

U. S. Department of Transportation
Pipeline and Hazardous Materials
Safety Administration



Damage Prevention Research
Government/Industry Pipeline R&D Forum

www.phmsa.dot.gov

Strategies & Goals

	<u>Program Elements</u>	<u>Program Element Goals</u>
1.	Damage Prevention	Reducing the number of incidents and accidents resulting from excavation damage and outside force
2.	Pipeline Assessment and Leak Detection	Identifying and locating critical pipeline defects using inline inspection, direct assessment and leak detection
3.	Defect Characterization and Mitigation	Improving the capability to characterize the severity of defects in pipeline systems and to mitigate them before they lead to incidents or accidents
4.	Improved Design, Construction, and Materials	Improving the integrity of pipeline facilities through enhanced materials, and techniques for design and construction
5.	Systems for Pipeline Mapping and Information Management	Enhancing the ability to prevent and respond to incidents and accidents through management of information related to pipeline location (mapping) and threats definition
6.	Enhanced Operation Controls and Human Factors Management	Improving the safety of pipeline operations through enhanced controls and human factors management
7.	Risk Management & Communications	Reducing the probability of incidents and accidents, and mitigating the consequences of hazards to pipelines
8.	Safety Issues for Emerging Technologies	Identifying and assessing emerging pipeline system technologies for opportunities to enhancing their safety

Damage Prevention Research

#	Goal	Pipeline Type	Contractor	Project Title	PHMSA	Co-Share	Pct Cmpl
1.	Safety	HazLiq GasTrans Dist-Steel Dist-Non-Metal	Witten Technologies, Inc.	<i>"Digital Mapping of Buried Pipelines with a Dual Array System"</i>	\$469,060	\$539,671	100
2.	Safety	Dist-Non-Metal	Gas Technology Institute	<i>"Pipeline Damage Prevention Through the Use of Locatable Magnetic Plastic Pipe and a Universal Locator"</i>	\$95,502	\$95,541	100
3.	Safety	HazLiq GasTrans Dist-Steel Dist-Non-Metal	Battelle Memorial Institute	<i>"Emerging Padding and Related Pipeline Construction Practices"</i>	\$70,000	\$70,000	100
4.	Safety	HazLiq GasTrans Dist-Steel Dist-Non-Metal	C-FER Technologies	<i>"Effectiveness of Prevention Methods for Excavation Damage"</i>	\$70,000	\$80,000	100
5.	Safety	HazLiq GasTrans Dist-Steel Dist-Non-Metal	Northeast Gas Association	<i>"Infrasonic frequency seismic sensor system for preventing third party damage to gas pipelines"</i>	\$210,000	\$210,000	100
6.	Safety	HazLiq GasTrans Dist-Steel Dist-Non-Metal	Gas Technology Institute	<i>"Differential Impedance Obstacle Detection Sensor (DIOD) – Phase 2"</i>	\$237,151	\$237,215	53
7.	Safety	HazLiq GasTrans Dist-Steel	Gas Technology Institute	<i>"Improved In-field Welding and Coating Protocols"</i>	\$109,618	\$390,871	17
8.	Safety	HazLiq GasTrans Dist-Steel Dist-Non-Metal	Physical Sciences Inc.	<i>"Infrasonic Frequency Seismic Sensor System for Pipeline Integrity Management"</i>	\$748,308	\$0	78
Total:					\$2,009,639	\$1,623,298	



U.S. Department
of Transportation

Pipeline and
Hazardous Materials
Safety Administration



Damage Prevention Research “Generating Innovation”

- **Technology Improvements**
 - Enhanced subsurface mapping
 - Avoidance sensors on digging/boring equipment
 - Encroachment sensors for right of ways
- **Standard Practice/Process Improvements**
 - Improved construction practices
 - Damage mitigation during in-field welding and coating application



U.S. Department
of Transportation

Pipeline and
Hazardous Materials
Safety Administration



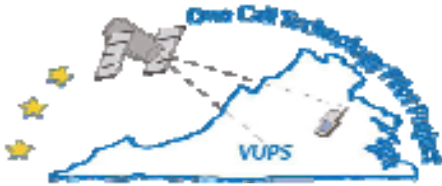
Virginia One-Call Technology Pilot Project

Purpose:

Reduce Over-Notification to Underground Facility Owners
More Accurate Description of Proposed Excavation Area

Sponsors:

- Currently PHMSA/CGA and Colonial Pipeline/PRCI have committed direct funding
- Many stakeholder organizations contribute time and efforts
 - Virginia Utility Protection Service (VUPS)*
 - Virginia State Corporation Commission (VA SCC)*
 - Washington Gas*
 - Verizon*
 - Dominion Resources*
 - various Excavators*
 - National Utility Contractor's Association (NUCA)*
 - Associated General Contractors of America (AGC)*

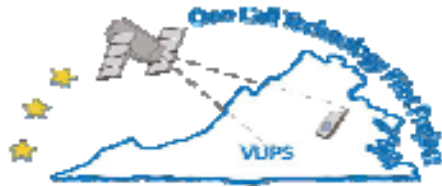


Over-Notification with Current System



Installing footers for a deck.

