWNER.
- CONTRACTOR shall be responsible to arrange electricity at his cost for the execution of scope of work entrusted to him. Lighting arrangement at site in CONTRACTOR's scope.
- CONTRACTOR shall arrange the transportation of his work force to and from the site.
- CONTRACTOR shall ensure effective communication from site to OWNER office through Mobile phone.
- CONTRACTOR shall make the PE pipelines, install, repair and recharge the gas supply as per OWNER's approved maintenance procedures.

- CONTRACTOR shall ensure such maintenance shall be done as per technical document of GGL. All relevant reporting for the same should be submitted to OWNER along with photographs at the earliest.
- CONTRACTOR on behalf of OWNER shall issue a notice for such occurrences. Final bill should be issued / settles as per Owner's SOR / norms.

6.2.1.2. Handling Gas Leak / Network Damage

Handling gas leak / network damage is the activity carried out for quickly and safely arresting the gas leak and pipe damage and restoration of gas supply to the customers. The gas leak on the underground network poses the potential hazard of asphyxiation / fire / explosion and environment concern. Hence timely and safely attending the gas leak and restoration of gas supply to the customers are very important as the task has direct effect on company's operation, safety, quality, production, customer satisfaction and environment

6.2.1.3. Activity Steps for Handling Gas Leak / Network Damage

- Contractor to reach site quickly after receipt of intimation from OWNER, observing law full driving and traffic safety
- To assess the situation and quickly take steps to Cordon and secure the affected area
- Check the surrounding properties for ingress of gas. If gas concentration is found to be 20% LEL or above inside any of the properties then evacuate the said property. Close off access roads
- Eliminate possible sources of ignition. Do not operate electrical switches.
- Identify or locate suitable squeeze point on the line and valve chambers for isolation purpose.
- Make public announcement for affected customers for stoppage of gas supply
- To excavate pit for squeezing, ensure zero gas % in trench, and prevent further damage to gas line and other utilities. Pit should be of adequate space. Remove stones etc. which may create an accidental spark
- **For PE pipe of 20MM TO 160 mm dia.:** To isolate the gas supply in section by squeezing the PE pipe, Use optimum squeeze pressing. Too hard pressing will damage the pipe and too light press will cause gas passing through squeeze, for 125mm dia. & above size hydraulic squeezing tools is preferred to avoid excess / light press. PE pipes shall be squeezed at a distance of 300mm from fittings / welds on previous squeezed location.
- To isolate the gas supply in section by closing the nearest valves.
- Ensure positive shut off condition of valve by indicator and reducing residual gas venting pressure.
- To allow venting of residual gas, measure the gas percentage, 3 times. It should be zero.
- To prepare pit at leak / damaged point, after complete venting of residual gas, as measured by detector, take care not to further damage the gas line and other utilities. Pit should be of adequate space. Remove stones etc. which may create accidental spark
- To provide earthing on both sides of the pipe, from where the pipe is to be cut, for draining the built up static charge on the PE pipe, Earthing may be provided by wrapping wet cloth, around the pipe and contacting positively to the soil. Or special earthing wire and grip clips may be used from pipe to natural soil.
- To cut the pipe after making, initial small cut mark on pipe, recheck the gas presence again, it should be zero
- To ensure clean working place before opening new coupler from its packing and further working then after, by placing clean paper or rubber sheet on the pit bottom
- To check fuel, earthing and wires / cables of the power generating set for prevention of shock and fire. Qualified / experienced wireman should be engaged for all such electrical jobs.

- To start, run and observe the power generator performance. Check the output voltage and current. Voltage, current and frequency should match with Electro fusion welding machine. Also output should be constant.
- To post one responsible person at generator set power board, for emergency shut off of the electric supply, in case of an incident.
- To ensure that competent and certified PE welder is engaged for PE welding
- To mark and carry out the scrapping / degreasing / cleaning area of pipe ends, by inserting coupler on the ends and using proper scrapping tool and liquid cleaner. Ensure cleanliness of coupler ends. Prevent damage to the heating coils of EF coupler
- To insert the coupler / couplers on pipe ends and connect the leads wires / cables. Check the proper and safe connections. To remove PE cap from the fusion terminal of the fittings. To check proper functioning of power generator and EF welding m/c, condition of fusion cable, power cable, before connecting the fusion cable. To keep EF m/c minimum 1 meter away from the joint spot. To ensure proper rating of genset.
- To fix alignment clamp on the above mentioned set up. Do not disturb the set up. Do not fuse electro fusion fittings without applying alignment clamp irrespective of PE pipe size.
- To start the Electro fusion welding machine and carry out the welding as per the procedure and check list supplied by EF machine and coupler supplier. Prevent over / under heating and interruption of welding. Do not disturb the set up.
- To allow adequate cooling time for welded joints. Do not touch / move any parts during the cooling time. Do not remove alignment clamp during cooling time.
- After cooling of Electro fusion fittings, open downstream squeeze / isolation valve, by initially crack opening, and once it is pressurized carry out leak check by gas detector and soap solution.
- If joints is/are ok, inform all concerned about readiness of resumption of gas supply, especially to the customers by public announcement.
- To slowly open the upstream squeezes or upstream isolation valve and allow the pressure to rise to normal working pressure. The squeeze or valve should be crack opened initially, observing the overall integrity of section at new joints, vents, drains. After completion of work squeeze tools should be removed from pipe line and PE pipe line should brought to its original round shape with the help of re-rounding tool. Squeeze area of the pipe should be wrapped with warning tape "Do Not Squeeze" to avoid re-squeezing of the same area / spot of the pipe
- To continue public announcement to customers for resumption of gas supply.
- To attend the customer complaints in the area, if required to visit the customer door to door, remaining in contact with control room for customer complaints / other emergency
- To pay special attention to the complaints of gas smell / leak, especially from closed houses of the affected area.
- To back fill and compact the pits excavated for squeeze and weld. To restore the original site soil layer and to remove the excess soil. To clean / clear the site.
- To observe / monitor the condition of the section after resumption of gas supply and before leaving the site
- To prepare reports and update the records. Especially, Near miss, hazard and lesson learning, if any should be reported and shared with others.

6.2.2. Routine Maintenance on PE Network

- PE distribution network is safe against corrosion unlike steel network however they are prone to damage by third party and rat bite. Hence the Contractor shall carry out vigilant and vigorous patrolling of network and effective coordination with other utility agencies to prevent damage to pipeline.

As is mentioned in various section of this tender document following regular attention and activities shall be carried out by the Contractor as per suggested frequencies for maintenance of PE network.

S. No.	Activity	Frequency
01	Awareness to all concerned persons about network and it's extension / modification	Regular
02	Patrolling and Third-Party Coordination if work is going on or near gas pipeline route	As per AOMP Daily - If third party work is going on or near gas network
03	Valve Chamber / Service Regulator module Maintenance	As per AOMP
04	Surface Gas Detection Survey	As per AOMP
05	Pressure Drop Test (Lock Test) of Network	As per AOMP

- The frequencies and the extent of the work are based on requirements as per GGL requirement, operational experience and good engineering practice. Based on past experience, some of the frequencies may be adjusted.
- Subsidence at crossings and with trenches generally.
- The painting of marker posts enclosures and gates.
- Clearing of grass from around installations including enclosures, corrosion protection unit's markers, etc.
- Replacement of stolen or damaged markers, test points, gates, etc.
- Contractor shall carry out the maintenance work of PE distribution network as per tender specification. Detail of distribution network, as-built drawings, testing reports and other construction records to be collected from Gujarat Gas.
- Contractor shall visit overall site along with related staff members to make themselves aware about route, type of laying and size of pipeline

Procedural Steps for Routine Maintenance on PE Network by GGL engaged Contractor.

Sr.No.	Activity
01	On receipt of O&M contract, Contractor shall take specification / detail of distribution network, as-built drawings, testing reports and other construction records from Gujarat Gas
02	Contractor shall visit overall site along with related staff members to make themselves aware about route, type of laying and size of pipeline
03	As built drawings / schematic etc. of network shall be taken over from Gujarat Gas or from its contractor in soft copy and same shall be updated regularly with repairs / modifications / extensions carried out over the time period.
04	All above listed maintenance activities shall be commenced immediately after taking over as per approved work instruction by GUJARAT GAS.
05	Post surface gas detection survey, the action/s, shall be initiated & ensured as per Leak Classification and approved Action Criteria.
06	In case of pressure drop is more in a particular section, pressure drop test in sub-sections (small sections of particular big section) either through valve chambers or squeezing of section shall be conducted. Pressure drop in particular small section shall be found out / located
07	Vigorous Surface / Subsurface Gas Detection Survey immediately to identify probable gas leak location shall be arranged

08	Excavation at probable gas leak location shall be arranged and the cause of gas leak shall be identified.
09	Repair rectification of gas leak shall be arranged as per "Procedure for attending Gas leakage / Gas Escape on PE distribution network"
10	Report and records of maintenance shall be prepared and submitted to Gujarat Gas O&M In charge regularly
11	On receiving intimation regarding charging of a particular network or extension of network from Gujarat Gas , O&M contractor shall visit overall site along with related staff members to make themselves aware about route, type of laying and size of pipeline
12	'As Built Drawing' Laying Reports and Pressure Test reports shall be taken over from Construction Contractor / Gujarat Gas
13	All valve chambers shall be inspected for proper construction, its cover, tagging & marking and gas leak. In case of any gas leak, potential hazard or poor construction same shall be reported to Construction Contractor and or Gujarat Gas within three days
14	Awareness program including site visit shall be organized for each member of O&M team
15	The extended network shall be included in Annual Maintenance Plan and maintenance activities shall be started as per above procedure
16	Staff shall be regularly trained and educated for network route, O&M procedures and HSE Aspects

6.2.3. Safe Practices / Guidelines for Below Ground Network

The operation and maintenance of a gas distribution is a specialist function, which requires a high level of operator and supervisory experience and substantial management support. The In-charge, O&M shall be responsible for ensuring there is adequate experience available to ensure the safe and secure functioning of the distribution system. Job planning is an essential part of safe practices and should be applied to all jobs by Supervisory personnel. Safe procedures must always be incorporated in the planning of any job.

- **Supervision by an experienced Supervisor in the planning and field execution of the following activities is essential,**
 - All emergency situations
 - All major gas escapes
 - On unusual or complex jobs
- **On site supervision is preferable when,**
 - Training of inexperienced field personnel are handling specialised work
 - Welding on charged network
 - Shutting down of gas supply or bypassing a main is involved in the work
 - Work is being performed in deep trenches
 - Work involving major disruption of traffic
 - A large number of consumers could be affected by the work
- **While working on Gas Escape, ensure followings**
 - When working on gas escapes, suitable masks are to be worn in addition to normal personal protection such as helmets, gloves, etc.
 - Where gas is evident a dry powder fire extinguisher must always be on the work site in a safe and handy position, upwind of escaping gas.

- Consideration is to be given to the safety of the public especially in the provision of adequate safety barriers and safe access for pedestrians. Control of vehicular traffic must also be considered depending on the site conditions.
- Assess the volume of escaping gas, and what means is available to bring it under control.
- Check to see if the gas is entering buildings, pits, drains, etc...
- Decide what material and equipment is required to bring the escape under control.
- Assess how long it will take to effect temporary or permanent repairs.
- Check proximity of overhead power lines, underground cables and any other possibility which may cause ignition.
- Ensure that no smoking is allowed on the work site.
- Place the dry chemical extinguisher approximately six metres from the work site in a safe position and upwind from the proposed area for excavation. If a second fire extinguisher is considered necessary it is to be placed adjacent to the excavation.
- Check all points of possible ignition such as,
 - i) Vehicular traffic
 - ii) Electrical installations such as switch and transformer boxes
 - iii) Passing pedestrians whom may be smoking

6.2.4. General Instructions while handling Gas escape / Leakage:

- CONTRACTOR shall take care to prevent damage to or interference with the proper functioning of all underground utilities like the telephone or any other pipeline used for the transmission of gas, water or electricity and all cables, pipes, ducts, drains and tunnels whatsoever. CONTRACTOR will at his own cost repair or replace damaged portion of utility or pay to concerned department for getting it repaired.
- CONTRACTOR shall ensure safe handling of gas detecting instrument.
- If CONTRACTOR desires to use mechanical appliances for excavating trenches, he shall submit his proposal for approval of OWNER. This does not relieve CONTRACTOR from responsibility for any type of damage to existing services. Any complaint regarding damage must be repair as per the instruction given, failing which, the OWNER has right to impose penalty, as deemed fit.
- All top soil road metal or other surface material and hard-core shall be kept separate from other excavated material over the width of the trench and good soil should be used for Back-filling over the pipeline (i.e. without any stone pieces, brick, garbage, sharp edged particles, etc...). Maximum possible care should be taken while Back-filling the trench over the pipeline. The pipeline should not have any tension while Back-filling. Also, ensure warning tape in place along / over pipelines.
- CONTRACTOR shall obtain permit for maintenance work in Townships, Consumer premises, industry and commercial establishments, prior to start the work.
- CONTRACTOR shall carry out extensive patrolling, monitoring & educate the authorities, especially on "HOLI", "DIWALI", etc...when the ignition sources & hence, fire potential is maximum.
- Contractor shall prepare for Monsoon-flood & other natural calamities emergency plan provided by GGL EIC

6.3. WORK INSTRUCTIONS FOR CLEANING / REPLACEMENT OF FILTER ELEMENTS OF CPRS / DRS / DPRC/IMS

- Ensure that filter body is depressurised by opening drains and top gauge connection. Venting is done under controlled condition with all safety precautionary measures as per work permit system
- Before starting venting operation, ensure that CPRS / DRS / IMS inlet and outlet valves are closed.
- Unbolt bolts of Top cover of filter & Remove Filter top cover, carefully.

- Remove filter element carefully, after removing the nut on element guide rod.
- Observe / check the inside of filter body and element fixtures for any abnormality, and finally clean inside of the filter body.
- Clean the faces of filter cover and body
- Similarly clean and reuse the old element, if possible.
- If required, replace the element with new element.
- Refit the element by screwing down the nut, washer and rubber packing, on guide rod.
- Use the old gasket if the condition of the same is good. If not replace the same, by new gasket.
- Refit the top cover by bolting down equally on all sides.
- Carry out the leak check of cover joint by soap solution, when the filter is pressurised after completion of all other jobs on CPRS / DRS.
- Check and record the final DP.
- Prepare the report and update the record including, spares / material consumption statement and submit to Gujarat Gas in charge for material reconciliation and inventory management.

6.4. WORK INSTRUCTION FOR ROUTINE MAINTENANCE OF CPRS / DRS /DPRC

- Check CH₄ % with gas detector and carry out leak test with soap solution of all pipe, valve and tube joints.
- Clean externally all valves, drains vents, pressure gauges, pipe spools and pilot regulators and filter, with dry clean cloth.
- Operate all valves in clock-wise/anti clock-wise direction frequently to make all them free in operation.
- Collect and deposit the all scrap / garbage / packing materials from above activities, at designated GGL stores/material management system established by GGL.
- Close the cabin and fencing gate and lock it.

6.5. INDUSTRIAL METERING AND REGULATING STATION (IMS)

In a city gas distribution business, gas connection to industry is a major activity and it consists of variety of gas equipment from simple furnace to complex thermo pack or boiler. PE pipeline carrying Natural gas at pressure is laid underground from downstream of CPRS and connected to IMS which is installed in industrial premises for metering and regulating purpose. The selection of site for installation of Metering and Regulating Station (IMS) in the premises of industry is key to safety & integrity of gas installation and public. It should be installed in well-ventilated area away from buildings or major installation having easy approach and access.

The contractor's scope of work will include but not limited to the following:-

Contractor representative has to visit customers premise at periodic intervals as per OWNERS instruction for ensuring proper housekeeping, Monitoring/recording operative parameters and submit it to same to GGL representative. Also if observed any hazardous activity/storage around the IMS, same has to be intimated to GGL representative.

6.6. NETWORK ISOLATION VALVE (PE BALL VALVE)

For Operations & Maintenance of underground Distribution mains & Services network, isolation valves are provided as per the norms to isolate the gas supply in pipeline for any emergency or operational purpose. The Valve is made of PE material vary from 32 to 160 mm sizes. Valve assembly comprises purge connection assembly installed in a special pit / chamber as per enclosed drawings, covering with slippers. CONTRACTOR shall be responsible for providing labours, tools & tackles,

equipments, taking work permits, etc. To maintain this facility in order, preventive maintenance is required to be carried out periodically as follows;

a. **PREVENTIVE / PERIODIC MAINTENANCE OF VALVE ASSEMBLY / PIT**

Inspection of Valve Pit / Chamber

Valve pits / chambers provided on pipeline shall be inspected / checked periodically by CONTRACTOR & submit the report of the overall status of valve assembly, valve pit condition as per AOMP. CONTRACTOR shall excavate buried valves, and restore the same.

Water Removal / Housekeeping in the PE Valve Pit

CONTRACTOR shall carry out general housekeeping inside & outside the valve pit & water removal from the valve pit if exists. This activity should be carried out at least twice in a year (i.e., pre & post monsoon) for the entire network / all valves or as per AOMP. CONTRACTOR shall take due care of safety in terms of any creature, sharp edge of any material during the activity. Proper security & safety must be ensured.

