Cross Bore
Awareness & Prevention

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UNITING THE INDUSTRY

Agenda

1) Risks of cross bores

2) MN Actions

3) IM Approach

4) Response and Investigation

5) Public Awareness

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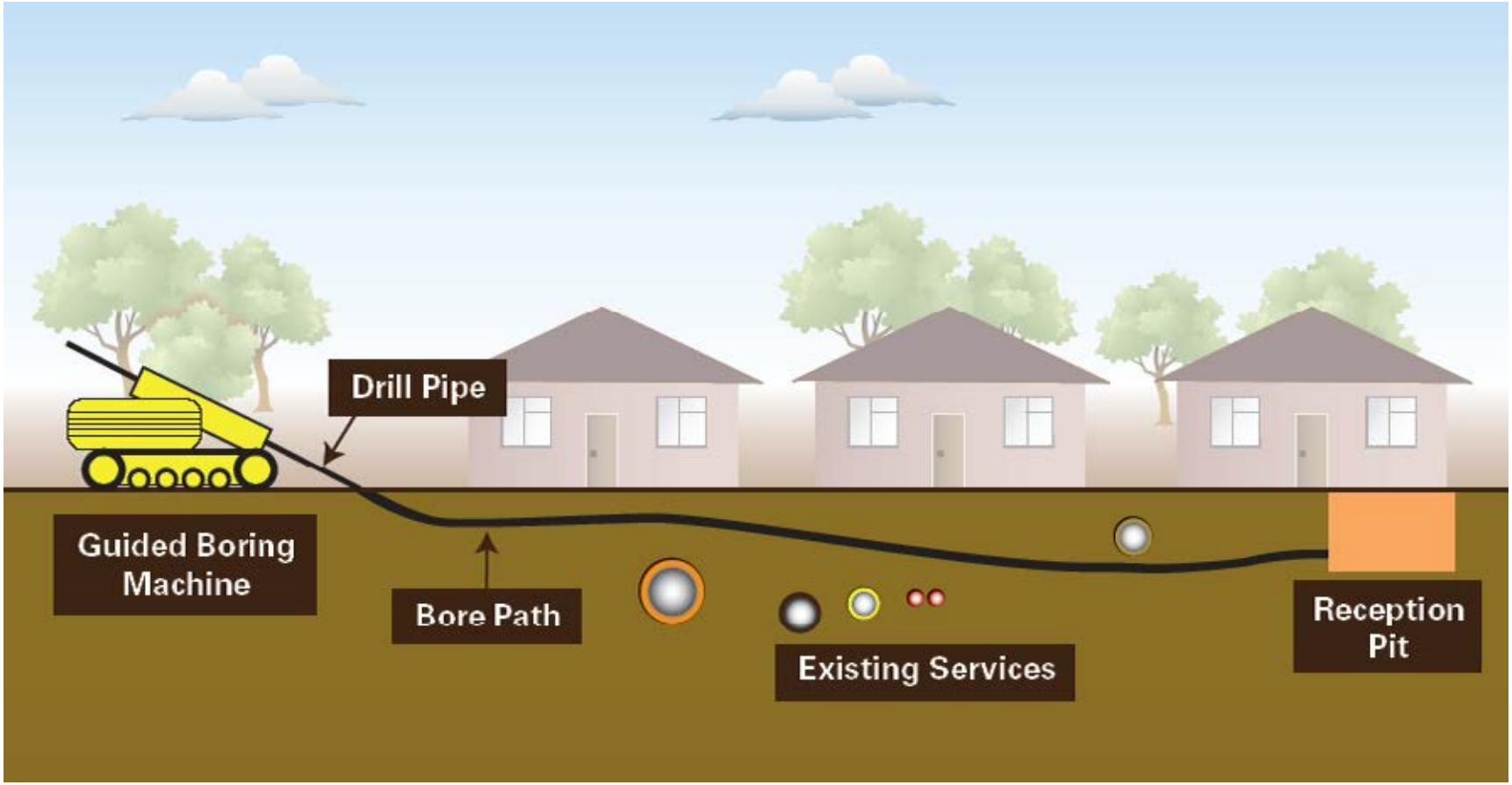
How cross bores happen…



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The old way…

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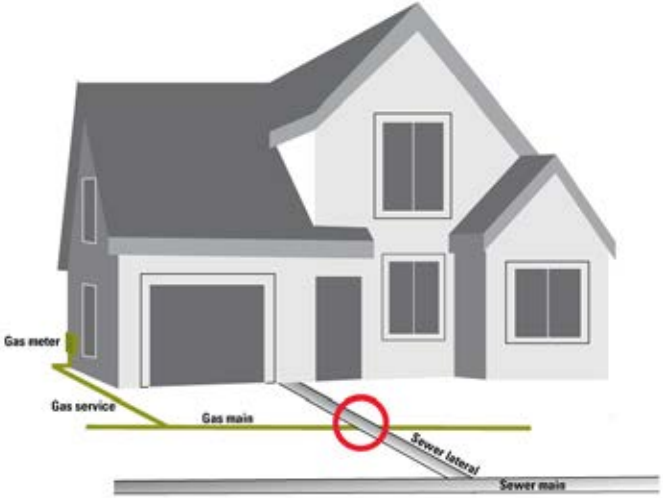

