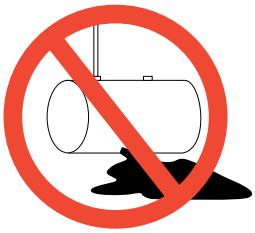
New England Interstate
Water Pollution Control
Commission

Boott Mills South
100 Foot of John Street
Lowell, Massachusetts
01852-1124

Special Appendix

Bulletin 47
June
2004

L.U.S.T.LINE



A Report On Federal & State Programs To Control Leaking Underground Storage Tanks

SPECIAL APPENDIX to

Pipes and Sumps—As I See Them

Thoughts from a Florida UST Inspector

by Ernest M. Roggelin

**The following photos are a supplement to the *LUSTLine* 47 article "Pipes and Sumps—As I See Them: Thoughts from a Florida UST Inspector" and help illustrate the article.
The article can be dowloaded at *www.neiwpcc.org/lustline.htm*.**

UST SYSTEM PIPING

 # 1 Rigid FRP pipe with impact damage

 # 2 Rigid FRP pipe with scratch or score on surface

UST SYSTEM PIPING

#3 Rigid FRP pipe – failure to obtain adequate surface bond

#4 Internal color change of carrier portion of pipe from ivory to black; very brittle

#5 Internal color change

#6 External color change

#7 External color change

#8 Black mold growth; degradation of single-wall pipe's external cover

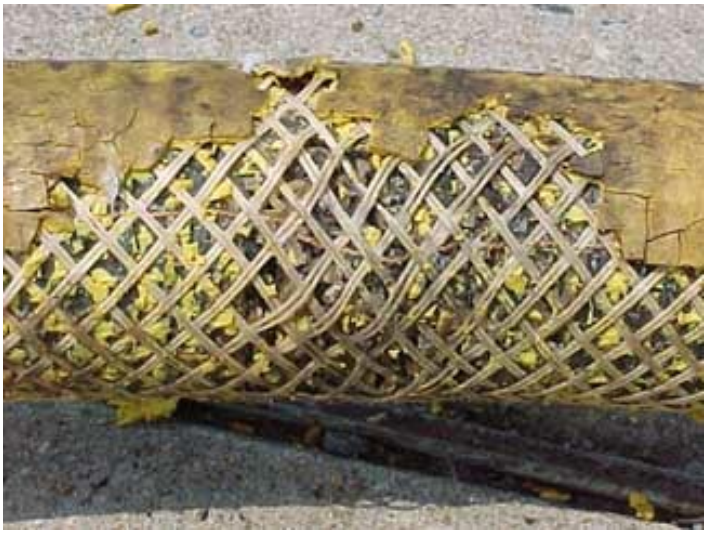
UST SYSTEM PIPING

#9 Degradation of outer layer of single-walled pipe

#12 Jelling of single-walled pipe

#10 Subsequent to degradation of outer skin, the substrate of the pipe becomes granular

#13 Softening of single-walled pipe with product being squeezed out



#11 Loss of substrate integrity

#14 Softening of single-walled pipe

UST SYSTEM PIPING

#15 Blowout – generally occurs near end of pipe

#16 Blowout

#17 Blowout

#18 Blowout; also note the apparent growth of pipe evidenced by the exposed "clean section"

