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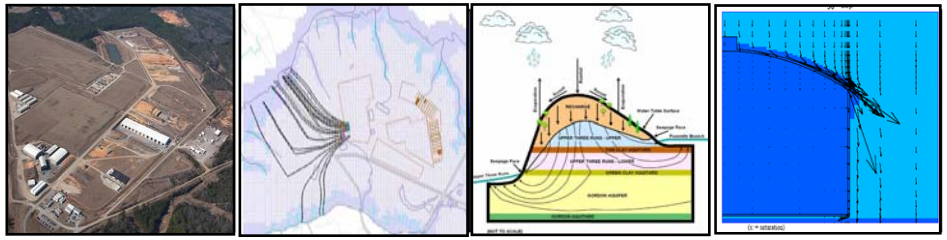
International Activities Related to Performance Assessment

Roger R. Seitz

21 May 2009



DOE EM-21 Office of Waste Processing Technical Exchange

Denver, CO

SRNL-MS-2009-00104-S, Rev. 1

EM Office of Environmental Management
safety ❖ performance ❖ cleanup ❖ closure

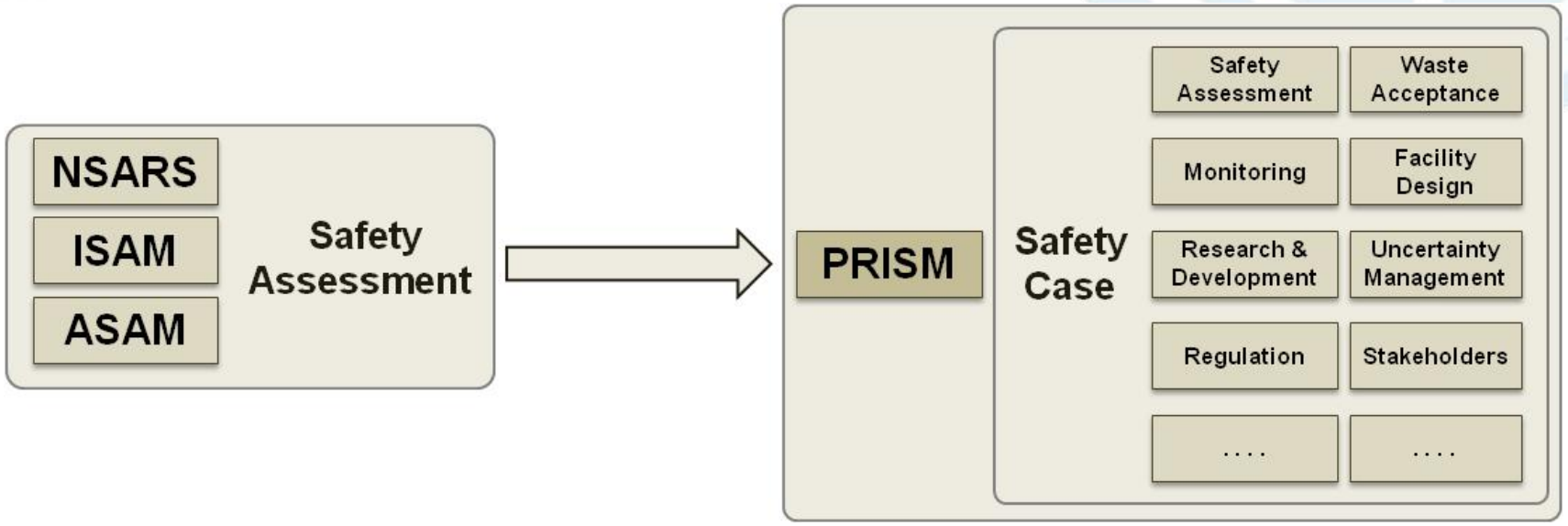
Objectives

- **Provide perspective on challenges that are being discussed in an International Atomic Energy Agency performance assessment related project**
- **Identify key concepts that have remained relevant for performance assessments in the US and globally over time**
- **Brief update on current activities in the US**

