

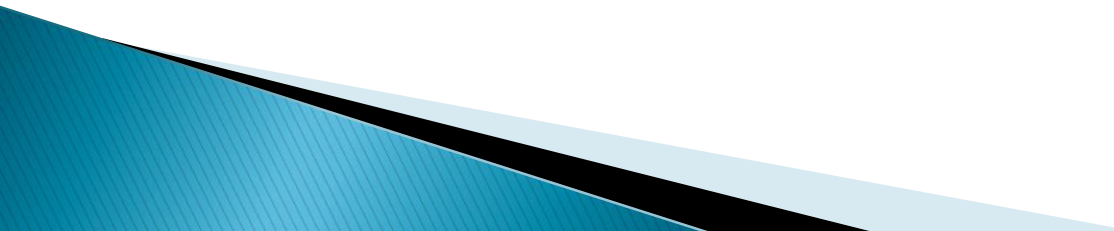
Pipeline Safety Seminar

2020 NC's Incidents and Investigations

**Pennsylvania PUC - Pipeline Safety
September 9th, 2021**

Bob Biggard & Mike Chilek

Main purpose of NCs

- ▶ Inform operators of issues found by the Safety Division which may be a violation with State or Federal codes
 - ▶ Operators are expected to address the concerns and recommendations to ensure the issues are corrected
- 

Federal – High level view of 2021

- ▶ **78** -Total Non-compliance letters in 2020
- ▶ **160** –49 CFR 192 violations
- ▶ **25** –49 CFR 199 & part 40 violations
 - **Majority – Small entities lack of plan**

A closer look...49CFR192

- ▶ 70 issues with Subpart O
 - Operations
 - Procedures – not following
 - Damage Prevention Program– not following
 - Public Awareness – none, not following
- ▶ 19 issues with Subpart I
 - Corrosion Control –
- ▶ 13 issues with Subpart N
 - Operator Qualifications – none
- ▶ 12 issues with Subparts E,F,G,H
 - Construction – steel, joining, mains, service lines

“Big Take Away – Fed”

- ▶ Follow Written Procedures
 - ▶ Follow Damage Prevention Program
 - ▶ Follow Construction Specifications
- 

A Closer look...Title 52 Chapter 59

▶ 33 –State code violations

- Typically involve a release of gas
 - Imposing hazards to persons
 - No warning
- No maps and records
- Often coupled with damage prevention

“Big Take Away – State”

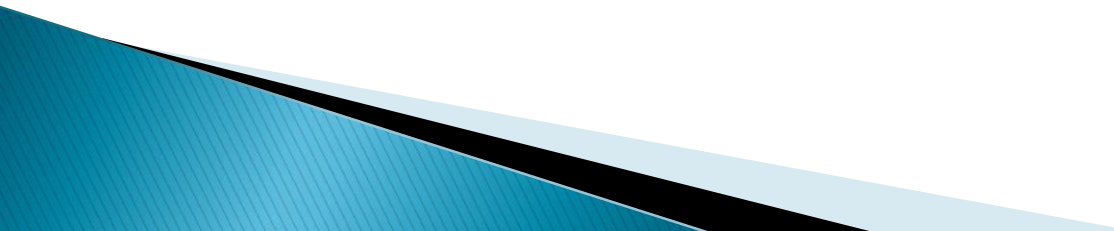
- Follow Plans, Programs & Procedures
- Know where facilities located
 - Take adequate precautions when unknown

Plastic Pipe & Failures

- ▶ PPDC – Plastic Pipe Database Committee
 - AGA
 - Voluntary
 - Plastic Pipe Failures
 - Collection Cumulative Failure Information

- ▶ PA PUC leak info
 - Leak Inspections, other data, etc.

