NASTT NE Regional Chapter Trenchless Conference Thursday, November 16, 2017

Moving Forward: Pipe Bursting and the Administrator Approved Alternate for Asbestos Cement Pipe

Edward Alan Ambler, P.E., LEED AP Vice President, AM Trenchless





History of Asbestos

Naturally occurring mineral fiber Attractive attributes

- •Fire and chemical resistance
- •Flexible, long, thin fibrous shape
- High strength



Use noted as early as Ancient Greece Use of asbestos supported nationwide during the early 20th century Navy was #1 consumer of asbestos during the first half of the 20th century Knowledge of inhalation dangers solidified by 1950's

Asbestos Mining and Manufacturing Operations

- Large asbestos deposits are rare but found in North America and Europe in the late 19th century
- Use of asbestos encouraged by developing nations and increasing wealth
- First commercial use as insulation in 1860
- Incorporation of asbestos fibers in cement was developed in 1931
 - Used in pipes, wallboard and siding









Manufactured Products Containing Asbestos

- Fibrous insulation #1 health hazard
 - Sprayed in, blown in and electrical
- Roofing Shingles
- Floor and Ceiling tiles
- Brake pads



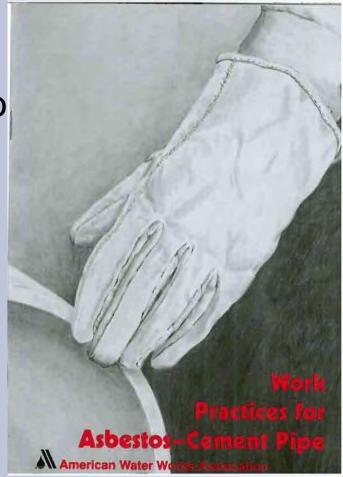
- Paints, plasters, mastics, adhesives & tape
- Gaskets
- Packing materials
- Fire blankets and curtains
- Boiler insulation US Navy
- Asbestos cement pipe





AWWA Work Practices for AC Pipe

- Keep the AC pipe wet
- Don't saw cut the AC pipe to release fibers
- Utilize a snap cutter on the AC pipe



Asbestos Fibers During Rehabilitation

- Work during a recent pipe bursting projects in Boynton Beach, Florida performed an extensive Negative Exposure Assessment on the pipe bursting project
- Results indicated levels of asbestos under the limits set by OSHA





Is AC Pipe Friable After Bursting?

- <u>EPA</u> currently believes AC pipe that has undergone the mechanical process of pipe bursting <u>SHOULD BE</u> <u>SUBJECT TO NESHAP.</u>
- RACM is defined as friable asbestos material or non-friable ACM that will be or has been subjected to sanding, grinding, cutting, or abrading or has crumbled, or been pulverized or reduced to powder in the course of demolition or renovation operations



RACM is regulated AC pipe that can be further reduced to powder by hand

National Emissions Standards for Hazardous Air Pollutants

- Promulgated in 1972
- Part 61 governs 7 key air pollutants
 - Asbestos, Beryllium, Mercury, Vinyl Chloride, Benzene, Arsenic, Radon/radionuclides
- Requires an Act of Congress to change
- Does not provide adaption for technology development
- Does allow for an Administrator Approved Alternate
 as approved process different from regulations

NESHAP Compliance – 5 Key steps

- Notice Submit 10 days prior to work (61.145(b))
- Emission Control during work (61.145(c) / 61.150)
- Control Public Access 2' of cover or fencing (61.151 / 61.154)
- Deed Notation for site after work is complete (61.151(e))
- Notice Prior to Digging Up Site 45 days before digging up the site (61.154(j) / 61.1(d))

NESHAP Compliance

FDEP Form 62.257-900

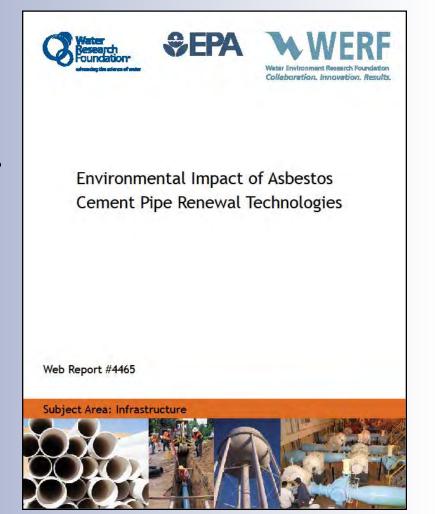
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WRF #4465 - Project Overview

 Project to provide water utilities with reliable performance and environmental data relating to asbestos cement (AC) pipe renewal.