#19 Blowout – reverse view

#20 Blowout – at sump wall

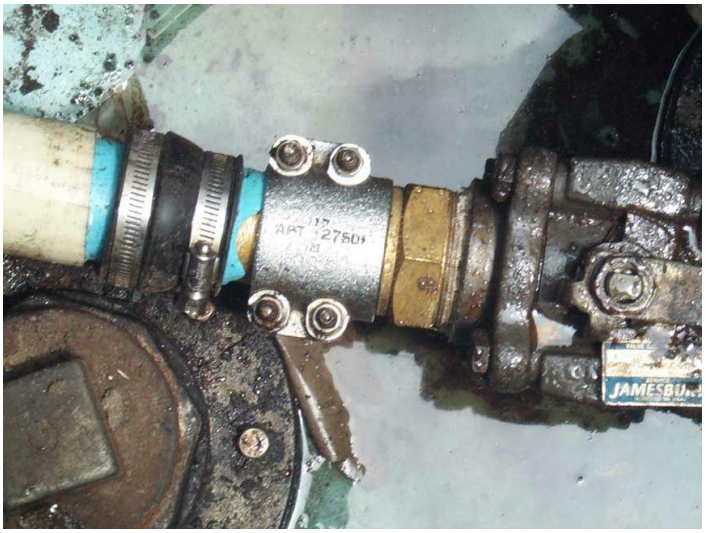
UST SYSTEM PIPING

#21 Apparent 3-inch growth in secondary pipe layer

#22 Secondary layer overrides fitting

#23 Split fitting resulting in disconnection of pipe

#24 Primary pipe jacket damage



#25 Primary pipe jacket damage

#26 Growing pipe meets fitting

UST SYSTEM PIPING

#27 Cracking of outer layer of primary pipe

#28 Cracking of outer layer of primary pipe

#29 Pipe growth pushes metallic fittings out of vertical orientation; black boot torn away from sump wall

#30 Secondary pipe layer overrides fitting; metallic fittings pushed out of vertical orientation

#31 Radical kink in pipe

#32 Interesting orientation of pipe; note scrunching of pipe skin at sharp bend-radius points.

UST SYSTEM PIPING

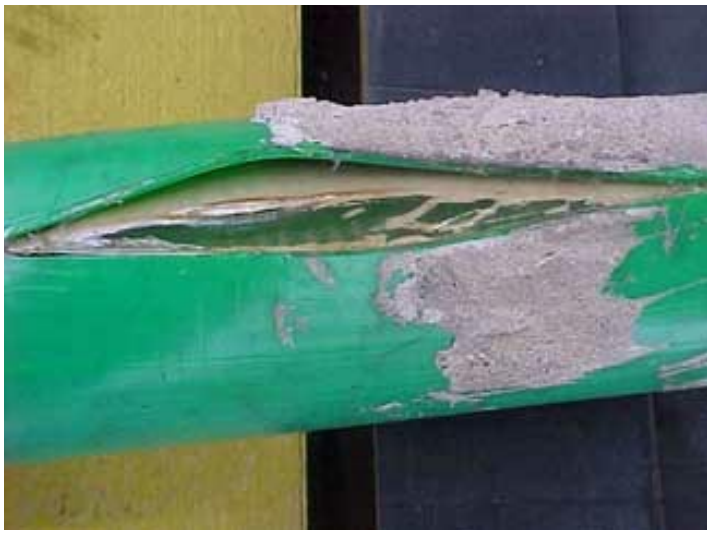
#33 Two sharp bends in double-wall pip; note scrunching/slippage of secondary layer

#34 Orientation of pipe after disconnection from pump

#35 Split in primary pipe outer layer

#36 Split in secondary pipe; note that there appears to be a pvc-chase pipe penetrating the sump wall