Plastic Pipe Database Committee

- ▶ AGA
 - ▶ Plastic failures
 - ▶ Status report
 - ▶ Failures with 5 years of install – Table 3
- 

PPDC Status Report Table 3

Cause	% of All Failures Occurring Within 0-5 Years in Service
Cap (Other)	2.1%
Corrosion	0.3%
Excessive Expansion/Contraction	2.1%
Excessive External Earth Loading	3.0%
Gopher/rodent/worm damage	0.8%
Installation Error	38.7%
Material Defect	11.2%
Other	7.2%
Point Loading	1.6%
Previous Impact	0.9%
Squeeze Off	0.5%
Threaded Cap (Cracked Cap)	0.4%
Threaded Cap (Loose cap, not cracked)	3.8%
Threaded Cap (Other, describe)	0.6%
Threaded Cap (Seal/O-ring defect)	0.8%
Unknown	25.6%
Unknown- Abandoned	0.1%
Unknown - Not Excavated, Replaced	0.3%
Grand Total	100.0%

Table 3. Causes for All Failures Occurring Within 0-5 Years of Installation

Note: Percentages less than 0.1% are not listed in the chart

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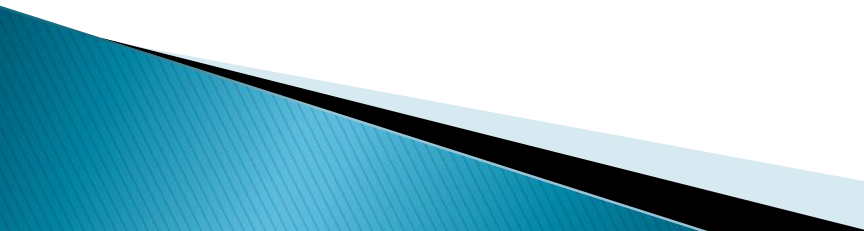
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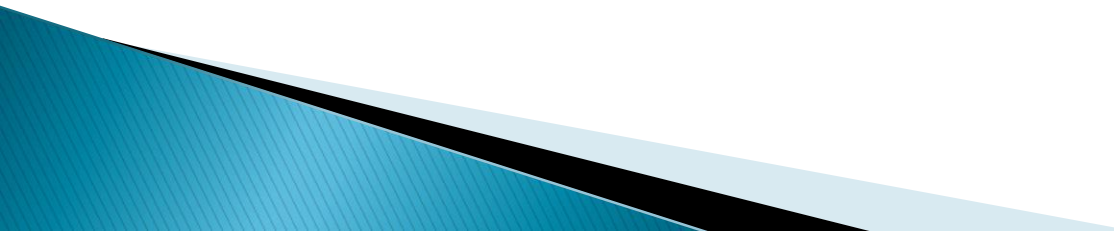
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PUC inspections & investigations

- ▶ Leaks on Caps
 - ▶ Older mid-80's pipe tends to crack if under duress
- squeeze off, impingement, rocks
 - ▶ There have been leaks on Butt fusions, Saddle Fusions, & Socket Fusions
 - ▶ Electrofusions are not immune, scraping issues, fitting issues
- 

PUC inspections & investigations

- ▶ Mechanical fittings are probably the most prone to leakage
 - ▶ Installation errors
 - ▶ The number 1 issues as far as leakage is concerned are valves
 - ▶ These valves are old – 25+ years similar to PPDC
- 

PUC inspections & investigations

- ▶ By far service lines – saddle to meter valve
- ▶ Few on pipe itself, it is the fittings
- ▶ Minimum of 8 fittings on a service line!
 - ▶ Saddle-main, saddle, cap, cap-threads, SL-connection, SL pipe, riser-connection, riser
- ▶ By far, majority leaks are on older 25+ years
- ▶ Estimated 5% on newly installed pipe

ASTM F2620-12



Designation: F2620 – 12

An American National Standard

Standard Practice for Heat Fusion Joining of Polyethylene Pipe and Fittings¹

This standard is issued under the fixed designation F2620; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

1. Scope*

1.1 This practice describes procedures for making joints with polyethylene (PE) pipe and fittings by means of heat fusion joining in, but not limited to, a field environment. Other suitable heat fusion joining procedures are available from various sources including pipe and fitting manufacturers. This standard does not purport to address all possible heat fusion joining procedures, or to preclude the use of qualified procedures developed by other parties that have been proved to produce reliable heat fusion joints.

