



Dial Before You Dig



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Foreword

This booklet has been prepared and issued by Phoenix Natural Gas to assist those involved in excavation works in the vicinity of underground gas mains, services and other plant and provides key information relating to the gas network and advice on the necessary safeguards required in the prevention of damage and avoidance of accidents.

It is intended that this booklet be available to all utilities, contractors, builders and developers alike responsible for the management, planning, supervision and undertaking of excavation works.

Please note that this booklet does not substitute the guidance contained within the Health and Safety Executive document HSG47 entitled 'Avoiding Danger From Underground Services' and therefore should be used in conjunction with it.



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Always Remember...

...Dial Before You Dig 028 9055 5819



Introduction



This document has been produced in recognition of the high level of risk associated with damage to the Phoenix Natural Gas [PNG] network that could result in fatal or severe injuries to operatives, others present or the general public through fire, explosion or asphyxiation.

The purpose of this publication is to increase awareness of the dangers of working in close proximity to gas pipes when adequate precautions are not taken and to promote safe digging practices.



Note: It is our policy to always charge for damages to our apparatus

Why Does the Risk Exist?

The PNG network is constructed of polyethylene [PE] pipe 20mm to 450mm in diameter delivering gas within three distinct pressure tiers.

- **Intermediate pressure** 7 bar [100psi]
- **Medium pressure** 4 bar [60psi]
- **Low pressure** 75 mbar [1.1psi]

Where adequate precautions have not been taken; scraping, gouging, and puncturing of PE pipe by common excavation tools can all lead to an uncontrolled release of gas. The higher the operating pressure the greater the volume release of gas. In all instances there is a real risk of gas igniting and/or tracking into buildings.



Increasing

Severity

Decreasing



Mechanical Excavation [JCB, Mini Excavator]



Hand Held Power Tools [Pneumatic breaker]



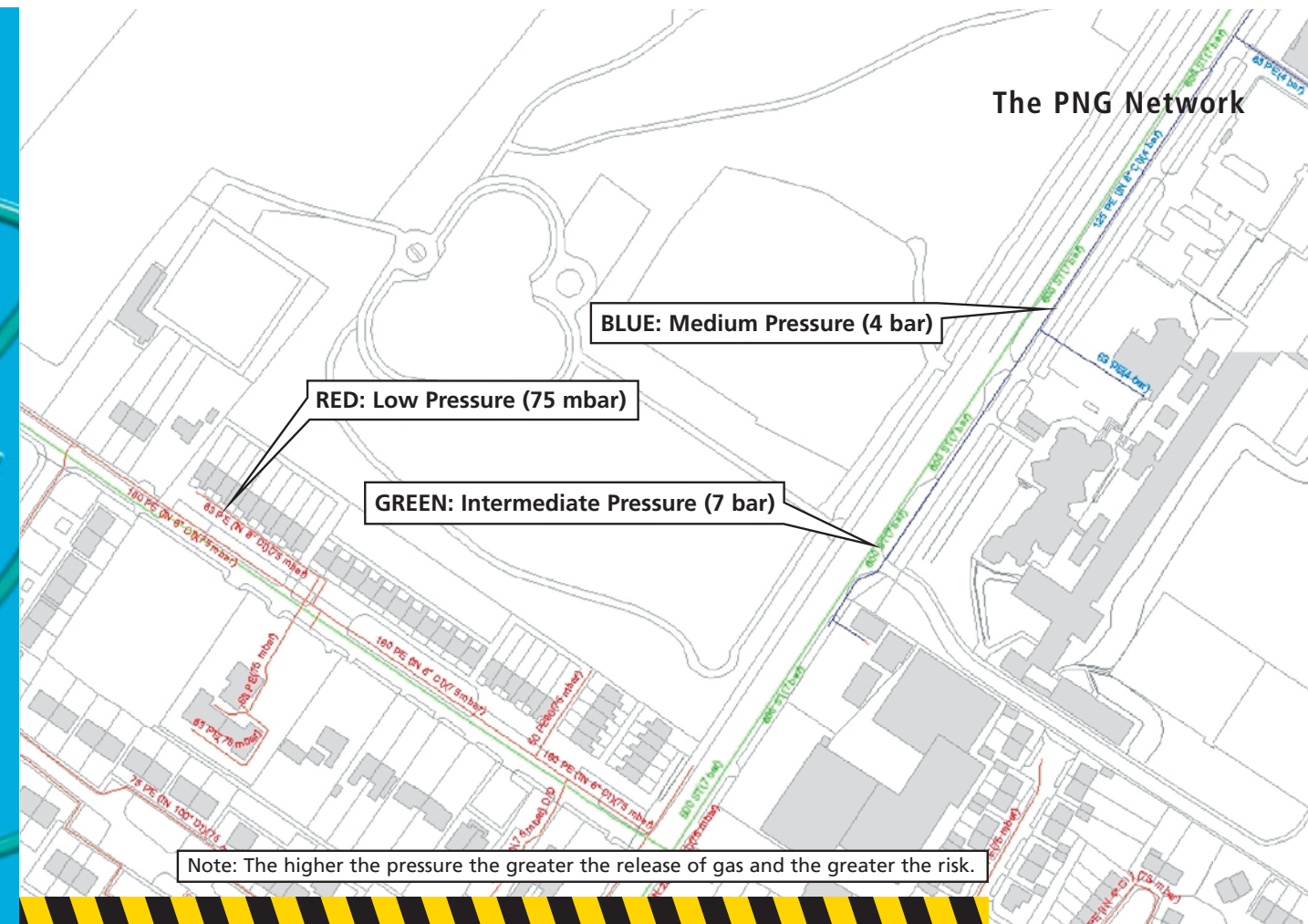
Hand Tools [Picks, forks, crowbars and pins]