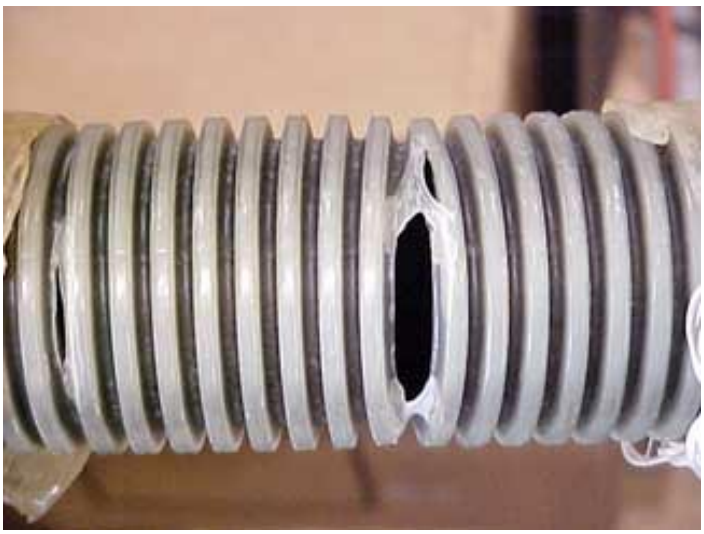
#37 Split pipe



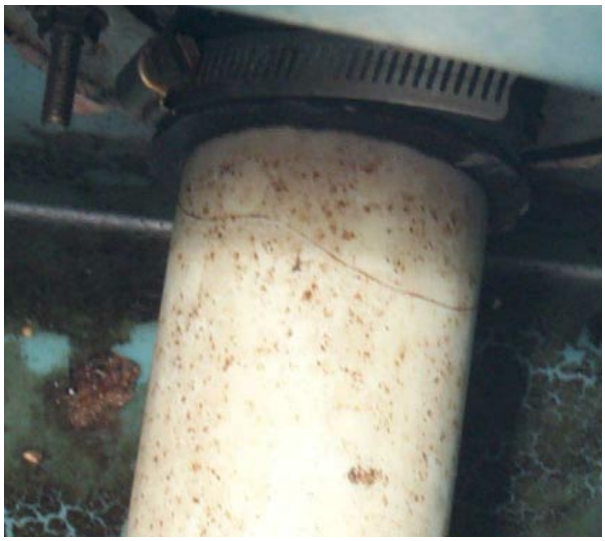
#38 Split of secondary pipe; apparent failure of primary layer underneath

UST SYSTEM PIPING

#39 Crack in pipe



#42 Exposed cracks in primary pipe wall



#40 Hairline crack in secondary pipe

#43 Expansion of primary pipe blocks communication avenue of blue secondary

#41 Loss of structural integrity of carrier portion of primary pipe

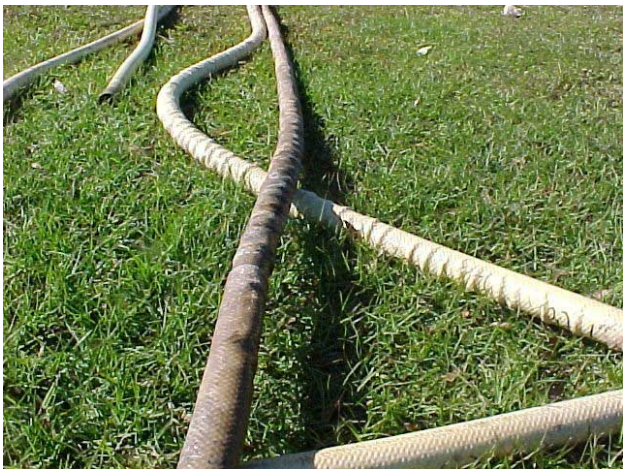
#44 Swell of primary against secondary

UST SYSTEM PIPING

#45 Swell of primary against secondary

#46 Swell of primary against secondary

#47 Loosening of primary pipe skin; torn boot



#48 Loosening or "alligatoring" of primary pipe skin

#49 Loosening of primary pipe skin

#50 Discoloration and loosening of primary pipe skin

UST SYSTEM PIPING

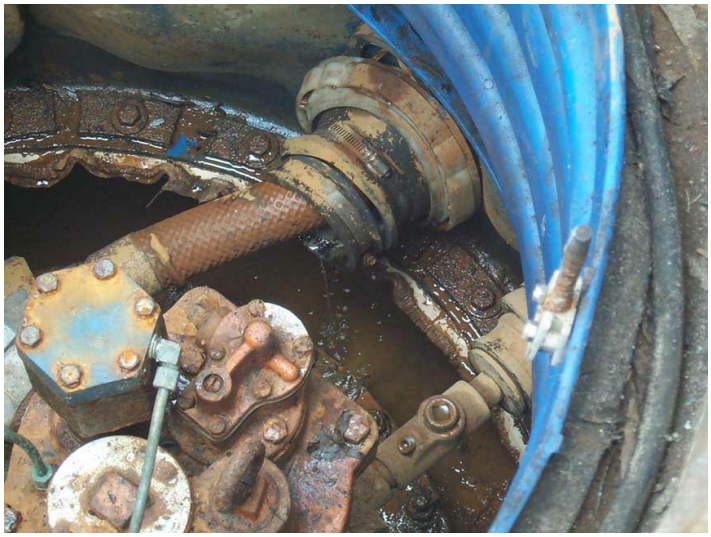
#51 Cracked fitting

#52 Cracked fitting

UST SYSTEM SUMPS

#53 Ripple in sump wall; torn boots; shift in pipe position within secondary pipe

