

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

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

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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



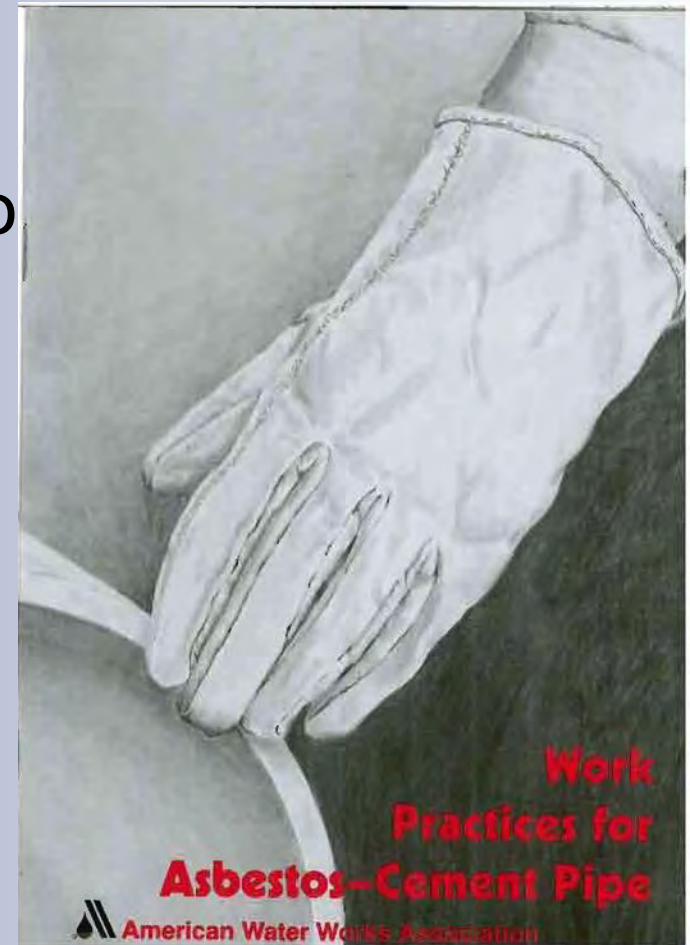
Manufactured Products Containing Asbestos

- 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?

- EPA currently believes AC pipe that has undergone the mechanical process of pipe bursting SHOULD BE SUBJECT TO NESHAP.
- 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

 **Florida Department of
Environmental Protection**
Division of Air Resource Management

DEF Form 62.257-900(1)
Effective 10-10-98
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NOTICE OF DEMOLITION OR ASBESTOS RENOVATION

TYPE OF NOTICE (CHECK ONE ONLY): ☒ ORIGINAL ☐ REVISED ☐ CANCELLATION ☐ COURTESY
TYPE OF PROJECT (CHECK ONE ONLY): ☒ DEMOLITION ☐ RENOVATION
IF DEMOLITION, IS IT AN ORDERED DEMOLITION? ☐ YES ☒ NO
IF RENOVATION:
IS IT AN EMERGENCY RENOVATION OPERATION? ☐ YES ☐ NO
IS IT A PLANNED RENOVATION OPERATION? ☐ YES ☐ NO

I. Facility Name City of Casselberry Potable Water System
Address Project Area 12 / Helen St, Timberlane Trail, Landmark Ln, Lands End, Colony Dr, Aurora Dr, Belle Ave - Exhibit A
City Casselberry State FL Zip 32707 County Seminole
Site Public Road Right-of-Way as stated above; see attachment - Exhibit A Consultant Inspecting Site CPI Engineers
Building Size NA (watermain) (Square Feet) # of Floors _____ Building Age in Years 50
Prior Use: ☐ School/College/University ☐ Residence ☐ Small Business ☒ Other potable water distribution system
Present Use: ☐ School/College/University ☐ Residence ☐ Small Business ☒ Other potable water distribution system

II. Facility Owner City of Casselberry Phone (407) 262-7725
Address 95 Triplet Lake Drive
City Casselberry State FL Zip 32707

III. Contractor's Name Killebrew, Inc. Phone (863) 701-0272
Address P.O. Box 6258
City Lakeland State FL Zip 33807
Is the contractor exempt from licensure under section 469.002(4), F.S.? ☒ YES ☐ NO

IV. Scheduled Dates: (Notice must be postmarked 10 working days before the project start date)
Asbestos Removal (mm/dd/yyyy) Start: _____ Finish: _____ Demo/Renovation (mm/dd/yyyy) Start: see attachment - Exhibit B
Finish: see attachment - Exhibit B

V. Description of planned demolition or renovation work to be performed and methods to be employed, including demolition or renovation techniques to be used and description of affected facility components: pipe bursting to replace existing asbestos-cementitious water main
Procedures to be Used (Check All That Apply):

