REX2024
PRCI Research Exchange

Potential SRP: Pipeline Risk Management - Project Deep Dive

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Overview

Objectives

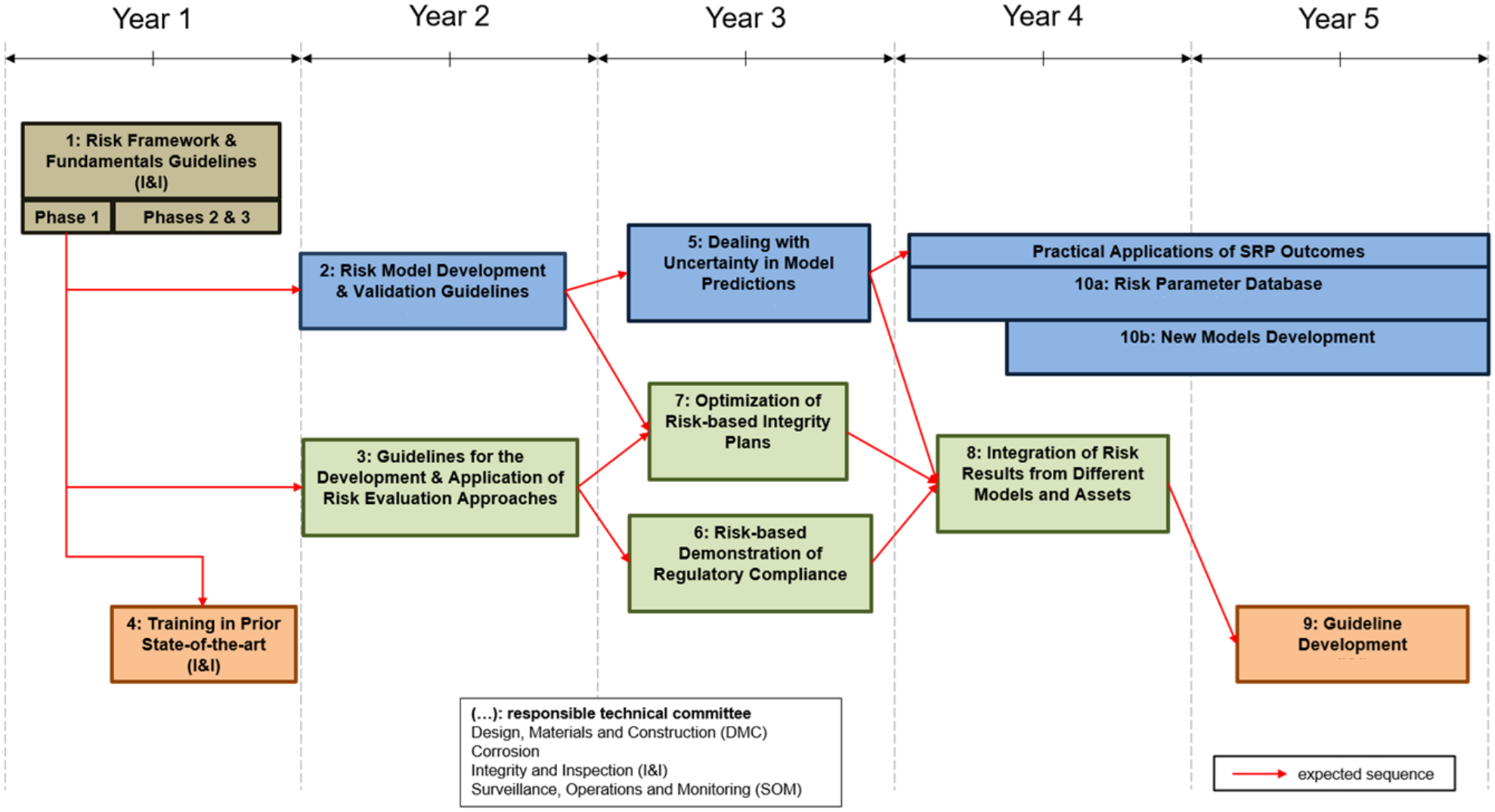
- **Provide an overall picture of the proposed projects and what aspects of risk management are to be covered**

- **Deep dive into the first one or two years of projects**
  - Explain what each project is about
  - Seek inputs regarding objectives, scope, etc. for each project
  - **Looking for interested SMEs, team members and team leads**

Agenda

- Proposed Projects Overview (10 min)
- Risk Framework & Fundamentals – Year 1 (15 min)
- Training in Prior State-of-the-Art – Year 1 (15 min)
- Risk Model Development and Validation Guidelines – Year 2 (15 min)
- Guidelines for the Development of Application of Risk Evaluation Approaches – Year 2 (15 min)
- Later year projects and new ideas

Project Overview



Project Themes

- **Risk Framework and Fundamentals – Project 1**
  - Building consensus on risk management framework and terminologies
  - Establish general principles regarding the development, use and interpretation of risk models and risk results
  - Support ongoing communication and advocacy with standard organizations
- **Risk Model and Risk Parameter Database Development – Project 2, 5, 10**
  - Guidelines on how to develop and validate various risk-related models, including failure rate and consequence models, quantitative and qualitative
  - Guidelines on how to deal with uncertainties in data and in model prediction
  - Practical applications of the guidelines on developing risk parameter databases and risk models of industry interests.

