



REX2024
PRCI Research Exchange

Potential SRP: Pipeline Risk Management

Dongliang Lu
Senior Integrity Engineer, South Bow
Dallas, TX



Pipeline Research Council International



Why Pipeline Risk Management SRP

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- **The Urgency**

- Increased scrutiny from regulators and the public
- Aging infrastructure requiring holistic and improved integrity management
- Use and the expectation of using the vast amount of integrity data (and considering data uncertainties)
- Challenges from energy transition and emerging threats

- **The Importance**

- Risk management as a comprehensive and well-accepted approach to measure, improve and demonstrate the overall safety and reliability performance
- An effective tool for data integration, accounting for data uncertainties and making data-driven decisions
- A common platform for broader industry collaboration in sharing data, knowledge and lessons learned to improve safety



Why Pipeline Risk Management SRP

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- **The Challenges**

- A consistent risk management framework in the context of pipeline integrity management
- Consensus in the role, capabilities and applicability of risk models and risk management in general
- Guidelines to risk model development that is applicable to a broad range of threats and application scenarios
- Guidance on development of risk evaluation and governance approaches and proper risk communications

- **The Answer**

- A pipeline risk management SRP that focuses on building consensus, developing guidelines and best practices for risk model development, and encouraging industry collaboration and data sharing



Pipeline Risk Management SRP – What It Is (and Is Not)

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- **What It Is?**

- The SRP is about building consensus, clearing misconceptions, and developing general guidelines around pipeline risk management
- The intention is to help operators, consultants to be better at developing risk models, applying risk management principles, and having improved risk communication with regulators and the public
- The SRP is also about building community of practice, encouraging and facilitating industry collaboration, coordinating with standard organization in risk management and data sharing

- **What It is Not**

- The SRP is NOT about imposing prescriptive risk modelling, risk evaluation and other risk management practices
- The SRP is less about developing specific likelihood or consequence of failure models, but more about how data and mechanistic models can be best incorporated into management of risk, understanding the uncertainties and limitations of the data and model