<input type="checkbox"/> Strip and Removal	<input type="checkbox"/> Glove Bag	<input type="checkbox"/> Bulldozer	<input type="checkbox"/> Wrecking Ball
<input checked="" type="checkbox"/> Wet Method	<input type="checkbox"/> Dry Method	<input type="checkbox"/> Explode	<input type="checkbox"/> Burn Down

OTHER: pipe bursting

VI. Procedures for Unexpected RACM: Stop work and notify FDEP

VII. Asbestos Waste Transporter: Name Lanora Constr. & Environmental (if req'd) Phone (863) 284-0968
Address P.O. Box 97034
City Lakeland State FL Zip 33806

VIII. Waste Disposal Site: Name Angelo's Recycling (if required) Class III
Address 41111 Enterprise Road
City Dade City State FL Zip 32251

IX. RACM or ACM: Procedure, including analytical methods, employed to detect the presence of RACM and Category I and II nonfriable ACM.
Presumed asbestos-cementitious pipe (category II nonfriable)

X. Fee Invoice Will Be Sent to Address in Block Below: (Print or Type)

City of Casselberry
Public Works Department
95 Triplet Lake Drive
Casselberry, FL 32707

Amount of RACM or ACM*
square feet surfacing material _____
9,365* linear feet pipe _____
cubic feet of RACM off facility components _____
square feet cementitious material _____
square feet resilient flooring _____
square feet asphalt roofing _____

*Identify and describe surfacing material and other materials as applicable: None. RACM is existing asbestos-cementitious water main pipe to be rehabilitated using pipe bursting technology and replaced with high density polyethylene pipe utilizing wet method.

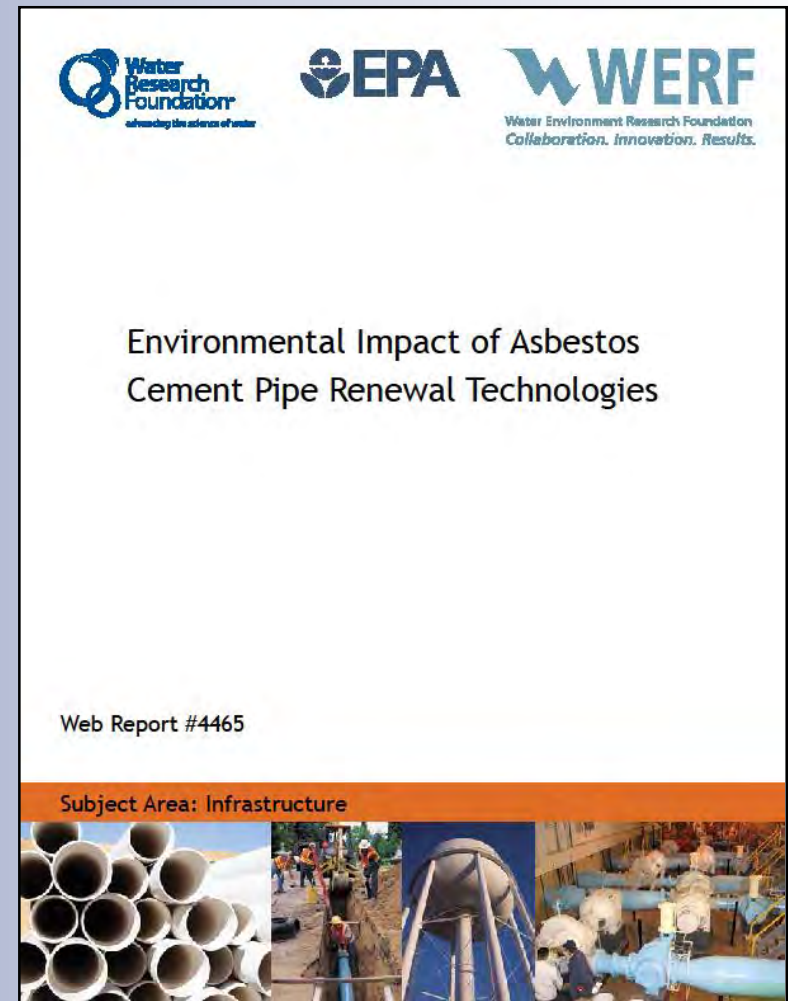
I certify that the above information is correct and that an individual trained in the provisions of this regulation (40 CFR Part 61, Subpart M) will be on-site during the demolition or renovation and evidence that the required training has been accomplished by this person will be available for inspection during normal business hours.