Project Themes

- **Assess, Use and Communication of Risk Results - Project 3, 6, 7, 8**
  - How can one develop a defendable risk evaluation approach and how it can be applied
  - How to demonstrate safety and/or demonstrate regulatory compliance from a risk management perspective
  - How can one make optimized integrity plans based on risk information
  - How risk results from different models and assets can be integrated to support higher-level decision making
- **SOTA, Knowledge Transfer and Guideline Development – Project 4, 9**
  - What are the current SOTA and where are the gaps and challenges
  - Collate deliverables from all projects into a unified guideline document for publication
  - Support liaising with standard organizations on making guideline document more widely available

Projects Deep Dive

Risk Framework and Fundamentals

- **Idea 3786, 2025 I&I**
  - ~$260K
  - Justin Raimondi, D. Lu, K, Thompson, T. Sera, G. Emmerson, J. Moritz, M. Tomar

- **Objective and Benefits**
  - To promote consistent risk management terminology and provide guidelines on appropriately using different risk methods and measures and interpreting their results.
  - This project will facilitate smooth risk-related communication between all stakeholders and correct application of different types of risk models.

- **Phase 1 - Risk terminologies**
  - Establish the appropriate definition and interpretation of risk-related terms under different contexts and provide commentary on the rationale for the selection.

Risk Framework and Fundamentals

- **Phase 2 – Risk framework and fundamentals**
  - Review of different risk models and risk measures (e.g., qualitative vs quantitative)
  - Understand the benefits, limitations, utility or application of each risk model and measure
  - Guidance on considering cost of risk reduction in risk management for different risk measure and risk model
  - Guidance for combing outputs from different risk measures and risk models in risk-based decision making

- **Phase 3 – Coordinate and support liaising with standard organizations**
  - Coordinate with PRCI staff to start liaising with standards organizations to publish the guidelines.
  - Support PRCI staff in ongoing communication and advocacy with standards organizations.

Training in Prior SOTA of Risk Management

- **Idea 3788, 2025, I&I**
  - ~$110K
  - D. Lu, K. Thompson, A. Chamberlin, A. Woll, T. Sera, K. Yap,. C. Newton, J. Moritz

- **Objective and Benefits**
  - Develop and deliver training to familiarize risk practitioners and decision-makers with the existing state-of-the-art in risk methodologies.
  - Providing PRCI members with the knowledge required to steer the remainder of the SRP activities
  - Enable better use of risk management and better management of this PRCI SRP
  - Facilitate the creation of a future accreditation program (in partnership with standards organization) to qualify risk management practitioners

Training in Prior SOTA of Risk Management

- **Scope of Work**
  - Collect key literature on risk management practices in the PRCI library and the public domain
  - Develop the structure and content of the training material and prepare the material for presentation
  - Deliver the training one or more times in person and develop an online version
  - Support PRCI staff in approaching interested standards organization to explore future development of an accreditation program

Risk Model Development and Validation Guidelines

- **Idea 3804, 2026**
  - ~$425K

- **Objectives and Benefits**
  - Guidelines on identification of primary applicable threats and how to identify and use relevant data to develop and validate risk models
  - Provide a consistent and robust methodology for producing comprehensive and validated risk models
  - Provide a suite of tools that can be used to better analyze the effectiveness of the existing and potential safeguards from a risk modeling perspective

Risk Model Development and Validation Guidelines

- **Scope of Work**
  - Data requirements for assessing pipeline threats, considering regulatory requirements
  - Guideline for identifying the primary applicable threats
  - Guideline for building a failure likelihood model (quantitative or qualitative)
  - Guideline for building pipeline release consequence model for risk management purposes
  - Guideline for updating existing risk models to incorporate new /additional data or requirements
  - Guideline for validating likelihood and consequence models (e.g., verification, hindcasting, developing benchmarking programs and sensitivity analysis)
  - Provide examples of application of the guidelines produced above.

Guidelines for the Development and Application of Risk Evaluation Approaches

- **Idea 3805, 2026**
  - ~$389K

- **Objectives and Benefits**
  - Guidance on developing and applying risk evaluation approaches and criteria for safety and environmental risks
  - Provide recommended practice on the fundamentals, format, and application of risk evaluation approaches that can be used by stakeholders (such as regulators, industry organizations, or individual operators) to develop their own risk evaluation methodologies
  - Promote industry-wide consistency in risk-based decision-making and facilitate the justification of decisions within organizations and in regulatory interactions

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Guidelines for the Development and Application of Risk Evaluation Approaches

- **Scope of Work – Phase I Risk Evaluation Approaches**
  - Review and evaluate the literature on different approaches that have been used to evaluate risk and develop safety and environmental risk criteria
  - Develop a guideline describing viable approaches for risk evaluation and risk criteria development, their strengths and weaknesses, required data sources, and examples of their use in developing risk criteria
  - Identify viable approaches for evaluating risk, including the development and use of risk evaluation criteria.
  - Adopt or develop an approach for converting risk criteria into reliability-based criteria using simplified consequence modeling

Guidelines for the Development and Application of Risk Evaluation Approaches

- **Scope of Work – Phase II Risk Evaluation Applications**
  - Develop an approach for accounting for the linear nature of pipelines, including variation of risk along the route, in risk evaluation
  - Develop an approach for incorporating the cost of risk reduction (based on the framework developed in Project 1) in risk evaluation
  - Develop an approach for evaluating risk for individual threats (i.e., leading to threat-specific risk evaluation)
  - Develop guidance for accounting for the time-dependent nature of some failure causes in the application of risk criteria (e.g. annual versus cumulative risk).

Projects Deep Dive – Cont'd

To do

- Other projects

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Questions

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Backup Slides