Enforcement Policy for the iron mains risk reduction programme 2021 - 2026

Background

The Health and Safety Executive's (HSE) enforcement policy for the Iron Mains Risk Reduction Programme (IMRRP) addresses the failure of 'at risk' iron gas mains (i.e. those pipes within 30 metres of buildings) and the consequent risk of injuries, fatalities and damage to buildings. It is designed to secure public safety whilst allowing efficiency, environmental, strategic and customer service factors to contribute to driving the programme and allowing sufficient flexibility to enable the Office of the Gas and Electricity Markets (Ofgem) to incentivise innovation in risk management.

Over the last 43 years various iron mains replacement programmes have been in place. Since 2002 the programmes have been designed to decommission all 'at risk' iron pipes within a 30-year period.

In December 2010 HSE and Ofgem jointly commissioned an independent report to assess the progress made with decommissioning programmes since 2002, and to evaluate potential options for the remaining 20 years of the original programme taking into account the benefits and costs of each option. and is published on HSE's website at RR888 - HSE/Ofgem: 10 year review of the Iron Mains Replacement Programme[1] (the CEPA/AESL report).

The 10 Year Review of the Health and Safety Executive's enforcement policy for the replacement of iron gas mains[2] describes how HSE used the findings of the CEPA/AESL report to develop the enforcement policy for the 2013-21 enforcement policy.

As the 2013-21 enforcement policy drew to a close evidence was provided that demonstrated that as a consequence of the use of the Mains Risk Prioritisation System (MRPS) tool to facilitate the prioritisation of high scoring pipes (the seed pipes), the risk score profile of the remaining population of at risk iron pipes has flattened out, and so consequently is less useful in prioritising pipes for decommissioning.

This finding, is consistent with the comments on page 84 of the 2011 HSL Research Report 888 "HSE/Ofgem: 10 year review of the Iron Mains Replacement Programme"; which even 10 years ago was acknowledging the impact of decommissioning on the risk profile of the remaining iron pipes.

Since 2002 approximately 20% of the 'at risk' iron mains population has been decommissioned. Although dynamic risk growth remains a feature of the 'at risk' iron mains population a proportion of the higher risk iron mains have now been decommissioned. This has allowed HSE to accept longer planning timescales for zonal replacement projects…."

Consequently, selecting individual (seed) pipes for replacement on the basis of a small difference in MRPS risk score, has relatively little effect on the degree of risk removed.

Therefore, the new enforcement policy to be applied from April 2021 to March 2026 while requiring Tier 1 "at risk" pipes to be prioritised based on risk no longer requires decommissioning projects to be based on "seed pipes" (although GDNs can still use the seed pipe mechanism if they so wish – provided they also have

mechanism for identifying and prioritising pipes that may present a higher risk for reasons that are not necessarily reflected in the MRPS score).

Small local networks

To the best of HSE's knowledge there are no longer any small local networks using 'at risk' iron pipes. As such, they are not included within this policy. However, if during the lifetime of this policy any are identified they will be dealt with on a case-by-case basis.

Legal requirements

The Health and Safety at Work etc. Act 1974 (HSWA), section 3(1), requires pipeline operators to conduct their undertakings to ensure, so far as is reasonably practicable, that persons not in their employment are not exposed to risks to their health and safety.

In addition, the Pipelines Safety Regulations 1996 (PSR), regulation 13 requires the operator to ensure that a pipeline is maintained in an efficient state, in efficient working order and in good repair. This duty is absolute, with a limited defence only if a breach is caused by a third party.

In November 2003 the Pipelines Safety (Amendment) Regulations 2003 came into force. This created a statutory defence under PSR regulation 13A to a breach of regulation 13 if the failed iron gas pipe was included in a decommissioning programme approved by HSE. Initially decommissioning programmes were approved for a period of twelve months although longer approval periods have also been granted since 2011.

The arrangements for meeting the replacement programme form part of the GDN operators' safety cases prepared under GS(M)R. The GDN operators have a duty to follow these arrangements.

Industry structure

In June 2005 Transco completed the sale of four of its original eight gas distribution networks (GDNs). Then in 2017 National Grid Gas plc (Transco's successor) sold its remaining four networks to form Cadent Ltd.