1.2 The parameters and procedures are applicable only to joining polyethylene pipe and fittings of related polymer chemistry. They are intended for PE fuel gas pipe per Specification **D2513** and PE potable water, sewer and industrial pipe manufactured per Specification **F714**, Specification **D3035**, and AWWA C901 and C906. Consult with the pipe manufacturers to make sure they approve this procedure for the pipe to

2. Referenced Documents

2.1 *ASTM Standards:*²

D2513 Specification for Polyethylene (PE) Gas Pressure Pipe, Tubing, and Fittings

D3035 Specification for Polyethylene (PE) Plastic Pipe (DR-PR) Based on Controlled Outside Diameter

F714 Specification for Polyethylene (PE) Plastic Pipe (DR-PR) Based on Outside Diameter

F1056 Specification for Socket Fusion Tools for Use in Socket Fusion Joining Polyethylene Pipe or Tubing and Fittings

2.2 *PPI Documents:*

TR-33 Generic Butt Fusion Joining Procedure for Field Joining of Polyethylene³

TR-41 Generic Saddle Fusion Joining Procedure for Polyethylene Gas Piping³

2.3 *AWWA Documents:*

TR-33 vs ASTM F2620-12

source – PPI

Basic procedure Butt Fusion

1. Securely fasten the components to be joined
2. Face the pipe ends
3. Align the pipe profile
4. Melt the pipe interfaces
5. Join the two profiles together
6. Hold under pressure

TR-33 vs ASTM F2620-12

source – PPI

Melt the Pipe Interfaces

Reference	PPI TR-33	ASTM F2620
Pipe Diameter	Pipe Size (IPS)	Outside Diameter
Melt	Approximate Bead Size	Minimum Bead Size
Heating Time	Bead Size Only	<14" Bead size only ≥14" Bead size AND 4.5 mins/in wall thickness

TR-33 vs ASTM F2620-12

source – PPI

TR33 Pipe Size	TR33 approximate Bead	F2620 Pipe OD	F2620 Minimum Bead
1 ¼" and smaller	1/32" – 1/16"	< 2.37"	1/32"
**1 ½ IPS = 1.9"		< 2.37"	1/32"
Above 1 ¼" through 3"	About 1/16"	≥ 2.37" ≤ 3.5"	1/16"
Above 3" through 8"	1/8"-3/16"	> 3.5" ≤ 8.62"	3/16"
Above 8" through 12"	3/16"-1/4"	> 8.62" ≤ 12.75"	1/4"
Above 12" through 24"	1/4"-7/16"	> 12.75" ≤ 24"	3/8"
Above 24" through 36"	About 7/16"	> 24" ≤ 36"	7/16"
Above 36" through 63"	About 9/16"	> 36" ≤ 65"	9/16"

TR-33 vs ASTM F2620-12

source – PPI

Hold under pressure

Reference	PPI TR-33	ASTM F2620
Open/Close time	Inspect and immediately close	Max allowable time defined in Table 4, ASTM F2620-12 based on wall thickness
Hold under Pressure	30-90 seconds per inch of pipe diameter	11 Minutes per inch of wall thickness