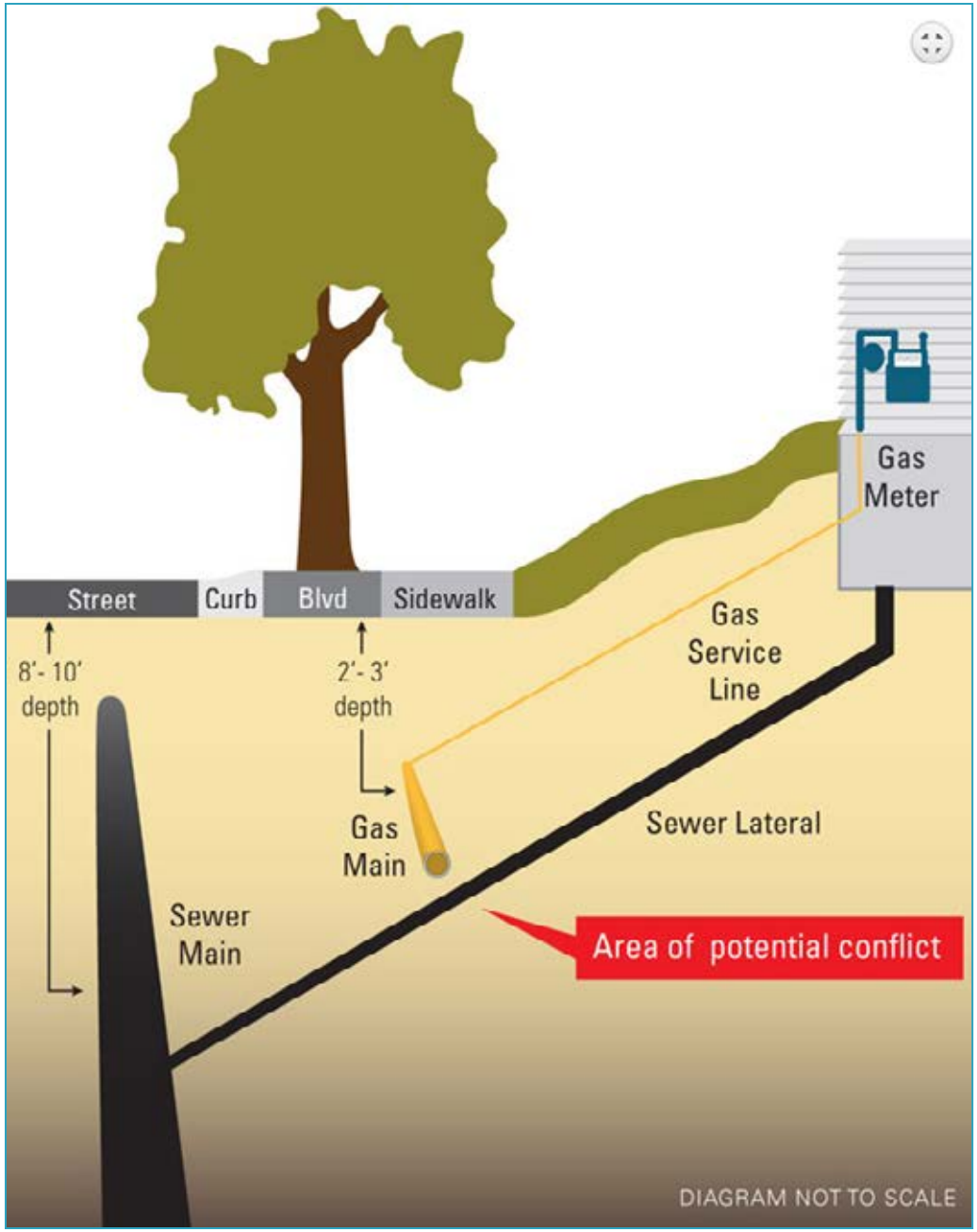

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It's a Silent Threat

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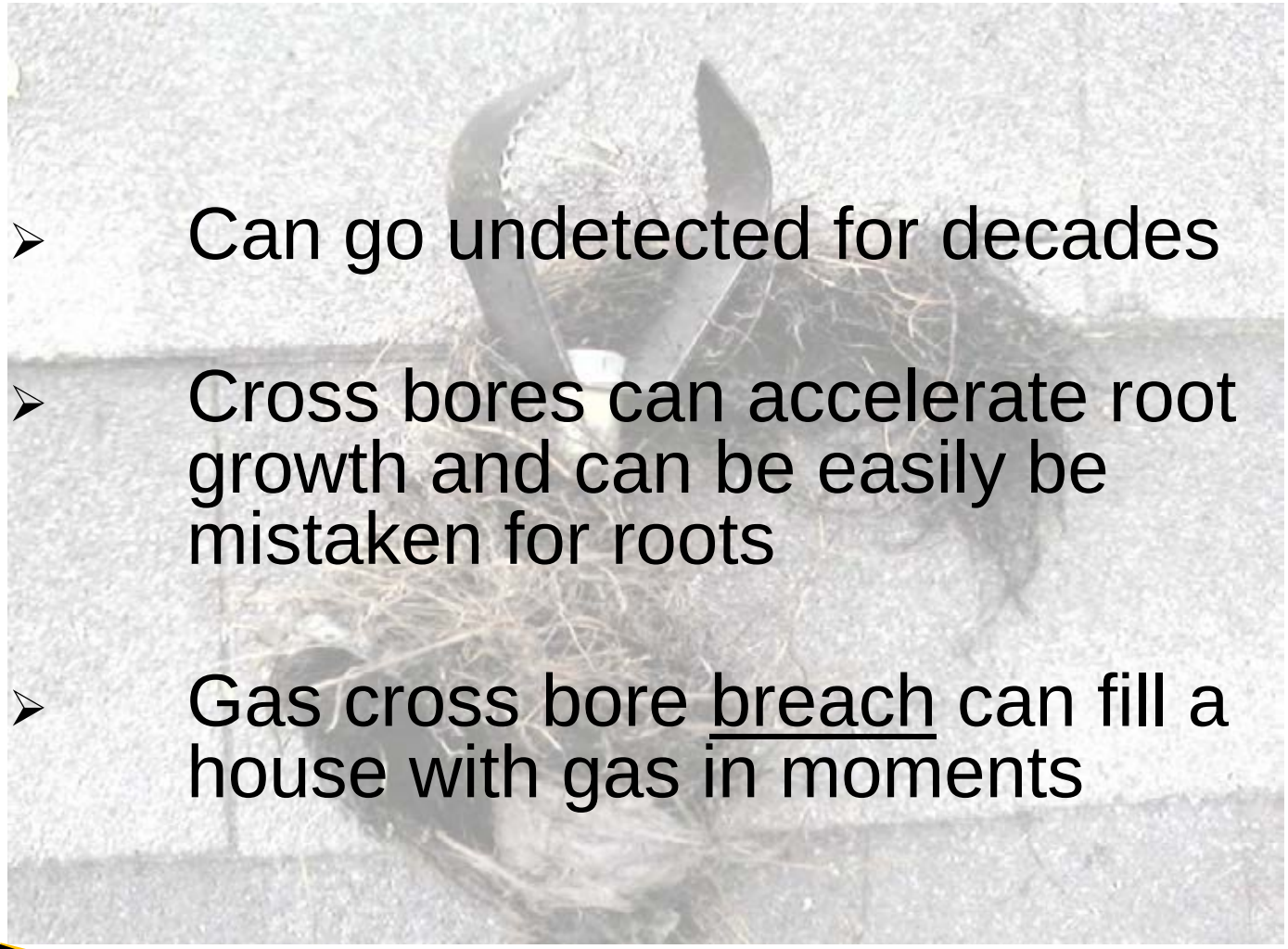
This is not a new problem

Nationally, sewer/gas cross bores were identified as early as 1972

A Big Problem



- Can go undetected for decades
- Cross bores can accelerate root growth and can be easily be mistaken for roots
- Gas cross bore breach can fill a house with gas in moments

