



U.S. NRC

UNITED STATES NUCLEAR REGULATORY COMMISSION

Protecting People and the Environment

U.S. NRC UPDATE ON BURIED AND UNDERGROUND PIPING AND TANKS

**Brian Allik
September 2016**



Outline

- Status of *Buried Piping Action Plan*
- Issuance of Summary of Results from NRC Temporary Instruction (TI) 2515/182 (ADAMS Accession Number: ML16174A032)
- Update on Review of Operating Experience (OE)
- Issuance of License Renewal Interim Staff Guidance, LR-ISG-2015-01, “Changes to Buried and Underground Piping and Tank Recommendations” (ADAMS Accession Number: ML15308A018)



Status of *Buried Piping* *Action Plan*

- *Buried Piping Action Plan* - The NRC reviewed codes, standards, regulations and industry practices related to degradation of buried piping and identified a number of ongoing activities. This action plan tracked those activities.
- Regulatory Outcome of *Buried Piping Action Plan* (from 2009-2015)
 - Staff concluded that current regulations ensure
 - a. leakage from buried piping has been of low safety significance with respect to structural integrity
 - b. the amount of radioactive material that has been released has been a small fraction of regulatory limits
 - Rates of significant leakage events have exhibited a decreasing trend consistent with improved maintenance and inspection practices over the span of the action plan



Status of *Buried Piping* Action Plan (cont.)

- In November 2015 the NRC had completed all action items and closed the action plan
 - The staff will continue certain activities such as participating in codes and standards activities
 - The staff will periodically meet with industry (e.g., ASME, NACE, EPRI)
 - The staff will be routinely reviewing operating experience
 - These activities will no longer be tracked by the action plan



Issuance of Summary of Results from NRC TI 2515/182

- *NRC TI 2515/182, “Review of the Implementation of the Industry Initiative to Control Degradation of Underground Piping and Tanks”*
 - **Phase I:** Determine if licensees were implementing the industry initiative (i.e., NEI 09-14) on buried and underground piping and tanks
 - **Phase II:** Assess whether the industry initiative provides reasonable assurance of the structural and leakage integrity of buried and underground piping and tanks



Issuance of Summary of Results from NRC TI 2515/182 (cont.)

- Summary of Results from NRC TI 2515/182 (ADAMS Accession Number: ML16174A032) was issued on June 23, 2016
 - Results of Phase I indicate that all licensees implemented the initiative and met established due dates
 - Results of Phase II indicate that all sites
 - perform effective risk ranking
 - have programs and have or are developing system health reports
 - are performing inspections of high risk buried assets



Issuance of Summary of Results from NRC TI 2515/182 (cont.)

- Results of Phase II indicate that many sites are making improvements to cathodic protection systems
- The staff has concluded that these changes have enabled utilities
 - to identify assets at risk for significant deterioration and implement inspection, maintenance, repair, and replacement strategies
 - to provide reasonable assurance of the long term reliability of buried and underground piping and tanks



Update on Review of OE

- NRC is continuing to review OE on an annual basis
- Reports are internal to the NRC (not publically available)
- Latest review spanned from May 2015 – April 2016
- Majority of the leaks occurred in potable water systems
- Based on the staff's review of the new event reports, there is no discernible trend of consequential pipe leakage issues



Overview of LR-ISG-2015-01

- LR-ISG-2015-01, “Changes to Buried and Underground Piping and Tank Recommendations,” superseded LR-ISG-2011-03, “Changes to the Generic Aging Lessons Learned (GALL) Report, Revision 2, Aging Management Program (AMP) XI.M41, ‘Buried and Underground Piping and Tanks,’” to provide revisions to AMP XI.M41, “Buried and Underground Piping and Tanks” (ADAMS Accession Number: ML15308A018)
- Key Revisions Included:
 - Significantly reduced the number of inspections when cathodic protection (CP) system is not meeting performance goals
 - Category E (CP system does not meet Category C, coatings/backfill meet “preventative actions”, acceptable plant-specific operating experience, non-corrosive soil) – Reduced maximum inspections from **29 to 9** for steel, copper, and aluminum
 - Category F (Does not meet Category E) - Reduced maximum inspections from **60 to 18** for steel, copper, and aluminum



Overview of LR-ISG-2015-01 (cont.)

- Key Revisions Included (cont.):
 - Alternative Cathodic Protection Acceptance Criteria
 - -750 mV relative to a copper/copper sulfate reference electrode (CSE) for soil resistivity of 10,000 – 100,000 Ω -cm
 - -650 mV relative to CSE for soil resistivity >100,000 Ω -cm
 - Verify less than 1 mpy loss of material, electrical resistance corrosion rate probes