(Print Name of Owner/Operator) _____ (Date) _____
(Signature of Owner/Operator) _____ (Date) _____

DEF USE ONLY Postmark/Date Received _____ ID# _____

WERF #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 (Pre-renewal)	6	NA	ND - Trace (<0.25% visual estimate)	EPA Method 600/R-93/116
Soil (Post-renewal)	6	NA	ND - Trace (<0.25% visual estimate)	
Water (Pre-renewal)	2	0.17 - 0.35 million structure/L	0.87 - 20.07 million structure/L	EPA Method 100.2
Water (Post-renewal)	2	0.08 - 0.09 million structure/L	0.09 - 0.94 million 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

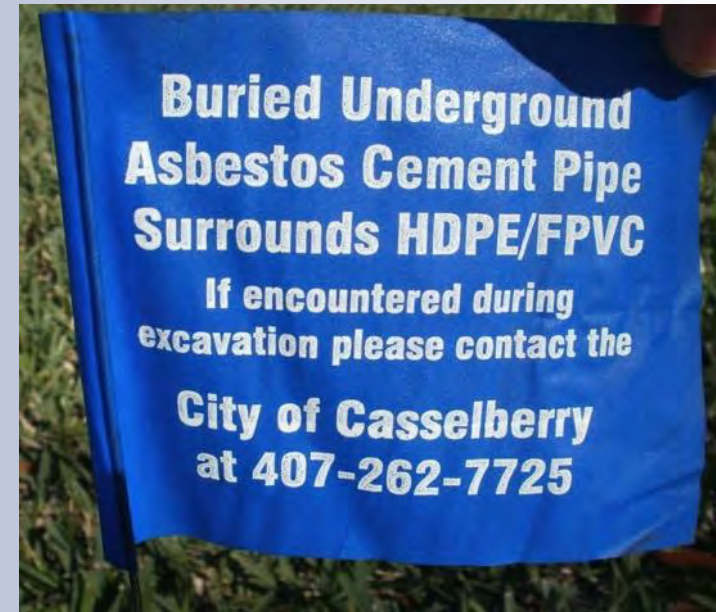
The reality is - all work performed will be below the 260 linear feet threshold set forth by NESHAP

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

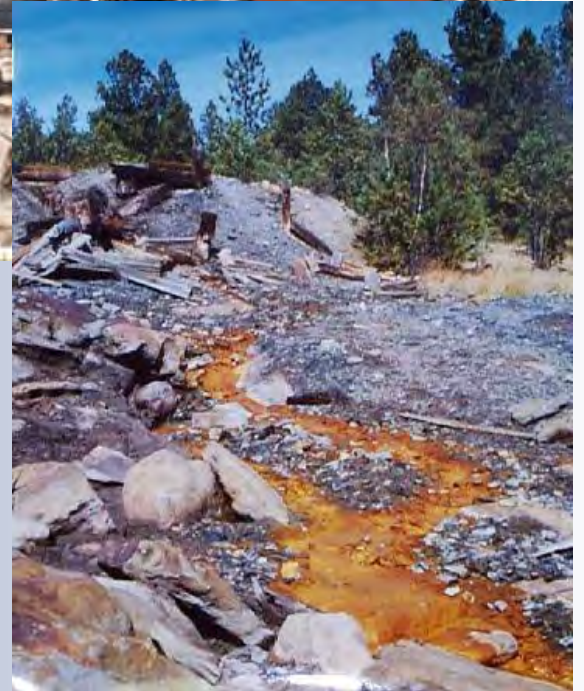
- AC pipe bursting projects can only be performed with all parties acknowledgement of process
- Right-of-way controllers approval
 - Casselberry only owns R/W for 30% of streets where AC pipe is located
- Local Environmental Regulators approval
- General public approval

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



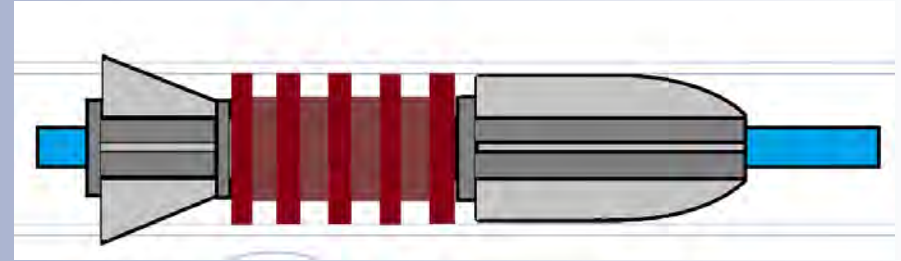
Delivery Systems Pre-Chlorinated Pipe

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

Results and Discussion

Recent successful installation of the encapsulation procedure

- Casselberry, Florida Dommerich Hills AC Pipe Bursting project
- City of Boynton Beach, Florida Tulip Tree Drive AC Pipe Bursting project

As indicated previously, it is thought that sampling activities captured the entire pipe bursting process, from start to finish, and should be thought of as representative to the work process and methodology. The results of personnel and area air samples can be found below.

Negative Exposure Assessment at the Boynton Beach project
yield no presence of asbestos fibers

Table I: Air Sampling Results		
Sample ID and Location	Sample Time (min)	Concentration (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 EncapsulAC



City of Boynton Beach AC Pipe Bursting with EncapsulAC



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
- EncapsulAC team submitted response to EPA
- EPA staff has indicated desire to perform site visit inspection of EncapsulAC installation in third quarter of 2017