Cadent Ltd, Scotland Gas Networks plc, Northern Gas Networks Ltd, Wales & West Utilities Ltd, and Southern Gas Networks plc are now responsible for complying with this enforcement policy within their respective GDNs.

HSE's Enforcement Policy for the Replacement of Iron Gas Mains 2021 – 2026: The Three Tier Approach

The three tier approach allows a greater focus on risk and larger diameter 'at risk' iron pipes will only be subject to decommissioning if either condition or risk assessment or engineering judgement indicates this is justified. There is greater flexibility to allow the GDN operators to exploit innovative solutions, where these are suitable and sufficient, such as pipe lining technologies to either replace pipes or extend pipe life. It also ensures efficiency, environmental and reliability benefits associated with the programme are accounted for.

The three tiers of pipe diameter are

- Tier 1: 8 inches and below (approximately 80% of all 'at risk' iron pipes)
- Tier 2: above 8 inches and below 18 inches (approximately 15% of all 'at risk' iron pipes)
- Tier 3: 18 inches and above (approximately 5% of all 'at risk' iron pipes)

At risk pipes in Tier 1

The CEPA/AESL report concluded that the ‘at risk’ iron pipe population at 8” diameter and below represents the most significant risk to the public. However, there is still no effective alternative to decommissioning for pipes in this diameter range.

As in the 2013 – 2021 enforcement policy each GDN operator will set a length of Tier 1 pipes to be decommissioned over the period of their approved programmes. This should be sufficient to ensure that all Tier 1 pipes are removed by the end of 2032 or earlier. For approved programmes lasting longer than one year the GDN operators will be allowed to adopt a flexible approach to their annual delivery so long as arrangements are in place to ensure that their approved target is met. This will facilitate the delivery of large or complex decommissioning projects which require significant preparation and will also allow the GDN operators to take remedial action should their progress with decommissioning fall short in a particular year.

The approach for Tier 1 pipes shall prioritise the efficient decommissioning of pipes with a higher risk. throughout the period of their Approved Programme. Gas Distribution Networks (GDN) operators are expected to make effective use of the risk models available to them and to make improvements where appropriate.

The GDN operators should continue to plan their Approved Programme so that their remaining population of Tier 1 pipes is decommissioned by 2032. In addition, the GDN operators should maintain effective management of the risk posed by their Tier 1 pipes and should set out their policy and procedures in their GSMR safety case for implementing and managing their Approved Programme to comply with this enforcement policy statement.

- stubs (short lengths of Tier 1 iron pipe) joined to a Tier 2 or Tier 3 parent main shall not be considered as a Tier 1 pipe for the purposes of this enforcement policy providing they do not exceed the maximum lengths specified in GDN policy and procedures for implementing and managing their Approved Programmes.
- any pipes decommissioned on the basis of their condition, or those selected for reasons of reliability or joint leakage, may be counted towards the approved programme target, and
- the GDN operators will be able to ‘profile’ their work to take account of the scaling down of workload towards the end of 2032.

At risk pipes in Tier 2

Tier 2 pipes scoring above a risk-action threshold [1], set by the GDN operator, will be selected to receive appropriate attention over the period of the Approved Programme. Appropriate attention means that Tier 2 pipes scoring above the risk-action threshold will either be decommissioned or, where a suitable and sufficient technique exists, assessed for continued use if found to be in good condition or remediated to allow for lifetime extension. In addition, those Tier 2 pipes scoring above the risk-action threshold will be subject to the condition monitoring arrangements described below.

Pipes in Tier 2 scoring below the risk-action threshold may still be subject to appropriate attention. This may include, but is not limited to, decommissioning where a cost benefit analysis agreed with Ofgem indicates that such action is justified. Examples of this might include the decommissioning and replacement of pipes that enable greater efficiencies in the delivery of Tier 1 decommissioning projects.

Since the onus is on the GDN operators to demonstrate that they control the risks in their network they have developed proposals to determine a risk-action threshold. These proposals have been reviewed by HSE and are considered appropriate. Each GDN operator’s PSR regulation 13A programme submission will contain a detailed description of the method used to set the risk-action threshold.