Desired Outcomes and Benefits

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- **Desired Outcomes**

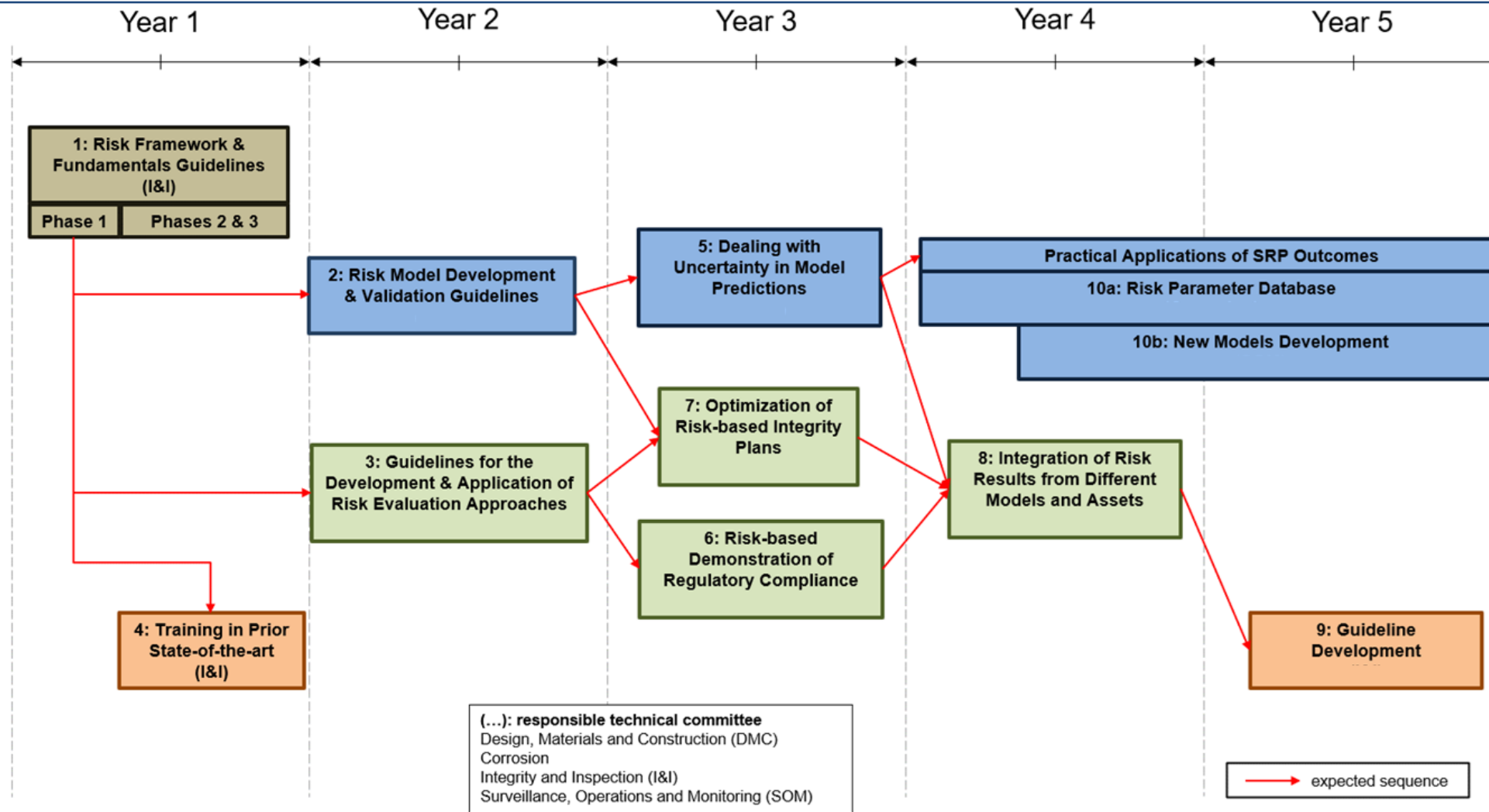
- Compile and upgrade existing pipeline risk management best practices
- Produce clear and specific guidelines for risk model methodologies development
- Support the development and improvement of risk models in areas of interest and high priority
- Support the initiation of a community of practice for industry collaboration and sharing

- **Benefits**

- Wider adoption of risk management best practices in the industry
- Improved safety and reliability performance of pipeline assets
- Optimized allocation of resources in integrity programs
- More effective communication to regulators and the public

Proposed Projects and Timelines

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Year	Funding
1	~370K
2	~800K
3	~680K
4&5	~1200K

Deep Dive Session This Afternoon

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- **Walk through and discuss the first two or three years' projects**
- **Call for team leads, team members and SMEs to:**
 - Refine the objectives and scopes of the projects
 - Flesh out tasks and deliverables and identify industry resources for
 - Socialize the SRP or individual projects with your RSC members



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Questions

Contacts:

Project lead

Dongliang Lu, dongliang.lu@southbow.com

Project manager

Jim wayman,



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Backup Slides

Risk Framework and Fundamentals

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- **Objective:**

- To promote consistent risk management terminology and provide guidelines on appropriately using different risk methods and measures and interpreting their results.

- **Scope of work highlights:**

- Develop the appropriate definition and interpretation of each risk-related term under different contexts and provide commentary on the rationale for the selection
- Develop a guideline focusing on the benefits, limitations, available risk acceptance criteria formats (not values or levels), and utility or application of each risk model and measure type.
- Develop methods for combining outputs from different risk measures (e.g., life safety, environmental, financial) and different model types and for applying those outputs in risk-based decision-making.
- Develop a framework and general guidance on incorporating the cost of risk reduction in risk acceptance criteria for each risk model and measure type
- Support ongoing communication and advocacy with standards organizations

Model Development and Validation

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- **Objective:**

- To provide the industry with guidelines on developing and validating a risk model, characterizing the uncertainty associated with its results, and properly applying it

- **Projects**

- **Project 2 model development and validation guidelines (360k):** to provide a consistent and robust guideline for producing comprehensive and validated risk models, including considerations of data requirement, development process, validation requirement and other relevant aspects
- **Project 5 dealing with uncertainties in risk predictions (\$150k):** to provide guidelines for the characterization of uncertainties in risk predictions to ensure the appropriate interpretation of risk results and the most effective ways in which they can be used in decision-making.
- **Project 10a risk parameter database (400k):** compile a database of risk-related pipeline parameters to facilitate the application of risk management
- **Project 10b new model development (900k):** develop risk models for high priority, new applications as identified by PRCI