NOTE: Be aware that damage may also result from hot works [welding, use of naked flames] adjacent to pipes and such works must be appropriately risk assessed.

Properties and Behaviour of Natural Gas

Natural gas unlike other gases such as LPG is lighter than air. It is primarily made up of methane and during an uncontrolled release has the following characteristics / behaviour;

- In open excavation where there is an unobstructed path natural gas will travel straight to atmosphere where it will be diluted and dispersed.
- Underground, and where a release path to atmosphere is not available, gas will quickly track through ducts, voids and annular gaps or follow the line of other services [note: do not cover a damaged gas pipe as this could force gas into adjacent properties].
- At specific concentrations in air, known as the flammability range [5% - 15% gas in air] AND where an ignition source is immediately present natural gas will ignite. Potential sources of ignition include;
 - Naked flames
 - Electrical switches [being operated either ON or OFF]
 - Non intrinsically safe equipment [eg. mobile phones/machinery]
- At high concentrations in enclosed areas or confined spaces [deep excavation or property cellars] asphyxiation may occur



Construction Methods

Throughout the construction of the PNG gas distribution network there have been a number of installation techniques employed for both services and mains. The network itself is virtually an all PE system comprising PE80 – medium density [yellow] and PE100 – high density [orange] polyethylene. There are 3 main methods of construction;



• **INSERTION** - where pipe has been inserted either as loose fit or close fit inside old cast iron [CI] or ductile iron [DI] towns gas infrastructure.



• **OPEN CUT** - where PE pipe has been laid by conventional trenching techniques.



• **DIRECTIONAL DRILLING / MOLING** - where PE pipe has been laid using no-dig technology.



Note
It is imperative that natural gas pipes are not mistaken for plant belonging to other utilities. In particular;

- Cast iron [CI] and ductile iron [DI] conduits must not be confused for water mains.
- Small diameter PE100 [orange] pipes must not be confused with street lighting cable / ducts.

Where sufficient information is not readily available such pipes should be treated as if they are live gas carrying pipes.

Gas pipes installed by open cut techniques will generally have a fine-fill surround [quarry dust] and marker tape above and in certain circumstances additional protection in the form of steel pates / box sections or plastic / concrete tiles. Given the variation in construction techniques the absence of marker tape, additional protection, fine-fill surround or imported fill must not be taken as reliable proof that a gas pipe is not present.