No annual decommissioning length target will be set for Tier 2 pipes scoring above the risk-action threshold as part of their approved PSR regulation 13A programme. This is because the Tier 2 pipes selected by the GDN operators within their networks to receive appropriate attention may not be decommissioned if a suitable and sufficient alternative to decommissioning is applied instead. No suitable and sufficient alternatives to decommissioning have been yet proposed by the GDN operators, however, it is anticipated that Ofgem funding incentives will drive innovation in this area. With increasing innovation HSE expects that decommissioning will be supplemented by alternative risk management methods.

As part of their approved programme submissions the GDN operators will be required to provide details of their arrangements for managing the risk from those Tier 2 pipes that have migrated to above the risk-action threshold during the course of the approved programme period and cannot reasonably be subjected to appropriate attention during that same period.

Pipes in Tier 2 scoring below the risk-action threshold may still be subject to decommissioning where a cost benefit analysis agreed with Ofgem is justified. Examples of this might include the decommissioning and replacement of pipes that enable greater efficiencies in Tier 1 decommissioning projects.

At risk pipes in Tier 3

The HSE/Ofgem: 10 year review of the Iron Mains Replacement Programme[2] concluded that iron pipes of 18" diameter and above are the least likely to fail of all those within 30 metres of buildings. As such Tier 3 pipes will be subject to the condition monitoring arrangements described below. In addition, Tier 3 pipes may still be subject to appropriate attention which may include but is not limited to decommissioning where a cost benefit analysis agreed with Ofgem is justified.

Condition Monitoring

Condition Monitoring

As part of their Approved Programmes the GDN operators should establish suitable condition monitoring regimes. Details of these regimes must be provided by the GDN operators as part of their Approved Programme submissions.

The GDN operators will continue to respond to all public reported gas escapes from all pipes as required by GS(M)R regulation 7(4), the procedures for which are detailed in their GS(M)R safety cases.

HSE expects the GDN operators to systematically analyse the outputs from these condition monitoring activities in order to pinpoint any pipe failure ‘hotspots’. Where pipes are found not to be in an efficient state, in efficient working order and in good repair, the GDN operators should take suitable and sufficient action to remedy this, including decommissioning where the pipe is considered to have deteriorated beyond safe or effective repair.

In addition, HSE expects the GDN operators to take advantage of innovative techniques that may allow them to pro-actively monitor the condition of pipes in Tier 2 scoring above the risk-action threshold and pipes in Tier 3 to predict the likelihood of failure and to improve asset integrity data.

Decommissioning of Iron Mains

Any iron pipe must be decommissioned when it can no longer be effectively repaired or remediated and becomes unsafe for use. As structured above, the three-tiered approach requires that all Tier 1 pipes will be decommissioned by the end of 2032 or earlier. Pipes in Tiers 2 and 3 must be decommissioned on the basis of

asset integrity assessment processes covered by supporting documentation to be provided by the GDN operators with their Approved Programme submissions.

Within a GDN operator's Approved Programme there may be pipes in Tiers 2 and 3 that, if subject to appropriate condition monitoring and/or remediation, will remain suitable for continued use. These pipes are included within the population of iron pipes benefiting from the statutory defence provided the Approved Programme has been followed by the GDN operator.

HSE will consider an iron pipe to be decommissioned when it is no longer used to carry gas. Where a polyethylene (PE), or other pipe, has been inserted into an iron pipe, or effectively a new pipe has been constructed using a spray-lining technology that uses an existing pipe as a mould for a new pipe, the existing iron pipe will be considered to be decommissioned. Iron pipes will only be considered to be decommissioned where the internal pipe is itself capable of meeting the requirements of PSR regulation 5 without any contribution from the external iron structure.

Approval of Iron Mains Risk Reduction Programmes from 1st April 2021

Each PSR regulation 13A approval granted by HSE will specify only the length of Tier 1 pipes to be decommissioned and the time period over which this will be achieved. However, the GDN operators should provide additional information in their submission regarding the length of Tier 2 pipes above the risk action threshold that will receive appropriate attention over the period of the approved programme. Each GDN operator should also provide details of how pipes in Tier 2 that score above the risk action threshold and pipes in Tier 3 will be monitored.

From 1st April 2021 HSE will grant PSR regulation 13A approvals to the GDN operators for periods of up to five years.