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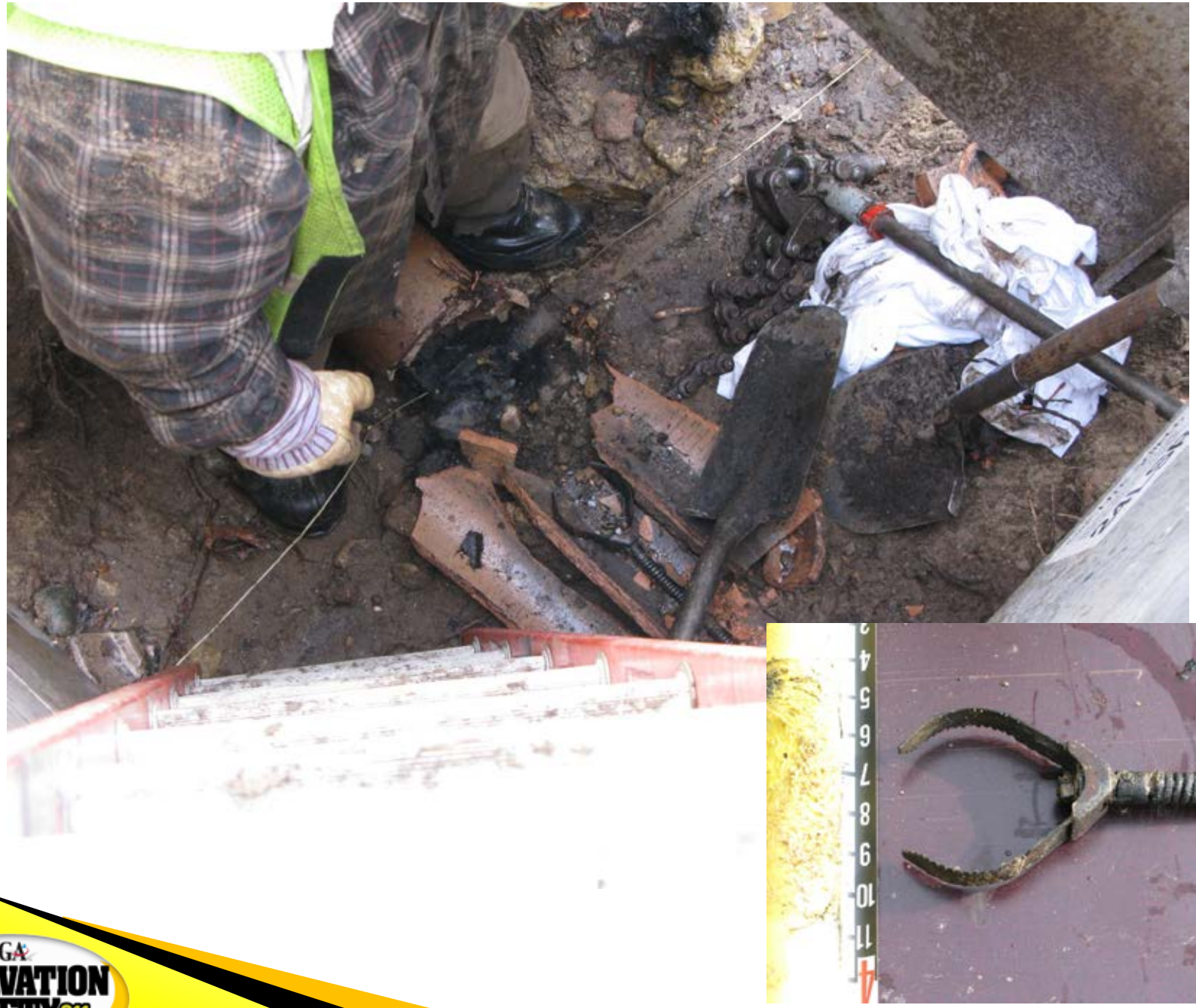

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Catastrophic consequences!!!

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Cross Bores in Minnesota

February 2010 explosion - MNOPS took action

Over 300 gas-sewer cross bores have been documented in Minnesota

Our goal… no more cross bores

Sewer Summit
March 9, 2010 St. Paul, MN

Effectively Addressing the Issue

For a gas operator

An <u>effective</u> Plan must address:

1. New gas facility Installations
2. Legacy Cross bores
3. Effective Public Awareness Plan

Conventional excavation laws do not adequately address this threat

811®

Know what's **below.**
Call before you dig.

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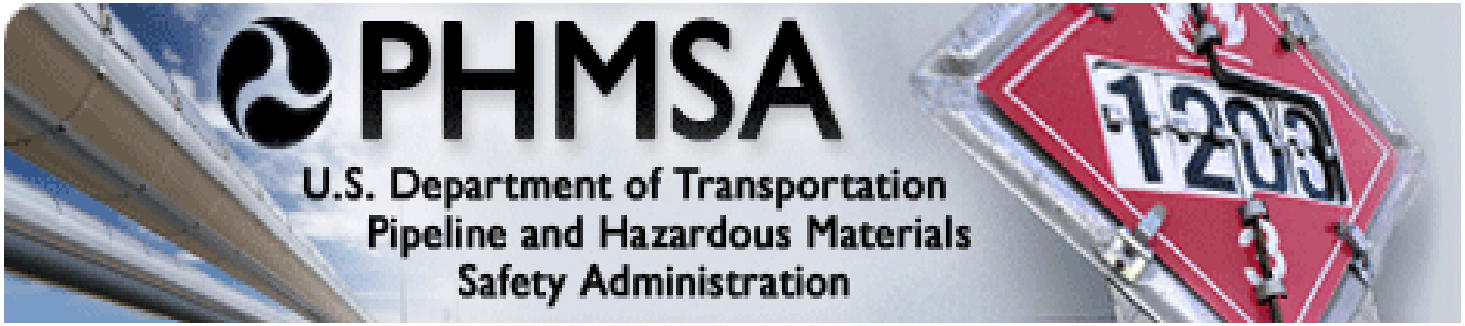
Actions Taken By The

