The Often Forgotten Underground World
Who is NPL?

**CORE BUSINESS:** The safe installation & maintenance of reliable energy distribution systems

- 2000 employees
- 5M work hours
- 13.5M feet installed/replaced
- Fleet of over 3000 units ranked in Top 20 in construction industry
- Heavy One-Call user
What is trenchless technology?
How about these?
Do we have a problem?

Who's responsible for marking?

What could happen?

Lateral to mains connection

City street

Property line

Installed line

House

Sewer Main
Some hits are a time bomb!

Madill, OK 1992

Madill, OK 2007
March 13, 2006

“Woman, Granddaughters Barely Escape Explosion”
“The gas-fueled fire that destroyed a St. Paul home is being investigated by Minnesota's Department of Pipeline Safety ...”

- KSTP TV
“Houston, we have a problem”

- Captain James Lovell,
  Spacecraft Commander of Apollo 13, 1970
How often does this happen?
What we know:

- Minnesota Public Utilities Commission
  - 27 cross bores reported in a 6 month period
- City A, CA
  - 4 blocks inspected. 24 cross bores found
- City B
  - 2 cross bores per mile in 200 miles of sewer main
  - One cross bore at a school
- City C
  - 3 cross bores per mile of sewer main
  - One cross bore at a hospital
- City D
  - 2% cross bores out of 11,000 sewer laterals inspected
Odds of getting a hole in one

1 in 10,000
0.01%

Montana Gimmie
How often do explosions happen?

Known explosions in past 10 years

- Austell, GA
- Bellwood, IL
- Burlington, VT
- Cincinnati, OH
- Massena, NY
- Merriam, KS
- Middletown, OH
- Mobile, AL
- Phoenix, AZ
- Rochester, MN
- St. Paul, MN
- Tucson, AZ
- White Bear Lake, MN

- Clayton County, GA
- Fairfax, OK
- Gilbert, AZ
- McKinney, TX
- Madill, OK
The exposure is:

- Low Frequency - High Severity
- Long Term vs. Short Term
- A “predictable surprise”
Unmarked sewer lines are risky business
One bad move...
Even when it seems as though you were born to do the job, things can go wrong.
So what should we do?

- Plumbers
- Academia
- Legislators
- Regulators
- Contractors
- Manufacturers
- Owner/Operators
The Use of Trenchless Excavation Equipment in Relation to the Marking of Underground Facilities

2008
“How important is the issue of unmarked sewer lines to your business?”

• 40 responses from major trenchless contractors in the US
• Average Importance: 9.26 out of 10
Do you want your contractor gambling?

Contractor’s Contingency Plan

Unmarked Sewer Lines
“Are owner / operators you work for required to mark their facilities?”
Does there need to be better enforcement of violators?

- Yes: 100%
- No: 0%
Regulators
Legislators

- 40+ states already require some level of locating by the sewer owner/operator
- Recent progress in AL, AZ, GA, KS, MN, NM, NV, SD, TN, VA, WI ...
- More can be done in most states
  - New installations
  - Replacement installations
Contractors
Installation Solutions

• All underground facilities, including sewer lines, should be marked
• All new sewer laterals should be installed with a location device
• All new gas lines should be installed only after verifying no conflict with all utilities, especially unmarked sewer lines
Industry Literature

- Guidelines for locating pre-construction and verification post construction
- Guidelines for Identification of Legacy Cross Bores
- Sample ordinances

www.crossboresafety.org
Sewer Line Conflict?  
Yes / No, proceed

Daylighted?  
No / Yes, proceed

Privately-Owned Sewer Systems (trailer park, school, etc.) require 100% daylight.

Sewer Main

NPL Policy #22, Process 2  
Visually Verify Bore Clearance  
No / Yes, proceed

NPL Policy #22, Process 3  
Spaced Verification  
No / Yes, proceed

STOP  
Call Area Manager

www.gonpl.com
Owners/Operators

Reduction of risk can be achieved:

• Formal program to address?
  ➢ 2008 AGA Survey of 60 LDC’s: 26% said yes.

• Better policies

• Relatively new technology for both new and legacy installations
• All sewer mains and laterals must be pre-located to the sidewalks
• Curb-to-meter services are completed with open trench
• Post Camera required before ANY GAS UP
• All recordings are copied and sent to the local sewer district
• Sewer Tag is attached to sewer cleanout
Duke Energy’s sewer locate & inspection process

Replacement installations:

• Site visit all projects
• Determine if sewer is in the front
• Determine depth of sewers and
• Document elevation of first floor vs. street grade
• Pre-locate sewer mains & laterals
• Post-camera required before ANY GAS UP
  - 8 cross bores found out of 8000 pre-camera’d services
  - .1% vs .01% for a hole-in-one
Cost?

