# Safe working in the vicinity of Northern Gas Networks high pressure gas pipelines and associated installations

Northern Gas Networks

Emergency Telephone Number for pipeline damage or gas escapes

# 0800 111 999*

*All calls are recorded and may be monitored

# Contents

# Foreword

This specification was approved by the transmission policy engineer, as document number T/SP/SSW22 on 3rd November 2003 for use throughout Northern Gas Networks.

Comments and queries regarding the technical content of this engineering document should be directed to;

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**Northern Gas Networks**
**Thorpe Park**
**1100 Century Way**
**Leeds LS15 8TU**

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# Disclaimer

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Specification for
Safe working in the vicinity of Northern Gas Networks high pressure gas pipelines and associated installations – requirements for third parties

# Introduction

This specification is for issue to third parties carrying out work in the vicinity of high pressure gas pipelines (above 7 bar gauge) and associated installations and is provided to ensure that individuals planning and undertaking work take appropriate measures to prevent damage.

Any damage to a high-pressure gas pipeline or its coating can affect its integrity and can result in failure of the pipeline with potential serious hazardous consequences for individuals located in the vicinity of the pipeline if it were to fail. It is therefore essential that the procedures outlined in this document are complied with when working near to a high pressure, above 7 bar gauge, pipeline. If any work is considered by Northern Gas Networks to be in breach of the requirements stipulated in this document then the Northern Gas Networks responsible person will suspend the work until the non-compliances have been rectified.

The Pipelines Safety Regulations state that “No person shall cause such damage to a pipeline as may give rise to a danger to persons” (Regulation 15). Failing to comply with these requirements could therefore also result in prosecution by the Health and Safety Executive (HSE).

The requirements in this document are in line with the requirements of the IGE (Institute of Gas Engineers) recommendations IGE/SR/18 Edition 2 – Safe Working Practices To Ensure The Integrity Of Gas Pipelines And Associated Installations and the HSE’s guidance document HS(G)47 Avoiding Danger from Underground Services.

It is the responsibility of the third party to ensure that any work carried out also conforms with the requirements of the Construction and Design Management Regulations and all other relevant health and safety legislation.

**When carrying out work in the vicinity of a high pressure pipeline follow the following process**

**CONTACT NORTHERN GAS NETWORKS**

Contact Northern Gas Networks to obtain formal consent – Section 2 of this document.
**Note:** at least 7 working days notice prior to commencement of the work is normally required.

**CONSIDER SAFETY**

Consider the safety requirements – Section 3 of this document.

**INFORM NORTHERN GAS NETWORKS AND REQUEST PIPELINE LOCATION**

Inform Northern Gas Networks prior to carrying out work and arrange for Northern Gas Networks to locate the pipeline – Section 4 of this document.
**Note:** at least 7 working days notice is normally required.

**OBSERVE RESTRICTIONS**

Observe Northern Gas Networks restrictions on the allowed proximity of mechanical excavators and other power tools and the measures to protect the pipeline from construction vehicles when carrying out the work – Sections 5, 6 and 7 of this document.
**Note:** Northern Gas Networks may wish to supervise the work, consult Northern Gas Networks to confirm whether or not this is the case.

**SPECIFIC ACTIVITIES**

If work involves any of the following activities:

| | | |
|---|---|---|
| No-Dig Techniques | Hot Work | Landfilling |
| Increase in Cover | Blasting | Pressure Testing |
| Piling | Surface Mineral Extraction | Seismic Surveys |
| Demolition | Deep Mining | |

Comply with the requirements in Section 8 of this document.

**CONSULT National Gas Networks**

Consult Northern Gas Networks prior to any backfilling over, alongside or under the pipeline and obtain Northern Gas Networks' agreement to proceed. Normally Northern Gas Networks require 48 hours notice prior to backfilling – Section 9 of this document.

**IMPORTANT: This flowchart should be used in conjunction with the entire SSW22 document and not in isolation, AND if at any time during the works the pipeline is damaged even slightly then observe the precautions in Section 10 of this document.**

**IF IN DOUBT CONTACT NORTHERN GAS NETWORKS**

# 1. Scope

This specification sets out the safety precautions and other conditions affecting the design, construction and maintenance of services, structures and other works in the vicinity of Northern Gas Networks pipelines and associated installations operating at pressures greater than 7 bar gauge, located in both negotiated easements (see Section 12) and public highways.