TR-33 vs ASTM F2620-12

source - PPI

		TR33 Cooling			
IPS Pipe size	OD	30s	60s	90s	ASTM F2620 DR11 Cooling Time
1/2	0.84	0:00:15	0:00:30	0:00:45	0:00:30
3/4	1.05	0:00:22	0:00:45	0:01:07	0:00:45
1	1.32	0:00:30	0:01:00	0:01:30	0:01:00
1 1/4	1.66	0:00:37	0:01:15	0:01:52	0:01:15
1 1/2	1.9	0:00:45	0:01:30	0:02:15	0:01:30
2	2.37	0:01:00	0:02:00	0:03:00	0:02:00
4	4.5	0:02:00	0:04:00	0:06:00	0:04:00
6	6.63	0:03:00	0:06:00	0:09:00	0:06:00
8	8.63	0:04:00	0:08:00	0:12:00	0:08:00
10	10.75	0:05:00	0:10:00	0:15:00	0:10:00
12	12.75	0:06:00	0:12:00	0:18:00	0:12:00
14	14	0:07:00	0:14:00	0:21:00	0:14:00
16	16	0:08:00	0:16:00	0:24:00	0:16:00
18	18	0:09:00	0:18:00	0:27:00	0:18:00

2015 NTSB Safety Alert



NTSB

SAFETY ALERT

National Transportation Safety Board

★ **Safety Through Reliable Fusion Joints** ★

Proper cleaning and surface preparation procedures can ensure fusion joint reliability in plastic natural gas pipelines

The problem

Fusion joints in high-density polyethylene (HDPE) piping are of great utility in the natural gas service and distribution industry. In a recent NTSB investigation of a New York City building explosion that caused eight deaths and dozens of injuries, NTSB investigators discovered that—

- Inadequate surface preparation or inadvertent contamination of plastic pipe surfaces prior to saddle fusion welding led to a joint with incomplete fusion.
- A weld joint with incomplete fusion can be strong enough to pass initial pressure testing of the piping system but



“Take Aways”

- ▶ Older plastic increased frequency @ 25+
- ▶ Failures do occur on new installations
- ▶ Installation errors are a major factor – PPDC & PUC
- ▶ Installation errors occur from not following procedures
- ▶ These errors occur even though people are supposedly “Qualified” every year

“Take Aways”

- ▶ Preventing failure must include prudent (& required) construction practices
- ▶ Plastic Pipe & fittings will fail (sooner or later) if it is under stress
- ▶ Use Good Practices
- ▶ FL-02-21

Good Practices

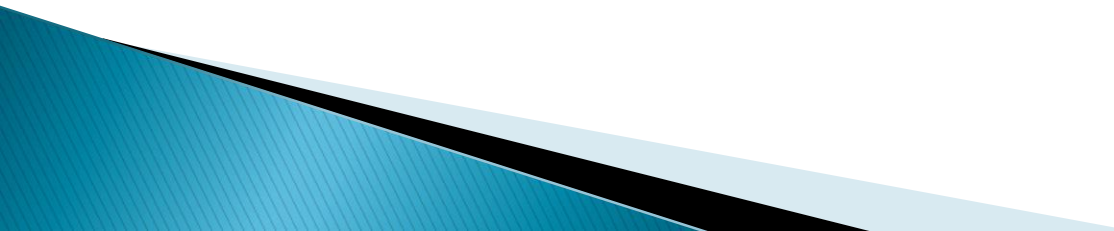
- Consider making and testing “dummy” fusions to ensure that personnel can perform, and heater plates, fusion machines, facers, scrapers, etc. are functioning properly.
- Ensure all in-service fusions, fittings and components pass visual test – **BEFORE BURIED**
- Know where your fusions, fittings and components are located

And now Mike Chilek...

▶ Thank you!



Reportable Incidents

- ▶ In 2020 Pennsylvania had 9 (6) reportable Incidents with 1 Fatality as defined in 191.3
 - ▶ In 2020 Pennsylvania had 0 (1) reportable Accident as defined in 195.3
 - ▶ There were 5 (7) events that were found to be Non-Reportable
- 