- Duke Energy:
  - Less than 5% more
  - Is it worth one life?
  - How do we justify not spending the $?
Legacy solutions

• Find installed problems … before they find us.
Incident in Phoenix, AZ, May 8, 2004
SWG’s Sewer Lateral Investigation Program

- Priority Customer Classes:
  - Schools
  - Hospitals
  - Nursing homes
  - Trailer parks
  - Apartment complexes

- Sewer Laterals Database
- Field Investigations
- Public Education
Investigation Methods

- Maps and Records review
- Electronic separation
- Video inspection
- Dig and Inspect
The Launch

And there she goes...
## Overall SLIP Conflicts Data

<table>
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<tr>
<th>Region</th>
<th>Total Investigations</th>
<th>Conflicts</th>
<th>%</th>
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<tbody>
<tr>
<td>Central Arizona</td>
<td>213,959</td>
<td>67</td>
<td>.03</td>
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<tr>
<td>Northern Nevada</td>
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<td>27</td>
<td>.08</td>
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<tr>
<td>Southern Arizona</td>
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<td>3</td>
<td>.01</td>
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<tr>
<td>Southern Nevada</td>
<td>109,548</td>
<td>5</td>
<td>.01</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>653,145</strong>*</td>
<td><strong>120</strong></td>
<td><strong>.02/.05</strong>*</td>
</tr>
</tbody>
</table>

* c. 35% of investigations were done in field
Public Education & Communication

• Targeted public are part of an ongoing public awareness program to provide further education and communication related to potential sewer lateral conflicts.

• The targeted public education is directed to the following:
  – Plumbing contractors
  – Equipments rental companies
• Sewer lateral conflicts are threats to the integrity of distribution pipelines
• Sewer lateral investigation programs have been effective in mitigating risks
• Public education programs have been effective in mitigating risks
• More preventative measures are needed in terms of marking sewer laterals to eliminate conflicts right from the start
“Luck is not a strategy”

- Steve Ewing
  Past Chairman AGA,
  Vice Chair, DTE
Goal: Protect all parties

Public
Plumbers
Academia
Legislators
Regulators
Contractors
Manufacturers
Owner/Operators
Questions??
Duke’s Verification Process

- Plumber or Customer calls re: sewer blockage

- Duke sends 1st responder to locate
  - No conflict – Plumber cleans sewer line
  - Potential conflict – Dispatch C&M crew to:
    - disconnect gas service and let plumber clean line
    - test and reconnect service
Legislators

• 40+ states already require some level of locating by the sewer owner/operator
  – Is that the home/building owner or municipality?
• Courts have ruled that home/building owner does not have expertise to be responsible for location of sewer laterals.
  – Does the State require them to join the One-Call system?
Legislators

• Recent progress in AL, AZ, GA, KS, MN, NM, NV, SD, TN, VA, WI …
• More can be done in most states
  – New installations
  – Replacement installations
Sewer work safeguards

Natural gas pipelines may be located close to a sewer line, so please take immediate action if you should see or smell any of the following signals the next time you clean out a sewer line with a rooter device:

- A strong natural gas odor at the cleanout or inside the building served by the sewer line
- Bubbles rising through standing water or in the toilet bowl

If these signals are present, stop what you’re doing, and:

- Have everyone immediately evacuate the premises, and as they do so, leave the building’s doors open
- Do not turn on or off any light switches, or use other sources of ignition
- From a safe distance, call Southwest Gas and 911 for immediate assistance

Should you sense or see, but not penetrate, an obstruction in the line, call the Southwest Gas emergency number below for immediate assistance to ensure that the gas line has not been damaged. There is no charge for this service.

In addition, should you be called to an address that indicates a blockage in the sewer lateral connecting a house or business to the main sewer, please call 811 for an emergency line locate to determine the location of our underground lines before starting any clean-out process.

For emergency assistance, call:

- Southern California – 1-800-867-9091
- Central Arizona (Phoenix area) – 1-800-528-4277
- Southern Arizona (Tucson, and other Southern Arizona communities) – 1-800-722-4277
- Northern Nevada, Northern California – 1-800-772-4555
- Southern Nevada (Bullhead City, Ehrenberg, Parker, Laughlin and Needles) – 1-800-447-5422
After seeing bubbles in the water and smelling the natural gas, the plumber told the grandmother and her three grandchildren to get out of the home immediately.

- Middletown, Ohio building inspector:

"The plumber did absolutely nothing wrong. He had no way of knowing the gas line had been breached."
Manufacturers

• 2005: 258 (5 per week) HDD hits in US
• Potentially affecting HDD use
One LDC’s standard

• Verification is required using any or all:
  – Check manholes for depth and direction
  – Fish tape with Sonde transmitter
  – Excavate 1’ > depth of lateral near start and end of bore
  – GPR, if it works
  – Camera before/after bore

• Pre and post construction door hangers
Industry standards

- HDD Consortium, Horizontal Directional Drilling - Good Practices Guidelines
- EMI, Safety Manual: Directional Drilling Tracking Equipment
- DCCA, Horizontal Drilling: Safe Operations Guidelines
- CGA, Minimum Damage Prevention Guidelines: Excavation Practices For Underground Facilities
- Manufacturer’s Manuals
- State One-Call Manuals