# 2. Formal Consent

High pressure pipelines are generally laid across country within an easement agreed with the landowner or within the highway.

As the required arrangements for working within an easement and working within the highway differ, this document has been structured to highlight the specific requirements for these two types of area where work may be carried out.

In Scotland a 'Deed of Servitude', known generally as a 'wayleave' is considered equivalent to 'easement' in this document.

Generally, normal agricultural activities are not considered to affect the integrity of the pipeline, however consult Northern Gas Networks prior to undertaking deep cultivation in excess of 0.5 metres.

In all other cases no work shall be undertaken in the vicinity of the pipeline without the formal written consent of Northern Gas Networks.

Any documents, handed to contractors on site by Northern Gas Networks, must be signed for by the site manager. Northern Gas Networks will record a list of these documents using the form in Appendix A, and the contractor should maintain a duplicate list.

## 2.1 Within An Easement

The promoter of any works (see Section 12) within an easement must provide Northern Gas Networks with details of the proposed works including a method statement of how the work is intended to be carried out.

Work must not go ahead until formal written consent has been given by Northern Gas Networks. This will include details of Northern Gas Networks' protection requirements, contact telephone numbers and the emergency telephone number.

On acceptance of Northern Gas Networks' requirements the promoter of the works must give Northern Gas Networks 7 working days notice, or shorter only if agreed with Northern Gas Networks, before commencing work on site.

## 2.2 Within the Highway

Work must be notified to Northern Gas Networks in accordance with the requirements of The New Roads and Street Works Act (NRSWA) and HS(G)47.

The promoter of any works within the highway should provide Northern Gas Networks with details of the proposed works including a method statement of how the work is intended to be carried out. This should be submitted 7 working days before the planned work is to be carried out or shorter, only if agreed with Northern Gas Networks. If similar works are being carried out at a number of locations in close proximity a single method statement should be adequate.

Work should not go ahead until formal written consent has been given by Northern Gas Networks. This will include details of Northern Gas Networks' protection requirements, contact telephone numbers and the emergency telephone number.

# 3. HS&E Considerations

## 3.1 Safe Control of Operations

All working practices must be agreed by Northern Gas Networks prior to work commencing. All personnel working on site must be made aware of the potential hazard of the pipeline and the actions they should follow in case of an emergency. The Site Document Control Form (Appendix A) should be used to record the list of relevant documents that have been provided by Northern Gas Networks to the contractor.

## 3.2 Deep Excavations

Special consideration should be given to the hazards associated with deep excavations. The HSE document CIS08 'Safety in Excavations' provides further guidance and is available on the HSE web site www.hse.gov.uk

## 3.3 Positioning of Plant

Mechanical excavators must not be sited or moved above the pipeline unless written authority has been given by the Northern Gas Networks responsible person.

Mechanical excavators must not dig on one side of the pipeline with the cab of the excavator positioned on the other side.

Mechanical excavators and other traffic must be positioned far enough away from the pipeline trench to prevent trench wall collapse.

## 3.4 General

Activities associated with working in the vicinity of pipelines operating above 7 bar gauge may have impact on the safety of the general public, Northern Gas Networks staff and contractors, and may affect the local environment. Contractors must carry out suitable and adequate risk assessments prior to the commencement of work to ensure that all such issues are properly considered and risks mitigated.

# 4. Pipeline Locating

Where formal consent to work has been given, the third party must give 7 working days notice or shorter, only if agreed with Northern Gas Networks, to ensure that the pipeline is suitably located and marked out by Northern Gas Networks prior to the work commencing.

Prior to work commencing on site the pipeline must be located and pegged or suitably marked out by Northern Gas Networks personnel. In exceptional circumstances with the prior agreement of Northern Gas Networks the locating and marking out of the pipeline could be carried by competent third parties on behalf of the contractor as long as Northern Gas Networks is assured of their competence and the procedures to be followed.