Minnesota Office of Pipeline Safety

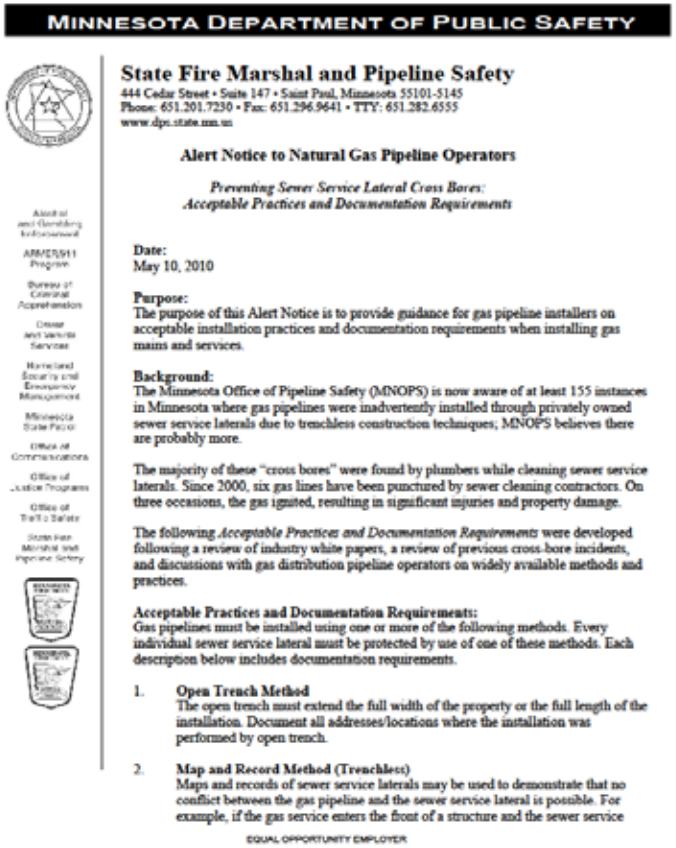


MNOPS used its authority Under CFR 49 Part 192 to develop an Alert Notice.

MNOPS Alert Notice

Published:
May 10, 2010

Acceptable methods to install a new gas pipeline in Minnesota



MINNESOTA DEPARTMENT OF PUBLIC SAFETY

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Alert Notice to Natural Gas Pipeline Operators

Preventing Sewer Service Lateral Cross Bores:
Acceptable Practices and Documentation Requirements

Date:
May 10, 2010

Purpose:
The purpose of this Alert Notice is to provide guidance for gas pipeline installers on acceptable installation practices and documentation requirements when installing gas mains and services.

Background:
The Minnesota Office of Pipeline Safety (MNOPS) is now aware of at least 155 instances in Minnesota where gas pipelines were inadvertently installed through privately owned sewer service laterals due to trenchless construction techniques; MNOPS believes there are probably more.

The majority of these "cross bores" were found by plumbers while cleaning sewer service laterals. Since 2000, six gas lines have been punctured by sewer cleaning contractors. On three occasions, the gas ignited, resulting in significant injuries and property damage.

The following *Acceptable Practices and Documentation Requirements* were developed following a review of industry white papers, a review of previous cross-bore incidents, and discussions with gas distribution pipeline operators on widely available methods and practices.

Acceptable Practices and Documentation Requirements:
Gas pipelines must be installed using one or more of the following methods. Every individual sewer service lateral must be protected by use of one of these methods. Each description below includes documentation requirements.

1. **Open Trench Method**
The open trench must extend the full width of the property or the full length of the installation. Document all addresses/locations where the installation was performed by open trench.

2. **Map and Record Method (Trenchless)**
Maps and records of sewer service laterals may be used to demonstrate that no conflict between the gas pipeline and the sewer service lateral is possible. For example, if the gas service enters the front of a structure and the sewer service

EQUAL OPPORTUNITY EMPLOYER

https://dps.mn.gov/divisions/ops

Approved Methods to Prevent Cross Bores

1. Open Trench Method
2. Map and Record method (Trenchless)
3. Exposed Sewer Method (Trenchless)
4. Sonde Method (Trenchless)
5. Relative Elevation Method (Trenchless)
6. Televising Method (Trenchless)
7. Other (with pre-approval)

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1. Open Trench Method

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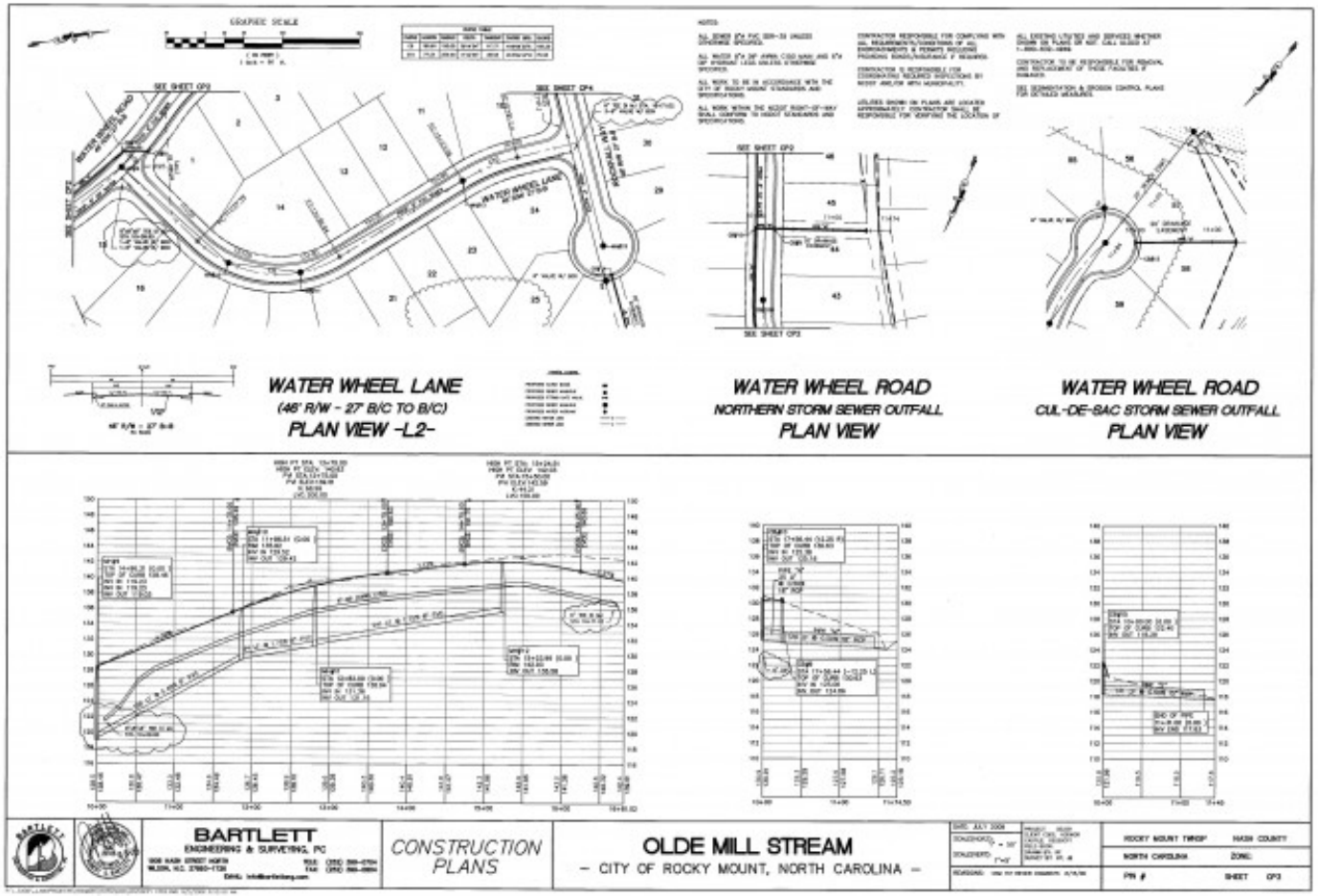
2. Map and Record Method (trenchless)



