

License Renewal Teleconference on the Updated License Renewal Aging Management Program for Buried and Underground Piping and Tanks (XI.M41)

August 24, 2010



Agenda



- Objective
- Definitions
- Philosophy
- Preventive Actions
- Inspections
- Summary

Buried pipe is primary focus

Objective



- Manage aging of buried and underground piping and tanks
 - Primary issue is external corrosion

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Definitions



- Buried
 - In direct contact with soil or concrete
- Underground
 - Below grade
 - Limited access
 - In contact with air
 - e.g. pipes in trenches or vaults

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Philosophy



- Preventive actions are the best approach to aging management
 - Some inspections still required
 - More inspections required if prevention is less than perfect

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Philosophy



- Concentrate efforts on high "risk" pipe
 - Higher probability of corrosion
 - Code Class or safety related
 - Hazmat
 - Radiation, diesel fuel etc.

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Philosophy



- Design preventive actions and inspections to prevent adverse effects
 - Code class/safety related
 - Must have sufficient water flow
 - Hazmat
 - Must not contaminate groundwater

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Philosophy



- Excavations can damage pipe
 - Permit alternatives to excavations whenever possible
 - Hydrotests
 - Internal inspections

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Preventive Actions **U.S.NRC** United States Nuclear Regulatory Commission Protecting People and the Environment

- Applies to all piping except possibly fire mains
- Separate recommendations for
 - Buried piping and tanks
 - Underground piping and tanks

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Preventive Actions **U.S.NRC** United States Nuclear Regulatory Commission Protecting People and the Environment

- Based on material of construction
- Recommend
 - Coating
 - Backfill
 - Cathodic protection

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Preventive Actions



Material ¹	Coating ²	Cathodic Protection ⁴	Backfill Quality
Titanium			
Super Austenitic Stainless ⁸			
Stainless Steel	X ³		X ^{5, 7}
Steel	X	X	X ⁵
Copper	X	X	X ⁵
Aluminum	X	X	X ⁵
Cementitious or Concrete	X ³		X ^{5, 7}
Polymer			X ⁶

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Inspections



- Categories considered
 - Buried pipe
 - Underground pipe
 - Buried tanks
 - Underground tanks
- Each category addressed separately

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Inspections



- Apply to
 - Code Class/safety related
 - Hazmat
- Expand to
 - All piping

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Inspections



- Designed to accommodate
 - Poor prevention in first inspection (yrs 30-40)
- Expect
 - Good prevention in remaining inspections

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Inspections



Material ¹	Preventive Actions ²	Inspections ³	
		Code Class Safety Related ⁴	Hazmat ⁵
Titanium			
Super Austenitic Stainless ⁷			
Stainless Steel		1 ⁶	1 ⁶
HDPE ⁸	A	1 ⁶	1 ⁶
	B	2	1%
Other Polymer ⁹	A	1 ⁶	1 ⁶
	B	2	1%
Cementitious or Concrete		1 ⁶	1 ⁶
Steel	C	1 ⁶	1 ⁶
	D	1	2%
	E	4	5%
	F	8	10%
Copper	C	1 ⁶	1 ⁶
	D	1	1%
	E	1	2%
	F	2	5%
Aluminum	C	1 ⁶	1 ⁶
	D	1	2%
	E	1	5%
	F	2	10%

Inspections



Material ¹	Preventive Actions ²	Inspections ³	
		Code Class Safety Related ⁴	Hazmat ⁵
Steel	C	1 ⁶	1 ⁶
	D	1	2%
	E	4	5%
	F	8	10%

Inspections



- Alternatives
 - Fire mains
 - Flow tested at 6 month intervals
 - All pipe
 - Hydrostatic tests
 - Internal inspections

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Summary



- Intent is to manage aging
 - Best accomplished through preventive actions
 - Necessary preventive actions depend on material
- Inspections necessary
 - Level depends on prevention
 - Good prevention expected by second inspection

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Summary



- Concentrate on important piping
 - Code Class/safety related
 - Hazmat
 - Level of inspection differs
- Excavations may damage piping
 - Alternatives provided