Iowa Department of Natural Resources

Plastic Water Line Survey Results

Presented By

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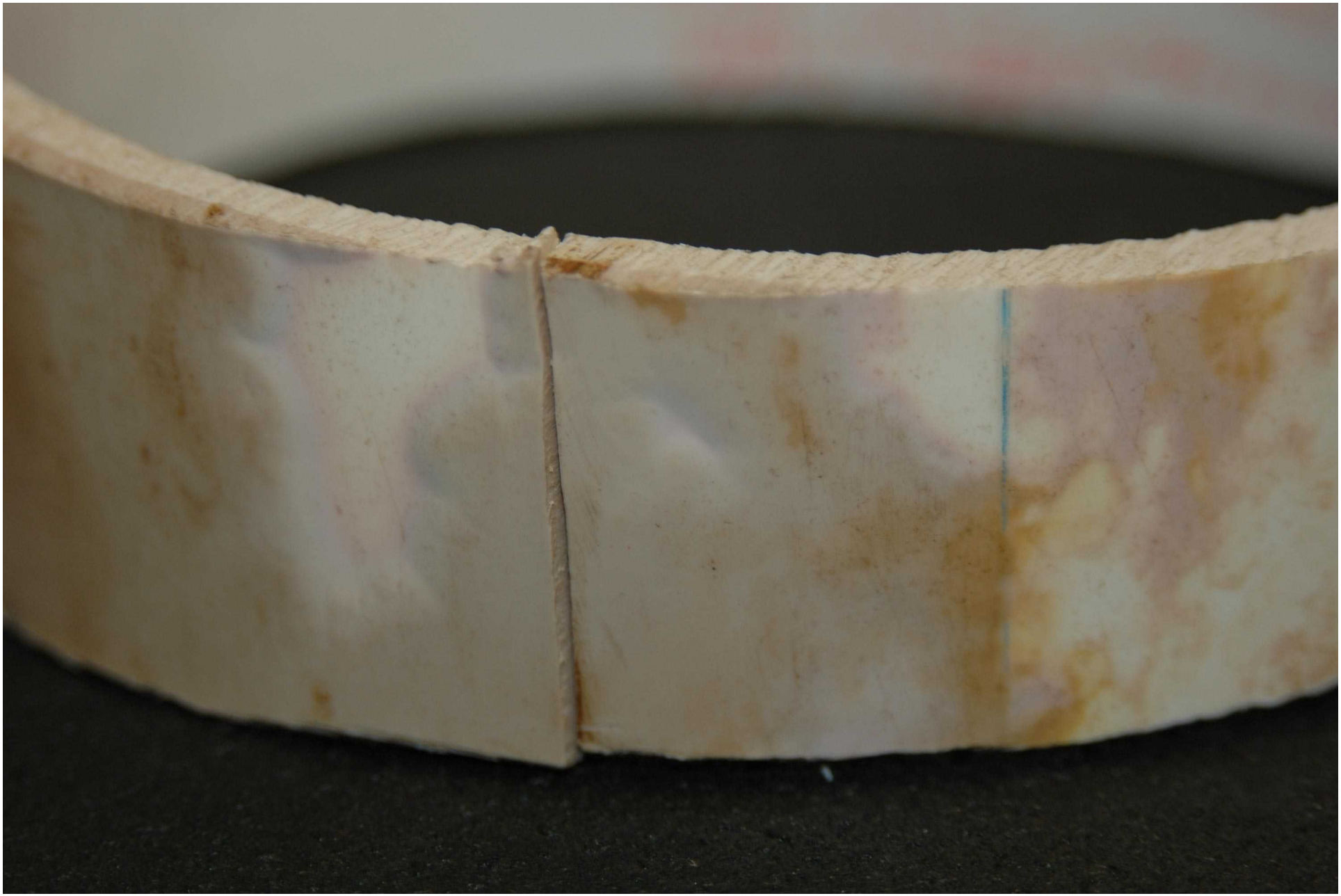
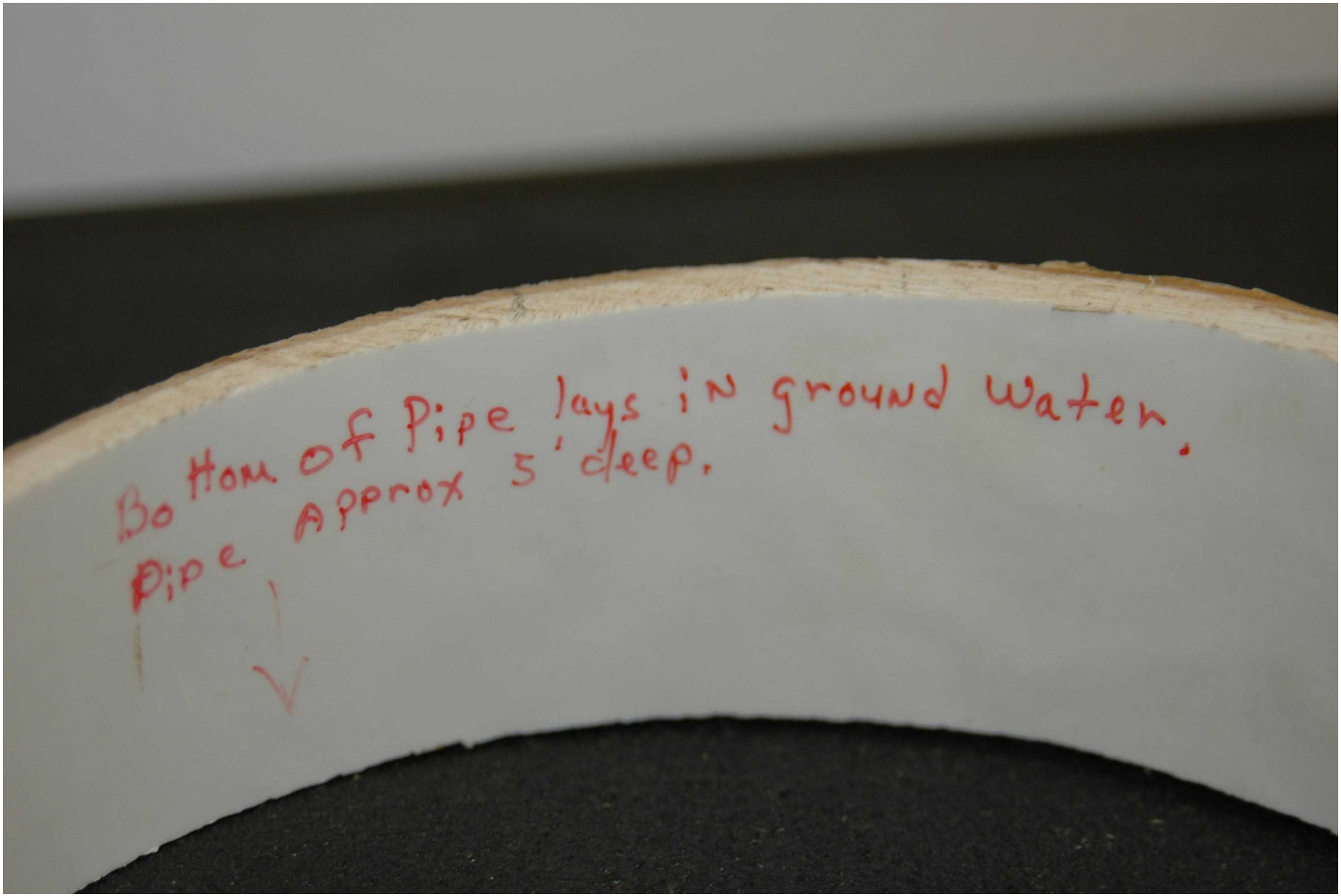