• Objectives:

- 1. Synthesize existing knowledge on AC pipe renewal.
- 2. Demonstrate technologies to gather environmental impact data.
- 3. Inform the stakeholder groups of project findings.



WRF #4465 - Environmental Impact Analysis

Measured the asbestos in air, water, and soil



Environmental Impact of AC Pipe Bursting – WRF Project #4465

There is no evidence to support that the bursting of AC pipe has any negative impacts on the environment or the workers performing the work

Sample Type	No. of Samples	Analytical Sensitivity Range	Sample Result Range	Analytical Method	
Air	6	0.0036 - 0.0042 s/cc	BAS	ISO Method 10312	
Soil			ND - Trace (<0.25% visual		
(Pre-renewal)	6	NA	estimate)	EPA Method 600/R-	
Soil			ND - Trace (<0.25% visual	93/116	
(Post-renewal)	6	NA	estimate)		
Water		0.17 - 0.35 million	0.87 - 20.07 million		
(Pre-renewal)	2	structure/L	structure/L	EPA Method 100.2	
Water		0.08 - 0.09 million	0.09 - 0.94 million	EFA Wiethod 100.2	
(Post-renewal)	2	structure/L	structure/L		

Mitigation of Exposure Risk Utility Crossings

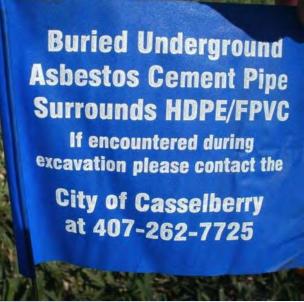
- Occur when other utility companies are required to perform work around remaining AC pipe fragments
- Utility companies will not perform extensive excavation within a few inches of the new HDPE pipe

The reality is - all work performed will be below the 260 linear feet threshold set forth by NESHAP

Mitigation of Exposure Risk Resident Excavation

- Resident installing new tree or other will not
 excavate to water main depth for extended length
- Casselberry utilizes special locate flags that will generate questions

The reality is - all work performed will be below the 260 linear feet threshold set forth by NESHAP



Mitigation of Exposure Risk Replacement of Production Pipe

- Utility provider performing AC pipe bursting must acknowledge the risk of future work required around AC pipe fragments
- Emergency repairs will be below the 260 linear feet threshold set forth by NESHAP
- Focused production pipe replacement will occur after production pipe has expelled its service life

The reality is - all work performed will be below the 260 linear feet threshold set forth by NESHAP

Resistance to AC Pipe Bursting

- AC pipe bursting projects can only be performed with all parties acknowledgement of process
- Right-of-way controllers approval
 - Casselberry only owns R/W for 30% of streets where AC pipe is located
- Local Environmental Regulators approval
- General public approval

Resistance to AC Pipe Bursting Unclear Application of NESHAP

- Active Hazardous Waste Site
 - One year of air monitoring
 - Signs above site every several hundred feet
- In-active Hazardous Waste Site
 - Record notation to deed to property
 - Problem: Public right-of-way has no deed
 - After significant discussion and demonstration of pipe bursting, EPA suggested use of the Administrator Approved Alternate

Resistance to AC Pipe Bursting Active Hazardous Waste Sites



Resistance to AC Pipe Bursting Pipe Bursting Sites





EncapsulAC

- Simple process and procedure added during pipe bursting activities
- Addition of a proprietary fluid that entombs remaining asbestos cement pipe fragments after pipe bursting
- Remaining coagulated mass is workable and does not harden like cement

EncapsulAC



Significant research and development and testing, testing, testing

- EncapsulAC Fluid
- Delivery Systems
- Distribution Systems
- Pumping & Mixing Equipment
- Testing & Evaluations

EncapsulAC Fluid

- Soil Conditions
- Distance being delivered
- Set Timing
- Cured State & Color-Fast
- Challenges overcome through continued testing, refining mix design and more





EncapsulAC

From pump-able fluid to congealed mass in 24 hours





Delivery Systems Non Pre-Chlorinated Pipe

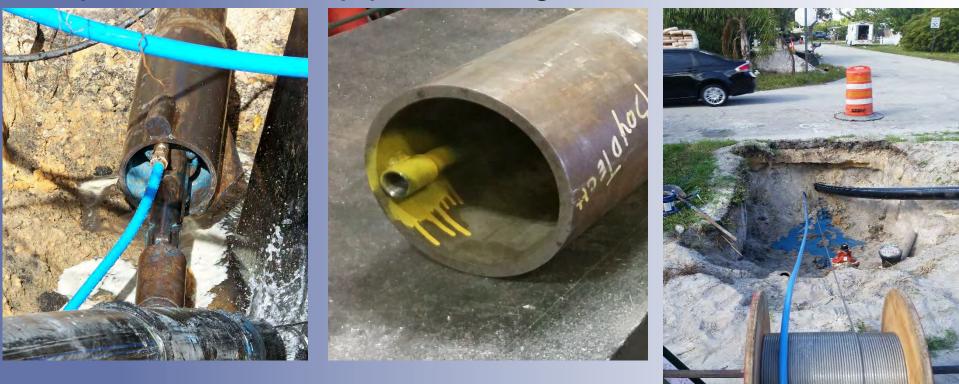
For non pre-chlorinated pipe bursting, the fluid delivery can be provided through the production pipeline