Safe digging practices, in accordance with HSE publication HS(G)47 should be followed as both direct and consequential damage to gas plant can be dangerous both to employees and to the general public.

Previously agreed working practices should be reviewed and revised based on current site conditions. Any changes must be agreed by the Northern Gas Networks responsible person.

The requirements for trial holes to locate the pipeline or determine levels at crossing points must be determined on site by the Northern Gas Networks responsible person.

The excavation of all trial holes must be supervised by the Northern Gas Networks responsible person.

# 5. Slabbing and other protective measures

No protective measures including the installation of concrete slab protection should be installed over or near to the Northern Gas Networks pipeline without the prior permission of Northern Gas Networks. Northern Gas Networks will need to agree the material, the dimensions and method of installation of the proposed protective measure. The method of installation must be confirmed through the submission of a formal written method statement from the contractor to Northern Gas Networks.

Where permanent slab protection is to be applied over the pipeline Northern Gas Networks will normally carry out a survey (Pearson Survey) of the pipeline to check that there is no existing damage to the coating of the pipeline prior to the slab protection being put in place. Northern Gas Networks must therefore be contacted prior to the laying of any slab protection to arrange for them to carry out this survey.

The safety precautions detailed in Sections 3 and 6 of this document should also be observed during the installation of the pipeline protection.

# 6. Excavation

## 6.1 In Proximity to a Pipeline in an Easement

Third parties may excavate, unsupervised, with a powered mechanical excavator no closer than 3 metres to the Northern Gas Networks located pipeline and with hand held power tools no closer than 1.5 metres. Any fitting, attachment or connecting pipework on the pipeline must be exposed by hand. All other excavation shall be by hand.

Consideration may be given to a relaxation of these limits by agreement with the Northern Gas Networks responsible person on site and only whilst he remains on site. In this case a powered mechanical excavator shall not be allowed to excavate closer than 0.6 metres to the nearest part of the pipeline.

Where sufficient depth of cover exists, following evidence from hand dug trial holes, light tracked vehicles may be permitted to strip topsoil to a depth of 0.25 metres, using a toothless bucket.

No topsoil or other materials should be stored within the easement without the written permission of Northern Gas Networks.

No topsoil or materials shall be stored over the pipeline.

No fires shall be allowed in the easement strip or close to above ground gas installations.

After the completion of the work the level of cover over the pipeline should be the same as that prior to work commencing unless agreed otherwise with the Northern Gas Networks responsible person.

No new service shall be laid parallel to the pipeline within the easement. In special circumstances, and only with formal written agreement from Northern Gas Networks, this may be relaxed for short excursions where the service shall be laid no closer than 0.6 metres to the side of the pipeline.

Where work is being carried out parallel to the pipeline within or just alongside the easement a post and wire fence must be erected as a protective barrier between the works and the pipeline.

## 6.2 In Proximity to a Pipeline in the Highway

Removal of the bituminous or concrete highway surface layer by mechanical means is permitted to depth of 0.3 metres, although the use of chain trenchers to do this shall not be permitted within 3 metres of the pipeline. The Northern Gas Networks responsible person may want to monitor this work.

Where the bituminous or concrete highway surface layer extends below 0.3 metres deep it should only be removed by handheld power assisted tools under the supervision of the Northern Gas Networks responsible person. In exceptional circumstances, and following a risk assessment, these conditions may be relaxed by the Northern Gas Networks responsible person.

Third parties may excavate, unsupervised, with a powered mechanical excavator no closer than 3 metres to the located Northern Gas Networks pipeline and with hand held power tools no closer than 1.5 metres. Any fitting or attachment must be exposed by hand.

In special circumstances consideration may be given to a relaxation of these rules by agreement with the Northern Gas Networks responsible person on site and only whilst he remains on site.

The use of 'No dig' techniques is covered in Section 8.1.

Any new service running parallel to the pipeline should be laid no closer than 0.6 metres to the side of the pipeline (see Section 6.4).

## 6.3 Crossing Over a Pipeline

Where a new service is to cross over the pipeline a clearance distance of 0.6 metres between the crown of the pipeline and underside of the service must be maintained. If this cannot be achieved the service must cross below the pipeline with a clearance distance of 0.6 metres.