Maintenance of PE Valve Assembly / Pit

- Leakage to be attended / arrested, if any on valve assembly.
- Repair of any damage to other utility during excavation will be under CONTRACTOR's scope.
- CONTRACTOR shall visit the site for shifting of valve pit if any, along with OWNER's representative.
- Contractor shall arrange all required material, consumable items like Teflon tap and others except PE Ball Valve, if any. The CONTRACTOR shall prepare as laid drawing in AutoCAD with soft copy mentioning material consumption for the necessary changes and the same will be submitted along with DPR to concerned OWNER's representative on very next day, duly signed
- CONTRACTOR shall ensure that his supervisor is present at site, till completion of work.
- CONTRACTOR shall arrange the cordoning tape and signboard for cordoning of work place.
- CONTRACTOR shall be responsible to arrange water and electricity / Diesel Generator at his cost for execution of scope of work entrusted to him.
- CONTRACTOR shall be responsible to collect all the materials related to his scope from OWNER's stores/material management system established by the Owner (free issue material) and bring them to the site at his risk and cost.
- CONTRACTOR shall arrange the transportation of his work force to and from the site.
- CONTRACTOR shall return the old material removed from site and all type of scrap to OWNER's stores/material management system established by GGL and maintain the record of same.
- CONTRACTOR shall ensure the supply of gas is not affected and / or resumed after completion of maintenance.
- Proper housekeeping & disposal of waste material should be carried out as per HSE norms.
- CONTRACTOR shall ensure that slipper / enclosure is in place after the completion of work.

Procedure

- Pit preparation as per OWNER's / site requirement & specifications.
- Squeezing of PE line at both ends.
- Connection with charged PE line following electro fusion jointing process.
- Electro fusion welding for different sizes of pipes and fittings.
- Installation of valves & purge assembly on supports, if required.

- P.C.C., Structural, Reinforcement, Brick masonry and civil construction of valve chamber as per specifications.
- Backfilling, Compacting and removing excess soil.
- Demolitions of old chamber after removing old valve and assembly, Backfilling the same includes compaction.
- CONTRACTOR shall check the valve chamber for any leakage through leak detection equipment.
- Check and repair any damages inside and outside the chamber.
- Check and repair the sleepers as well as the lifting hooks welded on sleepers.
- Check the plastering work inside/outside and repair if needed.
- Check and repair the chamber frame.
- Painting / White washing / Stencilling, if required.

Conditions

- Excavation of valve chambers / Pit shall be carried out in all kind of solid. If water, mud observed during excavation, shoring and dewatering by manually or normal pumping shall be carried out by CONTRACTOR.
- Work permit to be issued from GGL by Contractor prior to starting of work.
- For any deviation, CONTRACTOR shall obtain approval from OWNER.
- CONTRACTOR shall use all required PPEs' at site.
- CONTRACTOR shall ensure the condition of pit & follow norms for confined space.
- CONTRACTOR shall ensure water curing for the new pits.
- CONTRACTOR should ensure that the PE Ball valve is covered with fine sand to prevent any damages. CONTRACTOR shall supply the slipper as per GGL specification that can be lifted with a normal man, in case of emergency.
- CONTRACTOR should not clean the valve pit in dark / night hours.

6.7. ATTENDING GAS SMELL / LEAK COMPLAINT IN DOMESTIC CONNECTION

General

Attending gas smell / leak complaints in domestic connection is the activity carried out for quickly finding the cause / source / place of smell and safely repairing / arresting the gas leak, and restoration of gas supply to the customer. The gas smell creates panic to the customer for probable gas leakage and associated potential hazards. Similarly the obvious gas leak in the domestic customer connection may pose highest potential hazards of asphyxiation / fire and explosion, depending up on the volume, time of gas escape and ventilation of customer premise during the gas escape. Here in the domestic connection the risk is still higher as all the family members, from child to aged and weak and sick and formally untrained persons are exposed to the hazards. Hence it is very important that the gas smell and leak complaint in domestic connection is attended at the earliest. This task has direct effect on company's operation and reputation, customer safety and customer satisfaction

Activity Steps for Attending Gas Smell / Leak Complaint in Domestic Connection

If customer complaint directly receive by the contractor , he has to give important safety instructions to the customer, like closing the control valve / no Smoking, / not to operate electrical appliances / opening the doors and windows / keeping people away, after noting his address and telephone nos. Initial instructions to customer are very important in controlling the hazards and mitigating the consequences, hence check list type ready format should be always available with control room call receiver, for such communication

- To reach site, quickly, observing law full and traffic safety
- To assess the situation, for taking the following steps Cordon and secure the affected area, keep the other persons away. Open the door and windows.
- To open the control valve, if the valve is closed by customer previously, ensuring that valve opening does not create any hazard.
- To identify the smell / leak spot, by carrying out, smell / noise and gas detection survey in the various parts of premise in consultation with customer. If the smell / leak spot is not found in the customer premise, then, to carry out the survey in toilets, bathrooms and surrounding area of drainage, gutters etc. as some times the leaking gas from underground PE network, travel back in the toilets, bathrooms of customer premise, thru. drainage and gutters
- To close the control valve after identification of leak spot. Measure should be taken for prevention of accidental opening of control valve.
- To arrest the leak by repair / replacement of the component / piping, as per established procedure, and engaging a trained and certified person only
- To open the control valve, and pressurize the connection, watching smell and noise, from any obvious opening left unattended.
- To carry out the vigorous leak check by detector and soap solution, on and around the piping and components opened and refitted.
- To witness the leak detection tests by an engineer in charge.
- To ask the customer to operate his stove, to show him that now it is safe to operate. If possible to explain the customer about what we did and what might have caused the smell / leak.
- To take customer Signature on call note as a conformity of attending the job and handing over the safe operating connection to customer.
- To prepare reports and update the records. Especially, Near miss, hazard and Lesson learning, if any, should be reported and shared with others.

6.8. GI WALL PIECE REPLACEMENT IN GAS INSTALLATION

- As Instructed by GGL representative Customer list shall be taken by CONTRACTOR At customer premises selected wall crossing pieces shall be replaced with PVC sleeve and anti-corrosive tape after obtaining permission from customer.
- CONTRACTOR shall carry out leak test of modified installation after completion of required alteration work
- After Completion of leak test, CONTRACTOR shall ensure the soundness of connection and Cementing of wall crossing hole at both sides.
- After Completion of Work, CONTRACTOR shall inform customer of resumed gas supply and check the gas supply at burner.

6.9. EMERGENCY RESPONSE VEHICLE (ERV)

- a) Emergency Response Vehicle (ERV) Vehicle shall not be older than 3 years from the date of the vehicle registration OR shall not be used for more than 1.5 lakh kms whichever is earlier, subject to availability of valid road worthiness certificate. This condition is applicable throughout the contract period. Contractor to ensure this requirement at the time of deployment of vehicle to avoid change of vehicle during contract period. In case of change of vehicle, contractor to ensure branding and other required changes in advance for continuity of the service
- b) The vehicle to be inducted should be standard, tested and established models like TATA 207, Mahindra Bolero for MUV, TATA ACE (CHHOTA HATHI) for Small 4 wheeler or any equivalent vehicle mutually decided between GA team and Contractor.

- c) CONTRACTOR shall provide ERV along with Accessories and the vehicle shall be used and must be kept in good working conditions all the time. Driver to be deployed on this vehicle must be well trained / experienced, non-alcoholic or drug addict & dressed in approved uniform. Necessary manpower, machine / equipments, spares / materials & consumables shall be arranged by CONTRACTOR for any emergency.
- d) Driver deployed in this vehicle should have valid license.
- e) ERV with Driver should be deployed in shift (3 shifts, 2 shifts or only 1 shift) as per requirement provided by respective GA for different O&M Locations. However, in case of emergency / requirement by GGL, driver shall be provided by contractor in any / all shift with no additional cost to GGL. Statutory compliance to be ensured for deployment of Driver.
- f) Emergency vehicle shall reach at emergency site within defined SLA after receiving call.
- g) If parallel emergency call received, priority to be given looking to the criticality. ERV to be relieved to attend other emergency after isolation of supply and handing over the balance work to repair team.
- h) Payment of Toll tax shall be in GGL Scope
- i) For Carrying out various planned operation and maintenance activities of the city gas distribution system, well equipped normal vehicle to be used because Emergency response vehicle is for responding & attending emergency/leakage complaints only. Standard reasonable load carrying vehicle, with open truck type body and good manoeuvrability that can be converted into maintenance van, after building customized body for storage and security of various tools tackles, pipes and fittings, fire extinguishers etc. generally required for handling gas leak / escape emergencies and routine and break down maintenance of network and installations, from city gate station to customer connections, located near and far.
- j) For highlighting the company identity, the van is painted with company logo, name, and contact telephone numbers as per Gujarat Gas approved design and colours.
- k) For monitoring the vehicle movement, Contractor should fit the vehicle (4 wheeler/3 wheeler/2 wheeler) with owner provided Vehicle Tracking System (VTS). Contractor shall ensure that the instrument remains installed in the vehicle without damage. If vehicle is changed then the Contractor shall inform GGL a week in advance so that the vehicle tracking instrument can be uninstalled from old vehicle and installed in new vehicle. Any cost incurred for reinstallation/damage/repair to the VTS system shall be borne by the contractor
- l) Any detour away from the scheduled route / route to be followed for attending maintenance activities cannot be considered as a part of the mileage to be paid.
- m) Emergency response vehicle is also fitted with public announcement system and if wireless equipment is required same shall be provided by GUJARAT GAS. The public announcement system is required for making announcement for stoppage and resumption of gas supply, during pipe line damage / gas escape, or equipment failure and for festival safety. The VHF wireless equipment is for contact with control room from remote areas.
- n) As stated above, ever readiness of Emergency response vehicle with all required items is very important, and hence should be operated and maintained with utmost care. The vehicle should be used only for intended purpose. Ensure driving of the vehicle with lawful and traffic safety, taking care of the damaging bumps on the road. The regular checks and inspection procedure should be

established, assigning responsibility to particular shift engineer. The vehicle should be checked daily in the morning, as per the check list, having checks for, tire pressure, engine oil, fuel level, other abnormalities like over temperature, vibration, noise etc. including announcement and wireless system.

- o) The vehicle should be regularly serviced in a good equipped garage. Similarly, the tools tackles should be checked every month end to ensure the availability and working condition of each item. The effective material reconciliation procedure and check list should be prepared to ensure the availability of pipes and fittings and replacements for the consumed pipes and fittings. The replacement for the use / lost items should be done immediately otherwise there are chances of forgetting the replacement.
- p) The fire extinguisher and pressure gauges, flame proof torches, stored in the van, should be periodically checked and calibrated for their working. For overall security of all items, the van should always be locked and guarded, when not in use.
- q) At site vehicle should be parked at safe and secured place, keeping watch. Take out the required items only, do not remove / take out unwanted items, from the vehicle. Return back the items in vehicle immediately after completion of job. Ensure that all items are collected and returned back in the vehicle to their respective place, after repeatedly looking outside, here and there.
- r) CONTRACTOR shall maintain the day-to-day records as per MIS & submit it along with monthly reports.
- s) Vehicle should be maintained in proper working conditions throughout the tenure of the contract by carrying out preventive, periodic & breakdown maintenance as per Manufacturer's recommendations. CONTRACTOR shall submit the report on such scheduled or breakdown maintenance performed from time to time. All the inspection & maintenance should be carried out by authorized dealers only.
- t) CONTRACTOR shall make an alternate arrangement in case of Routine, Periodic maintenance to be carried out or for RTO purpose required from time to time at his own cost & risk. OWNER shall ensure that in such case the O&M is not affected. In case of any breakdown of ERV, Contractor needs to provide alternate appropriate good conditioned vehicle immediately. While providing the alternate vehicle (during intervening period) in case if contractor could not make the site safe during any emergency as per SLA, penalty will be applicable in addition to the cost towards the damage incurred due to delay in making site safe will be debited from Contractor.
- u) Any penalty for non-compliance or delay in compliance of statutory matters shall be realized / recovered from CONTRACTOR.
- v) CONTRACTOR shall ensure the validity of driving license for the driver deployed on vehicle at his own cost.
- w) CONTRACTOR shall be solely responsible for any accident of vehicle & caused damages to vehicle or the property of third party or the human (injury or death). Such cost shall be recovered from CONTRACTOR & any complaints in police or competent authorities in this regard shall be taken up at his cost & risk including insurance claim, repairing of vehicle, damage to third party, etc.
- x) The prices as agreed shall remain firm throughout the currency of the contract except for variation in Fuel price & GST. Owner shall Increase or Decrease the agreed Monthly / Casual hire charges due to variation in fuel price when variation in price to base rate is beyond +/- Rs. 5. Such increase and decrease in hire charges due to this variation in fuel prices shall be worked out from the base rate in accordance to the following formula:

Petrol & Diesel:-

Increase and decrease in monthly/ casual hire charges =
Committed KMs X (Revised rate per Liter - Base rate per Liter.) / Average KM per liter of fuel consumption (KMPL)

CNG:-

Increase and decrease in monthly/ casual hire charges =
Committed KMs X (Revised rate per Kg - Base rate per Kg.) / Average KM per Kg of fuel consumption

Calculator for the same is attached herewith for reference.

- In case of petrol/diesel, the average KM per liter of fuel is to be assumed as 12 Kms & in case of CNG vehicle, the average KM per Kg of fuel is to be assumed as 20 Kms for Tata 207 or Equivalent Vehicle, Chhota Hathi or Equivalent Vehicle and Three-Wheeler
- The average KM per liter of fuel is to be assumed as 45 Kms for Two-wheeler.
- If there is decrease in fuel price, formula will indicative negative which mean hire charges shall be reduced.
- The base rate of fuel for the purpose of price variations shall be the rates prevalent as per below mentioned city of respective state ,on the Bid Due Date to be considered. In case of fuel, normal diesel/petrol/CNG price shall be considered.

1	Gujarat and DNH	Gandhinagar
2	Madhya Pradesh	Indore
3	Rajasthan	Sirohi
4	Punjab and Haryana	Amritsar
5	Maharashtra	Thane

- The revised hire charges due to variation in fuel price shall be applicable w.e.f the 1st day of next month reckoned from such price variations as referred above. However, there shall be no revision allowed in hiring charges for first three months from the date of commencement of the contract on account of variation in fuel price.

Vehicle Inspection

- Periodic vehicle inspections shall be ensured by O&M Contractor. A well planned vehicle inspection will assist, in detecting defects, faulty equipment and violations of safety or legal regulations. Identification and correction of these hazards will reduce the potential for accidents, minimize vehicle downtime and reduce overall maintenance costs.
- Each vehicle should be checked and report should be submitted to concerned person / In-charge for further action.
 - Headlights
 - Tail lights
 - Turn signals
 - Windshield wipers, washers and washer fluid
 - Horn
 - Reverse Tune / Horn
 - Brakes

- Vehicle emergency lights
- Emergency brake
- Seat belts and shoulder straps
- Side mirror
- Tires
- Windshield Condition
- Vehicle body condition (scratches and dents)
- First Aid kit
- Fire extinguisher
- Communication equipment
- Wheel chocks

6.10 INSTALLATION PHILOSOPHY OF SS TUBE IN ISLAND KITCHEN

(New Island Kitchen Installation Or Modification/Alteration of Existing Island Kitchen)

Advancement in infrastructure and aesthetic design creating hurdles in many cases where installation of GI gas pipeline as per conventional way is not possible. In some of the residences, kitchen platform is located in centre of the kitchen room and GI pipeline mounted on one of the kitchen walls requires to be extended up to the appliance. Under such circumstances, pipe can be laid in flooring with adequate protection. Same shall be termed as "Kitchen with island platform". To overcome this challenge and fulfil customer's requirement, Gujarat Gas Limited has proposed installation of SS tubing housed in UPVC conduit pipe, which will be installed in the groove underneath the floor tiles.

CONTRACTOR SCOPE OF WORK

- Contractor shall deploy Skilled manpower for SS tube installation work, comprising minimum one experienced technician along with helper.
- Contractor manpower shall have necessary tools & tackles like SS bender, spanners & other associated items/consumables required for SS tube installation.

6.10.1 CONTRACTOR PROCURED MATERIAL USED FOR ISLAND KITCHEN

Below mentioned material will be supplied and installed by contractor as per site requirement.

