

To all concerned parties

We act for PowerGas Ltd.

NOTES FOR WORKING NEAR POWERGAS GAS TRANSMISSION PIPELINE

1. Introduction

- 1.1 The Gas Transmission Pipeline (GTP) is designed to carry gas at high pressures. It is buried underground with granite dust and earth backfill cover as required under LTA's regulations. Warning markers are planted near the pipeline to indicate its existence and warn third parties working in the area.
- 1.2 SPPG patrols the pipeline regularly to monitor works in the vicinity by third parties. Such works if done without knowing the existence and/or exact location of the pipeline can potentially damage the pipeline and/or its coating. SPPG pays special attention to drilling, piling, blasting or any high impact works, excavation and tunneling works and construction of structures near or over the pipeline.
- 1.3 Any party who intend to carry out any construction activities in the vicinity of the GTP shall notify and collaborate with SPPG to implement measures to protect the pipeline from all possible damages.

2. Statutory Requirement

- 2.1 Section 32 Carrying out earthworks within vicinity of gas plant or gas pipe of the Gas Act (Chapter 116A) requires anyone who wants to carry out earthworks in the vicinity of the gas plant or gas pipe to
 - (a) give the gas transporter (SPPG) not less than 7 days' notice in writing of the date on which it is proposed to commence the earthworks;
 - (b) obtain from the gas transporter the necessary information on the location of the gas plant or gas pipe; and
 - (c) consult the gas transporter on the steps to be taken to prevent the gas plant or gas pipe from being damaged while the earthworks are being carried out.
- 2.2 Section 32 also requires the person carrying out the earthwork to comply with the requirements of the transporter, ensure precaution measures are taken to prevent damage to the gas pipe or gas plant and provide access to the transporter for inspection or taking necessary protective measures.
- 2.3 Any person that contravenes this Section 32 is guilty of an offence and shall be liable to a fine not exceeding \$100,000 or to imprisonment for a term not exceeding 5 years or both.

3. Requirements on Third Parties working near the Gas Transmission Pipeline

3.1 Pre-work Consultation with SPPG

- a) The works owner and contractor must inform SPPG in advance of their intention to work within 30m vicinity of the GTP. Such works include excavation, piling, earthwork leveling,

page 1 of 4

- bore logging, trial holes, blasting, tunneling or any earth works. The proposed work with construction drawings and method of statements must be given to SPPG to evaluate the impact of the works on the pipeline. This enables SPPG to advise on appropriate precautionary measures to be taken.
- b) The works owner and contractor must obtain the as-built drawings of GTP from SPPG. They are required to incorporate the pipeline alignment co-ordinates into their construction drawings. Please note that the information in the as-built drawings should be treated as confidential. Do not disclose or forward them to others.
 - c) No permanent structures shall be designed and constructed above the GTP. However, surface road over the pipeline without reducing the pipeline cover may be acceptable, subject to SPPG's concurrence.

3.2 Precautionary Measures during Works

- a) The works owner and contractor must take all necessary precautions to prevent any damages to the GTP during the construction stage. They must inform SPPG before carrying out any excavation works near the pipeline. It is important to **report all damages** to the pipeline and its coating to SPPG. Repair must be done immediately to prevent corrosion aggravation to the pipeline at the damage location and thus becoming a potential hazard.
- b) Trial holes to prove the location of the GTP are not allowed. However, if very necessary, it must only be done in the presence of SPPG officer. If any **excavation is within 3m of the pipeline**, a competent surveyor must be engaged to peg the pipeline alignment and interpret the pipeline depth from the pipeline as-built drawings. The contractor's competent personnel should supervise the excavation, monitoring closely the pipeline depth based on the surveyor's interpretation. Only hand excavation is allowed within 0.5m of the pipeline.
- c) Under no circumstance should the GTP be exposed without written consent of SPPG. If a GTP is exposed, the owner/contractor must take the necessary measures to protect the pipe from any physical impact that may cause damage to the pipe and/or its coatings to the satisfaction of SPPG.
- d) Do not shift or remove warning markers indicating the existence of the GTP at site without SPPG's approval. The contractor must protect them from being damaged or tempered. Where necessary, additional temporary warning markers should be installed to warn others of the pipeline's presence.
- e) For **blasting works**, piling of any works that cause ground vibration, the peak particle velocity (PPV) of ground shock generated by the blast should be limited to 15mm/s measured at the pipeline.
- f) For **deep tunneling and shaft excavation** works, ground consolidation could occur due to ground water losses resulting in surface settlement. This settlement can potentially induce excessive stress on the pipeline. The contractor should conduct a risk assessment to assess the impact of tunneling on the surrounding area. To monitor the surface settlement, surface monitoring points must be installed along the pipeline alignment at every 10m intervals for at least 100m pipe length from the tunnel or shaft. The settlement must be regularly monitored while excavation or tunneling works are being carried out. A differential settlement of 20mm will require all parties involved to assess the ground consolidation and evaluate the need to implement measure to arrest the consolidation. A thorough stress analysis of the pipeline must be done by competent persons recognised by SPPG if the differential settlement reaches 60mm. Depending on the findings of the analysis, measures must be taken to relieve the pipeline from the stress.