Marion Rural water had a Main break on 12/13/86. Pipe lays approx 15' N. of above Ground fertilizer & Pesticide tanks at Smith fertilizer. location Approx. 5 miles South of Knoxville on Highway #5.

Pipe has been in the ground Approx 2 years.


Bottom of Pipe lays in ground water.
Pipe Approx 5' deep.

Plastic Water Line Pictures

- It is speculated the plastic water line was weakened by the fertilizer and pesticide.
- Pesticides commonly use petroleum based solvents.
- The pictures show a plastic water line can be impacted at locations other than the joints.
- The pipe was 6 inch diameter and SDR 26 (Standard Dimension Ratio).

Industry Survey

- The Iowa Department of Natural Resources (IDNR) asked six questions to:
  - American Water Works Association
  - National Pipe and Plastics, Inc.
  - Society of Plastics Engineers
  - Engineering Systems, Inc.
  - National Sanitation Foundation

Industry Survey

- Continued
  - American Water Works Association Research Foundation
  - Uni-Bell PVC Pipe Association
  - Ductile Iron Pipe Research Association
  - American Cast Iron Pipe Company
  - Plastic Pipe Institute

Industry Survey

- Question #1 Are you aware of any research papers on petroleum permeation of plastic water lines that would be beneficial to us and readily available? If so, how could we obtain a copy (i.e., internet site, contact information, etc.)?

Industry Survey

- Question #2 Have you evaluated or funded research on the impact of petroleum on plastic pipe including polyvinyl chloride (PVC), polyethylene (PE or black pipe), and polybutylene (PB)? If so, what was your determination?