- SS-316 Grade tube "Supply of 1/2" OD Tube, MOC: SS316, Hardness: Rb80, Finish: Full Annealed, Wall Thickness: 0.065", Tolerance in OD: +0.005"
- SS-316 Grade - 1/2" Ferrule*1/2" BSPT MALE connector (Compression fitting)
- SS-316 Grade - 1/2" Ferrule*1/2" BSPT FEMALE Connector (Compression fitting)
- UPVC pipe 1"
- Hollow End cap (MOC- Rubber/UPVC)
- PVC Clamp 1/2"
- Anti-Corrosive tape

6.10.2 INSTALLATION PHILOSOPHY:

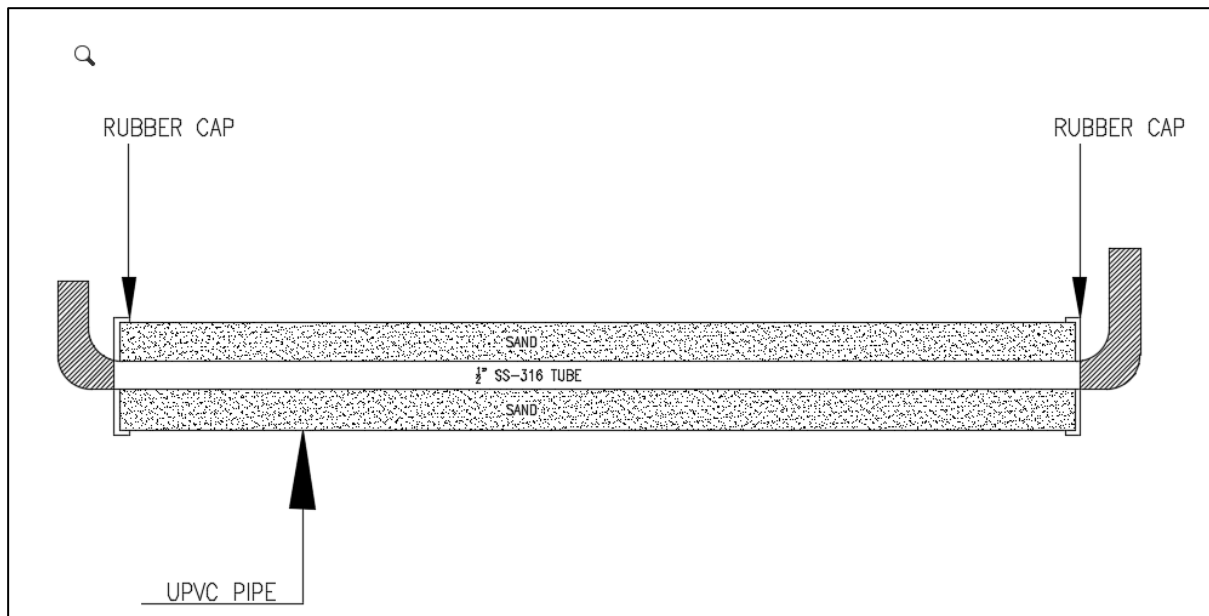
Guidelines for Installation at Island Kitchen is as follow:

- A groove is required below the floor tiles / on the concrete slab as shown in the drawing (Refer Drawing No.1). Groove shall be prepared by the customer.
- SS tube (1/2") to be inserted in UPVC pipe (1") and space between ss tube and UPVC Pipe shall be filled with sand. Cap (hollow) to be fixed on both end of UPVC pipe.

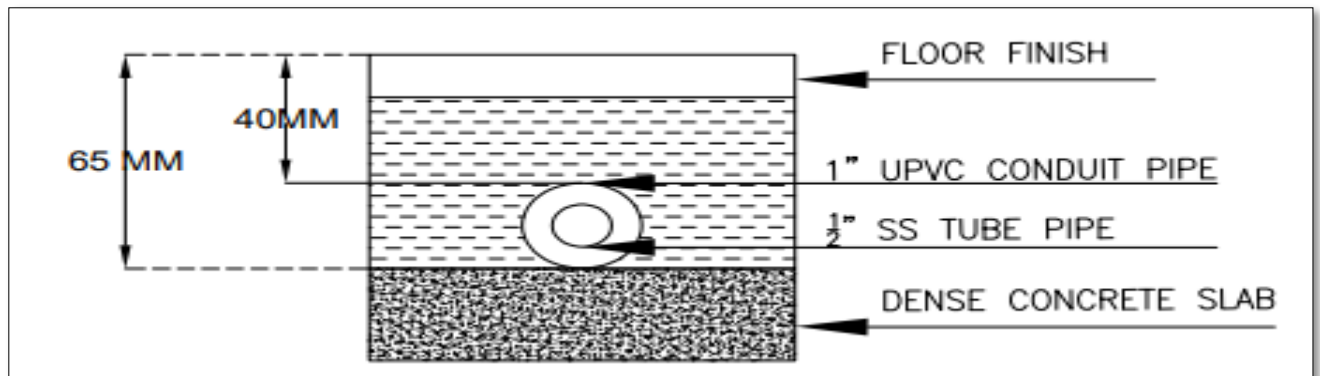
- SS tube to be bent with SS tube bender to bring the tube vertically up at both ends inside the kitchen.
- GI pipe installation on the kitchen wall to be connected with SS tube with connector. (1/2" Ferrule*1/2" BSPT Female at minimum height of 6" from floor.
- Self-adhesive anti-corrosive tape shall be wrapped on the Connector joint and Pipe (300 mm above and 300 mm below) with 50% overlap. It is required to serve the purpose of prevention of galvanic corrosion due to bi-metal contact of GI and SS materials.
- Appliance Valve to be connected with SS tube inside the kitchen with Connector (1/2" ferrule*1/2" BSPT Male). Appliance Valve on island kitchen outside wall shall be installed at height where it is easy to operate. Appliance Valve and SS Tubing can be installed inside wall of the Island kitchen only when area below platform is not closed / properly ventilated and Appliance valve is easily accessible.
- This prefabricated assembly to be fixed in the floor groove. (Refer Drawing.1)
- Pipe work laid in flooring shall be protected against various factors leading to corrosion and also against failure caused by movement.
- Groove / screed depth shall be 65 mm minimum on the top of the concrete slab which will provide an approximate cover of 40 mm over a 25 mm UPVC conduit pipe.
- The conduit pipe should be fixed in the groove properly.
- Entire DPNG installation shall be tested including SS tubing as per existing practice (PPT of above ground Plumbing at 3.5 Kg/Cm2 for 30 Minute)
- Customer can fill the groove as per his requirement / can fix floor tiles after testing of the installation work.
- Following precautions to be taken during SS Tube Installation.
 - ✓ Do not conceal above ground GI pipe and above ground SS Tubing including Connector joints and ensure always to be exposed to the atmosphere
 - ✓ No joints are allowed in SS tubing inside conduit pipe under the floor.
 - ✓ Unions are allowed in SS tubing only while installation of plumbing on wall.
 - ✓ Safe and shortest possible route shall be selected. Bends and deviations shall be avoided
 - ✓ Any interference with other utilities shall be avoided. In case there is such interference, a minimum distance of 300mm should be maintained.

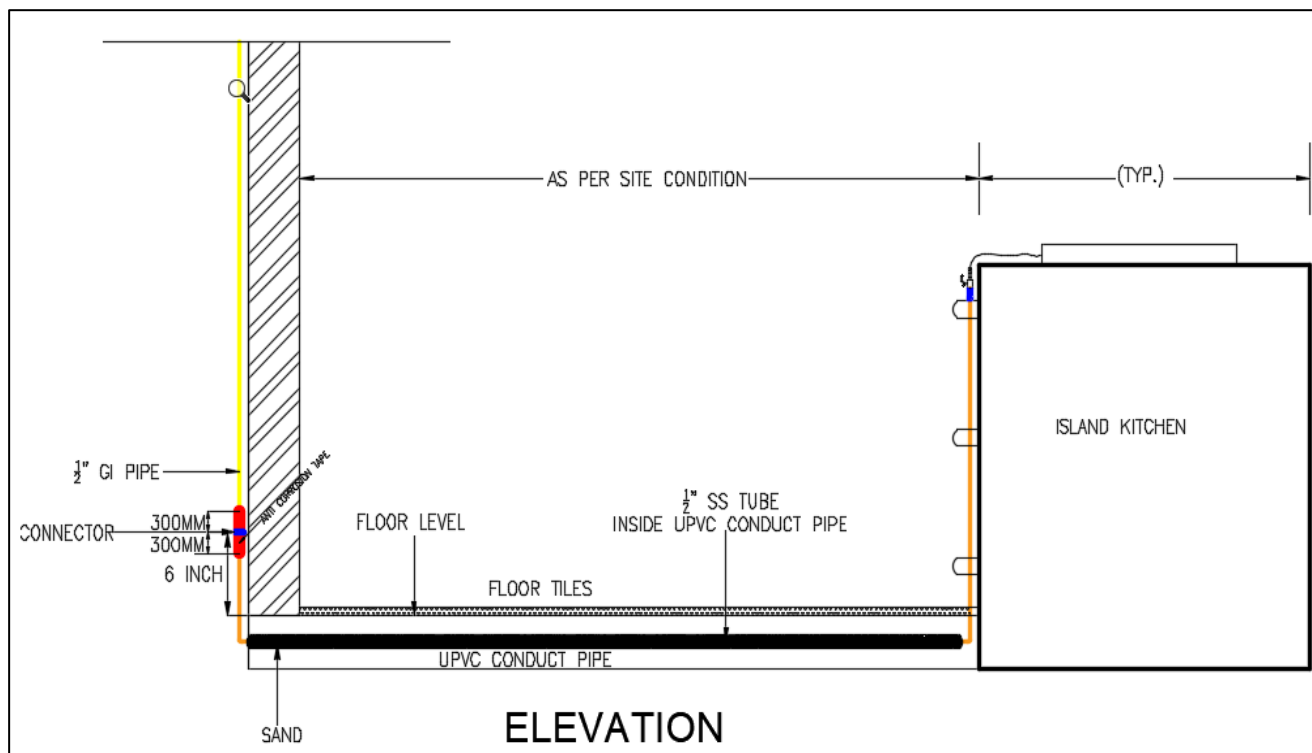
DRAWING.1

TYPICAL INSTALLATION FOR ISLAND KITCHEN



CROSS SECTION: SS TUBE IN FLOORING





7.0. CONSUMER SERVICES / COMPLAINT HANDLING

7.1. GENERAL

The purpose of extending consumer services & complaints handling is to manage / facilitate the day to day operations in such a way to enhance the satisfaction of PNG consumer at optimal level with due adherence of HSE / Statutory aspects, which will be related to technical & non-technical issues. The services shall be handled as per the service levels specified by GUJARAT GAS.

CONTRACTOR shall, at its own cost, provide uniform and identity card to all his employees deployed for the O&M work and shall ensure that such uniforms / identity card are worn by his employees while on duty especially for field activities being performed at consumer premises / at site. To enable OWNER to maintain the identity, the CONTRACTOR shall follow the dress code for the uniforms & identity card duly endorsed prescribed by OWNER.

CONTRACTOR shall take due care of the equipment and shall ensure that the same are operated by properly trained staff in a prudent manner. In case of breakdown in or damage to or defect in the equipment / installation, the CONTRACTOR shall immediately notify the same to the OWNER's representative. The CONTRACTOR shall also take due care of and take appropriate measures for the protection of the consumer & OWNER's assets as well.

CONTRACTOR shall ensure and follow the guidelines / norms for performing the consumer services laid down by OWNER / Statutory authority for all the technical & non-technical natures. The necessary records should be maintained for the same on day to day basis as per MIS.

CONTRACTOR shall maintain / log in the data register of PNG complaints, customer service call notes, damages reports, as per the format approved by OWNER and OWNER shall have the right to examine all relevant records, charts and calculations of CONTRACTOR relating to the operation and maintenance of the CGD.

CONTRACTOR shall ensure / arrange for effective operation, complaints handling for consumer services every time.

Effective consumer support and handling of all consumer grievances including law and order situation handling filing / register the complaint or FIR, if required as per OWNER's direction.

OWNER reserves all the right to demand for change of any personnel found not satisfactory without assigning any reason.

CONTRACTOR must not use the premises or consumer base / data for any other purpose / business other than specified in the scope of work. Also, the stay of any persons will not be permitted in the OWNER's premises unnecessarily without any official work.

CONTRACTOR shall indemnify OWNER / CONSUMER to compensate for any liability or losses incurred by the CONTRACTOR or his personnel by virtue of unauthorized carried on by the operator.

CONTRACTOR or his personnel shall not carry out any unauthorised work directly to the consumer. Consumer should always be asked to consult concerned representative of the OWNER at designated office on working days & time for any activity to be carried out except emergency. If Contractor is found to deviate from the process given, OWNER reserves the right to terminate/penalise CONTRACTOR against the noncompliance.

CONTRACTOR's personnel should follow all instruction being issued by OWNER from time to time regarding operations, maintenance, billing, services, complaints handling, etc.

Before starting activity, prior permission must to be taken from the consumer. Job shall be executed with proper tools & tackles.

After completion of job, CONTRACTOR personnel shall inform consumer / OWNER's representative regarding the actives carried out & acknowledgement for satisfactory completion of job thereof.

Ensure there is no leakage after job completion.

During the execution of work, utmost care must be taken so that no property or part of the property is damaged. If in case the damage is done by whatsoever reason or due to any negligence on your part the damaged property or part of the property shall be repaired / replaced by CONTRACTOR. No additional payment shall be done by GGL.

Customer can be contacted over phone prior to visit customer house to avoid house close issue and no additional charge will be provided to contractor for re-visit in case of house is closed. If additional visit is required to execute any services of Section-B and No extra cost will be provided.

7.2. COMPLAINT HANDLING

The requirement stipulated in this clause shall supplement the requirement of consumer services, where different type of complaint arises looking to the various consumer aspects.

Generally two types of complaints shall be observed, i.e. technical & non-technical as described below;

a) Technical Complaints

- Related to Network, PNG Installation inside consumer premises, i.e. gas leakages in underground / above ground pipeline / installations / equipments, valve chambers, No Gas / Stoppage of supply, fire & explosion, etc...
- High gas smell in kitchen / house, Volunteered dis-connection, re-connection, No Flame (Under pressure), High flame (Over pressure), Meter malfunctioning or showing incorrect value, stove / burner complaints or conversion on NG from LPG, emergency call, survey for alteration / modification in existing installation, connection transfer, etc...

b) Non-Technical Complaints

- Such as New Booking, Meter reading, billing discrepancies, name transfer in case of occupant death, sale of property or other reason, intends to extend / modify the existing installation, agreements, etc...
- Related to CONTRACTOR's services, information pertaining to the services or installations may be for safe usage, safety, general awareness.

Generally, services shall be categorized looking to its criticality, in terms of, incident occurrence or likely hood to occur, supply interruption, consumers' services / concerns or may be routine services / activities. Based on the nature, OWNER & CONTRACTOR shall mutually prepare the modus operandi & response time for every complaint after award of the contract.

However, CONTRACTOR must give priority in below sequence if multiple activities at a same time

Emergency or Fire & Explosion I Gas Escape I Gas supply interruption I Breakdown Job I Consumer Services for Technical job I Routine or Periodic Operations & Maintenance I Consumer Services for Non-technical job.

However, it should be operated looking to the type of complaints, scenario at site from time to time. OWNER reserves all the right to modify the priority at its sole discretion.

CONTRACTOR shall follow the safety procedures & best engineering & logical practices from time to time, specified by OWNER in operating the same. Specifically, the CONTRACTOR shall comply with and observe code of practice of relevant prevailing statutory / ISO / BIS / OISD / PNGRB / International standards for the safe, reliable & uninterrupted services to the consumer.

OWNER shall conduct the Consumer Satisfaction Survey from time to time pertaining to the operations and services extended by CONTRACTOR.

CONTRACTOR shall follow the policy established by OWNER & take instruction, wherever required related to the consumer services & various complaints handling. Also, educate consumer / local authorities from time to time includes updates / revision, if any.

CONTRACTOR shall essentially conduct & carryout the additional services such as safety campaign, presentation, seminars, pertaining to the safe, reliable usage of PNG & its facility. Such cost towards special events will be reimbursed by the OWNER subject to prior approval in writing.

OWNER shall penalise CONTRACTOR, if the jobs are failing to be attended frequently as per response time framed.

Complaint handling for fast meter also is in the scope of O&M contractor.

7.3. DISCONNECTION (DC) / RE-CONNECTION (RC)

CONTRACTOR shall be responsible for disconnection and re-connection procedure of all PNG consumers (Domestic / Commercial / Industrial). However, it should be performed in consultation with the OWNER / its representative. The charges for DC / RC shall be paid as per SOR respective line item.

DISCONNECTION

Disconnection procedure can be categorised into two following type, volunteered or forced disconnection. CONTRACTOR shall carry out following activities;

7.3.1. Volunteered disconnection / Temporary disconnection

- Billing personnel shall receive the consumer application form from Owner's representative. If all the conditions for executing the temporary disconnection are satisfied, then the application shall be forwarded to EIC, who in turn will hand over the job to Contractor's technician team for physical disconnection. On completion of TDC as per the instructions of EIC, submit the document to EIC confirming the TDC to update the details in billing software / MIS.
- Contractor's technical group, on successful disconnection shall intimate / provide the details to billing personnel for necessary entry / update in the billing software. The response time for this activity shall be fixed by the OWNER / CONTRACTOR mutually.

7.3.2. Forced Disconnection

- Forced disconnection shall be carried out in following cases;
 - Non-payment of gas consumption bill for more than two (2) billing cycle (i.e. more than 4 months) or as per GGL latest guidelines,
 - Non-payment of installation cost, penalty for various reasons.
 - Using gas with unsafe installation / circumstances or tampering / manipulation of installation / equipment or for any other technical / non-technical reason.
- This activity shall be carried out in close consultation with OWNER / its representative.
- After successfully carrying out such disconnection, necessary report / updating in billing software / MIS shall be made. The charges and modes-operand shall be decided by the OWNER.