Mark the rear of the property.



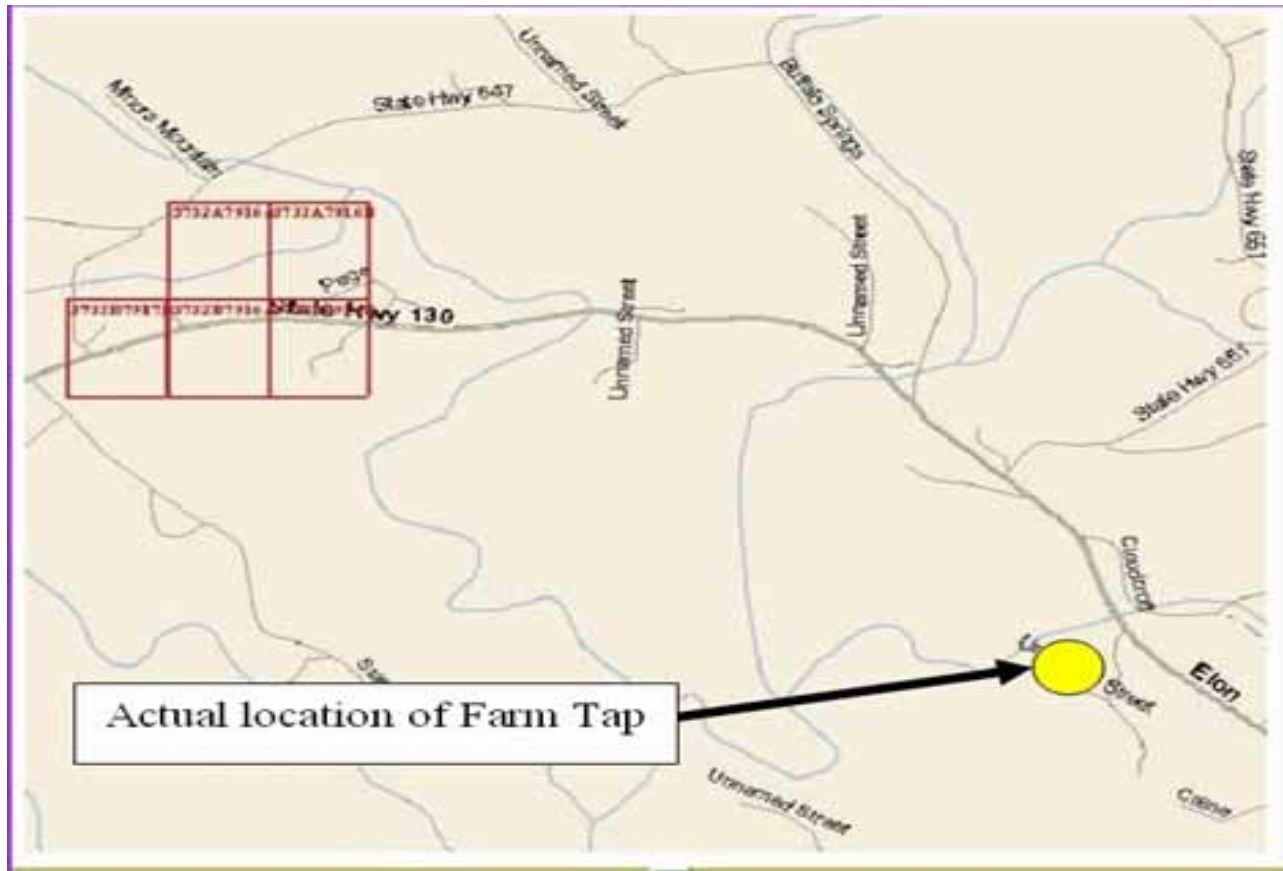
Over-Notification with Current System



Colonial Pipeline Easement

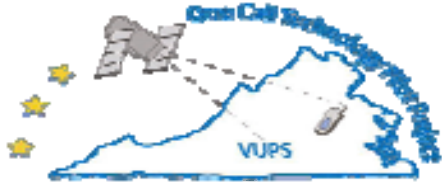


