Northeast Gas Association
Spring Operations
Conference

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Construction Issues
Safety – Where are you standing?
Pipe on skids can move and fall. You want to park where!
Do you want to be under these wires or near this equipment?
Patch Stick Issues

- Poor application practices.
- Soil stress can remove poorly installed patch stick repairs.
- Heating the patch stick and dripping the product on the coating holiday is not acceptable.

The photo shows a poorly adhered patch stick repair. This was found while uncovering a newly built pipeline.
Manufacturer’s procedures for patch stick application must be followed. The photo shows that a fingernail was able to scratch off an applied patch stick repair.
Good patch stick application - notice heated/discolored area around patch, this indicates that the pipe was heated before and during patch stick application
Patch Sticks are only for pinhole or abrasion repair. 2 part epoxy should have been used.
Seriously!!!!
2 part epoxy

• Follow manufacturers instructions
• Preparation required (Sanding = anchor pattern)
• Thoroughly mix product
• Use promptly
• If products starts to cure before application the repair presents the appearance of the next slide
2 Part Epoxy
Electronic Holiday Detection (Jeeping)

- Visual inspection must supplement jeeping
- Problems identified
  - Bent defective spring
  - Not identifying and repairing all “jeeps”
  - Passing over visible holiday without the jeep sounding
  - Based on experience, jeep voltage may need to be set as high as 3500v to detect coating defects
Are the workmen finding coating holidays? Do the workmen operating the jeep have time to find and repair coating holidays?
A bent jeep spring can miss coating holidays
Duct tape can shield coating holidays
• Manipulating the jeep spring over building fiberboard stuck to the pipe is poor practice
Just jeeping at skids only on lowering in is not usually per construction procedures
• Look for coating holidays in the ditch.
• Observing these indicates a problem.
Thin Film Epoxy Issues

- Insufficient heating (3M procedure specify 425 – 488 degrees F - lower temperatures could mean improper curing)
- Over heating during application can be a problem (the coating looks burnt and is unacceptable)
- Poor sandblasting
425°F to 488°F
Gouges and Bending

- Gouges – consult procedures
- Acceptable wall thickness?
- < 1% diameter?
Proper burial depth on bores?
Is the pipeline buried deep enough and protected from erosion?
High Mechanized Defect Rate

• Causes
• Pipe sizing issues
• Inexperienced welders
• Start up issues
• X-ray or AUT falling behind eliminates timely feed back. Feed back is a valuable tool to improve weld quality.
The welding procedure allows how much high-low?
High Mechanized Defect Rate

• PHMSA Concerns:
• Having defects not an issue.
• Defect repair, NDT and tracking is an issue.
• Industry experience usually shows
  10% defect rate on mechanized welding
  7% for semi-automatic welding
  5% on manual welding
Laminations can be an issue especially associated with an 80% waiver
AUT, automated ultrasonic testing, easily shows laminations
Preheat

• Heating the weld joint before welding
• Temperature of the weld joint immediately before the arc is struck.
• Procedures state Contact Pyrometer, or Temperature Indicating Crayon
• Range of preheat values found in the welding procedure
Use of Temperature Indicating Crayon

• Temperature indicating crayons (Tempilstik) are specially formulated to melt at a specific temperature.
• On a cold pipe surface upon heating the mark changes color and melts at the specific temperature.
• Used on a hot surface the crayon only indicates the temperature is greater than the specified temperature on the crayon if the crayon melts.
Use of Temperature Indicating Crayon

- Applying the crayon on an area adjacent to a weld joint and then heating with a propane torch directed on the mark will give a false temperature indication. In this case the flame heats the crayon mark faster than the pipe. The pipe will not be up to the required temperature.
- The crayon should be used after heating and two different temperature crayons may be necessary to determine the preheat is within the welding procedure.
Temperature Indicating Crayons

The crayon holder specifies the melt temperature.
Preheat

- What should workman do if the weld joint is too cool? (add more heat)
- What does welder do if the weld joint is too hot? (allow joint to cool)
Interpass Temperature

• The temperature at a location near the start position of the welding arc(s) recorded immediately before initiating consecutive pass or passes. (from Appendix A)