#55 Ripple in wall; shift in pipe position within secondary pipe



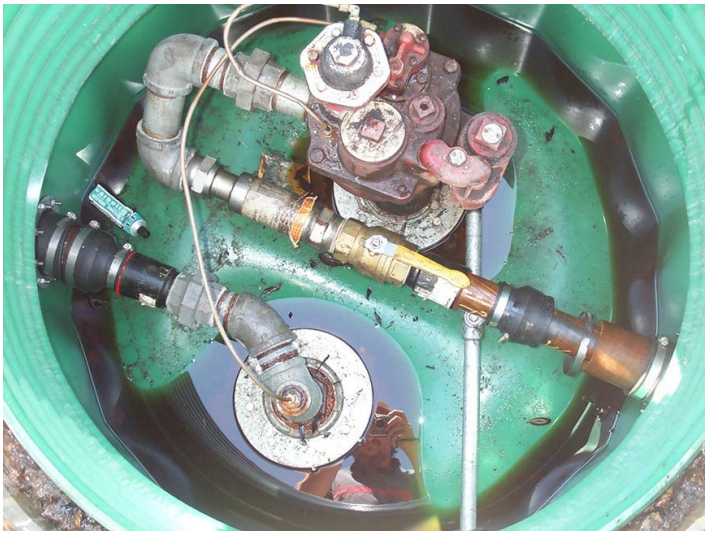
#54 Ripple in sump wall; torn boot; shift in pipe position within secondary pipe; water intrusion due to apparent loss of secondary integrity

#56 Torn boot

#57 Tank secondary jacket deformed

UST SYSTEM SUMPS

#58 Tank secondary jacket deformed; note shift in primary pipe orientation within secondary pipe; loosening of primary pipe skin; discoloration of primary pipe



#61 Pipe sump floor warped

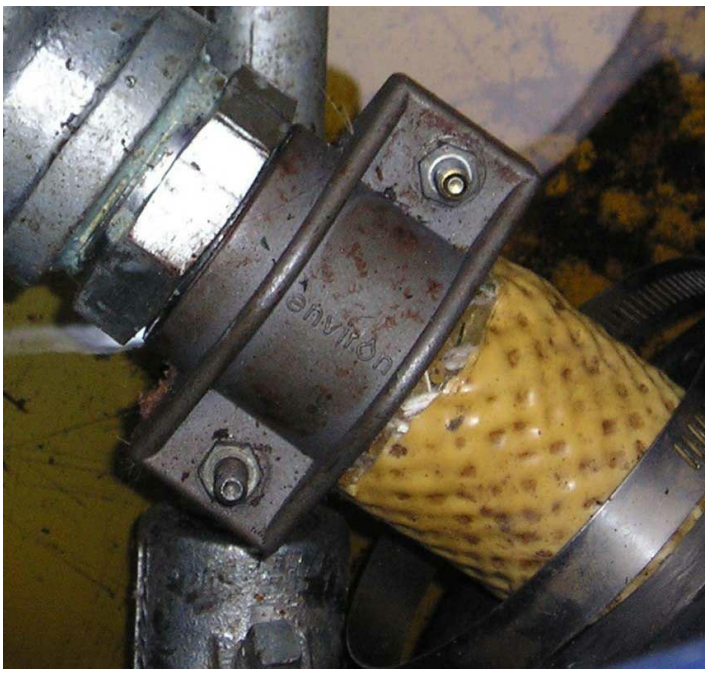
#59 Floor of dispenser sump warped

#62 Transition sump floor pushed up into contact with primary pipe; primary pipe, in turn, in contact with secondary pipe (groundwater at 2-3 feet below land surface)

#60 Pipe sump floor warped

UST SYSTEM CONTRACTOR ERROR

#63 Contractor Error – failure to use sump manufacturer specified wall penetration fitting & oblique angle of wall penetration



#65 Contractor Error – mating two different manufacturer's product

#64 Contractor Error – "Scuff Guard" layer penetrates sump wall – this layer should terminate outside the wall