Problems with Incorrect Gridding

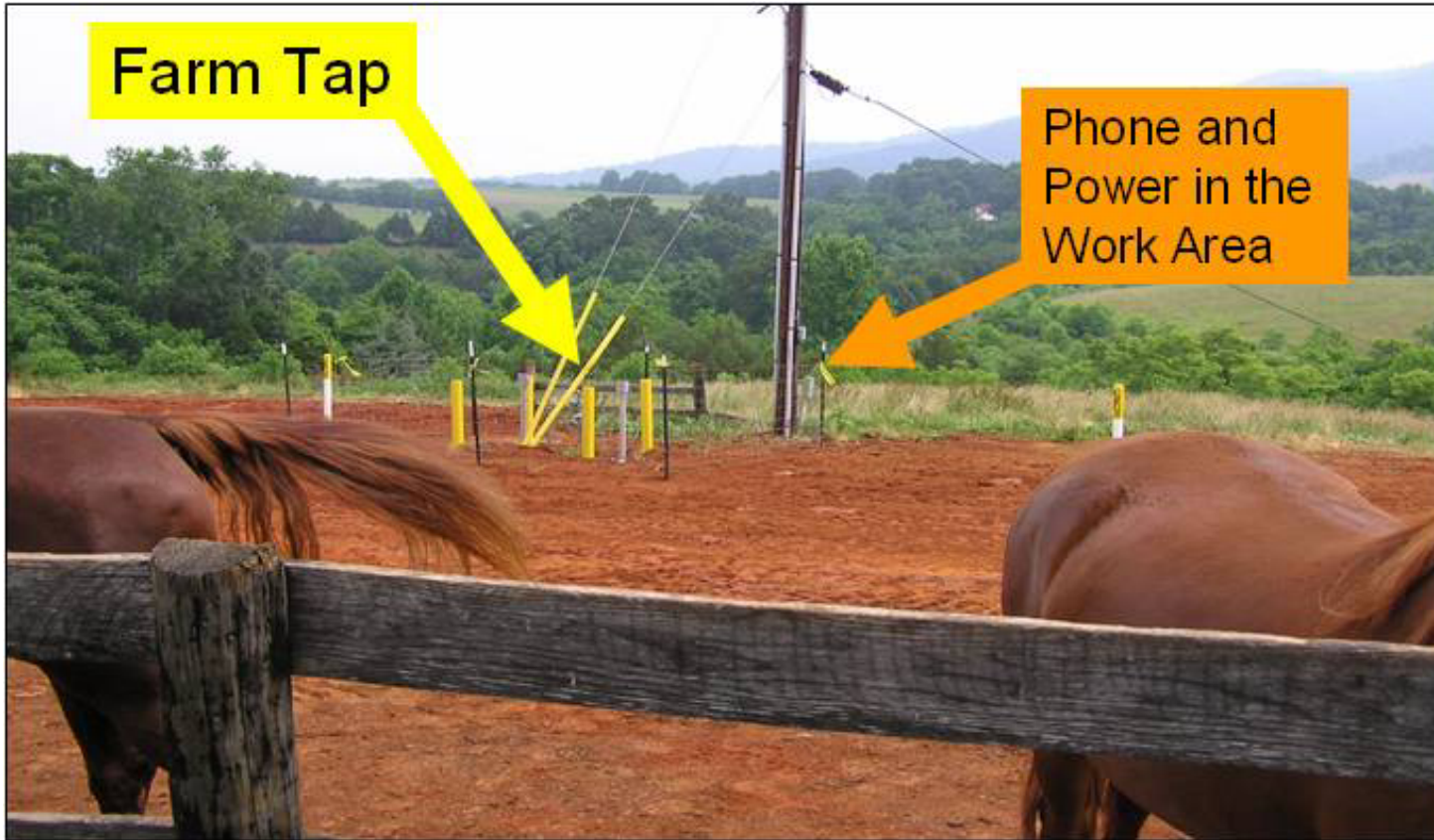


Locate out 200 feet on the right side of the house
and 60 feet around the Farm Tap