Application and Communication of Risk Results

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- **Objective:**

- To provide the industry with guidelines on developing and validating a risk model, characterizing the uncertainty associated with its results, and properly applying it

- **Projects**

- **Project 3 guidelines for development and application of risk evaluation approaches (\$330k):** to provide guidelines that can be used by stakeholders (such as regulators, industry organizations, or individual operators) to develop and validate their own risk evaluation methodologies
- **Project 6 demonstration of regulatory compliance (\$210k):** to develop guidance for applying risk-based methods in engineering assessments as allowed or required by regulations. The outcome of this project will facilitate making an engineering case for deviations from prescriptive requirements in regulations, such as 49 CFR 192 and 195.

Application and Communication of Risk Results – Cont'd

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- **Project 7 optimization of risk-based integrity planning (\$220k):** To develop guidance for using the results of risk assessment to make optimized integrity management plans for defect management and damage prevention. The outcome of this project can be used to support effective allocation of resources to improve pipeline safety.
- **Project 8 integration of risk results from different models and assets (\$200k):** To develop approaches and guidelines for integrating risk results from different models and asset categories to support higher-level assessments and decision-making. The outcome can be used for decision-making (e.g., resource allocation) at the corporate-level, considering a broad variety of assets, not just pipeline assets.

Trainings and Knowledge Transfer

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- **Objective:**

- Ensure effective dissemination and information sharing of learnings and outcomes from the SRP.

- **Projects**

- **Project 4 training in prior state-of-the-art (\$110k):** to provide risk practitioners in the industry with background knowledge on existing state-of-the-art pipeline risk methodologies and will improve the ability of PRCI members to effectively steer the remainder of the SRP activities to ensure that outcomes are maximally impactful
- **Project 6 guideline development (\$170k):** to coordinate and combine deliverables from selected Pipeline Risk Management SRP projects to produce a unified risk guideline document that is suitable for publication by a recognized standards development organization. The published guideline will serve as a comprehensive and unified reference to guide the development and application of risk models in the pipeline industry.

Idea #	Project Title	Year	Committee	Team leader	Team	Idea refined	RFP status	Cost
3786	Risk Framework & Fundamentals Guidelines	2025	I&I	Justin Raimondi	D. Lu, K, Thompson, T. Sera, G. Emmerson, J. Moritz, M. Tomar			259600
3788	Training in Prior State-of-the-art, Risk Management	2025	I&I	Dongliang Lu	K. Thompson, A. Chamberlin, A. Woll, T. Sera, K. Yap,. C. Newton, J. Moritz			110000
3804	SRP-IRM: Risk Model Development &Validation Guidelines	2026						424800
3805	SRP-IRM: Guidelines for the Development & Application of Risk Evaluation Approaches	2026						389400
3806	SRP-IRM: Dealing with Uncertainty in Model Predictions (Risk Management)	2027						177000
3810	SRP-IRM: Risk-based Demonstration of Regulatory Compliance	2027						247800
3812	SRP-IRM: Optimization of Risk-based Integrity Plans	2027						259600
3814	SRP-IRM: Integration of Risk Results from Different Models and Assets	2028						236000
3818	SRP-IRM: Practical Applications of SRP Outcomes: Risk Parameter Database	2028						236000
3819	SRP-IRM: Practical Applications of SRP Outcomes: New Models Development	2028						531000
3817	SRP-IRM: Guideline Development	2029	I&I					200600

Active and Planned Related Work

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- IM-1-05 Comprehensive Review and Categorization of Threats to Pipelines and Pipeline Facilities
- IM-1-07 Variance from 5-year Inspection Intervals in Limited Situations
- IM-1-09 PHMSA Data Key Performance Indicators
- EC-02-14 Develop Best Practice Guidelines for Application of Machine Learning in Integrity Management Decisions
- EC-02-15 Development of a Generalized Framework for Anomaly Assessment with a Specific Implementation for Corrosion