7.3.3. Permanent Disconnection

- Billing personnel shall receive the consumer application form from Owner's representative. If all the conditions for executing the Permanent disconnection are satisfied, then the application shall

be forwarded to EIC, who in turn will hand over the job to Contractor's technician team for physical disconnection. On completion of Permanent Disconnection (PDC) as per the instructions of EIC, submit the document to EIC confirming the Permanent disconnection to update the details in billing software / MIS. Bills shall be generated on actual basis, if Permanent disconnection is done during the billing cycle.

- Contractor shall disconnect the connection & disconnected materials i.e. GI pipes & Fittings, Domestic meter & regulator, Ball Valve & Gas Tap etc shall be recovered from site & hand over to Owner's representative. Contractor shall ensure permanent disconnection from riser / approach tapping tee for tapping connection or from PE service line away from premise near mains for individual PNG connection
- Contractor's technical group, on successful disconnection shall intimate / provide the details to billing personnel for necessary entry / update in the billing software. The response time for this activity shall be fixed by the OWNER / CONTRACTOR mutually.

7.3.4. Reconnection

- On receipt of consumer request for re-connection, Contractor's responsible personnel shall ensure whether the disconnection was done voluntarily as per customer request or forcefully.
- If consumer satisfies the clearance process, then the application will be forwarded to Contractor's EIC who in turn will hand over the job to Technician team for re-connection.
- Contractor shall carry out leak detection after reconnection of PNG installation. While carrying out first reconnection from riser / common approach used for multiple connections and not charged (forced NG cases), carry out leak test and ensure no leakage in other uncharged PNG installations on the riser. Customer visit report to be prepared & submit to GGL representative with all details duly signed by contractor & customer representative
- CONTRACTOR's technician, on successful re-connection shall intimate / provide the details to Contractor's responsible personnel for necessary entry / update in the system against the respective consumer. The response time for this activity shall be fixed by the OWNER / CONTRACTOR mutually.

7.3.5. Meter Reading and Spot Billing

- Scope includes availability of required instruments, Gadgets, Manpower, travelling, loading, Boarding, transportation, vehicles and all applicable resources
- Spot billing and Meter reading including capturing of photograph, Bill processing, Printing and invoice hand over to customer
- GGL reserves its right for operation or non-operation of Meter Reading & Spot Billing activities at its sole discretion under this contract without assigning any reason to bidder. Bidder shall be obliged and responsible for performing the activities as per the instructions of GGL Engineer-in-Charge

8.0. Waste management

- BIDDER shall coordinate & carry out the disposal of any waste (Hazardous or otherwise) produced or occurring as a consequence of its operations pursuant to the contract, all such disposals shall

be in accordance with all legislation, OWNER's norms and best practices, whether that shall be for hazardous waste or non-hazardous waste. BIDDER shall ensure that all necessary approvals or licenses are obtained and that any subcontractors utilized for this purpose fully comply with such requirements. BIDDER shall record & provide OWNER with a copy of each waste transfer / disposal report / note.

- For meeting the environmental requirements as per ISO 14000, BIDDER has to
 1. Return all PE cut pieces to GGL stores/material management system established by GGL and maintain certified records of the same
 2. Return all GI pipes and fittings, suraksha rubber tubes dismantled from customer's premises to GGL stores and maintain certified records of the same
 3. Plastic packing materials, GI thread cutting burrs, used oil / diesel, cotton waste contaminated with used oil, other consumables and other hazardous waste has to be disposed of by BIDDER through agency authorised to handle such waste with supporting documents and submit the supporting documents to GGL for records
 4. Bentonite if used for HDD shall ensure proper disposal as per vendor specification. . Bentonite slurry and returns from the drilled hole shall be disposed off in the mud pit to be excavated at site. Bentonite to be used does not contain any constituents hazardous to the environment
 5. Non-hazardous waste generated out of free issue materials has to be returned to GGL stores/material management system established by the Owner and other non-hazardous waste has to be disposed off to authorised scrap dealers. Supporting documents to be submitted to GGL

9.0. STATUTORY COMPLIANCE

9.1. STATUTORY COMPLIANCE

- 9.1.1.** CONTRACTOR shall comply with the Statutory requirements / Rules / Act / Laws, such as, Labour Laws, Minimum Wages Act, Payment of Wages Act, Workmen Compensation Act, Personal Injury (Compensation Insurance) Act, Industrial Dispute Act, Shop & Establishment Act, Employee Provident Fund Act, Gratuity Act, Bonus Act, Family Pension, medical act and Deposit Linked Insurance Scheme or any other act related to the Employee's welfare.
- 9.1.2.** CONTRACTOR shall be responsible for Insurance coverage of the complete manpower engaged for O&M jobs under the workmen's compensation Act / Group personal accident policy for the number of persons engaged by him at any point of time. He shall produce necessary documentation for the same to OWNER. He shall not engage any person less than 18 years of age.
- 9.1.3.** If time taken by the team for performing any breakdown or shutdown maintenance activity on charged network is beyond 8 hours, then contractor has to make overtime payment to the team and the same need to be recorded in Overtime register in line with the minimum wages act.
- 9.1.4.** CONTRACTOR shall indemnify and keep indemnified the OWNER and its representative / servants and agents from and against all third party claims whatsoever including but not limited to property loss and damage, personnel accident injury or death, etc.
- 9.1.5.** CONTRACTOR shall at his own expenses comply with all labour laws and keep the OWNER indemnified in respect thereof. The OWNER shall be entitled to deduct directly from the bills to be paid to the CONTRACTOR any sum, fines / penalty payable by the CONTRACTOR and which sum / sums the company is required to pay as the principal employer on account of the CONTRACTOR's default in respect of all liabilities referred to in above clause.

- 9.1.6.** CONTRACTOR shall be responsible for the payment of contribution under Employee State Insurance Act, Provident fund and other statutory payment to be made under any law or statutory rules and regulations for the time being applicable to the personnel deployed by the CONTRACTOR for the work at the OWNER's premises / sites.
- 9.1.7.** CONTRACTOR shall be responsible to comply with all the liabilities and accordingly, CONTRACTOR shall maintain all record and registers and produce before the competent Authorities under the Act or the OWNER as and when demanded.
- 9.1.8.** By way of illustration of various Acts as stated in the contract, the CONTRACTOR thereof shall comply with the following Acts prevailing from time-to-time or any amendments therein;

1	The Employee's Provident Fund Act, 1952
2	The Employee's State Insurance Act, 1948
3	The Contract Labour (regulation and abolition) act, 1970
4	The Minimum Wages Act, 1948
5	The Payment of Wages Act, 1936
6	The Workmen's Compensation Act, 1923
7	The Payment of Bonus Act, 1965 & The Gratuity Act
8	The Factories Act, 1948

- 9.1.9.** Any other statutory requirements of Local / State Government / Government of India shall be complied by the CONTRACTOR and the same shall be included in his scope of work.

9.2. STATUTORY COMPLIANCE FOR O&M

All the statutory approval / consent & Liaisoning required for entire scope of work shall in the scope of OWNER.

CONTRACTOR shall comply with all Health, Safety & Environmental aspects including legal related requirement applicable to excavation / pipeline laying / equipment /, vehicles, transportations and other operations & maintenance for entire scope of work.

The O&M of CGD Network should comply with the following codes / standards;

- Relevant Factory Act / Rules, Relevant HSE norms.
- ANSI/ ASME B 31.8
- Australian standard – AS 3723 -1989 Installation & Maintenance of plastic pipe system for gas.
- ISO- 4437 Buried PE pipes for the supply of gaseous fuels.
- American Gas Association Vol.III
- Gas Cylinder Rules 2004, Indian Explosive Act / Rules, Indian Electricity Act.
- Gas Act 1992 and Gas Regulation 1993.
- OISD Norms, ASME B 31.8, IGE/SR/16, IGE/TD/1, 3, 4, 9, 10, NEMA, ASTM, ANSI, NFPA-52; 1992, NFPA-37, API-11P.

CONTRACTOR shall not discuss / disclose / inform to the statutory, local authorities during Audit / Inspection in verbal / writing without prior consent of OWNER pertaining to the operations.

CONTRACTOR shall obtain all statutory approvals of concerned authorities for providing various services such as provision of utilities, personnel, etc...for the scope of work.

10.0. REPORTING

CONTRACTOR shall be responsible for reporting as per OWNER's "Management Information System" (MIS). OWNER shall provide the copy of MIS to the successful CONTRACTOR, according to which CONTRACTOR has to submit the same for perusal & approval of the OWNER. Typically the CONTRACTOR shall prepare the following reports but not limited to:

For evaluating the performance against the activities based on SLAs, contractor has to maintain time of commencement of activity and completion of activity separately and submit the same to EIC.

While handling Emergencies contractor has to maintain separate records for;

- A. Time taken for making site Safe i.e. time at which the information is received at control room to the Time at which site is declared safe for commencement of next activity like Repair, start of alternate supply, alteration / modification can be initiated etc. Time taken for making site Safe i.e. time at which the information is received at control room to the Time at which site is declared safe for commencement of next activity like Repair, start of alternate supply, alteration / modification can be initiated etc.
- B. For any job performed on Gas network after making the site safe, time taken for SLA has to be recorded from the time of commencement of the job to the time gas is charged in the network

CONTRACTOR shall prepare General Reports regarding the CGD operations in Daily, Weekly or Monthly frequency and submit the same to OWNER, Soft as well as Hard copy in the format provided to the CONTRACTOR. The general activity report mainly comprising of Daily Progress Report, PE & PNG Updates, Periodic / Preventive / Breakdown / Shutdown job (if any), Flow meter readings, CGS, TB, parameters readings, patrolling reports, Customer service call, Emergency vehicle records, Gas Purchase Report, Bank Statement, Expenditures, Gas Reconciliation Report, Asset Update, ERDMP update, First-Aid up Keeping, Stores and Inventory.

CONTRACTOR shall submit the plan based on the AOMP (Annual Operation & Maintenance Plan), duly approved by OWNER. The copy of AOMP will have to be maintained at all times at site by CONTRACTOR for reference. The access of the same will be restricted to authorized personnel only.

The successful CONTRACTOR shall prepare & submit the Quality Assurance Plan, Work Instruction, Standard Operating Procedures, Reporting Formats, etc. & get it approved by OWNER for implementation in addition to Statutory / Manpower documents, List of Tools & Tackles, Equipments, etc.

CONTRACTOR shall submit O&M activity / highlight report with reference to the AOMP. Monthly Shift Schedule will also be a part of reporting.

CONTRACTOR shall upkeep the daily status for the Material In-Out, Odorant inventory, dosing, etc. to the OWNER.

CONTRACTOR shall ensure that all Near Misses occurred during execution of the work are reported from time to time to OWNER. Any Hazard spotted while on job shall be reported to OWNER for further mitigation. Any incident / Accident shall be reported to OWNER as per guidelines.

CONTRACTOR's operator shall maintain logbook / record of the entire operations & maintenance as well and calibration & testing of equipment and instruments, if any.

CONTRACTOR shall make correspondence in writing with the OWNER.

CONTRACTOR shall prepare the detailed inspection and health check-up report for each equipment / installations and submit the OWNER for the perusal.

CONTRACTOR shall strictly adhere to the work permit system as per OWNER's specification.

Before taking any shutdown or planned / breakdown maintenance or overhauling, CONTRACTOR shall inform to the OWNER and obtain the approval for the same.

CONTRACTOR shall maintain the data for Dis-connection, Re-connection, New installation, Conversion, etc. & update in the Billing software.

CONTRACTOR shall prepare the analysis reports related to various activities to enable OWNER to carry out the predictive actions therein.

CONTRACTOR shall assist OWNER to prepare statutory or other reports as & when required related to CGD operations.

CONTRACTOR shall monitor & analyze the Cathodic Protection (TR / TLP readings / PSP) to assess the health of the system.

Contractor shall provide all Call notes / O&M Formats and its copies as required by GA team timely.

Office Assistant deployed as per SOR line item, shall report to GGL EIC and work for GGL only. Contractor to recruit his own manpower for the invoice and data management related for his contract activities.

11.0. QUALITY CONTROL / INSPECTION

11.1. GENERAL

The Quality Control / Inspection indicate the requirement for various activities pertaining to the scope of work. This is significant requirements to ensure "Safe, Reliable & Uninterrupted" supply of natural gas by delighting customer with due compliance of ISO 2001:2015, ISO 14001 and ISO 18001. CONTRACTOR shall prepare and submit the Quality Assurance / Control Plan based on the activity to be performed throughout the tenure and get it approved by OWNER along with AOMP.

11.2. INSPECTION

All components such as flow meters, safety relief / shut-off valves, fire protection / fighting systems, PPEs', gas detectors, sensors / switches, pressure / temperature gauges, pressure vessels / cylinders, tubing / piping, valves, etc... should be periodically inspected for, calibrated and tested as per the norms laid down by the statutory authorities or by OWNER.

To ensure periodic safety check, test schedule, parameters, such as, inlet / outlet pressures on skid, gas compositions / characteristics, all type of vales, to their serviceability, installation for obvious gas leaks, safe working condition, etc. Also, ensure for visibility and in place of safety / other signs / instructions, gas odorization, display of inspection certificate, tagging, etc.

Testing, calibration, refilling of equipments, components, installations, etc. shall be carried out by OWNER or its representative up on receipt of advance requisition from CONTRACTOR. However, CONTRACTOR shall assist OWNER for the said activity to be carried out as and when required, and also to ensure smooth functioning of the same during their operations.

Contractor shall ensure that all equipment, instruments and materials used are fit for use. OWNER have the right to carry out the Quality Assurance, periodic safety check and test schedule of all the equipments and instruments mobilized by contractors includes inspection of spares, material at factory / site / stores, if required.

On completion of the inspection of the installation of equipment being found to comply with codes & standard (National & International), the competent Quality Control Organization shall issue the inspection / test certificate for records, wherever mandatory & required.

11.3. GUARANTEES AND WARRANTIES

Performance Guarantee of the Work

CONTRACTOR shall guarantee the work executed by him against poor workmanship, defective equipment and material, etc. for certain period as decided by OWNER. If any defects are found during the guarantee period, CONTRACTOR shall rectify the same with short notice as informed by OWNER. Otherwise OWNER may get the same rectified through other agencies and recover the cost, so incurred from the CONTRACTOR deposit against performance guarantee or amount due to the CONTRACTOR.

If after delivery, acceptance and installation and within the guarantee period, the operation or use of material or equipment supplied and installed by the CONTRACTOR, prove to be unsatisfactory to the OWNER's representative, he shall have the right to continue to operate / use such material or equipment until rectification of defects, errors or omissions, or by practical replacement made thereof, without interfering with the operation of the network / installation. This may even require replacement of defective material / components / equipment by new ones whenever found essential.

Equipment and Material / Spares Warranty

- All the equipments and materials, if supplied by CONTRACTOR shall be warranted for trouble free operation for a certain period as decided by OWNER / OEM.
- In case of bought out items, CONTRACTOR shall obtain such warranty from the sub-vendor in favour of OWNER without prejudice to his liability for the performance of whole system including bought out items. CONTRACTOR shall intimate to OWNER for any defect found in the material supplied by the OWNER promptly.
- In case of any problem arising during guarantee period, CONTRACTOR has to carryout necessary rectification at no extra cost to the OWNER.

11.4. OTHERS

OWNER, from time to time shall carry out the performance evaluation of the CONTRACTOR for the entire operations and take appropriate action in this regard.

CONTRACTOR shall ensure the uninterrupted supply of gas to various applications & extended consumer services at all the time. However, major / breakdown maintenance should be carried out in non-peak hours / timings with due coordination with customers / end users / Owner.

CONTRACTOR shall provide the material Invoices, Challan, Test Certificates, process / witness / inspection documents & other references for the spares, material, etc. procured for the scope of work.

Contractor shall inform GGL for material inspection before using at site for material procured directly from GGL approved vendor. OWNER / it's representative shall inspect the material and approved the same for using at site.

OWNER / its representative shall inspect / witness the activities performed by the CONTRACTOR including Laying, Electro fusion, Preventive / Breakdown maintenance, LDT, LPT, etc.

OWNER shall conduct necessary qualification process for the PE welder to be deployed by OWNER before commencement of work & renewal of the same from time to time. No welder shall be allowed without such qualification / certifications.

CONTRACTOR shall carry out all the job with due care & attitude towards HSE norms, best engineering practice, code of conduct, OWNER norms / specifications, Particular Technical Specifications, OEM guidelines, complying National & International standards, etc. prevails from time to time.

CONTRACTOR shall provide all the equipment, tools & tackles, measuring devices, etc. duly calibrated, tested for performing any scope of work.

In case any inspection, test fails, re-inspection / tests shall be carried out after necessary rectification / replacement by the CONTRACTOR at his risk / cost.