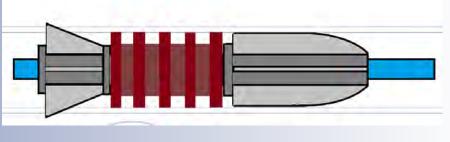


Delivery Systems Pre-Chlorinated Pipe Fluid delivery outside of the production pipeline allows for pre-chlorinated pipe bursting



Fluid Distribution System

- A pigging system was needed in front of the expander head to coat all fragments with EncapsulAC
- Lower wings were added to resist rotation
- A dorsal sheave would provide a protected path for fluid delivery piping





Fluid Distribution System



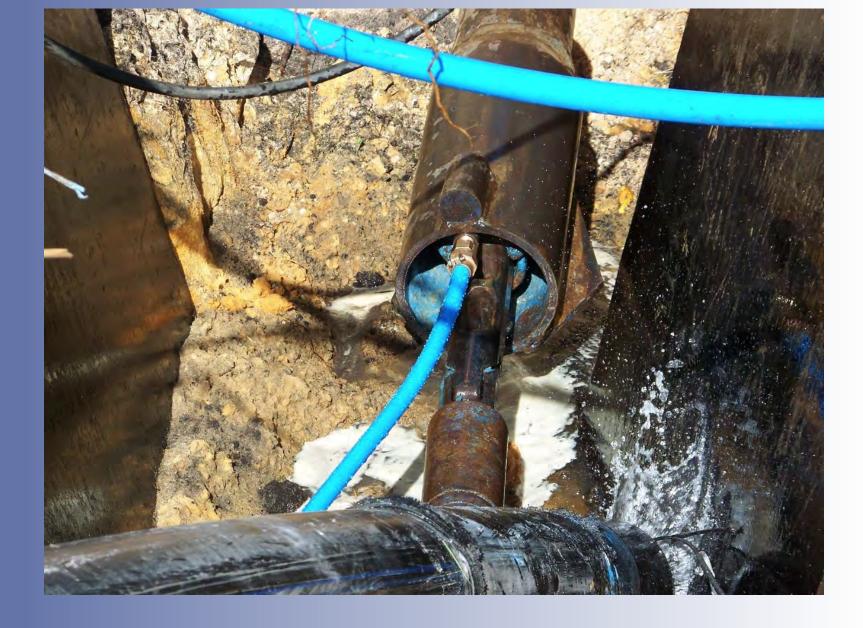
4" to 6" Burst Head w/ Pig

6" on 6" Burst Head w/ Pig

















EncapsulAC Negative Exposure Assessment

Recent successful installation of the encapsulation procedure

•As iCasselberry Elorida Dogmerich Hills ACt Pipe Bytsting project pipe •burstily of Boynton Beach file in data Tulio Tree Drive AC Pipe •bursting project the Work process and hethodology. The results of personnel and area air samples can Negative Exposure Assessment at the Boynton Beach project yield no presence of asbestos fibers

Table I: Air Sampling Results							
Sample ID and	Sample Time (min)	Concentration					
Location	Sample Time (mm)	(f/cc)					
1-Roberto Morales	237	0.036					
2-Mikey Lopez	243	<0.006					
3-Insertion Pit	239	<0.006					
4-Machine Pit	240	<0.006					
5-Background	239	<0.006					

-The OSHA PEL for asbestos exposure is 0.1 f/cc

As NIOSH Method 7400 is not specific for asbestos fibers, any fiber or structure

City of Boynton Beach AC Pipe Bursting with EncapsuIAC



City of Boynton Beach AC Pipe Bursting with EncapsuIAC



City of Boynton Beach AC Pipe Bursting with EncapsulAC





EncapsulAC Team Submits to EPA

- NESHAP allows for alternate procedure to be approved through EPA's Administrator
- EncapsulAC team submitted "Administrator Approved Alternate" for EPA's consideration in June 2016
- Team provided significant scientific data and case study information on AC pipe bursting and encapsulation
- EncapsulAC continues installations in Florida and case study documentation
- EncapsuIAC team submitted response to EPA
- EPA staff has indicated desire to perform site visit inspection of EncapsulAC installation in third quarter of 2017