In special circumstances this distance may be reduced at the discretion of the Northern Gas Networks responsible person on site.

## 6.4 Crossing Below a Pipeline

Where a service is to cross below the pipeline a clearance distance of 0.6 metres between the crown of the service and underside of the pipeline must be maintained.

The exposed pipeline should be suitably supported. Where lengths of pipeline greater than 5 metres are to be exposed and unsupported the Northern Gas Networks responsible person shall be consulted and a stress analysis shall be required in order to establish support requirements. The stress analysis should be carried out by individuals with demonstrated expertise in this area, Northern Gas Networks can be consulted for advice on suitable specialists. Northern Gas Networks may request a copy of the stress analysis to confirm its adequacy. Such supports must be removed prior to backfilling.

The exposed pipeline must be protected by matting and suitable timber cladding.

## 6.5 Cathodic Protection

Cathodic Protection is applied to all of Northern Gas Networks' above 7 bar gauge buried steel pipelines and is a method of protecting pipelines with damaged coatings from corrosion by maintaining an electrical potential difference between the pipeline and anodes placed at strategic points along the pipeline.

Where a new service is to be laid and similarly protected, Northern Gas Networks will undertake interference tests to determine whether the new service is interfering with the cathodic protection of the Northern Gas Networks pipeline.

Should any cathodic protection posts or associated apparatus need moving to facilitate third party works reasonable notice, typically 7 working days, shall be given to Northern Gas Networks. Northern Gas Networks will undertake this work and any associated costs will be borne by the third party.

# 7. Construction Traffic

Where existing roads cannot be used construction traffic shall **ONLY** cross the pipeline at previously agreed locations. All crossing points will be fenced on both sides with a post and wire fence and with the fence returned along the easement for a distance of 6 metres. The pipeline shall be protected at the crossing points by temporary rafts of either sleeper or reinforced concrete construction, constructed at ground level. The Northern Gas Networks responsible person will review ground conditions, vehicle types and crossing frequencies to determine the type and construction of the raft required.

# 8. Specific Activities

This section details the precautions that need to be taken when carrying out certain prescribed activities in the vicinity of the pipeline. Consult Northern Gas Networks if you are intending to undertake one of the listed prescribed activities and/or you require further advice on whether the work that you are intending to undertake has the potential to affect the pipeline.

## 8.1 No-Dig Techniques

Where the contractor intends using no dig techniques then a formal method statement must be produced for all work that would encroach (either above or below ground) within the pipeline easement. This method statement must be formally agreed with Northern Gas Networks prior to the commencement of the work. Northern Gas Networks may wish to be present when the work is being carried out and must therefore be given adequate advance notice before the commencement of the work.

## 8.2 Increase in Cover

A pipeline integrity assessment must be provided for situations involving a final cover depth exceeding 2.5 metres. This assessment should take due account of both soil 'dead' loading and ground settlement due to earthworks. Embankment design and construction over pipelines must give consideration to prevention of any instability. Expert advice may need to be sought which can be arranged through Northern Gas Networks.

## 8.3 Piling

No piling will be allowed within 15 metres of a pipeline without an assessment of the vibration levels at the pipeline. The peak particle velocity at the pipeline should be limited to a maximum level of 75 mm/sec. Where the peak particle velocity is predicted to exceed 50 mm/sec, the ground vibration shall be monitored by the contractor and the results available to the Northern Gas Networks responsible person at their request. A typical monitoring device would be the Vibrock V801 seismograph and tri-axial geophone sensor.

Where ground conditions are of submerged granular deposits of silt and sand, an assessment of the effect of vibration on settlement and liquefaction at the pipeline shall be made.

Expert advice may need to be sought which can be arranged through Northern Gas Networks.

## 8.4 Demolition

No demolition is allowed within 150 metres of a pipeline without an assessment of the vibration levels at the pipeline. The peak particle velocity at the pipeline must be limited to a maximum level of 75 mm/sec. Where the peak particle velocity is predicted to exceed 50 mm/sec, the ground vibration shall be monitored by the contractor and the results available to the Northern Gas Networks responsible person at their request.