• Minimum Inter-pass Temperature – generally preheat temperature

• Maximum Inter-pass Temperature – highest temperature allowed to start welding.
• If the procedure states the Maximum Inter-pass Temperature is 350 degrees F and the pipe measures 360 degrees F – What should the welder do before starting to weld?
Must follow welding procedure

• Some items to check
  – Bevel configuration
  – Electrodes – rods – filler metals
  – Electrical parameters
  – Speed of travel
  – Weld dimensions
Welding Procedures

The procedure states 20 – 40 cfh shielding gas flow rate. Does the photo show an acceptable value?
Electrical Characteristics

- Values displayed on welding machines should be within the range of the WPS.
- Machine is not calibrated but usually close.
- If outside procedure use calibrated clamp-on.
Welding procedure required 250°F preheat
Band Damage
Welding Band Damage to Coating
Inspection Requirements

• Large variation in inspector competency
• What are the inspectors responsibilities?
  – Welding inspector must be knowledgeable and competent
  – Verify welding procedure is followed
  – Observe
  – Document
  – Report
  – Correct
  – Work stoppage
Seriously???
Enduro Sta: 24+43.50  Customer Sta: 28908+29.8
Wall Thickness: 0.355 in
Min CSD: 18.782 in  Max CSD: 42.159 in
Deformation - Ovality
Orientation: 06:06
Depth: 2.023 in
4OD: 4.818 in
Length: 546.00 in
Affects girth weld
Field Reported

Upstream Weld # (West Weld): IAMG-0030
Downstream Weld # (East Weld): IAMG-0031
Possible Debris

Upstream Weld # (West Weld): IHTT-60
Downstream Weld # (East Weld): IHTT-58R

This "trimmed to fit" bend appears to be under stress. Further analysis will be needed in this area to verify.

Possible stress located at this bend. A measurement for stress on this bend will not be very accurate due to the debris induced vibration seen on the upstream side of this factory bend.
Pipe on Solid Rock

Anomaly Dig
DCVG Dig on First Phase

Disbonded girth weld coating – poor surface preparation
DCVG Dig

Calculated as 11.67%
DCVG Distance: 7974.47
UT: 0.491" TEMP: 75°
Coating Thickness: 14 mils

15 total holidays in 0.10' of pipe
ranging from 1/4" x 1/4" to pinholes

15 Holidays
DCVG Dig
DCVG Dig on First Phase – Girth Weld Coating Mixed with Backfill

Wet Epoxy Mixed with Backfill
Protected from rocks in the ditch?
Pipe Defect – Does remaining wall thickness meet requirements of API 5L?
Long Seam Location 195.212
Grinding Remaining W.T.
Hydrotest

- Procedures should include provisions for cold weather testing (if not see next slide)
- Pressures should be maintained at least 8 hours for buried piping. Any pressure decline should be investigated. A second pressure test may be warranted. (See chart of failed test)
Chart shows pressure loss last 3 ½ hours
Arc Burns

• Arc burns are not acceptable on high pressure gas pipelines and liquid pipelines.
• The following slides show that arc burns can happen during internal back welding.
The external weld was completed in the trench box. Then the welder crawled inside and completed the back weld. This was a transition weld between 0.740 and 0.486 wall thickness pipe. The welder struck the arc multiple times inside the pipe and missed the bevel multiple times.
Lessons Learned

• Ineffective Contract Inspection - Much more Operator Oversight Needed
• Some Jobs – Particularly Coating - are an Issue
• Mechanized Welding can Work Well – However, much care and attention needed at Startup
• Some Spread Contractors Needed Extra Attention
• The Combination of Poor Inspection and a Contractor Not Following Procedures Can Lead to Major Problems
• Deadline Urgency from the Operator is an Issue
  • Contract Incentives for early completion
Guess what’s wrong associated with welder qualifications
What is wrong with this coated girth weld?
What is wrong with this lowered-in pipe?
Guess what’s wrong with this?
Any idea what happened?
What’s up here? Who’s at fault?
What is this?
Anything out of the ordinary?
What caused this coating damage
What caused this reoccurring coating defect?
What’s up with this thin film epoxy coating?
The gauge measures 7/16”. Is this okay?
Thoughts?
Distribution isn’t left out!!
Guess what it says on the top?
Contact Information

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