Contents

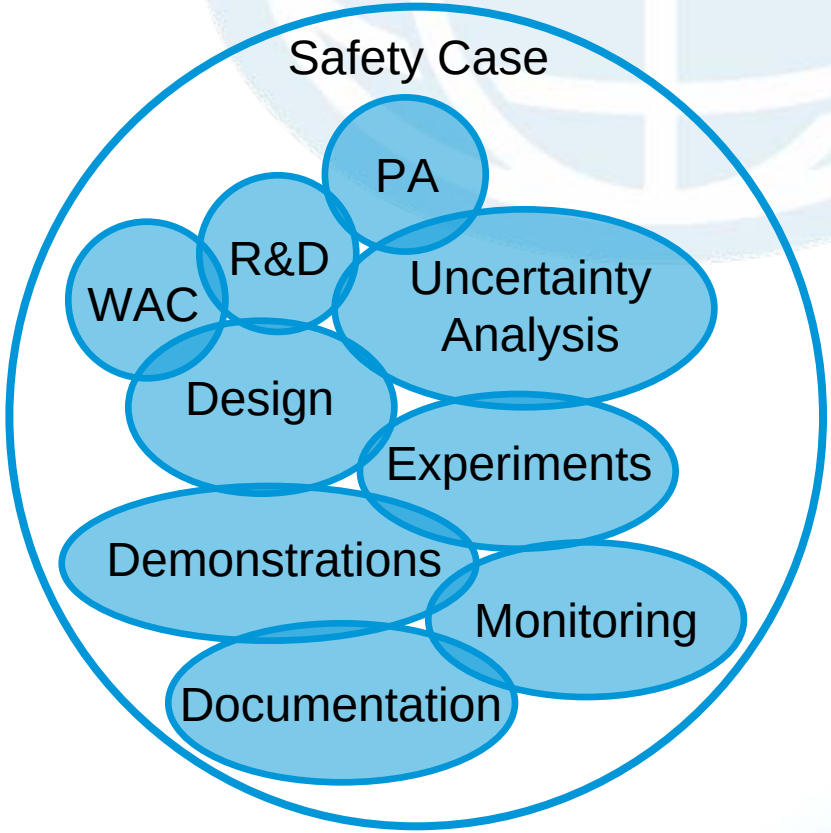
- **International Atomic Energy Agency Project – Practical Illustration and Use of the Safety Case Concept in the Management of Near-Surface Disposal (PRISM)**
- **Recent US Activities**
- **Discussion**