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3. Exposed Sewer Method (Trenchless)

Excavator exposes the sewer lateral at the gas crossing

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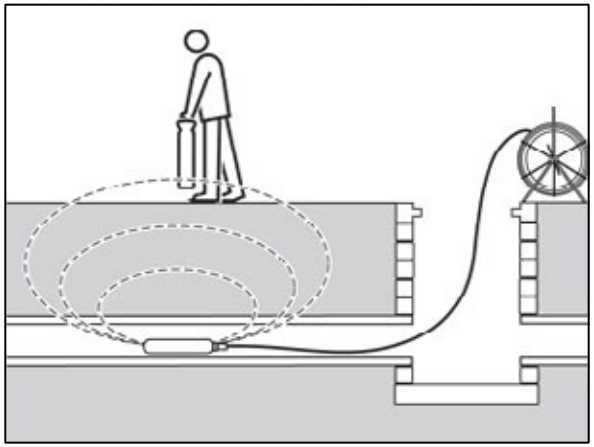
4. Sonde Method (Trenchless)



Maintain 3 feet between drilling head and sewer service
Drilling head and sewer depth at each crossed location

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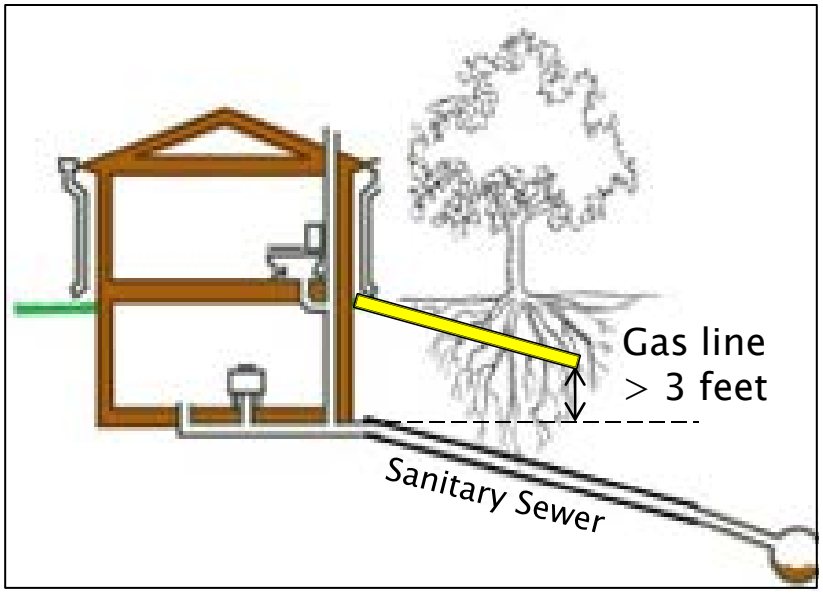
5. Relative Elevation Method (Trenchless)



Requires Sonde on drilling head to verify
3 feet above highest point on sewer

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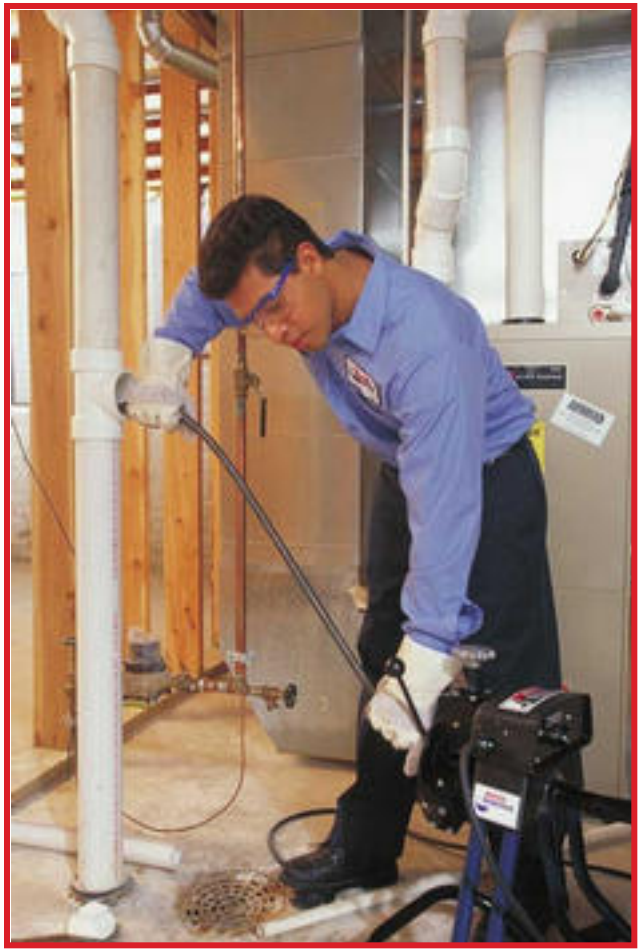
6. Televising Method (Trenchless)



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7. OTHER Trenchless Sewer Service Verification Methods

Must meet or exceed the level of safety offered by the approved methods

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Methods that are NOT acceptable

1) Manhole listening devices

2) Potholes over unverified locates

Limitations of the Alert Notice

1. No parameters on scoping acceptance or quality of equipment

2. Mapping acceptance depends on operators acceptability criteria

3. Many of the methods rely on the accuracy of the sewer operator mapping

4. Sonde typically sets on bottom of pipe so diameter of pipe needs to be considered

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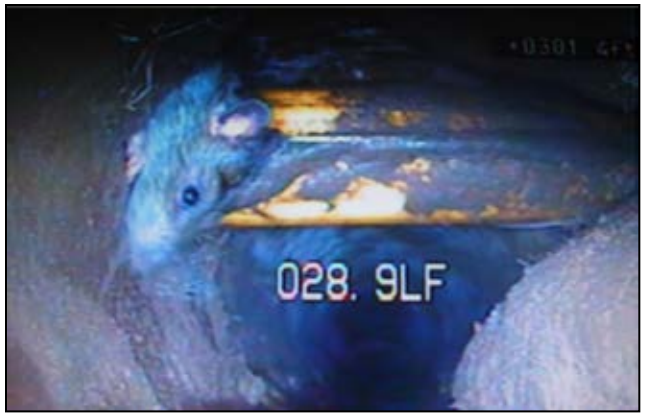
Limitations of the Alert Notice

VIDEO:

Determine whether or not the “Televising Method” should be accepted or not?