12.0. SITE FACILITIES

- 1.1. **Power Supply:** Contractor shall arrange at his own cost power supply distribution for the site. All works by the Contractor will be done as per Indian Electricity Act & Rules framed there under and passed by the Engineer-in-Charge. The temporary lines will be removed forthwith, after completion of the work or if there is any hindrance caused to other work due to the alignment of these lines, the Contractor will re-route or remove the temporary lines at his own cost. The Contract Price shall be deemed to include all costs towards all above.
- 1.2. **Site Camp Facilities:** Besides providing site facilities as per law of land, site camps with all related amenities shall be provided in line with the requirements of all Regulations/Acts and the Statutory Authorities along with the following facilities at all work places where workmen are deployed/ engaged by contractor:
 - a. Arrangement for First Aid.
 - b. Arrangement of Drinking water
 - c. Arrangement for Clean & Potable Drinking Water & Tea, etc.
 - d. A Crèche where 10 or more women workers are having children below the age of 6 years.
 - e. Any other facility/ utility as may be required under the Contract as per the existing legislation.
 - f. Rest Rooms/ Toilets for Site Staff/ Labour.
 - g. Proper Rest Facility

ANNEXURE-1

MINIMUM TOOLS, EQUIPMENTS & RESOURCES TO BE MADE AVAILABLE BY THE CONTRACTOR

SN	Name of Material	UOM	Make
1	Drill Machine-24"	Nos	Bosch
2	Drill Machine-10"	Nos	Bosch
3	Drill Bit 5"	Set	Bosch
4	Wire Brush	Nos	Any standard make
5	Hack Saw/ Blade	Nos	Bipco
6	Small Hacksaw	Nos	Bipco
7	Safety Helmet	Nos	Any standard make
8	Cotton Hand Gloves	Nos	Any standard make
9	Gum Boot	Pairs	Any standard make
10	Ear Miff	Nos	Any standard make
11	Ear Plug	Nos	Any standard make
12	Reflective Jacket	Nos	Any standard make
13	Simple Rubber Gloves	Set	Any standard make
14	Rubber Hand Gloves	Set	Any standard make
15	Goggles	Pairs	Any standard make
16	Fire Blanket	Nos.	Any standard make
17	Fire Retardant Suit	Nos	Any standard make
18	Flame Proof Torch - min. 25 lumens	Nos	Any standard make
19	Normal Torch. - min. 25 lumens	Nos	Any standard make
20	Screw Jack with Tommy Bar	Nos	Any standard make
21	Safety Harness - for Working at Height	Nos	PeTzl
22	Traffic cones / Barricades with fluorescent paint	Nos.	Any standard make
23	Fusion Machine	Nos	Approved vender
24	Generator - min. 5 kVA	Nos	Any standard make
25	De-watering Pump - 3.5 HP	Nos.	Any standard make
26	Extension Board with 40 meter cable & RCCB / ELCB	Nos.	Any standard make
27	Conversion Kit	Kit	Any standard make
28	PE Pipe Cutter 20-32 mm	Set	Any standard make
29	PE Pipe Cutter 63 -160 mm	Set	Any standard make
30	PE Pipe Scraper	Nos	Any standard make
31	Permanent Marker Pen	Nos	Any standard make
32	Re-rounding tools 63mm	Nos	Any standard make
33	Re-rounding tools 90mm	Nos	Any standard make
34	Re-rounding tools 110mm	Nos	Any standard make
35	Re-rounding tools 125mm	Nos	Any standard make
36	Re-rounding tools 160mm	Nos	Any standard make
37	Squeeze Tool 20mm - 32 mm with earthing rod	Nos	Any standard make
38	Squeeze Tool 63mm with earthing rod	Nos	Any standard make
39	Squeeze Tool 125 & 90mm with earthing rod	Nos	Any standard make
40	Hydraulic Squeeze Tool with earthing rod	Set	Any standard make
41	Allingment Clamp 160 mm	Nos	Any standard make

42	Alignment Clamp 125 mm	Nos	Any standard make
43	Alignment Clamp 90 mm	Nos	Any standard make
44	Alignment Clamp 63 mm	Nos	Any standard make
45	Alignment Clamp 32 mm	Nos	Any standard make
46	Alignment Clamp 20 mm	Nos	Any standard make
47	PE Saddle Clamp	Nos	Any standard make
48	Allen Key	Set	Taparia
49	Iso-propyl Alcohol (500ml in each vehicle)	Bottle	Any standard make
50	Tissue Paper	Roll	Any standard make
51	Vice For Pipe along with BSPT Die	Nos	Jainson
52	Tool Box	Set	Taparia
53	Pipe Wrench	Nos	Taparia
54	Side Wrench	Nos	Taparia
55	Screw Driver	Set	Taparia
56	Fix Spanner	Set	Taparia
57	8x9	Nos	Taparia
58	12x13	Nos	Taparia
59	16x17	Nos	Taparia
60	18x19	Nos	Taparia
61	21x23	Nos	Taparia
62	20x22	Nos	Taparia
63	24x27	Nos	Taparia
64	Ring Spanner	Nos	Taparia
65	18x17	Nos	Taparia
66	18x19	Nos	Taparia
67	Box Spanner Set	Set	Taparia
68	Hammer	Nos	Taparia
69	Plastic / Rubber Hammer	Nos	Any standard make
70	Measure Tape - 10.0 mtr.	Nos	Any standard make
71	Fire Extinguisher 5kg	Nos	Any standard make
72	Safety Shoes/Gum boot	Pairs	Any standard make
73	Emergency light (Flam proof Halogen light arrangement for work carried out during night)	Nos	Any standard make
74	Pressure Gauge (0-10.bar & 0 - 4 bar)	Nos	Any standard make
75	Digital Pressure Gauge for LP network 0-5000 mmwc	Nos.	Any standard make
76	Digital Manometer 0-1999.9 mmwc	Nos	Any standard make
77	3 Mtrs height venting arrangement for venting of NG during Emergency with earthing facility	Mtr	Any standard make
78	Spray Bottle	Nos	Any standard make
79	Trikam	Nos	Any standard make
80	Pawda	Nos	Any standard make
81	Tagara	Nos	Any standard make
82	Water Bucket	Nos	Any standard make
83	Sign Board	Nos	Any standard make
84	Torch/Battery	Nos	Any standard make

85	Chisel	Nos	Any standard make
86	File	Nos	Any standard make
87	First Aid Box	Nos	As recommended by GGL
88	2 1/2" Pipe Wrench	Nos	Any standard make
89	Valve Chamber Opener	Nos	Any standard make
90	PE Valve Chamber Key	Nos	Any standard make
91	Cordoning Tape	Mtr	Any standard make
92	Non Sparkling Tool Set	Set	Any standard make
93	Hard barricading	Nos.	As per approved drawing
94	Site Umbrella (Summer)- Extra large	No	Any standard make
95	Garden Umbrella (Monsoon)- 49" or large	No	Any standard make
96	Teflon insulated crow bar	No	Any standard make
97	Aluminium ladder- rated load 150 kgs,3 mtr Length	No	Any standard make
98	Grass Hook (Hand Sickle)	Nos.	Any standard make
99	Digital pressure Gauge (0-10 bar) for MP LPT with least count 0.001 Bar	Nos.	Any standard make
100	Rubber mat	No	GGL recommended
101	Tablet for Dom/Comm. AMC & O&M activity	No	GGL recommended
102	Valve keys for valve operation - all sizes & types	Nos.	Any standard make
103	Electrical Supply Tester (Upto 500V)	Nos	Any standard make
104	Pack - III for Odorant monitoring	Nos	Any standard make
105	Grease Gun	Nos	Any standard make
106	SS tube bender for island kitchen work	Nos	Any Standard make

Note:

- All pressure gauges shall be calibrated at every one year
- Above list of tools and tackles are considering complete range of pe network of PNG installations across GGL location. Ga will prepare and issue a list of require tools and tackles during kick-off meeting after issuance of wo to O&M contractor for their inventory management. All instruments / equipments are calibrated and / or tested as per GGL approved procedure

ANNEXURE-2
PE/GI CONSUMABLE MATERIALS/ ITEMS

SR. NO.	NAME OF MATERIAL	UOM	MAKE
A	ELECTRO FUSION FITTINGS		
1	PE Coupler 160 mm, As per Network	Nos.	Approved vendor
2	PE Coupler 125 mm	Nos.	Approved vendor
3	PE Coupler 110 mm, As per Network	Nos.	Approved vendor
4	PE Coupler 90 mm	Nos.	Approved vendor
5	PE Coupler 63 mm	Nos.	Approved vendor
6	PE Coupler 32 mm	Nos.	Approved vendor
7	PE Coupler 20 mm	Nos.	Approved vendor
8	PE Elbow (90°) 160 mm , As per Network	Nos.	Approved vendor
9	PE Elbow (90°) 125 mm	Nos.	Approved vendor
10	PE Elbow (90°) 110 mm , As per Network	Nos.	Approved vendor
11	PE Elbow (90°) 90 mm	Nos.	Approved vendor
12	PE Elbow (90°) 63 mm	Nos.	Approved vendor
13	PE Elbow (90°) 32 mm	Nos.	Approved vendor
14	PE Equal Tee 160mm, As per Network	Nos.	Approved vendor
15	PE Equal Tee 125mm	Nos.	Approved vendor
16	PE Equal Tee 110mm, As per Network	Nos.	Approved vendor
17	PE Equal Tee 90mm	Nos.	Approved vendor
18	PE Equal Tee 63mm	Nos.	Approved vendor
19	PE Equal Tee 32mm	Nos.	Approved vendor
20	PE Equal Tee 20mm	Nos.	Approved vendor
21	PE Reducer 125 x 110mm, As per Network	Nos.	Approved vendor
22	PE Reducer 110 x 90 mm, As per Network	Nos.	Approved vendor
23	PE Reducer 160 x 125 mm, As per Network	Nos.	Approved vendor
24	PE Reducer 160 x 90 mm, As per Network	Nos.	Approved vendor
25	PE Reducer 125 x 90 mm	Nos.	Approved vendor
26	PE Reducer 125 x 63 mm	Nos.	Approved vendor
27	PE Reducer 90 X 63 mm	Nos.	Approved vendor
28	PE Reducer 63 X 32 mm	Nos.	Approved vendor
29	PE Reducer 32 X 20 mm	Nos.	Approved vendor
30	PE Saddle 160 x 32 mm, As per Network	Nos.	Approved vendor
31	PE Saddle 125 x 63 mm	Nos.	Approved vendor
32	PE Saddle 125 x 32 mm	Nos.	Approved vendor
33	PE Saddle 90 x 63 mm	Nos.	Approved vendor
34	PE Saddle 90 x 32 mm	Nos.	Approved vendor
35	PE Saddle 90 x 20 mm	Nos.	Approved vendor
36	PE Saddle 63 x 32 mm	Nos.	Approved vendor
37	PE Saddle 32 x 20 mm	Nos.	Approved vendor
38	PE Saddle 63 X 20 mm	Nos.	Approved vendor
39	PE End Cap 160mm, As per Network	Nos.	Approved vendor
40	PE End Cap 125mm	Nos.	Approved vendor

41	PE End Cap 110mm, As per Network	Nos.	Approved vendor
42	PE End Cap 90mm	Nos.	Approved vendor
43	PE End Cap 63mm	Nos.	Approved vendor
44	PE End Cap 32mm	Nos.	Approved vendor
45	PE End Cap 20mm	Nos.	Approved vendor
46	Transition Fitting 1/2"x 20mm	Nos.	Approved vendor
47	Transaction Fitting 1"x 32mm	Nos.	Approved vendor
48	Transaction Fitting- MS,GI,BW,32MM PEX1"	Nos.	Approved vendor
49	Transaction Fitting- MS,GI,BW,63MM PEX2"	Nos.	Approved vendor
50	Transaction Fitting- MS,GI,BW,90MM PEX3"	Nos.	Approved vendor
51	Transaction Fitting- MS,GI,BW,125MM PEX4"	Nos.	Approved vendor
52	Transaction Fitting- MS,GI,BW,160MM PEX6"	Nos.	Approved vendor

B	G.I. / CU. CONSUMABLE MATERIAL LIST		
48	GI 1/2" Pipe	Mtr	Approved vendor
49	GI 1" Pipe	Mtr	Approved vendor
50	GI 1" Coupler	Nos.	Approved vendor
51	GI 1" Union	Nos.	Approved vendor
52	GI 1" Elbow	Nos.	Approved vendor
53	GI 1" Plug	Nos.	Approved vendor
54	GI 1" Tee	Nos.	Approved vendor
55	GI 1" Clamp	Nos.	Approved vendor
56	GI 1" Hex Nipple	Nos.	Approved vendor
57	GI 1" Nipple 1"x2	Nos.	Approved vendor
58	GI 1" Nipple 1"x3	Nos.	Approved vendor
59	GI 1" Nipple 1"x4	Nos.	Approved vendor
60	GI 1" Nipple 1"x6	Nos.	Approved vendor
61	GI 1/2" Coupler	Nos.	Approved vendor
62	GI 1/2" Union	Nos.	Approved vendor
63	GI 1/2" Elbow	Nos.	Approved vendor
64	GI 1/2" Plug, Cap	Nos.	Approved vendor
65	GI 1/2" Tee	Nos.	Approved vendor
66	GI 1/2" Clamp	Nos.	Approved vendor
67	GI 1/2" Hex Nipple	Nos.	Approved vendor
68	GI 1/2" Nipple 1/2"x2	Nos.	Approved vendor
69	GI 1/2" Nipple 1/2"x3	Nos.	Approved vendor
70	GI 1/2" Nipple 1/2"x4	Nos.	Approved vendor
71	GI 1/2" Nipple 1/2"x6	Nos.	Approved vendor
72	TUBE,CU,12MM OD	Mtr	Approved vendor
73	COUPLING,COPPER,12MM OD	Nos.	Approved vendor
74	TEE,CU,12MM OD	Nos.	Approved vendor
75	ELBOW,COPPER,12MM OD	Nos.	Approved vendor
76	CLAMP,PVC,12MM OD	Nos.	Approved vendor
77	UNION,BRASS,1/2"ODX12MM OD	Nos.	Approved vendor
78	ADAPT,12MM OD X 1/2"BSPT,BRASS	Nos.	Approved vendor
79	SCREW,WOOD,6X32MM	Nos.	Approved vendor

80	Regulator Bush	Nos.	Approved vendor
81	Teflon Tape	Nos.	Approved vendor
82	O-rings For Meter Adaptor, Union, Plug Valve	Nos.	Approved vendor
83	O-rings For Regulator Adaptor	Nos.	Approved vendor
84	Domestic Meter adaptor	Nos.	Approved vendor
85	Commercial meter adaptor (All size)	SET	Approved vendor
86	Commercial Regulator bush	Nos.	Approved vendor
87	Adaptor Up/Down	Nos.	Approved vendor
88	Warning Tape	Mtr	Approved vendor
89	Soap Solution Bottle	Nos.	Approved vendor
90	Fittings For Pr. Gauge	Set	Approved vendor
91	Revel Plug	Nos.	Approved vendor
92	Screw	Nos.	Approved vendor
93	Simmering Tool	Nos.	Approved vendor
94	Waste Cloth	Roll	Approved vendor
95	Burner Jet 110 & 125	Nos.	Approved vendor
96	Grease stick - A,B,C type or MP grease cartridge	PKT	Approved vendor
97	GI 1 " x 1/2" Reducer	Nos.	Approved vendor
98	GI 1 " x 1/2" Tee	Nos.	Approved vendor
99	Blind apator-MS (Red Plug)	Nos.	Approved vendor

Note: Above list of consumables are indicative list considering complete range of PE network of PNG installations across GGL location. GA will prepare and issue a list of required consumables during Kick-off meeting after issuance of WO to O&M contractor for their inventory management.