Monitoring of Iron Mains Risk Reduction Programmes

Over the period of each approved programme HSE will require the GDN operators to provide the following information on a quarterly and annual basis

- Length of 'at risk' Tier 1 pipes decommissioned
- Length of 'at risk' Tier 2 pipes scoring above the risk action threshold subjected to appropriate attention
- Length of 'at risk' Tier 2 pipes scoring above the risk action threshold and decommissioned
- Length of 'at risk' Tier 2 pipes scoring below the risk action threshold decommissioned
- Length of all 'at risk' Tier 3 pipes decommissioned.

Only the length of 'at risk' pipes decommissioned in Tier 1 will contribute to the GDN operators approved programme target. Lengths of pipes subjected to leakage surveys need not be provided to HSE as part of the IMRRP monitoring arrangements although this may be sought by Inspectors during verification inspections.

Medium pressure ductile iron (MPDI) mains

HSE required Transco to decommission all MPDI mains within 30m of property by 30 April 2003, resulting in excess of 2800 km being decommissioned. Serious concerns remain about the integrity of MPDI mains and any

additional lengths which are found or become 'at risk' must be decommissioned as soon as reasonably practicable and in any case within 12 months.

GSMR safety cases and the network safety

GDN operators should set out their policy and procedures in their GSMR safety cases for implementing and managing their iron mains risk reduction programmes to meet the objectives of this policy.

Approvals granted by HSE under PSR regulation 13A and affected by this policy relate only to the risk from the failure of ‘at risk’ iron mains. Other GDN duties to ensuring the safety of the public from the gas distribution network, such as:

- Emergency response to gas escapes
- Network pressure management
- Network gas odourisation
- Up-to-date and accurate asset record keeping
- Repair and maintenance of assets other than iron mains within 30m of occupied buildings remain unaffected by the PSR regulation 13A approval.

These duties are addressed in each GDN operator’s intervention strategy and will be examined in the event of any gas escape subject to an HSE investigation.

Footnotes

1. A risk threshold sets a limit beyond which a pipe must be removed.

2. HSE/Ofgem: 10 year review of the Iron Mains Replacement Programme 2011 Research Report 888 (PDF) [3]

Resources

Avoiding danger from underground services[4]

Consultation on amendments to PSR 1996[5]

Related content

Domestic gas[7]

Pipelines[8]

Pipelines and gas supply industry: FAQs[9]

Offshore oil and gas[10]

COMAH[11]

Regulating major hazards[12]

Carbon capture and storage (CCS)[13]

Liquefied Petroleum Gas pipework survey[14]

Link URLs in this page

1. RR888 - HSE/Ofgem: 10 year review of the Iron Mains Replacement Programme
   https://www.hse.gov.uk/research/rrhtm/rr888.htm
2. 10 Year Review of the Health and Safety Executive's enforcement policy for the replacement of iron gas mains
   https://www.hse.gov.uk/gas/supply/mainsreplacement/10-year-review.htm
3. HSE/Ofgem: 10 year review of the Iron Mains Replacement Programme 2011 Research Report 888
   https://www.hse.gov.uk/research/rrpdf/rr888.pdf
4. Avoiding danger from underground services
   https://www.hse.gov.uk/pubns/books/hsg47.htm
5. Consultation on amendments to PSR 1996
   https://consultations.hse.gov.uk/
6. More resources
   https://www.hse.gov.uk/gas/supply/resources.htm
7. Domestic gas
   https://www.hse.gov.uk/gas/domestic/index.htm
8. Pipelines
   https://www.hse.gov.uk/pipelines/index.htm
9. Pipelines and gas supply industry: FAQs
   https://www.hse.gov.uk/pipelines/faqs.htm
10. Offshore oil and gas
    https://www.hse.gov.uk/offshore/index.htm
11. COMAH
    https://www.hse.gov.uk/comah/index.htm
12. Regulating major hazards
    https://www.hse.gov.uk/regulating-major-hazards/index.htm
13. Carbon capture and storage (CCS)
    https://www.hse.gov.uk/carboncapture/index.htm
14. Liquefied Petroleum Gas pipework survey
    https://www.hse.gov.uk/gas/lpg/survey.htm

Glossary of abbreviations/acronyms on this page

PSR
Pipeline Safety Regulations
FAQs
Frequently Asked Questions