An operators Quality Control measures need to be clearly defined.

Limitations of the Alert Notice

MNOPS Alert Notice only addresses new installations.

What can be done about legacy cross bores?

Locating Private Sewer laterals

Installed after 12/31/2005:

- Locate portion of service lateral within the public ROW

Installed prior to 01/01/2006 (3 Options):

- Locate service lateral
- Provide maps, drawings, or other records
- Inform excavator that no information exists

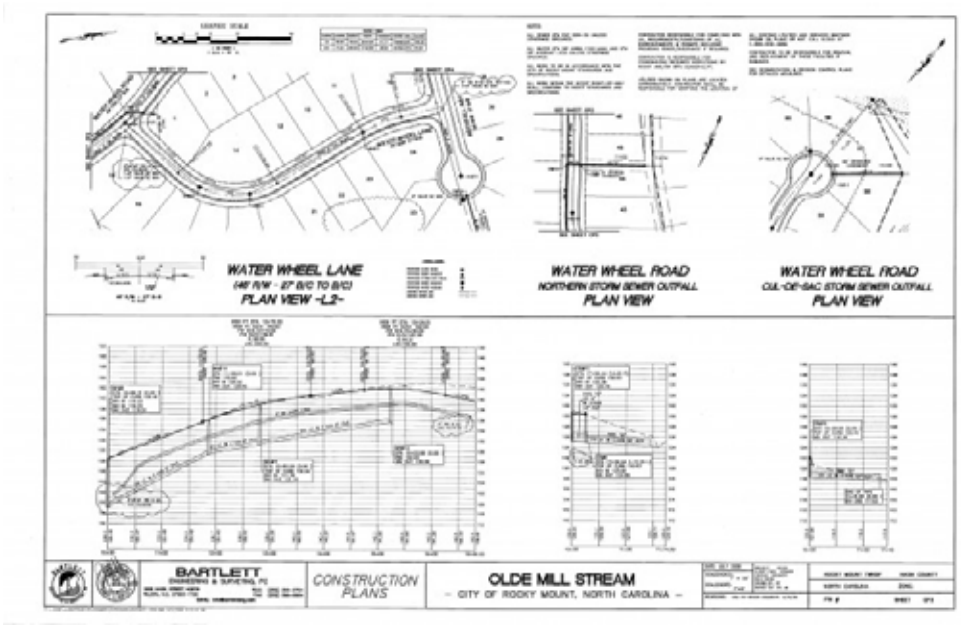
Locating Private Facilities

MN Statute: recognizes and encourages good faith information on private facilities.

Mapping Facilities

A joint and cooperative effort

TO PROTECT OUR FUTURE



CONSIDER PHMSA TAG GRANTS

(Technical Assistance Grants to communities)

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Integrity Management

49 CFR 192.1001

An overall approach by an operator to ensure the integrity of its gas distribution system.

Addressing Legacy Issues

Legacy cross bores must be considered and incorporated into a gas operators Distribution Integrity Management Plan (DIMP).

49 CFR 192.1005 – 192.1011

DIMP Effective Date: Feb. 12, 2010

Implementation Date: August 2, 2011

DIMP Elements

- Knowledge of system
- Identify Threats
- Evaluate and Prioritize Risk
- Identify and Implement measures to address risk
- Measure performance, monitor results, evaluate effectiveness
- Periodic evaluation and improvement
- Report Results

Knowledge of systems and identifying threats…

1. Installation methods
2. Year pipe was installed & past installations
3. Topography where pipeline was installed
4. Type of structures in a given area (example – townhomes)
5. Location of gas main with consideration to ROW
6. Soil Conditions/W.T considerations where pipeline was installed
7. Population where pipeline was installed
8. Scoping methods used (considering equipment limitations)
9 Known shallow depths on sewer mains (shallow bedrock)
10. Methods that were used to prevent cross bores
11. Accuracy and Reliability of Sewer maps
12. History of conflicts previously identified

Evaluate and Prioritize Risk

Risk = Likelihood x Consequence

Likelihood: MN: over 300 documented cross bores

Consequences: Catastrophic

Addressing Risk – hypothetical example

In January 2013, as part of its DIMP program, a gas operator has identified cross bores as a potential threat to its system.

To better understand the threat and determine appropriate actions, it creates a cross bore study team.

Addressing Risk – hypothetical example

Multi disciplinary team

I. Gas Operations/Engineering
II. Compliance
III. GIS
IV. Field Construction
V. SME

Objective:

1) Identify extent of threats to the system

2) Recommend measures to address risk

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Addressing Risk – hypothetical example

All documented gas/sewer conflicts within its service area were reviewed.

Review findings:

1. pre-1980: 1 conflicts
2. 1980-1990: 2 conflicts
3. 1990-2000: 24 conflicts
4. 2000 – present: 8 conflicts

Addressing Risk – hypothetical example

The team developed a risk based criteria for conducting its study:

Risk Based Criteria

1. Locations of gas main installations between 1990 - 2000
2. Locations where the structure is more than 5 feet above the roadway
3. Locations within 500 feet of schools, hospitals and churches
4. Locations of properties not containing basements (example – townhomes, trailer parks)

Addressing Risk - Hypothetical Example

Team identified locations meeting at least 3 of the 4 risks in its criteria.

2500 sewer laterals televised.

Scoping Results

125 conflicts – 0.5% conflict rate

This is a realistic conflict rate in a high risk area.

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Addressing Risk: Hypothetical Example

KEY FINDINGS:

1. **Plastic gas pipe** was material in each conflict found

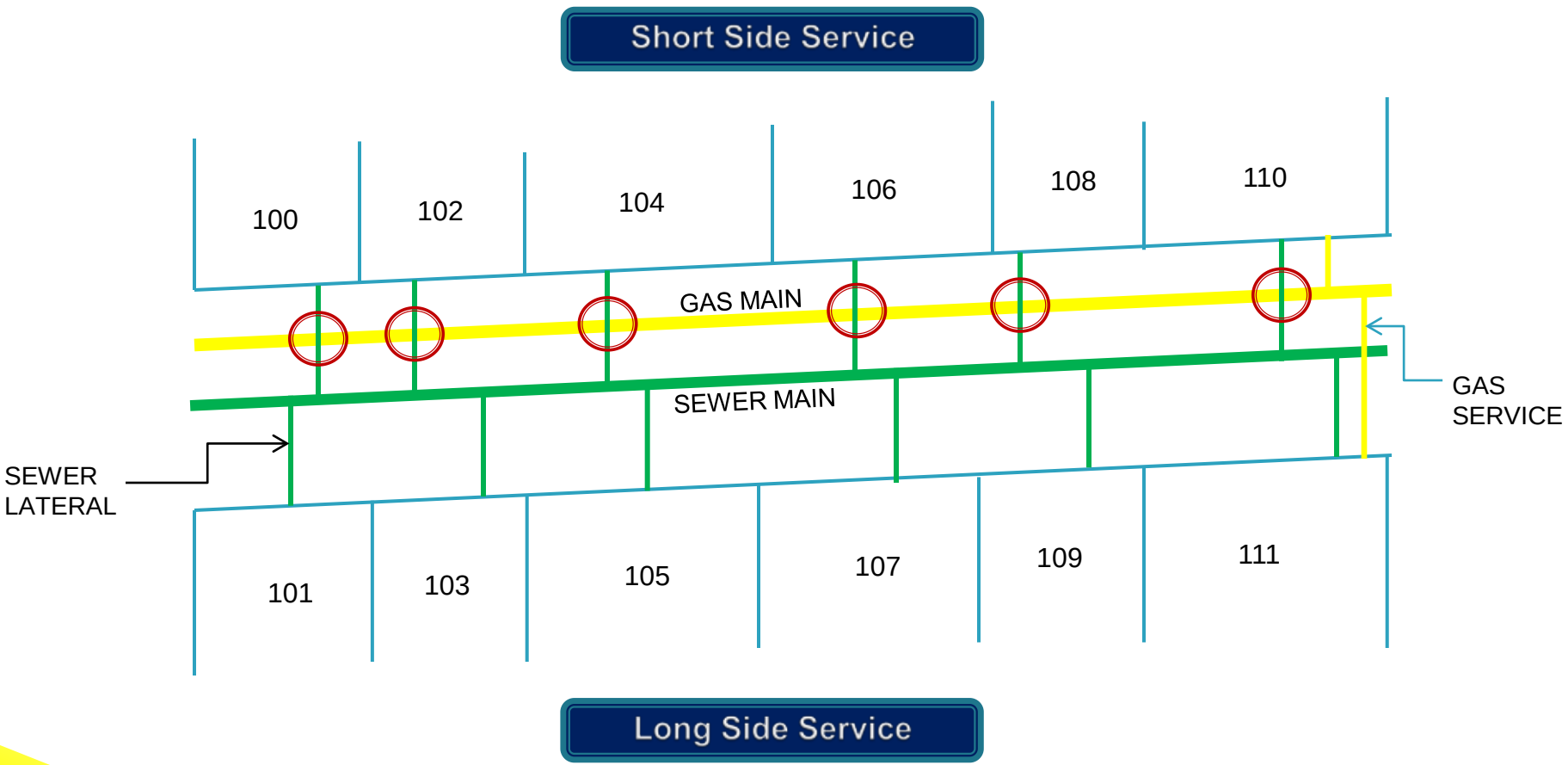
2. **Areas with municipal sewer systems** were involved in each conflict
   (If the area used septic systems outside ROW, likelihood is significantly reduced)

3. **Trenchless gas installation methods** were used for each conflict

4. **Short-side service situations** accounted for 100 (80%) of conflicts

5. **Installations involving previous projects where conflicts were found** accounted for 35 the study conflicts

Long Side vs. Short Side Services



= Highest Risk Location

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Addressing Risk – Hypothetical Example

Team recommendations:

1. Review all locations in its system meeting at least 1 of the 4 criteria in the “risk based criteria”.
2. Use the key findings from the study to prioritize neighborhoods/areas by risk.
3. Scope sewers on a risk basis.

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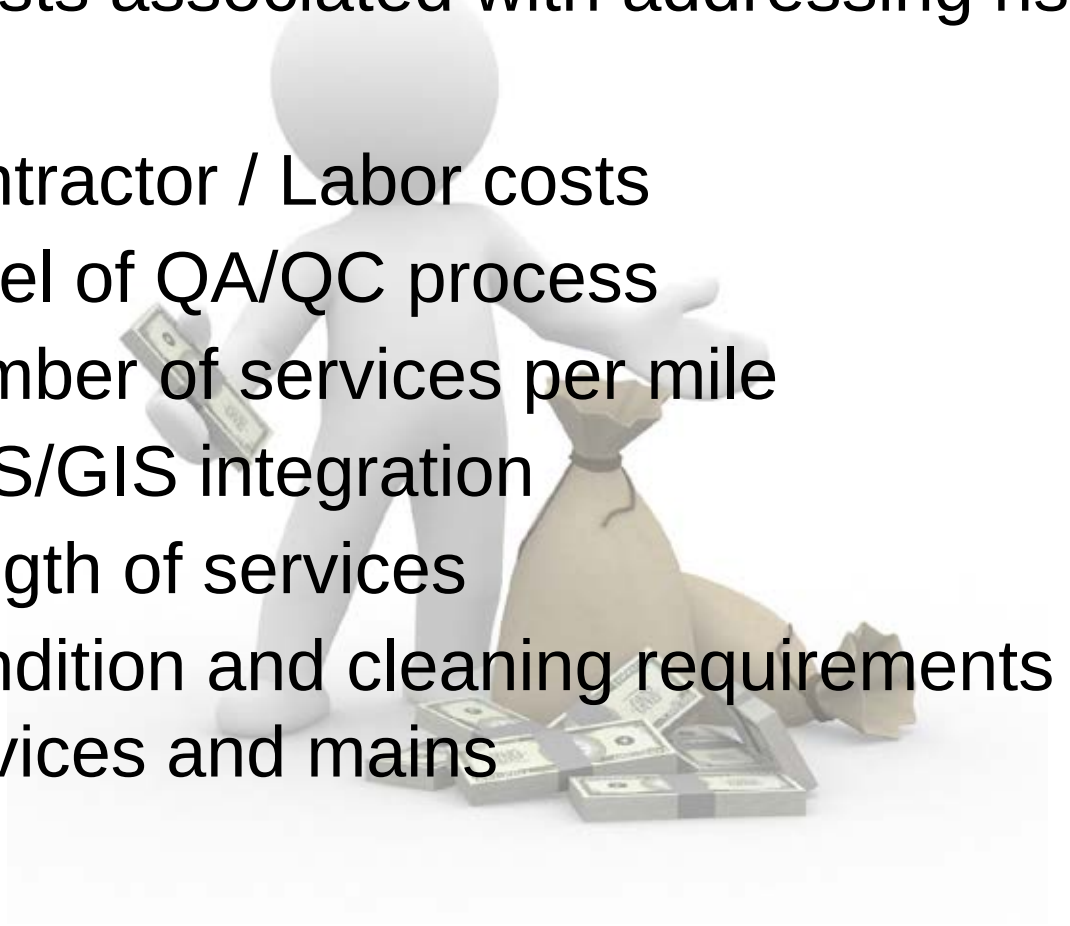
How much will this cost?