Marker Tape
Concrete Tile
Steel Box Section

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How to Interpret a Plan

• Colour Coding of Plans

- o Intermediate Pressure 7 bar Green
- o Medium Pressure 4 bar Blue
- o Low Pressure 75 mbar Red



- **Annotation** - information provided includes: pipe dia [mm] / pipe material / pressure / method of lay [including for insertion carrier pipe dia [mm or inches and material]. Specific examples are as follows;

- o Open cut 63PE100 [4bar]
- o Insertion 63PE100 [in 4"CI] [4bar]
- o Insertion 125PE [in 6"DI] [75mbar]
- o Directional Drill 63PE80 [75mbar] D/D



Surface Meter Box



Recessed Meter Box



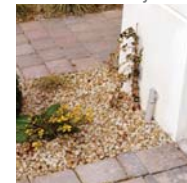
Semi-concealed Meter Box



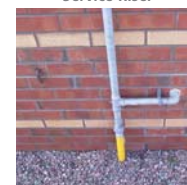
Commercial Meter Cabinet



House Entry



Service Riser



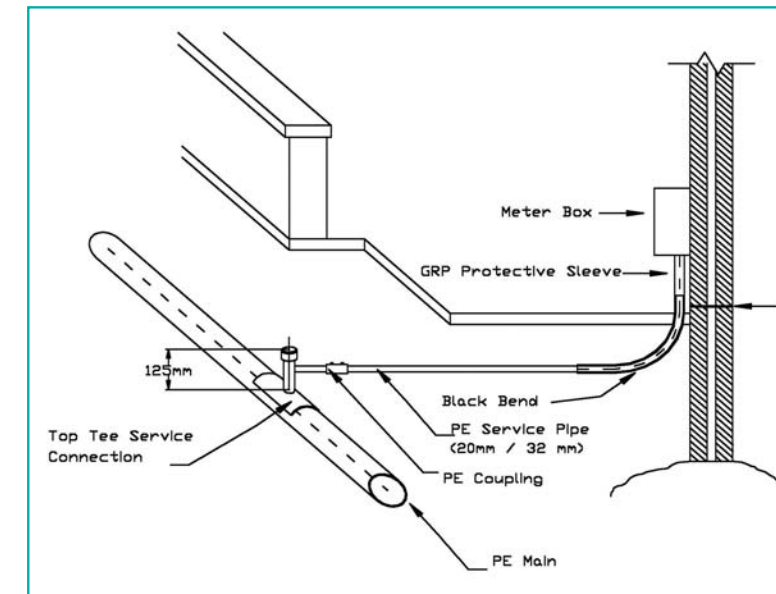
Valve Box



Pressure Reduction Installation

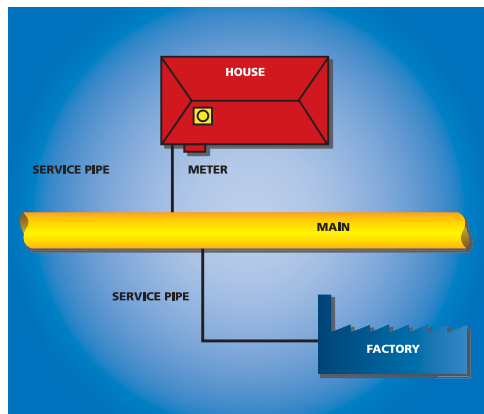


Natural Gas Services



Natural gas services are generally not identified on PNG record plans. Their presence should therefore be anticipated. Visible indicators which will help identify their existence include external meter boxes / cabinets, above ground house entries, valve box covers and reinstatement patches.

Services will normally run at right angles to the main.



As a guide buried gas pipes will normally be found at depths ranging from 375mm to 1m depending on carriageway type and may have positioned above them plastic marker tape, protective tiles or steel plates. Pipes will also be found within ducts common on new build sites or inserted in old towns gas infrastructure [cast iron / ductile iron] as is the case with a significant proportion of the PNG network. Depths of such CI and DI pipes may vary from guidance contained in HSG47 and appropriate care should be taken. When found these pipes should be treated as if 'live'.

