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United States Nuclear Regulatory Commission
Protecting People and the Environment

Effectiveness of Industry Initiatives: Change in Leak Incidence Rates

20 October 2011

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Agenda

- Objective
- Problem
- Conclusion

Objective

- Determine Effectiveness of Initiatives
  - Consider
    - Leaks from pipe and tanks
      - Safety related
      - Contain hazmat (environmentally sensitive)
      - Contain radioactive material (by design or contamination)

Objective

- Determine effectiveness of initiative (cont)
  - Expect
    - Pre 2009 – some number of leaks
    - 2009 – 2013 – higher number of leaks
      - Inspection transient
    - Post 2013 – lowest number of leaks
      - Improved piping/maintenance
  - Must be demonstrated

Problem

- How to determine leak rates
  - Three sources
    - EPIX
    - NEI survey results
    - NRC groundwater contamination
  - Not in complete agreement
  - EPIX reporting criteria changed in 2009
    - New data inconsistent with old

Problem

- EPIX data base categories, Buried Pipe
  - Component
    - Pipe, Fitting, Rupture Disk
  - Engineering Characteristics
    - Safety related
    - Contains environmentally sensitive fluid
    - Contains radioactive material
    - Run to failure
    - Not run to failure

Problem

- EPIX data base categories, Buried Pipe
  - Failure mode
    - Significant leak
    - Leak
    - External leak
    - Adverse inspection finding
    - Other degradation
    - Other
  - 194 total entries as of May 2011

Problem

- NEI data base categories
  - Leaks from
    - Safety related
    - Contains radioactive
    - Contains environmentally sensitive
  - 78 entries 2007-2010

Problem

- Total leaks by year
  - EPIX data not limited to safety related, radioactive, environmentally sensitive
  - As of spring 2011

Year	INPO Data			NEI Data
	Leak	Significant Leak	Total Leaks	
2007	10	0	10	11
2008	1	0	1	13
2009	62	7	69	19
2010	57	5	62	35
Total	130	12	142	78

Problem

- Safety related, radioactive, environmentally sensitive leaks by year
  - As of spring 2011

Year	INPO Data – Leaks (Not Fun to Failure, Other)				NEI Data
	Environmentally Sensitive	Radioactive	Safety Relevant	Total Leaks	
2007	0	0	0	0	11
2008	0	0	0	0	13
2009	10	5	2	17	19
2010	1	3	3	7	35
Total	11	8	5	24	78

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Problem

Year	INPO (verbal)	EPIX (all categories)	EPIX (safety rel., rad., env.)	EPIX (keyword)	NRC* (groundwater)
2000	2	2	1	0	1
2001	0	0	0	0	0
2002	0	0	0	0	0
2003	2	2	0	2	2
2004	2	2	0	5	1
2005	5	5	0	1	2
2006	0	1	0	0	5

* Not necessarily buried pipe leaks

- Older data does not compare well

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Problem

- Categorization issues
  - Significant leak of safety related service water reported as non leak
  - Leak of condenser (24,000 pC/l tritium) reported as buried pipe “run to failure”
  - Sodium hydroxide leak reported as buried piping “run to failure”
  - Essential service water leak reported as buried piping “not run to failure”

Conclusion

- Data sources are inconsistent with each other
- Data sources contain some examples of miscategorizations
- Pre-2009 data reporting basis inconsistent with later data
- Very difficult to compare data from different sources

Conclusion

- Evaluation of existing data has not revealed a useful pre 2009 leak rate
- Comparison with 2009-2013, and post 2013 leak rates may not be productive
- Need to establish a pre-inspection transient rate as a metric for comparison
- Seeking input