Where ground conditions are submerged granular deposits of silt or sand, an assessment of the effect of vibration on settlement and liquefaction at the pipeline shall be made.

Expert advice may need to be sought which can be arranged through Northern Gas Networks.

## 8.5 Blasting

No blasting is allowed within 250 metres of a pipeline without an assessment of the vibration levels at the pipeline. The peak particle velocity at the pipeline must be limited to a maximum level of 75 mm/sec. Where the peak particle velocity is predicted to exceed 50 mm/sec, the ground vibration must be monitored by the contractor and the results available to the Northern Gas Networks responsible person at their request.

Where ground conditions are of submerged granular deposits of silt or sand, an assessment of the effect of vibration on settlement and liquefaction at the pipeline shall be made.

Expert advice may need to be sought which can be arranged through Northern Gas Networks.

## 8.6 Surface Mineral Extraction

An assessment must be carried out on the effect of surface mineral extraction activity within 100 metres of a pipeline. Consideration should also be given to extraction around groundbeds and other pipeline associated plant and equipment.

Where the mineral extraction extends up to the pipeline easement, a stable slope angle and stand-off distance between the pipeline and slope crest must be determined by Northern Gas Networks. The easement strip should be clearly marked by a suitable permanent boundary such as a post and wire fence, and where appropriate, slope indicator markers shall be erected to facilitate the verification of the recommended slope angle as the slope is formed, by the contractor. The pipeline easement and slope needs to be inspected periodically to identify any signs of developing instability. This may include any change of slope profile including bulging, the development of tension cracks on the slope or easement, or any changes in drainage around the slope. The results of each inspection should be recorded.

Where surface mineral extraction activities are planned within 100 metres of the pipeline but do not extend up to the pipeline easement boundary, an assessment, by Northern Gas Networks must be made on whether the planned activity could promote instability in the vicinity of the pipeline. This may occur where the pipeline is routed across a natural slope or the excavation is deep. A significant cause of this problem is where the groundwater profile is affected by changes in drainage or the development of lagoons.

Where the extraction technique involves explosives the provisions of section 8.5 apply.

## 8.7 Deep Mining

Pipelines routed within 1 km of active deep mining may be affected by subsidence resulting from mineral extraction. The determination of protective or remedial measures will normally require expert assistance, which can be arranged through Northern Gas Networks.

## 8.8 Landfilling

The creation of slopes outside of the pipeline easements may promote instability within the vicinity of the pipeline. An assessment shall therefore be carried out, by Northern Gas Networks on the effect of any landfilling activity within 100 metres of a pipeline. The assessment is particularly important if landfilling operations are taking place on a slope in which the pipeline is routed.

## 8.9 Pressure Testing

Hydraulic pressure testing will not be permitted within 8 metres of the pipeline unless suitable precautions have been taken against the effects of a burst. These precautions should include limiting of the design factor to 0.3 for the third party pipeline for a distance of 6 metres either side of the Northern Gas Networks pipeline, and the use of mill tested pipe or sleeving.

## 8.10 Seismic Surveys

Northern Gas Networks must be advised of any seismic surveying work in the vicinity of pipeline that will result in Northern Gas Networks' pipeline being subjected to peak particle velocities in excess of 50 mm/sec. The ground vibration near to the pipeline shall also be monitored by the contractor whilst the survey work is being carried out. Where the peak particle velocity is predicted to exceed 50 mm/sec, the ground vibration shall be monitored by the contractor and the results available to the Northern Gas Networks responsible person at their request.

## 8.11 Hot Work

The Northern Gas Networks responsible person on site will supervise all welding, burning or other 'hot work' that takes place within the easement.

# 9. Backfilling

Third parties must provide Northern Gas Networks with 48 hours notice, or shorter notice only if agreed with Northern Gas Networks, of the intent to backfill over, under or alongside the pipeline. This requirement should also apply to any backfilling operations alongside the pipeline within three metres of the pipeline. Any damage to the pipeline or coating shall be reported to the Northern Gas Networks responsible person in order that damage can be assessed and repairs can be carried out.