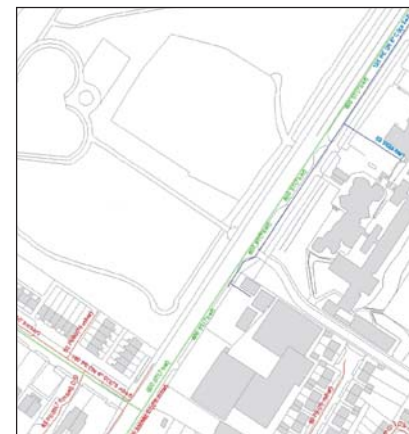
Please bare in mind that service connections in particular will have a reduced cover as these are made onto the top crown of the mains pipe.



Safe Systems of Work

A safe system of work, as commended by the HSE guidance document HSG 47, has the following elements:

- Planning the Work
- Plans
- Pipe Locating
- Safe Digging Practices



Planning the Work

At the planning stages of the job, PNG Records Department should be contacted on **02890 555819** giving a minimum of 10 working days notice requesting the appropriate utility drawing and safety information. Requests should be made in writing and include details of the intended works, anticipated duration and start date and be accompanied by a detailed site / location plan.

NOTE: Works involving demolition, development, construction and use of directional drilling should be discussed at an early stage.

Plans

When replying to requests for information by post we will issue colour plans. It is imperative that the coloured gas plans are available for the entirety of the proposed works and that all necessary detailed information is passed to contractors and those personnel directly engaged and responsible for the works.

Pipe Locating

Pipe detecting devices may be used to help locate CI and DI conduits inserted with gas carrying PE pipes. Such devices cannot trace PE itself and therefore it is especially important to use drawings and safe digging practices. This is particularly important for service connection pipes, which will not be marked on plans.

Safe Digging Practices

All information furnished by PNG is deemed to be accurate and given in good faith. This information should be used as a guide and given that PE pipe will not be detectable by a Cable Avoidance Tool [CAT] employing safe digging practices is the only way to avoid damages. The following is recommended;

- Use plans on site to identify route of main.
- Survey site to be sure you identify physical features.
- Mark out approximate location / route with paint / marker.
- Hand dig trial holes as necessary to physically prove location prior to mechanical excavation.
- Do not use mechanical excavation within 500mm of the proven pipe location.

Note: The majority of damage to gas apparatus is caused by mechanical plant.

- Do not leave PE pipe exposed, ensure all gas pipes are adequately supported / anchored and never use them as a sling support or step.

Where required assistance can be provided free of charge by our Plant Protection Officer. Contact can be made on 07800 626051. Please give a minimum of 48hrs notice.



High Risk Locations

This term refers to areas having mains operating at pressures >4bar and pressure reduction equipment sites where due to the potential consequences resulting from impact or interference they are deemed to present a higher risk. Additional precautions are therefore necessary during execution of works near to such pipe and plant.

These items of pipe and plant will be identified on drawings supplied by PNG. Additional requirements will be stipulated in our High Risk letter which will accompany the drawings.

These requirements can be summarised as follows;

- Prior to commencement, contact PNG 3 days in advance so that we may co-ordinate a visit to site by a member of the company's engineering team where the following is proposed;
 - Excavation within 3m of gas mains
 - Excavation within 10m of pressure reduction equipment

Note : Once the risks on site have been assessed by a PNG Officer and control measures agreed, which may necessitate a Permit to Work, these distances may be relaxed. Excavation in the vicinity of mains operating at 7bar and above must be witnessed by PNG personnel.

What To Do If Damage Occurs

- Inform Phoenix Natural Gas emergency call centre – **0800 002 001**.
- Remove all personnel from the immediate vicinity to an upwind position.
- Inform the site supervisor.
- Prevent any approach by the public.
- Enforce 'No Smoking'.
- Remove naked flames or heat.
- Do not operate any machinery / equipment or use mobile phones in the immediate area.
- Do not cover or interrupt the flow of gas to atmosphere.
- Assist Phoenix Natural Gas engineers or emergency service as requested.
- Do not attempt to repair Phoenix Natural Gas plant.
- Do not operate underground valves.



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