Work Type: Repairing gas main



Problems with Incorrect Gridding

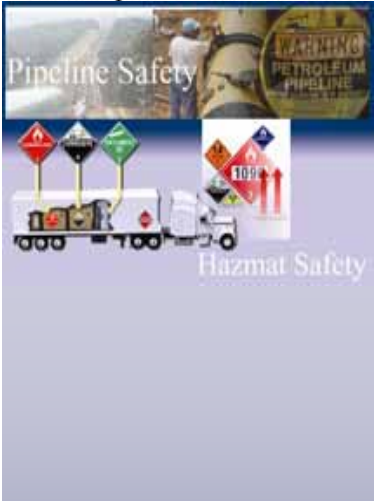


Difficult to describe the location of the Farm Tap

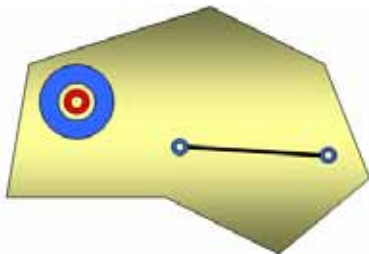


U.S. Department
of Transportation

Pipeline and
Hazardous Materials
Safety Administration



Bluetooth



VA Pilot Project - Focus

- **Use of Global Positioning System (GPS) technology to:**
 - Increase locational accuracy
 - Reduce damage to underground facilities
 - Reduce one-call process costs
- **Electronic white lining:**
 - Excavator determines the GPS coordinates of the planned excavation site utilizing:
 - *Windows Mobile SmartPhone & external GPS or*
 - *GPS-enabled cell phone.*
 - Excavator walks proposed excavation site
 - *Receives latitude / longitude coordinates onto hand held device*
 - *Map provided by VUPS to excavator for confirmation before creating ticket*



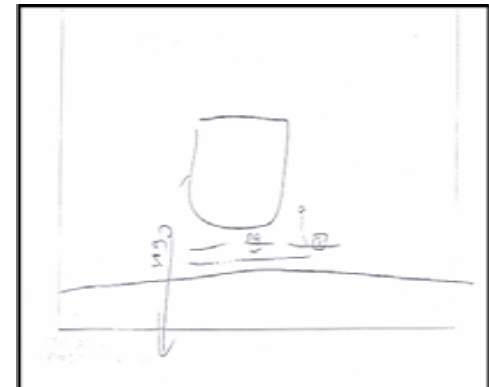
Phase II

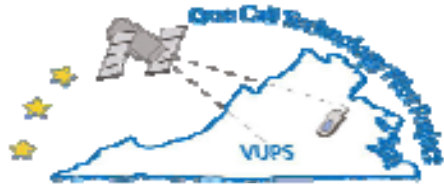
VA 1-Call Technology

- **Electronic manifest**
 - **Overlay GPS coordinates on ortho-photography to create electronic manifest**



Manifest record problems

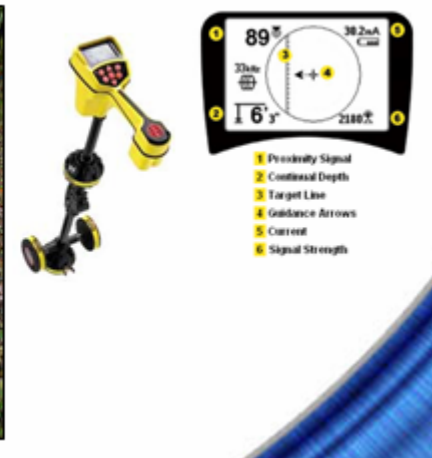




Phase II

VA 1-Call Technology

- **Locate process**
 - **GPR advancements**
 - **GPS, GIS, and SUE integration into new locate equipment**
 - **“Smarter” locate devices**
 - **Development of non-metallic pipe detection antennas**





U.S. Department
of Transportation

Pipeline and
Hazardous Materials
Safety Administration



Mechanical Damage (MD) PHMSA Study

- **Awarded to Michael Baker Jr. – Fall 2006**
- **Project Scope**
 - **Define MD**
 - **Identify technology and relevant standards**
 - **Peer report publicly**
- **Expected Impacts**
 - **Common definition of MD**
 - **Raise knowledge**
 - **Consensus Standard revisions**
 - **PHMSA regulatory clarity for MD**



U.S. Department
of Transportation

Pipeline and
Hazardous Materials
Safety Administration



Next Steps for Damage Prevention Research

- **Identify affected Consensus Standards from completed work**
- **Contact relevant Standards Development Organizations (SDOs) to quantify contribution of research to revising Standards**
- **Monitor technology demonstrations that are part of the work scope**
- **Organize and hold separate tech demos if necessary**
- **Report all impacts on R&D website**

PHMSA R&D Homepage
<http://primis.phmsa.dot.gov/rd/>