



PHMSA RESEARCH & TECHNICAL PERSPECTIVES



Working Group 4 – Improving Risk Models
Gov/Industry Pipeline R&D Forum

August 6-7, 2014



Research on Risk Models

- **Risk in general has seen a lot of work especially in the Direct Assessment area**
- **Historically since 2002, holistic Risk Models were not an R&D focus area**
 - Very little direct related work of mention
- **Model work was funded for a variety of individual issues**
 - SCC & Crack Growth Rate
 - Fracture Arrest
 - Interactive Threats



Issues/Challenges for Improving Risk Models

- **Identifying all threats or interactive threats**
 - System or segment specific
 - Can models factor these specificities?
- **Updating changes in threats or risk over time**
- **Data quality/management**
- **Qualifications of personnel – all aspects of risk programs**
- **Developing a comprehensive risk analysis process**
- **Picking the right performance measures to validate risk assessment process is germane**



IMP 2.0 Lessons Learned

- **10+ years of assessing operator IM programs and usage of risk models**
 - Next few slides describe hopeful model improvements
- **PHMSA IPC Paper (IPC2014-33423) The Evolution of PHMSA's Approach for Improving Pipeline Integrity**
 - Highlights of path forward with models
- **Proposed PHMSA/NAPSR IMP 2.0 public event in CY 2015**



Over a Decade of IMP

Frequent Integrity Management Issues

Failure to provide adequate detail in all or most areas of the IM Plan

Failure to have a systematic, documented process to evaluate additional measures to protect HCAs

Failure to develop a process to qualify personnel reviewing assessment results

Failure to require the integration of other pertinent data in a timely manner, when evaluating assessment results

Failure to develop a comprehensive risk analysis process or consider all required risk factors

Failure to consider facilities (e.g., tanks) in risk analysis

Failure to specify adequate vendor specifications including tool tolerances and timeframes for ILI reports

Failure to develop or document an adequate periodic evaluation process that meets rule requirements

Failure to require updates of the risk model for current conditions and environment

Failure to have a documented Emergency Flow Restriction Device needs analysis



Models to Facilitate Continuous Improvement/Feedback Loops

- **Evolving from relatively coarse “index” type of risk models used to rank line pipe segment baseline assessment scheduling priority to more investigative-oriented approaches/models. Such approaches must be reasonably straightforward to populate and use, but also capable of evaluating topics such as:**
 - Risk improvement of potential measures that reduce the likelihood of losses of integrity (preventive measures)
 - Locations of increased integrity vulnerability due to interactive threats



Cont.

- Human impact on risk (e.g., upset conditions or restart of a system that has a loss of line integrity)
- Incorporating updated system integrity information in a meaningful way – e.g., latest ILI and associated remediation results.
- Risk improvement of potential measures that reduce the consequences of line pipe releases (mitigative measures)



Inclusive of Facility Risk

- **Development of meaningful methods to evaluate risk from non-line pipe facilities. Approaches to evaluating the risk of significant releases from non-line pipe facilities for the IMP rules have not been well developed. In contrast to line pipe risk approaches, “facility risk” is more variant, particularly with respect to the type of facility – e.g., evaluation of breakout tank risk is largely different from pump station risk. Simplified approaches specific to each type of facility may be needed.**



Analytical Implementation

- A need of ways to facilitate the analytical use of risk approach/model results. Generation of “risk results” is not the end goal, but simply a means to the end of a structured way to investigate ways to reduce operational risk.



Next Steps?

- **What can be proscribed for risk models without singling out a given model?**
- **2015 IMP 2.0 or Risk Models public event**
 - More policy guidance to come
- **Promulgate minimum hallmarks of comprehensive models?**
 - “Hallmarks” approach utilized for other PHMSA programs such as for damage prevention
- **Research partnerships to improve models where proscribed?**
 - No endorsements though