**Minor damage to pipe coating and test leads shall be repaired by Northern Gas Networks free of charge.**

No backfilling should be undertaken without Northern Gas Networks' agreement to proceed. The Northern Gas Networks responsible person will stipulate the necessary consolidation requirements.

If the pipeline has been backfilled without the knowledge of the Northern Gas Networks' responsible person then he will require the material to be re-excavated in order to enable the condition of the pipeline coating to be confirmed.

## 10. Action in the case of damage to the pipeline

If the Northern Gas Networks pipeline is damaged, even slightly, and even if no gas leak has occurred then the following precautions must be taken immediately:

- Shut down all plant and machinery and extinguish any potential sources of ignition.
- Evacuate all personnel from the vicinity of the pipeline.
- Notify Northern Gas Networks using the free 24 hour emergency telephone number 0800 111 999*
- Notify the Northern Gas Networks responsible person or his office immediately using the contact telephone number provided.
- Ensure no one approaches the pipeline.
- Do not try to stop any leaking gas.

## 11. References

| | |
|---|---|
| NRSWA | New Roads & Street Works Act |
| HS(G)47 | Avoiding Danger from Underground Services |
| IGE/SR/18 | Safe Working Practices to Ensure the Integrity of Gas Pipelines and Associated Installations |
| CIS08 | Safety in Excavations (HSE document) |

## 12. Glossary of terms

| | |
|---|---|
| **Contractor** | The person, firm or company with whom Northern Gas Networks enters into a contract to which this specification applies, including the contractor's personal representatives, successors and permitted assigns. |
| **Deed of Servitude** | In Scotland a 'Deed of Servitude' is considered equivalent to 'easement' in this document. |
| **Easement** | Easements are negotiated legal entitlements between Northern Gas Networks and landowner and allow Northern Gas Networks to lay, operate and maintain pipelines within the easement strip. Easement strips may vary in width typically between 6 and 25 metres depending on the diameter and pressure of the pipeline. Consult Northern Gas Networks for details of the extent of the easement strip where work is intended. |
| **Liquefaction** | Liquefaction is a phenomenon in which the strength and stiffness of the soil is reduced by earthquake shaking or other rapid loading. Liquefaction occurs in saturated soils, that is, soils in which the space between individual particles is completely filled with water. When liquefaction occurs, the strength of the soil decreases and the ability of the soil to support pipelines or other components is reduced. |
| **Pearson survey** | A survey used for locating coating defects on buried pipeline services. |
| **Promoter of new works** | The person or persons, firm, company or authority for whom new services, structures or other works in the vicinity of existing Northern Gas Networks pipelines and associated installations operating above 7 bar gauge are being undertaken. |
| **Northern Gas Networks responsible person** | The person or persons appointed by Northern Gas Networks with the competencies required to act as the Northern Gas Networks representative for the purpose of the managing the particular activity. |
| **Wayleave** | General term which is considered equivalent to 'easement' in this document. |

## APPENDIX A

SITE DOCUMENT CONTROL FORM – SAMPLE

Emergency Telephone No. **0800 111 999***

# SITE DOCUMENT CONTROL FORM

**Activity Reference:**

**Activity Location:**

**Site Manager:** (name and telephone number)

**Northern Gas Networks Contact:** (name and telephone number)

**The following documents were issued to**

(individual's name) **of** (company name and address)

**by** (Northern Gas Networks representative) **on** (date)

**Documents:**

(List of documents)

**Signed:** (by the recipient)

**Date of signature:**

*All calls are recorded and may be monitored

SAMPLE

Emergency Telephone No. **0800 111 999***

## SITE DOCUMENT CONTROL FORM

| |
|---|
| Activity Reference: |
| Activity Location: |
| Site Manager: |
| Northern Gas Networks Contact: |
| The following documents were issued to<br>of<br>by on |
| Documents: |
| Signed:<br>Date of signature: |



*All calls are recorded and may be monitored

## Emergency Telephone Number for pipeline damage or gas escapes

# 0800 111 999*

Northern Gas Networks contact details:

*All calls are recorded and may be monitored

G2288

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