C	ADDITIONAL PROCUREMENT OF MATERIAL LIST ADDED IN CONTRACTOR SCOPE		
100	ANACONDA	Nos.	Approved vendor
101	SLEEPER WITH FRAME,FRP,600X600MM	Nos.	Approved vendor
102	SLEEPER WITH FRAME,FRP,1000X1000MM	Nos.	Approved vendor
103	SLEEPER WITHOUT FRAME,FRP,1000X500MM	Nos.	Approved vendor
104	VLV,APPLIANCE,BALL,BRASS,6MMX1/2"BSPT	Nos.	Approved vendor
105	VLV,BALL,BRASS,BSPT,1/2"	Nos.	Approved vendor
106	VLV,BALL,BRASS,BSPT,1"	Nos.	Approved vendor
107	VLV,BALL,BRASS,BSPT,1.5"	Nos.	Approved vendor


ANNEXURE-3 FORMAT OF REPORTS


a)

Leak Detection Test & Repair Report

File Number: GGL/Tech. Services/2024/12/99955

	LOCK PRESSURE TEST REPORT						Doc. No.	MAIF-01			
							Rev. No.	0			
							Eff. Date	18-04-2016			
LOCATION :							MONTH:				
DEPARTMENT :											
CONTRACTOR :											
LOCK PRESSURE TEST REPORT							Order No. :				
Feeder / Section under LPT:							Date :				
Section / SR Details	Location		Valve Closing Time	Initial Lock Pressure (mbar/barg)	Final Lock Pressure (mbar/barg)	Valve Opening time	LPT Hours	Pressure Drop (mbar/barg)			
<p align="center">STREAM - Down</p>											
Sr. No.	Time		Line Pressure (mbar)		Valve Position		Remarks				
1											
2											
3											
4											
5											
6											
<p align="center">Isolation details</p>											
Sr. No.	Isolation valve details				Valve position before start of LPT			Valve position after completion of LPT			Remarks
	Location	Type (SR inlet valve / Network Isolation valve / Commercial customer inlet valve / Industrial customer inlet valve)	Size	Identification number	Open/Close	Time	Name & sign	Open/Close	Time	Name & sign	
Sr. No.	Gauge Make		Dial Size	Pressure Gauge Range	Least Count	Calibration Due Date	Remarks				
Conclusion/ Observation:											
O&M Engg		Checked by				Verified by					
O&M contractor		Executive (O&M), GUJARAT GAS				Sr.Engineer (O&M), GUJARAT GAS					


 GUJARAT GAS	LEAK DETECTION TEST AND REPAIR				Doc. No.	MAI-F-02	
					REV. No.	0	
					PAGE No.	1 of 2	
					Eff. DATE	18/04/2016	
LOCATION:							
DATE:			Reference No:				
DPRC / DRS / CPRS :		FEEDER NUMBER :		SURVEY NO. :			
ADDRESS OF LEAKAGE LOCATION:				LOCATION OF LEAKAGE:			
				<input type="checkbox"/> DPRC CHAMBER	<input type="checkbox"/> VALVE CHAMBER	<input type="checkbox"/> DRAINAGE CHAMBER	<input type="checkbox"/> STORM CHAMBER
				<input type="checkbox"/> RCC GUARD	<input type="checkbox"/> TF FITTING	<input type="checkbox"/> GI FITTING	<input type="checkbox"/> ON ROAD
				<input type="checkbox"/> SERVICE REGULATOR		<input type="checkbox"/> ELECTRIC POLE	OTHERS... PL SPECIFY
NAME & CUSTOMER NUMBER:							
CONTACT NUMBER:							
LEAK SURVEY READING DETAILS							
SR. NO.	DESCRIPTION	HOUSE NO/ LANDMARK	LEAK SURVEYER READING DURING SURVEY	PRE REPAIR LEAK SURVEYER READING	POST REPAIR LEAK SURVEYER READING		
1	PROBABLE LEAKAGE SPOT						
2	Repaired Portion						
3	Drain Line						
4	Water Line						
5	Storm Line						
6	Electrical Pole						
7	RCC Guard 1						
8	RCC Guard 2						
9							
SKETCH OF THE DAMAGE AREA - LDT SURVEY				SKETCH OF THE DAMAGE AREA - REPAIR			
ADDITIONAL INFORMATION:							
LEAK SURVEY BY:			DATE AND TIME:		SIGNATURE:		

	LEAK DETECTION TEST AND REPAIR					Doc. No.	MAI-F-02		
						REV. No.	0		
						PAGE No.	2 of 2		
						Eff. DATE	18/04/2016		
DETAILS OF REPAIRED NETWORK									
COMPLAINT/LEAKAGE RECEIPT DATE / TIME			SITE REACHING DATE/ TIME		SQUEEZING / VALVE CLOSURE TIME				
DATE:	TIME:		DATE:	TIME:	DATE:	TIME:			
DETAILS OF SECTION ISOLATION									
<input type="checkbox"/> Section isolated by squeezing mm dia PE pipe from U/S <input type="checkbox"/> D/S <input type="checkbox"/>									
<input type="checkbox"/> Section isolated by closing isolation valves				DPRC / DRS/ PRS NO:		FEEDER NO:			
VALVE CLOSING & OPENING DETAILS (WHEREVER APPLICABLE)									
VALVE NUMBER									
VALVE CLOSURE TIME									
VALVE CLOSED BY									
VALVE OPENING TIME									
VALVE OPENED BY									
PIPE DIA IN MM/INCH	TYPE OF NETWORK	APPROX. DAMAGE SIZE OF HOLE IN MM	PROXIMITY FROM PROPERTY IN MTRS.	DEPTH OF PIPE IN MTRS.		SURFACE CATEGORY			
	MDPE/HDPE/MS					SOIL/TAR/CONCRETE / FOOT PATH			
APPROX. NOS. OF CUSTOMER AFFECTED :									
LPT TEST DETAILS (WHEREVER REQUIRED)									
PRESSURES GAUGE SR. NO.		DWG OF LPT SECTION 							
CALIBRATION DUE DATE:								MAKE:	
FROM:								TO:	
INITIAL READING: ____ KG/CM2								FINAL READING: ____ KG/CM2;	
DURATION: ____ MIN								DROP: ____ KG/CM2;	
PRESSURE GUAGE LOCATION: _____									
ADDITIONAL INFORMATION:									
REASON FOR LEAKAGE:									
<input type="checkbox"/> GI FITTING	<input type="checkbox"/> PVC CONNECTOR	<input type="checkbox"/> TF LOOSE	<input type="checkbox"/> TF CRACK	<input type="checkbox"/> THREAD LEAKAGE	<input type="checkbox"/> JOINT FAILURE - TEE, ELBOW, COUPLER, BUTT JT				
<input type="checkbox"/> RAT BITE	<input type="checkbox"/> TF CRACK	<input type="checkbox"/> SADDLE CAP LOOSE	<input type="checkbox"/> PVC SADDLE LEAKAGE / PULL OUT		<input type="checkbox"/> OTHERS:				
<input type="checkbox"/> CORROSION	<input type="checkbox"/> PIPE CRACK	<input type="checkbox"/> THIRD PARTY DAMAGE	<input type="checkbox"/> LEAKAGE AT SQUEEZED PIPE						
ACTION TAKEN:									
MATERIAL USED:									
WELDING PROCESS PARAMETER									
FUSION/WELDING TIME			COOLING TIME		MAKE OF EF MACHINE				
JOINT LEAK TESTING REPORT: LEAKAGE OF REPAIRED JOINT IS CHECKED ON LINE WITH SOAP SOLUTION / LEAK SURVEYOR & FOUND OK / NOT OK									
JOB COMPLETION :		DATE :	TIME :	RESTORATION DONE:					
JOB COMPLETED BY:									
SUPERVISOR			WELDER			HELPER			

b)

List of Critical Equipment

File Number: GGL/Tech. Services/2024/12/99955

	<h2 style="text-align: center;">ALTERATION JOB CARD</h2>										Doc. No. : MAI-F-103		
											Rev. No. : 0		
											Eff. Date : 05.02.2018		
Cust.ID No:										Location :			
Customer Name:										Inst. Date :			
Address:										Testing Date :			
Contact No:										Conv. Date :			
Meter No:										Notification No.:			
Meter Reading :													
Type of Activity: Extra Geyser: <input type="checkbox"/> Kitchen Point : <input type="checkbox"/> Modification: <input type="checkbox"/> Refitting: <input type="checkbox"/> RCC Guard Modification: <input type="checkbox"/>													
<div style="background: repeating-linear-gradient(45deg, transparent, transparent 2px, #ccc 2px, #ccc 4px); background-size: 10px 10px;"></div>													
BILL OF MATERIAL													
S.R. NO.	DESCRIPTION	UNIT	OPEN	REFFITED	NEW	S.R. NO.	DESCRIPTION	UNIT	OPEN	REFFITED	NEW		
1	Gas Tap (6/12mm)	Nos.				13	GI Coupling 1/2",1"	Nos.					
2	Rubber Tube	Nos.				14	GI Equal Tee 1/2",1"	Nos.					
3	Brass ball valve 1/2",1"	Nos.				15	GI Reducer Tee 1"x1/2"	Nos.					
4	GI Pipe 1/2",1"	Mtrs				16	GI Union 1/2",1"	Nos.					
5	GI Elbow 1/2",1"	Nos.				17	GI Cap/Plug 1/2",1"	Nos.					
6	MS Clamp 1/2",1"	Nos.				18	GI Reducer 1"x1/2"	Nos.					
7	Brick Hole	Nos.				19	GI Hex Nipple 1/2",1"	Nos.					
8	PVC Sleeve	Mtrs				20	6" Nipple 1/2", 1"	Nos.					
9	Brass Bush 3/4" x 1/2"	Nos.				21	4" Nipple 1/2", 1"	Nos.					
10	Brass Adaptor	Nos.				22	3" Nipple 1/2", 1"	Nos.					
11	O' Ring for Meter Adaptor	Nos.				23	2" Nipple 1/2", 1"	Nos.					
12	Regulator Bush	Nos.				24	RCC Guard	Nos.					
S.R.	DESCRIPTION	UNIT	Qty.	S.R.	DESCRIPTION	UNIT	Qty.	S.R.	DESCRIPTION	UNIT	Qty.		
1	Excavation	Mtrs		3	EF Tee 20 mm	Nos.		5	EF Saddle MM	Nos.			
2	PE Pipe 20 mm	Mtrs		4	EF Coupler 20,32mm	Nos.		6	TF 20MM	Nos.			
GROUND CONNECTION TESTING REPORT(GC)													
Date :													
Pre- Tested Coil Report no:													
EF Joint :													
GC Joint No:													
MANOMETER TESTING REPORT (MMT)													
Record	Pressure-mbar	Date/Time	Manometer No. :			Calibration Date :							
Initial			Test Result :										
Final			Rubber Tube : Make -										
Duration-Minutes			Mfg. Date / Year -			Expiry Date / Year -							
PIPE PNEUMATIC TESTING REPORT (PPT) (For Entire New installation only) TESTING MEDIUM : AIR													
Record	Pressure-Kg/Cm^2	Date/Time	Pressure Gauge No. :			Calibration Date :							
Initial			Test Result :										
Final													
Duration-Minutes													
<div style="display: flex; justify-content: space-between;"> <div> <p>૧. કર્મચારીનું ઓળખપત્ર બતાવેલ (છે / નથી)</p> <p>૨. પાઈપ લાઈનનું કિટીંગ કામરુટ પ્રમાણે સંતોષકારક થયેલ (છે / નથી)</p> <p>૩. પાઈપનું એલાઈમેન્ટ તથા કલેમ્પનું કિટીંગ બરાબર (છે / નથી)</p> <p>૪. દિવાલના ગાબડા બરાબર પૂર્ણ (છે / નથી)</p> </div> <div> <p>૫. રંગકામની ગુણવત્તા બરાબર (છે / નથી)</p> <p>૬. લીકેજ ટેસ્ટ કર્યું (છે / નથી)</p> <p>૭. ગેસ વપરાશ તેમજ સુરક્ષાની માહિતી આપેલ (છે / નથી)</p> <p>૮. અન્ય વિગતો</p> </div> </div>													
<p>હું/અમે પ્રમાણિત કરતો છીએ કે, અમારી ફરીયાદનું નિવારણ કંપનીનાં અધિકૃત કર્મચારી દ્વારા ગેસ કંપનીના નિયમોનુસાર અને અમારી જરૂરીયાત મુજબ સંતોષકારક કરેલ છે.</p> <p>I / We hereby certify that, the registered complaint has been resolved as per Gujarat Gas Ltd policy, our requirements and to my / our satisfaction by company representative.</p>													
ગ્રાહકનું નામ :			ગ્રાહક વતી સહી કરનારનું નામ						સહી / તારીખ				
(CONTRACTOR)				(TPIA)				(GUJARAT GAS)					

e)

Debit Note Charges for Domestic Alteration/Modification Work

DEBIT NOTE CHARGES FOR <u>DOMESTIC</u> ALTERATION / MODIFICATION WORK (As Per finalized rates)						
NOTIFICATION NO:					INSTALLATION DATE:-	
CUSTOMER NAME:						
SR.NO	Code	Type	MATERIAL DIScription	UNIT	SOR Rs./Unit	Actual Quantity
1	600000011	Service	DISMENTLING OF 1/2" GI	MTR		
2	600000013	Service	REINSTALTATION OF 1/2" GI	MTR		
3	100008122	Material	1/2" GI PIPE, C-CLASS, HEAVY	MTR		
4	100004868- for PE 80. Code not available for PE 100	Material	20 MM PIPE	MTR		
5	600000077	Service	Excavation and Laying of 20mm-32MM PE pipe	MTR		
6	-	Service	BORING	MTR		
7	600000063	Service	Replacement of Ball Valve, MCV/IV-1/2"	NOS		
8	100004182	Material	1/2"NB BRASS BALL VALVE	NOS		
9	100004903	Material	1/2" GI ELBOW	NOS		
10	100004905	Material	1/2" HEX NIPPLE	NOS		
11	100010677	Material	1/2" NIPPLE 2" LENGTH	NOS		
12	100004843	Material	1/2" NIPPLE 3" LENGTH	NOS		
13	100004846	Material	1/2" NIPPLE 4" LENGTH	NOS		
14	100004847	Material	1/2" NIPPLE 6" LENGTH	NOS		
15	100010527	Material	METER "O" RING	NOS		
16	100004901	Material	1/2" GI COUPLING	NOS		
17	100004896	Material	1/2" GI EQUAL TEE	NOS		
18	100004842	Material	1/2"GI POWDER COATED CLAMP WITH SCREW	NOS		
19	100004184	Material	1/2" NB BRASS APPLIANCE VALVE (Gas tap-6 mm)	NOS		
20	600000064	Service	Replacement of Gas Tap (1/2"-6 mm)	NOS		
21	100004181	Material	WIRE BRAIDED SURAKSHA RUBBER HOSE – 7.9mm x 1.0 MTR. LONG	NOS		
22	600000067	Service	Replacement/Installation of Rubber tube / Sursksha hose with Clamp fittings	NOS		
23	600000018	Service	Drilling of Hole in Brick / plastering	NOS		
24	600000019	Service	Drilling of Hole in RCC	NOS		
25	600000020	Service	Drilling of Hole in Others (Marble, Granite etc.)	NOS		
26	100010972	Material	G1.6 DOM. METER INLET ADAPTOR-BRASS	NOS		
27	100010973	Material	G1.6 DOM. METER OUTLET ADAPTOR WITH NRV, BRASS.	NOS		
28	600000061	Service	Replacement of Meter adaptor for Domestic Meter including O ring	NOS		
29	600000062	Service	Replacement of Domestic Meter including O ring	NOS		
30	100000140	Material	LOW PRESSURE DOMESTIC REGULATOR, INLET PRESSURE 30-110MBAR AND OUTLET PRESSURE 22 MBAR.	NOS		
31	600000063	Service	Replacement of Domestic Regulator (HP or LP)	NOS		
32	100004808	Material	SADDLE,TAPPING,EF,PE,PE100,40V,32X20MM	NOS		
33	-	Material	SADDLE 63x20	NOS		
34	100004804	Material	RED,EF,PE,PE100,40V,32X20MM	NOS		
35	-	Material	REDUCER 63x20	NOS		
36	100004786	Material	COUPLER,EF,PE,PE100,40V,20MM & 32MM	NOS		
37	100004814	Material	CAP,END,EF,PE100,40V,20MM	NOS		
38	100004798	Material	TEE,EF,PE,PE100,40V,20MM	NOS		
39	100008233	Material	RCC GUARD WITH CLAMP – 20mm PE pipe	NOS		
40	600000079	Service	INSTALLATION,RCC GUARD,20MM	NOS		
41	100004813	Material	1/2" X 20MM - GI TO PE TRANSITION FITTING	NOS		
42	600000030	Service	Installation of Transition fitting and welding E.F. coupler /s (E F welding charges)	NOS		
43	100011199	Service	Installation of PVC Sleeve on GI Pipe with Insulation at wall crossing.	MTR		
44	100008310	Material	Domestic Sursksha Hose CLAMP – 8 mm	NOS		
45	-	Material	1/2" HOLLOW HEX PLUG	NOS		
46	600000075	Service	Installation of hex plug	NOS		
47	100004899	Material	1/2" GI UNION	NOS		
Plumber Name			Customer Name			
Signature			Signature			
Contractor			TPI		Authorised Signature (Site Engineer)	


f)

Preventive Maintenance Report of PE/Steel Network Valve & Valve Chamber

[illegible]

g)


Meter Replacement Report

 GUJARAT GAS	<h2 style="text-align: center;">Meter Replacement Report</h2> <p style="text-align: center;">DOM / COM / NCOM / YHS</p>		DOC No.	MAI-F-114
			REV No.	0
			EFF.DATE	01.02.2018
Customer Details				
			City:	
			Customer Segment:	DOM / COM / NCOM / YHS
			Business Partner No.:	
			Contract Account No.:	
			Notification No.:	
			Order Number and Type :	
			Complaint Received by:	
			Response Details	
			Nature of Complaint :	
				Date
Received :				
Reached at Site :				
Completion:				
Complaint Details				
Details of Complaints:				
Observations (Tick Mark)		Reason (Tick Mark)		Decision (Tick Mark)
<input type="checkbox"/>	Meter is Stopped	<input type="checkbox"/>	Internal Fault (Stop)	<input type="checkbox"/>
<input type="checkbox"/>	Meter Reading Not Visible	<input type="checkbox"/>	Dust/Water inside Display	<input type="checkbox"/>
<input type="checkbox"/>	Meter Display Leakage	<input type="checkbox"/>	Display plate is misaligned	<input type="checkbox"/>
<input type="checkbox"/>	Meter Display Damage	<input type="checkbox"/>	Customer fault	<input type="checkbox"/>
<input type="checkbox"/>	Meter Body Leakage	<input type="checkbox"/>	Excessive Corrosion	<input type="checkbox"/>
<input type="checkbox"/>	Meter Body Damage			
<input type="checkbox"/>	Meter Faulty - Causing Flow Problem			
<input type="checkbox"/>	Meter is Fast/Slow			
<input type="checkbox"/>	Meter is Tampered			
Action Taken:				
Material Details:				
Sr.	Bill of Material (Used)	Quantity	Unit	Chargeable/Non Chargeable
Meter Details				
Meter Size		Leak Test Post work Execution : Ok / Not Ok		
Meter Mfg. Old Meter		Old Number:		Old Reading:
		Mfg Year:-		
Meter Mfg. New Meter		New Number:		New Reading:
		Mfg Year:-		
Comments / Feedback /Suggestions by Customer				
I hereby, do agree that my above mentioned gas installation has been checked/repaired/inspected with manometer and Solution, in my presence & found in safe working condition.Also I hereby agree to pay average billing of gas consumption for the period when meter was not working.				
Attended By			Name & sign Of Customer	
Name: Sign: Contact Number:-			Name: Sign: Contact Number:-	

h)