- g) For **crossing and parallel laying** of services to GTP, Table 1 shows the required separation distance between the GTP and other services or structures. It should be noted that other authorities may have stricter or additional requirements on minimum separation distance between proposed building / structure and the pipeline than what is stated here. Services crossing the pipeline must not be at the previous boring pit locations of the pipeline, the locations are which to be advised by SPPG.
- h) For major works that span over a long period of time, the owner and contractor must hold monthly meetings to update SPPG on the progress and any changes to their works.
- i) For any new development surrounding the GTP, the developer must inform the property owner on the location of the pipeline within their premises and draw up measures to prevent any possible damage to it. Pipeline within a fenced compound must be accessible to SPPG for patrolling and any maintenance works as and when required.

3.3 Repair of Damage Pipe/Coating

In the event the pipe and/or its coating are damaged by the third party works, SPPG will undertake the necessary repair works. All costs of such repairs shall be borne by the third party responsible for the damage.

3.4 Emergency Works

When urgent works resulting out of emergencies have to be done near the pipeline, the owner and contractor must **call SPPG** at the 24-hour hotline at **1800 752 1800 or 6751 8003**. SPPG officers will respond at site within 2 hours of the call to verify the location of the pipeline and monitor excavation works.

4. Enquiries

The above requirements are only stated in general. The concerned party must consult SPPG on all works near the GTP. SPPG reserves the right to alter any stated requirements or impose additional requirements that are necessary depending on site conditions and type of work. Refer all enquiries and correspondences on works near the Gas Transmission Pipeline to:

Postal address

SP PowerGrid Ltd (Gas Division)
National Gas Control Centre
24A Senoko Ave
Singapore 758314
Fax: 6751 8118
Attn: Gas Transmission O&M Section

telephone numbers

Deputy Director : 6316 2672
Engineers / Officers : 6751 8071 / 2 / 4 / 8
24-hour System Control Centre : **6751 8003**
24-hour Customer Service Centre : **1800 752 1800**

As agent for and on behalf of PowerGas Ltd,

DEPUTY DIRECTOR (GAS TRANSMISSION)
for DIRECTOR (GAS NETWORK MANAGEMENT)
SP POWERGRID LTD (GAS DIVISION)

Table 1 : Minimum Separation Distance Between GTP And Other Services / Structures

S/N	Service / Structure	Minimum separation distance
1.	Trench excavation	1.2m and requires shoring if deeper than 1.5m.
2.	Bore / sheet piling	2.0m
3.	200x200 Concrete Piles for drain	1.5m
4.	Tunneling	Clearance distance 1.5m or more. Depending on size and depth, it may require monitoring of soil movement and settlement and risk assessment.
5.	Formed Drain / Earth Drain	1.2m / 1.5m
6.	Minor Drain	0.5m
7.	Control Blasting	10m and PPV not more than 15mm/s.
8.	Water Pipe: less than 700mm dia.	0.5m
9.	Water Pipe: typically 700mm dia.	1.2m
10.	Water Pipe: Ultra large diameter	Clearance distance 1.5m or more depending on size of pipe and construction method.
11.	Minor Sewer Pipe	0.5m
12.	Sewer Trunk pipe	1.2m or more.
13.	Sewer Pipe: Ultra Large diameter	Clearance distance 1.5m or more depending on size of pipe and construction method.
14.	Electric Cables: less than 22 KV	0.5m
15.	Electric Cables: 22KV and above	1.2m
16.	Telecom cables	0.5m
17.	Low pressure gas pipe	0.5m
18.	Shrubs	1.2m
19.	Trees	Palm only, 2.0m
20.	Posts / foundations for light, signs etc	1.5m
21.	Road Pavement	1.5m
22.	Off-Road Crossing for heavy vehicles	1.5m or more with 25mm steel plating on surface.

Note: The above separation distance are for Gas Transmission Pipelines of diameters above 300mm. For 300mm or smaller diameter pipelines, the separation distance to other services/structures would be halved but not less than 0.5m.