Industry Survey

- Question #3 If you were aware of a utility project passing through a petroleum contaminated area, would you recommend the use of PVC, PE, or PB pipe? Or would your recommendation depend on the contaminant levels observed in the area (some studies suggest that PVC pipe is permeable by petroleum only at saturated conditions which we assume to mean free product, or grossly contaminated conditions)?

Industry Survey

- Question #4 Have you observed or been made aware of any known problems with petroleum permeation of plastic water lines? If so, can you recall what type of plastic pipe was permeated (i.e.,PVC, PE, PB, HDPE, etc.)? We are particularly interested in permeation of PVC pipe. If you are aware of any occurrences, can you recall if it occurred in a grossly contaminated area?

Industry Survey

- Question #5 Have you observed or been made aware of any known problems with petroleum permeation through pipe gaskets? Are you aware of any recommendations for the use of special pipe gasket materials in petroleum contaminated areas?

Industry Survey

- Question #6 Are you aware of other contacts from whom we could acquire information on this subject?

Industry Summary

- The American Water Works Association provided the most answers/responses while the majority of the remaining organizations referred the IDNR to another organization. The most common referrals were Unibell PVC Pipe Association and the Plastic Pipe Institute.

IDNR Survey

- The Iowa Department of Natural Resources (IDNR) asked four questions to field office and central office IDNR staff.
  - #1 Have you observed any known problems with petroleum permeation of plastic water lines?

IDNR Survey

- #2 If so, can you recall what type of plastic pipe was permeated (i.e., PVC, PE (black pipe), HDPE (high density polyethylene), etc.)?
- #3 If so, can you recall the site? The contaminant concentration detected in water samples?
- #4 Does your field office have any actual sections of the pipe that was permeated?

IDNR Summary

- 24 sites were identified
  - 4 were PVC mains
  - 4 were PVC service
  - 6 were PVC
  - 6 were PE Service
  - 1 was PE
  - 4 were Unknown

IDNR Survey

- Lowest and highest chemical of concern concentrations in water samples
  - benzene 1.4 ppb and 2900 ppb
  - toluene 1.0 ppb and 13.4 ppb
  - ethylbenzene 3.0 ppb and 4.6 ppb
  - xylenes 1.0 ppb and 25.6 ppb
  - TEH-diesel 200 ppb and 14,000 ppb
  - TEH-gasoline 300 ppb and 2400 ppb
  - MTBE 1.7 ppb

IDNR Summary

- The IDNR Underground Storage Tank Section regulates benzene, toluene, ethylbenzene, xylenes, TEH-waste oil, and TEH-diesel in soil and groundwater.
- The 2900 ppb benzene was from a polyethylene (PE) service line to a daycare.

States Survey

- The IDNR sent the state survey through the ASTSWOMO Network and through the ITRC State Point of Contact Network.
- 25 states responded to the survey.

States Survey

- Question #1 Does your state evaluate the impact of petroleum on plastic water lines (PWLs) in your underground storage tank (UST), leaking UST, water supply, and/or other section that might be involved in remediating or permitting of PWLs?

State Summary #1

- Four states have specific procedures for the assessment of plastic water lines.
- Seven states handle these sites on a site-specific basis.
- Ten states do not evaluate plastic water lines.
- Four states did not specifically answer the question.

States Survey

- Question #2 Does your state treat the different types of plastic water lines such as polyvinyl chloride (PVC) or polyethylene (PE) differently? If so, how and why?

States Summary #2

- Six states have procedures for treating types of plastic water lines differently.
- Fourteen states have no procedures for treating types of plastic water lines.
- Five states did not specifically answer the question.

States Survey

- Questions #3 Have you had any known problems with petroleum permeation related to plastic water lines? If yes, what? Was the type of plastic water line known to be PVC or PE?

States Summary #3

- Thirteen states have known problems with permeation of plastic pipe. Of those thirteen states, seven states have specifically had permeation incidents involving PVC.
- Nine states have no known problems.
- Three states did not specifically answer the question.

States Survey

- Question #4 Do you have procedures for addressing pipe gasket materials? If so, how?

States Summary #4

- Five states have specific procedures for addressing gasket materials.
- Six states handle gasket materials on a site-specific basis.
- Eleven states do not evaluate gasket materials.
- Three states did not specifically answer the question.

Survey Summaries

- The industry survey did not provide specific information. People referred IDNR to different organizations.
- The IDNR survey documents impacts to plastic water lines do occur.
- The state survey shows plastic water lines are not evaluated consistently by states.
- The surveys will be posted on www.iowadnr.gov