Customer Service Call Note


JOB ORDER / CUSTOMER VISIT REPORT FOR OTHER TECHNICAL REQUESTS

		Customer Service Call note DOM / COM / NCOM / YHS / IND		DOC No.	MAI-F-115
				REV No.	1
				EFF.DATE	01.08.2019
Customer Details					
				City:	
				Customer Segment:-	
				Business Partner No.:-	
				Contract Account No.:-	
				Notification No.:-	
				Order Number and Type :-	
				Complaint Received by:-	
				Response Details	
				Nature of Complaint :	
				Received :	Date
Reached at Site :					
Completion:					
Complaint Details					
Details of Complaints:					
Nature/Observation:					
Reason/Cause:					
Action Taken:					
Material Details:					
Sr.	Bill of Material (Used)	Quantity	Unit	Chargeable/Non Chargeable	
Sr.	Bill of Material (Returned)	Quantity	Unit	Condition (Usable /Not Usable)	
Meter/Rubber Tube Details					
Condition :-		New Number:	Mfg Year:-	New Reading:	
Rubber Tube Expiry:		Old Number:	Mfg Year:-	Old Reading:	
Comments / Feedback /Suggestions by Customer					
I hereby certify that, my above mentioned gas installation has been checked/repared/inspected with manometer and soap solution (to check leakages if any), in my presence & found in safe working condition. Information related to Safety & Service is given to me at the time of completion					
Attended By			Name & sign Of Customer		
Name:			Name:		
Sign:			Sign:		
Contact Number:-			Contact Number:-		

i)

PE/Steel Network Damage Report

 GUJARAT GAS	PE/STEEL NETWORK DAMAGE REPORT			Doc. No.	MAI-F-116	
				Rev. No.	0	
				Page No.	1 of 3	
				Eff. DATE	01.02.2018	
LOCATION:						
DATE:			COMPLAINT/ NOTIFICATION NO:			
CUSTOMER/INFORMER NUMBER:			MODE OF DAMAGE			
NAME OF CUSTOMER/INFORMER:			<input type="checkbox"/> MANUAL EXCAVATION <input type="checkbox"/> HDD <input type="checkbox"/> MECHANICAL EXCAVATOR			
ADDRESS OF DAMAGE LOCATION:			<input type="checkbox"/> JOINT FAILURE <input type="checkbox"/> RAT BITE <input type="checkbox"/> PILING			
<input type="checkbox"/> OTHER SPECIFY						
DAMAGED BY:	Name of Utility	Name of Contractor & Contact No.		Zone and Ward No		
DETAILS OF DAMAGED NETWORK						
PPE DIA IN MM/INCH	NETWORK TYPE	APPROX. DAMAGE SIZE OF HOLE IN MM	PROXIMITY FROM PROPERTY IN MTRS.	DEPTH OF PIPE IN MTRS.	MATERIAL OF PIPE	SURFACE CATEGORY
	MP/LP				MDPE/HDPE/STEEL	SOIL/TAR/CONCRETE/FOOT PATH
COMPLAINT RECEIPT TIME		SITE REACHING TIME	SQUEZZING/VALVE CLOSURE TIME		JOB COMPLETION	
					DATE:	TIME:
ACTION TAKEN :						
Abbreviation : (1) PE :- Poly ethylene (2) HDD: Horizontal Directional Drilling						
NOTE: GAS PIPELINE WAS DAMAGED BY US DURING EXCAVATION/ CIVIL WORK. AS A CUSTOMER / CONTRACTOR. I AM LIABLE TO PAY THE PIPELINE DAMAGE CHARGES AS PER GUJARAT GAS LTD'S NORMS, I HEARBY AUTHORISE GUJARAT GAS LTD. TO RECOVER THE AMOUNT THROUGH INVOICE.						
ENGINEER/ SUPERVISOR	TECHNICIAN/WELDER		HELPER/DRIVER		SIGN UTILITY/CUSTOMER REPRESENTATIVE	

 GUJARAT GAS	PE/STEEL NETWORK DAMAGE REPORT				Doc. No.	MAI-F-116
					Rev. No.	0
					Page No.	2 of 3
					Eff. DATE	01.02.2018
LOCATION:						
DATE:				COMPLAINT/ NOTIFICATION NO:		
CUSTOMER /INFORMER NUMBER :				MODE OF DAMAGE <input type="checkbox"/> MANUAL EXCAVATION <input type="checkbox"/> HDD <input checked="" type="checkbox"/> MECHANICAL EXCAVATOR <input type="checkbox"/> JOINT FAILURE <input type="checkbox"/> RAT BITE <input type="checkbox"/> PILING <input type="checkbox"/> OTHER SPECIFY		
NAME OF CUSTOMER/ INFORMER:						
ADDRESS OF DAMAGE LOCATION:						
DAMAGED BY:	Name of Utility	Name of Contractor & Contact No.		Zone and Ward No		
DETAILS OF DAMAGED NETWORK						
PPE DIA IN MM/INCH	NETWORK TYPE	APPROX. DAMAGE SIZE OF	PROXIMITY FROM PROPERTY	DEPTH OF PIPE IN	MATERIAL OF PIPE	SURFACE CATEGORY
	MP/LP				MDPE/HDPE/STEEL	SOIL/TAR/CONCRETE /FOOT PATH
AVAILABILITY OF WARNING MATE AT DAMAGED PORTION	METHOD THROUGH NETWORK LAID	COMPLAINT RECEIPT TIME	SITE REACHING TIME	SQUEZZING /VALVE CLOSURE TIME	HANDED OVER TO PE-REPAIRING TEAM	
YES / NO	OPEN CUT/ BORING				DATE:	TIME:
DETAILS OF SECTION ISOLATION						
<input checked="" type="checkbox"/> Section Isolated by squeezing.....mmdia PE pipe from U/S <input type="checkbox"/> D/S <input type="checkbox"/> Distance of Squeeze from damagelocation.....MTRS(Approx.)						
<input type="checkbox"/> Section isolated by closing Isolation valves			DPRC/PRS NO:		SR NO./FEEDER NO:	
APPROX. NO. OF CUSTOMER AFFECTED :				GAS VOL. LOSS IN M3:		
VALVE CLOSING & OPENING DETAILS (WHENEVER APPLICABLE)						
VALVE NUMBER						
VALVE CLOSUTE TIME						
VALVE CLOSED BY						
VALVE OPENING TIME						
VALVE OPENED BY						
PREPARED BY : EMERGENCY TEAM/ PE REPAIRING TEAM						
In case of Emergecny and Pe Repairing Team is Same Material Used:-				Actions Taken:- Post Leak Survey Reading:-		
SITE ATTENDED BY :						
ENGINEER SUPERVISOR	TECHNICIAN/WELDER			HELPER/DRIVER	SIGN UTILITY/CUSTOMER REPRESENTATIVE	


File Number: GGL/Tech. Services/2024/12/99955

	PE/STEEL NETWORK DAMAGE REPORT		Doc. No.	MAI-F-116
			Rev. No.	0
			Page No.	3 of 3
			Eff. DATE	01.02.2018
TO BE FILLED IN CASE OF EMERGENCY ISOLATION AND PE REPAIRING TEAM ARE DIFFERENT				
LEAK SURVEY DETAILS AT DAMAGE SITE			Date:	
SR.NO.	DESCRIPTION	HOUSE NO / LANDMARK	PRE REPAIR LEAK SURVEYOR READING	POST REPAIR LEAK SURVEYOR READING
1	Probable Leakage Spot			
2	Repaired Portion			
3	Drain Line			
4	Water Line			
5	Storm Line			
6	Electrical Pole			
7	RCC Guard 1			
8	RCC Guard 2			
LEAK SURVEY BY:				
SKETCH OF THE DAMAGE AREA - PRE REPAIR			SKETCH OF THE DAMAGE AREA - POST REPAIR	
REPAIRING TEAM SITE		DATE		TIME:
ACTION TAKEN :				
MATERIAL USED :				
Abbreviation : (1) PE:- Poly ethylene (2) HDD:-Horizontal Directional Drilling (3) DPRC: Domestic Pressure Reduction Chamber (4) PRS:- Pressure Reduction Station (5) SR:- Service regulator				
JOINT LEAK TESTING REPORT: LEAKAGE OF REPAIRED JOINT IS CHECKED ON THE LINE WITH SOAP SOLUTION / LEAK SURVEYOR & FOUND OK/NOT OK				
JOINT COMPLETION DATE & TIME:				
JOB COMPLETED BY:				
ENGINEER SUPERVISOR		TECHNICIAN/WELDER		HELPER/DRIVER

File Number: GGL/Tech. Services/2024/12/99955


Customer Call Visit Report (Gas Escape)

File Number: GGL/Tech. Services/2024/12/99955

 GUJARAT GAS	CUSTOMER CALL VISIT REPORT (GAS ESCAPE) DOMESTIC/COMMERCIAL/NON COMMERCIAL	Doc No. : MAI-F-117 Rev No. : 0 Page No. : 2 of 2 EFF. DATE : 01.02.2018		
LEAKAGE NOT DETECTED				
a) Details of equipment used for detection: Leak Surveyor <div style="text-align: right;"> Serial No. : _____ Calibration Date: _____ </div>				
b) Lock pressure test taken from the mains to meter control valve - If required <div style="display: flex; justify-content: space-between;"> <div> Initial Meter reading _____ kg/cm2 Duration _____ minutes </div> <div> Final Reading : _____ kg/cm2 Drop : _____ kg/cm2/hr. </div> </div>				
Odour type : Foul/ Inspection/ Pesticide/ LPG/Electric cableBurnt/Garbage/Human waste /Chemical smell/ Dead animal/Other (Please specify _____)				
Remarks : 1. Guidance to customer : 2. Site Observation 3. Recommendation / Further Action :				
Complaint attended by Name and Signature		Customer Signature & Contact No	Verifed & Checked By	In case of False Complaint Rechecked the location and certified that there is no gas emisison
Engineer	Technician	The complaint has been attended to my	GGL Executive/Shift In Charge	GGL Engineer/Sr. Engineer
		satisfaction	Dis-satisfaction	
Customer's suggestion				

k) **Technical Request Format**


File Number: GGL/Tech. Services/2024/12/99955

	Technical Request Format DOM / COM / NCOM / YHS		DOC No.	MAI-F-118
			REV No.	0
			EFF.DATE	01.02.2018
Customer Details				
	City:			
	Customer Segment:-			
	Business Partner No.:			
	Contract Account No.:			
	Notification No.:			
	Order Number and Type :			
	Complaint Received by:			
	Contractor Name & vendor Code :-			
	Response Details			
	Nature of Complaint :			
	Date	Time		
	Received :			
	Reached at Site :			
	Completion:			
Activity Details				
Details of Complaints:				
Actions Taken :- <div style="display: flex; justify-content: space-between;"> <div> <input type="checkbox"/> Temp. Disconnection <input type="checkbox"/> Permanent Disconnection <input type="checkbox"/> Gas Tap replacement </div> <div> <input type="checkbox"/> Reconnection <input type="checkbox"/> A/g Line Dismantling <input type="checkbox"/> Suraksha Hose replacement </div> <div> <input type="checkbox"/> U/g Line Dismantling </div> </div>				
Material Handed over to Customer in Case of Line Dismantling		Material Collected from Customer in case of Permanent Disconnection		
Item Description	Qty	Item Description	Qty	
Regulator		Meter/Regualtor Set		
Audco Valve /Ball Valve		Audco Valve /Ball Valve		
Gas Tap		Gas Tap		
1/2" GI Pipe		1/2" GI Pipe		
1/2" GI Elbow		1/2" GI Elbow		
Meter		Suraksha Hose		
Suraksha Hose		1/2" GI Union		
TF		1/2" GI Coupling		
1/2" GI Union		1/2" GI Tee		
1/2" GI Coupling		TF		
1/2" GI Tee		GI Length at the time of Installation		
Material Used for Attending Request/ Complaints				
Sr.	Item Description	Quantity	Unit	Chargeable/Non Chargeable
Meter Number:-		Last Meter Reading:-		Disconnected / Reconnected at
Leak Test Post work Execution : Ok / Not Ok			Gas Gyeser Location if available :-	
Comments / Feedback /Suggestions by Customer				
Attended By			Name & sign Of Customer	
Name: Sign: Contact Number:-			Name: Sign: Contact Number:-	

I)


Patrolling Report

File Number: GGL/Tech. Services/2024/12/99955

	Patrolling Report	Format No.	MAI-F-35																																																								
		Rev. No.	0																																																								
		Effective Date	13/11/2017																																																								
<p>Date of Patrol :</p> <p>Contractor :</p> <p>Network / Area :</p> <p>Pipeline Section & Pipeline covered (Kms.) :</p> <p>Pipeline Size (Dia) :</p>																																																											
<p>Patrolling Activity Report</p> <table border="1"> <thead> <tr> <th>Sr. No.</th> <th>Check Point</th> <th>Observation</th> <th>Remarks</th> </tr> </thead> <tbody> <tr><td>1</td><td>Excavation Work on / near Gas Pipeline</td><td></td><td></td></tr> <tr><td>2</td><td>Fire on/ near Our Gas Pipeline</td><td></td><td></td></tr> <tr><td>3</td><td>Civil / Construction Work on / near Gas Pipeline</td><td></td><td></td></tr> <tr><td>4</td><td>Condition of Warning Boards & Markers (Steel & PE Pipeline)</td><td></td><td></td></tr> <tr><td>5</td><td>Condition of Steel and PE valve chambers</td><td></td><td></td></tr> <tr><td>6</td><td>Condition of DRS/DPRC/PRS</td><td></td><td></td></tr> <tr><td>7</td><td>Condition of Service Regulator</td><td></td><td></td></tr> <tr><td>8</td><td>Condition of Stone Markers</td><td></td><td></td></tr> <tr><td>9</td><td>Condition of TLP's</td><td></td><td></td></tr> <tr><td>10</td><td>Erosion of Soil</td><td></td><td></td></tr> <tr><td>11</td><td>Surface Subsidence, Flooding</td><td></td><td></td></tr> <tr><td>12</td><td>Encroachment</td><td></td><td></td></tr> <tr><td>13</td><td>Any other Potential Hazard</td><td></td><td></td></tr> </tbody> </table>				Sr. No.	Check Point	Observation	Remarks	1	Excavation Work on / near Gas Pipeline			2	Fire on/ near Our Gas Pipeline			3	Civil / Construction Work on / near Gas Pipeline			4	Condition of Warning Boards & Markers (Steel & PE Pipeline)			5	Condition of Steel and PE valve chambers			6	Condition of DRS/DPRC/PRS			7	Condition of Service Regulator			8	Condition of Stone Markers			9	Condition of TLP's			10	Erosion of Soil			11	Surface Subsidence, Flooding			12	Encroachment			13	Any other Potential Hazard		
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Patrolman	Contractor In charge	GGL – Shift In charge																																																									


m)

Daily Monitoring of Odorant Parameters

		Daily Monitoring of Odorant Parameters															Doc. No. : MAI-F-80 Rev No. : 0 Eff. Date : 13/11/2017																
Month & Year:																																	
Parameters		Unit of Measurement	Measurements																														
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Odorizer Tank- Level (Panel)		%																															
Expansion Tank Pressure (Panel)		Bar																															
Odorant Storage tank pressure (Panel)		Bar																															
Odorant Temperature (Panel)		°C																															
Battery Voltage (Panel)		VDC																															
Odorant Injected (Panel)		Mg																															
Gas Inlet pressure (Gauge)		Bar																															
Pump Actuation pressure (Gauge)		Bar																															
Odorizer Tank- Level (@ tank Where LT installed)		Fraction																															
Odorizer Tank- Level (@ tank where Level Indicator only)		Cm																															
Alarm (if any in panel)																																	
Checked by Name:																																	
Signature																																	
Daily Reviewed by - EIC-O&M Name:																																	
Monthly Reviewed by - Technical Manager		Name															Signature																

n)

Service Regulator Maintenance Report

	Service Regulator maintenance report	DOC NO : MAI-F-83
		Revision No : 00
		Effective Date : 15/11/2017

Date			Time		
Service Regulator No.			Location		
Manufacturer		Mfg Sr. No.		SR Capacity	
General Maintenance details					
General maintenance	Done / Not done				
Painting	Not required / Done				
Leak Detection Test					
Observation / Remark					
Contractor Representative			GGL Representative		
Date			Date		
Signature			Signature		

o)