Some costs associated with addressing risk:

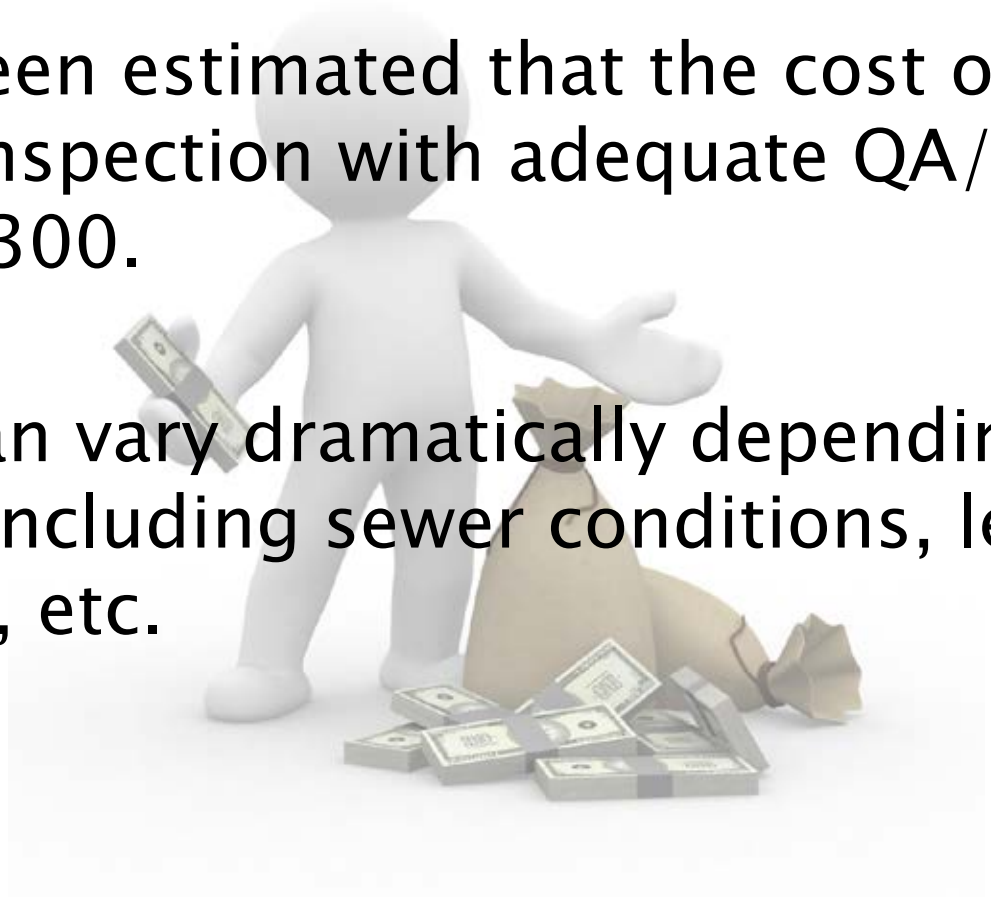
1. Contractor / Labor costs
2. Level of QA/QC process
3. Number of services per mile
4. GPS/GIS integration
5. Length of services
6. Condition and cleaning requirements on services and mains



How much will this cost?

It has been estimated that the cost of a sewer lateral inspection with adequate QA/QC costs $200-$300.

Costs can vary dramatically depending several factors including sewer conditions, length of services, etc.



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How much will this cost?

Some costs associated with **NOT** addressing risk:

1) Property damage costs
2) Risk to your OWN incident responders
3) Costs associated with injury or death
4) Investigative costs
5) Public perception costs
6) Legal costs
7) Regulatory agency penalties

Largest known court award associated with cross bore: $30,000,000!!!

Investigations & response

A cross bore is identified or suspected.

NOW WHAT?

Investigations & response

An operator should have specific procedures that address cross bore response and investigation.

For each cross bore, a comprehensive approach must be taken during the investigation.

(who, what, when, where, why & how)

Cross bore Response and Investigation

- How was the cross bore discovered?
- Have the homeowner & neighbors been notified?
- When & how was the gas line installed?
- Were the sewer lines previously televised?
- What other pipelines were installed in the same manner during the same time period?
- Area shall be assessed to determine what area if any needs to be televised as a result of the incident.
- Document and incorporate data into DIMP risk model.

Typical Cross bore Repair

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MNOPS Investigation Process

MNOPS Crossbore Checklist

Date: MNOPS Inspector:

Operator:

Address:

City:

1. How was the crossbore discovered? (homeowner, part of operator's ongoing program, non-related excavation...?)
2. When was the gas main installed?
3. When was the sewer installed?
4. Was the area scoped?
5. History of the area? (dates of street construction, sewer improvements, other utility improvements...?)
6. Were other crossbores found in the vicinity?
7. Has the general public near the vicinity been made aware of the crossbore? Is so, how?

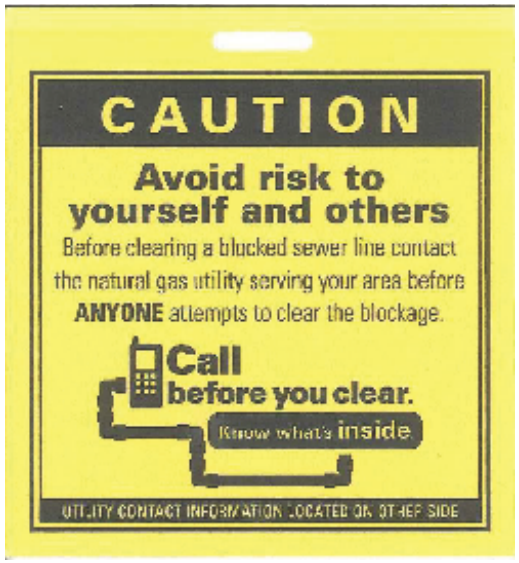
Note: If any information is not available on-site, follow up with the operator to obtain post-inspection.

Need to Obtain

1. Photos of the gas main
2. Depth and size of gas main and sewer lateral
3. Sketch of the area with measurements (building, gas location, sewer location, ground elevation changes from crossbore to house, etc...)
4. Did the gas main breech the sewer lateral? (top, bottom, center?)

Public Awareness

- Rental companies
- Rental equipment hang tags
- Plumbers and sewer cleaning contractors
- Trade associations
- Technical colleges
- Company website
- Media campaigns
- Bill inserts



Public Awareness

Information must be in both English and other languages commonly used by a significant concentration of non-English speaking population along its pipeline.

Program must be evaluated for effectiveness.

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Operator Initiatives: Legacy Issues

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Know what's inside.

cooperative effort - any operator can use

www.callbeforeyouclear.com

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Questions?