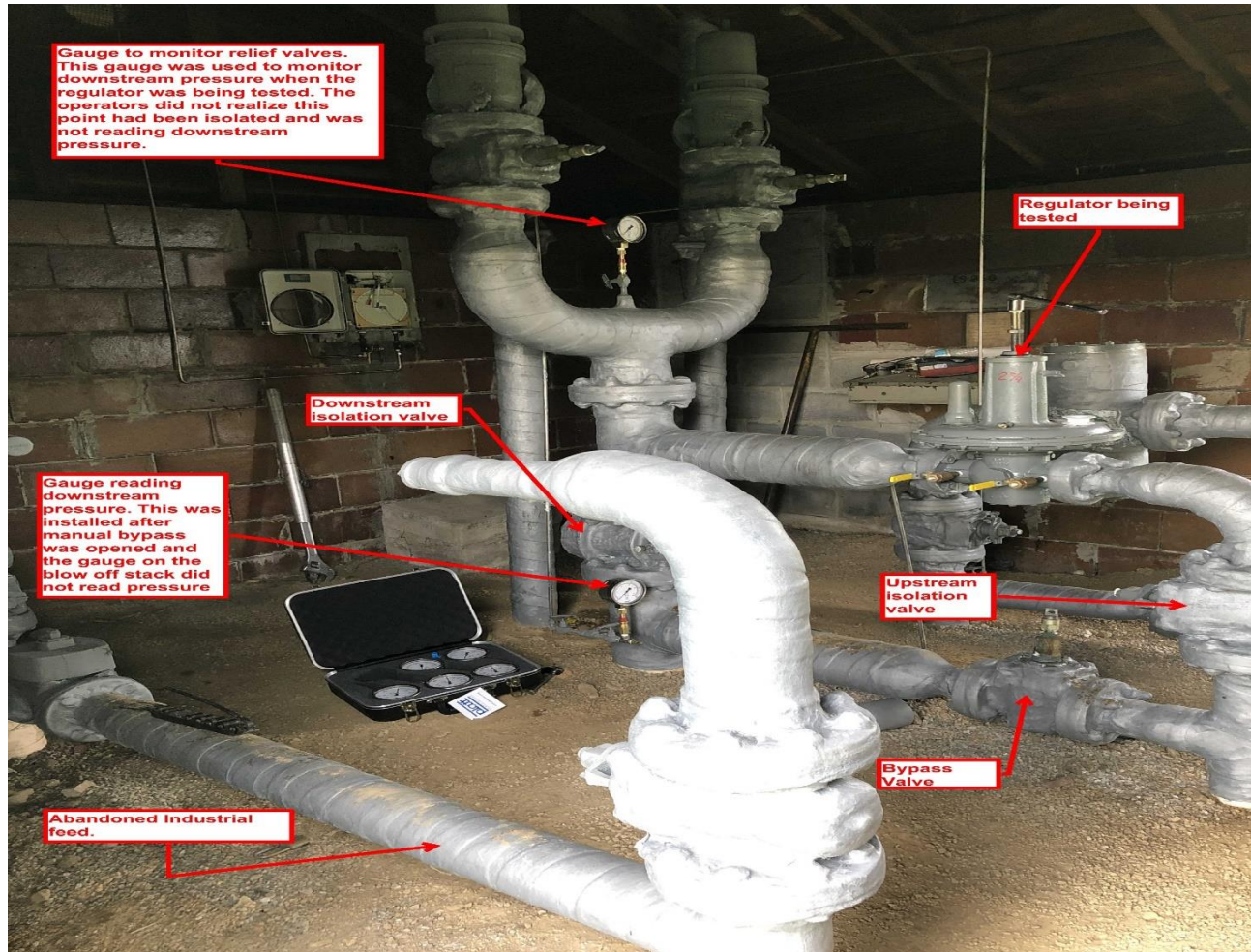
Farm Tap leak



Thankfully no injuries



Incorrect gauge placement



Gas loss thru relief



No One Call



Bulldozer damaged 10" Steel main



Main not marked



Downed electric wire



Vehicle damage



Leaking Butt Fusion



Failed Butt Fusion



Failed Butt Fusion



**Thank you for your
attention!**