Labour Compliance Checklist

Submission of signed labour compliance checklist along with monthly bills						
Name of Contractor :-					Vendor Code No	
Name of Company :-		Gujarat Gas Limited			Location :-	
Labour License No :-		Labour License Date:-		Labour License Expiry Date :-		Nature of work :-
PF Code No :-				ESI Code No :-		
WC (EC) Policy No & Date :-				Policy Expiry Date :-		No of Employees covered under WC Policy :-
Half yearly Return Copy				Due Date :-		File Date:
(1) Jan to June				Due Date :-		File Date:
(2) July to Dec				Due Date :-		File Date:
				Due Date :-		File Date:
Month	No. of Employees	Current Month Attendance register	Current Month Wage Register	Previous Month PF Challan / ECR Copy / Undertaking on LH	Previous Month ESI Challan / Undertaking on LH	Remarks
Jan-17						
Feb-17						
Mar-17						
Sign. & seal of Contractor				Signed & verified by Contract Owner		
Date :-				Date :-		

p)

Compliance list

File Number: GGL/Tech. Services/2024/12/99955

Compliance list in Phase - I		
Sr. No.	Particulars	Remark
1	Max. no workmen employed during the year	
2	Lic.No. if workmen is 20 or more	
3	Lic. renewal date	
4	BOCW license	
5	Payment of Levis under BOCW	
6	PF Code	
7	Salary payment thru bank - bank receipt	
8	Form no. 13 Register of workmen under CL (R&A) Act- Form-A	
9	Form no. 16 Muster roll under CL (R&A) Act Form-D	
10	Form No. 17/18 Register of wages/ Muster cum Reg. of wages under CL (R&A) Act Form-B	
11	Form No. 19 Wages slip under CL (R&A) Act	Not Applicable
12	Form No. 22 Register of advances under CL (R&A) Act Form-C	
13	Form No. 23 Register of Overtime under CL (R&A) Act	
14	Form No. 24 Half yearly return under CL (R&A) Act	
15	PF challan & ECR copy	
16	Undertaking in case if PF challan is common	
17	Form III (Mini. Wages Act)	
18	I-card Register under Factories Act	
19	ESI Code	
20	ESI Challans	
21	WCA Policy under Worker's Compensation Act	

q) **Form A (Register of Workmen)**

[See rule 2(1)] FORM A FORMAT OF EMPLOYEE REGISTER																														
Name of the Establishment : _____, Name of Owner : _____, UIN _____																														
Sl. No.	Employee Code	Name	Surname	Gender	Father's/Spouse Name	Date of Birth	Nationality	Education Level	Date of Joining	Designation	Category Address *(HS/S/SS/US)	Type of Employment	Mobile	UAN	PAN	ESI IP	LWF	AADHAR	Bank A/c No.	Bank	Branch (IFSC)	Present Address	Permanent	Service Book No.	Date of Exit	Reason for Exit	Mark of Identification	Photo	Specimen Signature /Thumb Impression	Remarks
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31

r) **Form B (Format for Wage Register)**

FORM B
FORMAT FOR WAGE REGISTER

Rate of Minimum Wages and since the date : <u>01.04.2017</u>								
	Highly Skilled		Skilled		Semi-Skilled		Un-Skilled	
Minimum Basic + DA	Area A	710	Area A	653	Area A	593	Area A	536
DA	Area B	593	Area B	593	Area B	506	Area B	448
Overtime	Area C	653	Area C	506	Area C	420	Area C	359

Name of Owner:

LIN:

Wage Period From	To	(Monthly)
------------------	----	-----------

[illegible]**Form C (Format of Register of Loan/Recoveries)**

FORM C
FORMAT OF REGISTER OF LOAN/RECOVERIES

Name of Establishment : _____ . LIN : _____

S. No. in Employee register	Name	Recovery Type (Damage/loss/fine /advance/loans)	Particulars	Date of damage/Loss*	Amount	Whether show cause issued	Explanation hard in presence of*	Number of instalments	First Month/Y ear	Last Month/ Year	Date of Complete Recovery	Remarks
1	2	3	4	5	6	7	8	9	10	11	12	13

Nil for the month of July'2017

Form D (Format of Attendance Register)

File Number: GGL/Tech. Services/2024/12/99955

Name of the Establishment: _____ **Name of Owner:** _____ **LN:** _____

[illegible]

File Number: GGL/Tech. Services/2024/12/99955

	Type-I Near Miss Incident	Type-II Without Loss of Production, Supply or Human life	Type-III With Loss of Production, Supply or Human Life	Type-IV Fire	Type-V Explosion /Fire/Gas Leakage/other emergencies Involving public
Location	√	√	√	√	√
Time	√	√	√	√	√
First Witnessed by	√	√	√	√	√
Details of Incident	√	√	√	√	√
Action Taken	√	√	√	√	√
Reporting Authority	Operator (O&M)	Operator (O&M)	Shift I/C	HSE Officer	Section I/C
Internal Investigating Authority	Head (HSE)	Head (HSE)	Head (O&M)	Head (HSE)	Head of Station
External Investigation	X	X	√	√	√
Report to PNGRB	X	X	√ (*)	√ (*)	√ (*)

√ To be filled in/reported

X Not required to be reported

(*) Shall also include the history of Type-I & Type-II incidents

ANNEXURE-5 MATERIAL SAFETY DATASHEET

1. MSDS of Natural Gas

1.	Chemical Identified	Safety Data Sheet	
	Chemical Name: Natural Gas	Chemical Classification	
	Synonyms: Natural Gas	Trade Name: Natural Gas	
	Formula: Mixture of Hydrocarbons: Methane (CH4), Ethane (C2H6), CO2 & N2	C.A.S. No. 8006-14-2 / 74-82-8	U.N. No. 1: UN 1971
	Shipping Name: Natural Gas		
	Codes/Label: Flammable Gas - Class 2		

Regulated identification..... Hazchem No.: **2S - E**

Hazardous Waste I.D. No.:

Hazardous Ingredients	C.A.S. No.	Hazardous Ingredients	C.A.S. No.
1. Methane	74-82-8	3. Propane	74-98-6
2. Ethane	74-84-0		
2. Physical and chemical data			
Boiling Range/Point	- 161 °C	Physical State: Gas	Appearance: Colour less
Melting/Freezing Point	- 182 °C	Vapour Pressure @ 35°C	Odour mm/Hg: Odourless. Ethyl Mercaptan (C₂H₅SH) is added for odourisation
Vapour Density (Air = 1): 0.6 to 0.8		Solubility in water @ 30°C: Not Soluble / Slight / Soluble	Others: -----
Specific Gravity Water-1: 0.62 to 0.70		PH : -----	
3 Fire and Explosion Hazard data			
Flammability Yes/No	LEL 5 %	%Flash Point 0° :----	Auto ignition: 540 ° C
TDG Flammability	UEL 15 %	%Flash Point 0°: ----	
Explosion Sensitivity to impact:	May Explode	Explosion Sensitivity to Static Electricity: May Explode	Hazardous Combustion Products: CO2 + Traces of oxides, CO (If incomplete Combustion)
Hazardous Ploymerisation: Will not occur			
Combustible Liquid: NA		Explosive Material: Yes	Corrosive: NA
Flammable Material: Yes		Oxidiser: NA	Others
Pyrophoric Material: NA		Organic Peroxide: NA	
4. Reactivity Data			
Chemical Stability: Stable			
Incompatibility with other Material : Yes. Readily forms explosive mixtures with air or oxygen. Avoid contact with strong oxidizing agents			
Reactivity: Strong oxidizing agents increase risk of fire (peroxides, perchlorates, chlorine, liquid oxygen).			
Hazardous Reaction Product: Incomplete combustion yields Carbon Monoxide			
5. Health Hazard Data			

Routes of Entry: Inhalation

Effects of Exposure Symptoms: **Inhalation** May cause asphyxiation by displacing or partially displacing the air required to support life.

Emergency Treatment:

INHALATION: Remove IP to fresh air, use respirator guards during normal exposure and breathing apparatus in case of major exposure. If breathing is difficult, have trained person administer oxygen. If respiration stopped, administer CPR and seek medical attention immediately.

TLV (ACGIH): -----	Ppm	ME/m ³	S T E L	PPM mg/m -----
Permissible Exposure Limit ppm mg/m ³ other Threshold: -----			mg/m ³	
Lo	LD2			
NEPA Hazard Signals	Health	Flammability	Stability	Special

6. Preventive Measures

Personnel Protective equipment: **Safety Goggles, Face Shield, Self-Contained Breathing Apparatus, Fire Retardant Clothing, Hand gloves**

Handling and storage Precautions:

- **Keep away from sources of ignition.**
- **Avoid breathing gas, use with adequate ventilation. Wear approved respiratory Protection if there is potential for exposure above the exposure limits.**
- **Avoid static build up.**
- **Monitoring concentration of Natural Gas in atmosphere with gas measuring equipments**

While draining/venting.

- **Avoid wearing contact lenses during handling of Natural Gas.**

STORAGE:

- **Keep away from source of ignition.**
 - **Use of appropriate warning / caution boards.**
 - **Store cylinders in well ventilated, low fire risk area.**
-

7. Emergency and First aid measure

Fire	Fire Extinguishing: Dry Chemical Powder, Carbon Dioxide. Water ineffective, but may be used to keep surrounding area cool
Fire	Special procedures: Cordoned off area. Evacuate all unnecessary personnel. Eliminate all sources of ignition. Best procedure is to shut off gas supply. Wear self - contained breathing apparatus and full protective clothing. Use water spray to keep fire exposed area cool
	Unusual Hazards: Mixture of natural gas and air in certain proportions can result in an explosive mixture.
Exposure	First Aid measures: Refer 5. Health Hazard Data
	Antidotes/Dosages -----
Spills	Steps to be taken: (in case of Leakage)

Evacuate unnecessary personnel upwind of the leakage area, remove or eliminate ignition sources, minor leaks can be detected with soap solution applied at suspected leak points, never use flame to detect presence of Natural Gas. Suitable Personnel Protective Equipments to be used.

Waste disposal Method : **NA**

8. ADDITIONAL INFORMATION / REFERENCES

2. MSDS of Ethyl Mercaptan

1.	Chemical Identified	Safety Date Sheet
	Chemical Name: Ethyl Mercaptan	Chemical Classification: 3
	Synonyms: Ethanethiol	Trade Name: Ethyl Mercaptan
	Formula: C2H5SH	C.A.S. No. 75 – 08 - 1 U.N. No. 1: 2363
	Shipping Name: Ethyl Mercaptan Codes/Label: 3.1 / 3	

Hazchem No.: **3WE / 2363**

Regulated identification.....

Hazardous Waste

I.D. No.: **E044**

Hazardous Ingredients	C.A.S. No.	Hazardous Ingredients	C.A.S. No.
1.Ethyl Mercaptan	75-08- 1		

2. Physical and chemical data

Boiling Range/Point	35 °C +/- 1	Physical State: Liquid	Appearance: Colourless liquid
Melting/Freezing Point	- 147.8 ° C / - 45 ° C	Vapour Pressure @ 35°C : 16.2 Psia = 838 mm/Hg @ 37.8 °C	Odor mm/Hg: Repulsive
Vapour Density (Air = 1): 2.1		Solubility in water @ 30°C: 0.70 at 20 °C / Slight	Others: -----
Specific Gravity Water-1: 0.845 @ 15.6		PH : Not Determined	

3 Fire and Explosion Hazard data

Flammability Yes/No	LEL 2.8 %	%Flash Point 0° :-	38.9 ° C	Auto ignition: 295 ° C
TDG Flammability	UEL 18 %	%Flash Point 0°: -	17 ° C	
Explosion Sensitivity to impact:	No	Explosion Sensitivity to Static Electricity:	Yes	Hazardous Combustion Products:
Hazardous Polymerization:		Will not occur		Oxides of Carbon, Sulphur Dioxide
Combustible Liquid:	Yes	Explosive Material:	Yes	Corrosive: No
Flammable Material:	No	Oxidiser:	No	Others
Pyrophoric Material:	NA	Organic Peroxide:	NA	

File Number: GGL/Tech. Services/2024/12/99955

4. Reactivity Data

Chemical Stability: **Stable**

Incompatibility with other Material : **May react with oxygen and strong oxidizing agents, such as chlorates, nitrates, peroxides, etc.**

Reactivity: **Not Established**

Hazardous Reaction Product: **Not Established**

5. Health Hazard Data

Routes of Entry: **Skin, Inhalation, Ingestion**

Emergency Treatment:

SKIN: Wash thoroughly with soap and water. Wash clothing before reuse, If Irritation occurs, get medical attention.

INHALATION: Remove to fresh air, If breathing is difficult, have trained person administer oxygen. If respiration stops, have a trained person administer artificial respiration. Get medical attention immediately.

INGESTION: Never give anything by mouth to an unconscious person. Have patient drink several glasses of water then induce vomiting by having patient tickle back of throat with finger. Keep airway clear. Get medical attention immediately.

Eye: Flush eyes with running water immediately while holding the eyelids open. Remove contact lenses, if worn, after initial flushing, and continue flushing for at least 15 minutes. Get immediate medical attention.

Note to Physicians: Ingestion of this product or subsequent vomiting may result in aspiration of light hydrocarbon liquid, which may cause pneumonitis.

TLV (ACGIH): 0.5 ppm / 1.3 mg / m³	ME/m ³	STEL	ppm mg/m: NA
--	-------------------	------	---------------------

Permissible Exposure Limit ppm	other Threshold: -----	mg/m ³
(Not known) mg/m³		

Lo

LD2

Acute Oral Toxicity: Ethyl Mercaptan: LD50 / rat / 682 mg/kg

Acute Dermal Toxicity: Ethyl Mercaptan: LD50 / rabbit / >2000 mg/kg

Acute Inhalation Toxicity: Ethyl Mercaptan: LC50 / rat / 4,420 ppm / 4 hour(s)

Human Odour Detection Limit: 0.4 ppb

NFPA Hazard Signals	Health	Flammability	Stability	Special
	2	3	---	---

6. Preventive Measures

Personnel Protective equipment: **Chemical Safety Goggles, Face Shield, Rubber Gloves, Eye Wash-Shower, Self-Contained Breathing Apparatus**

Eye/Face Protection: Wear eye protection such as safety glasses, chemical goggles, or face shields if engineering controls or work practices are not adequate to prevent eye contact.

Skin Protection: Wear impervious protective clothing to prevent skin contact. Selection of protective clothing may include gloves, apron, boots, and complete facial protection depending on Operations conducted. Users should determine acceptable performance characteristics of protective clothing. Consider physical requirements and other substances present when selecting protective clothing.

Respiratory Protection: Wear a NIOSH approved respirator that provides protection when working with this material if exposure to harmful levels of airborne material may occur, such as: Air-Purifying Respirator for Organic Vapours Use a positive pressure, air-supplying respirator if there is potential for uncontrolled release, exposure levels are not known, or other circumstances where air-purifying respirators may not provide adequate protection. Air-purifying respirators are not recommended due to potential olfactory fatigue.

Handling and storage Precautions:

Handling:

- **Keep away from sources of ignition. The vapours can travel to an ignition source and flash back causing a flash fire.**
 - **Avoid breathing vapour, handle Ethyl Mercaptan with adequate ventilation. Wear NIOSH / MSHA approved respiratory protection if there is potential for exposure above the exposure limits.**
-

- Do not get in eyes, on skin or clothing.
- Avoid static build up.

SPECIAL MIXING AND HANDLING INSTRUCTIONS :

- Keep container closed except when transferring material.
- Use with adequate ventilation.
- Do not reuse containers.

STORAGE:

- Store in a well-ventilated place. Keep cool. Store locked up away from heat, sparks and flame.

7. Emergency and First aid measure

Fire	Fire Extinguishing: Use water, foam, dry chemical or carbon dioxide (CO2) to extinguish flames
Fire	Special procedures: For fires involving this material, do not enter any enclosed or confined fire space without proper protective equipment, including self-contained breathing apparatus. Evacuate all unnecessary personnel. Shut down motors, pumps, electrical service and eliminate all sources of ignition. Use spray to keep fire exposed containers cool to avoid pressure build-up, wear self - contained breath apparatus and full protective clothing.
	Unusual Hazards: : Flammable vapours, being heavier than air, may travel long distance along the ground before reaching a source of ignition and flash back.
Exposure	First Aid measures: Refer 5. Health Hazard Data Antidotes/Dosages: Not Known
Spills	Steps to be taken: Should always be handled in a closed system. In case of spillage, use absorbent like activated charcoal, saw dust, dry sand and absorbers like Eco pearl. Suitable Personnel Protective Equipments to be used. Evacuate unnecessary personnel upwind of the spill area. Eliminate all sources of ignition; Do not allow entry in sewers and waterways.
	Waste disposal Method: Absorbed spilled liquid to be collected in air tight container for safe disposal. Do not dispose of sink, drain. Dispose in a safe manner in accordance with local / national regulation

8. ADDITIONAL INFORMATION / REFERENCES

ACGIH = American Conference of Governmental Industrial Hygienists.

PEL = Permissible Exposure Limit (OSHA)

STE = Short Term Exposure Limit (15 Minutes)

TDG = Transportation of Dangerous Goods. (CANADA)

TLV = Threshold Limit Value.

IDLH = Immediate Danger to Life & Health

NFPA = National Fire Protection Association.