Evolution of IAEA Safety Assessment Projects

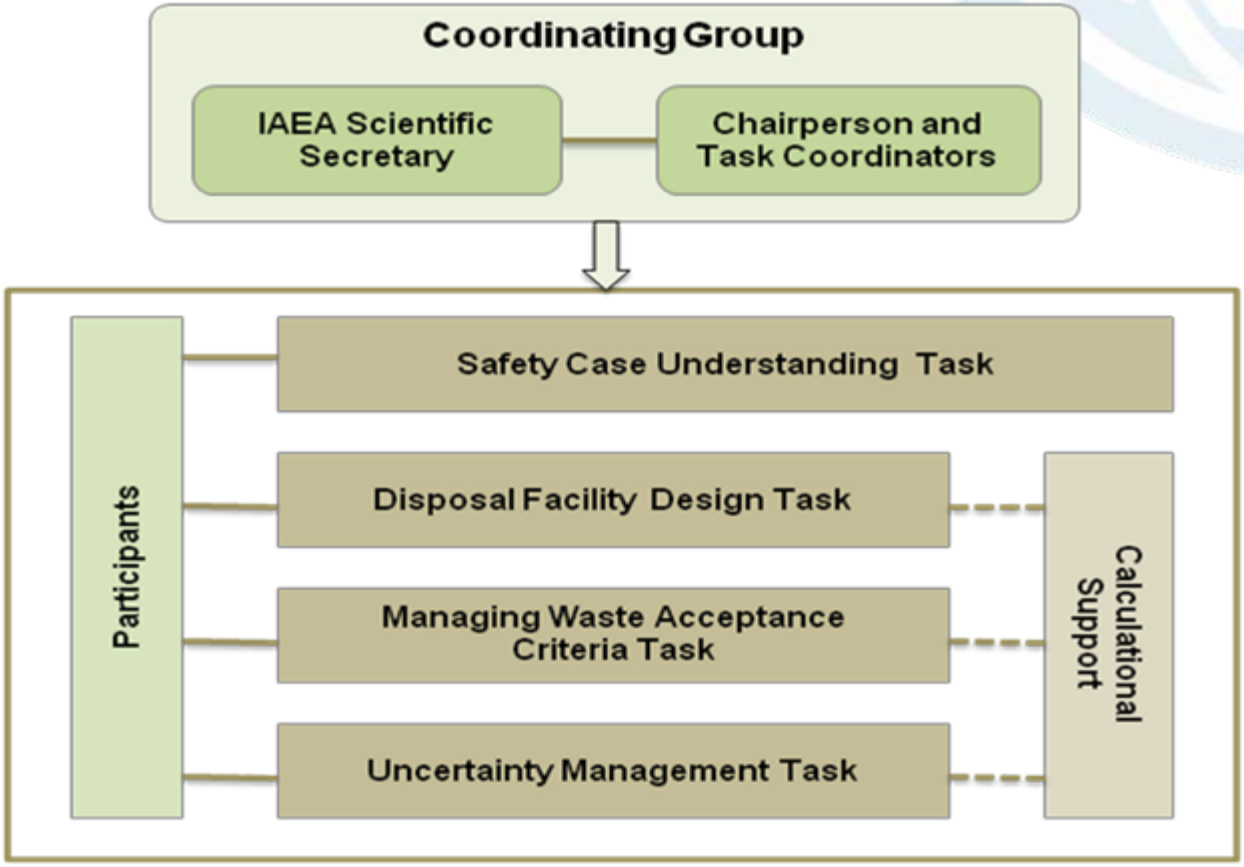


Concept of Safety Case

- **IAEA, Nuclear Energy Agency and others**
- **Reflects use of modeling and performance assessment as only one part of a package used to support decisions**
- **Uncertainties are managed in many different ways in addition to modeling**
- **Challenge is to efficiently develop safety case in environment with tension between programmatic and scientific needs**



PRISM Structure



Managing Uncertainties

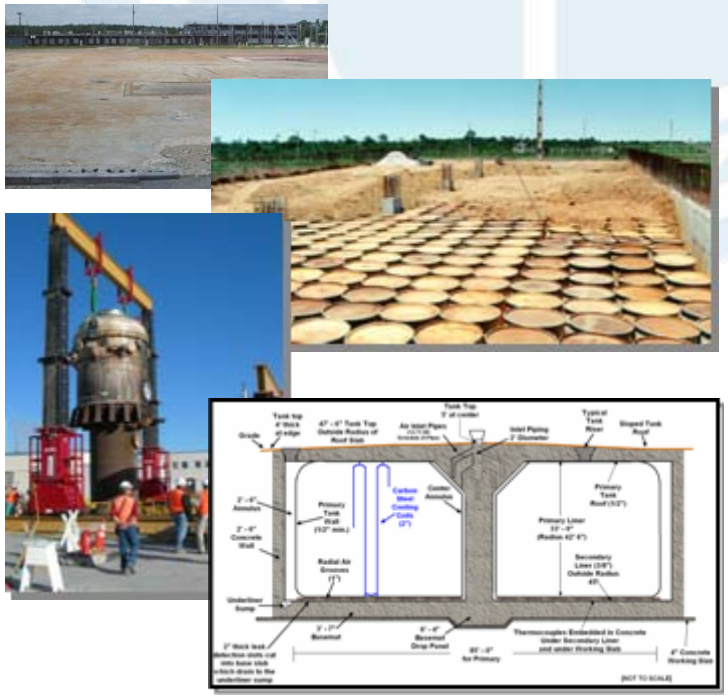
- **Four topical areas**
  - Primary Report documenting examples
  - Probabilistic approaches for deterministic regulation
  - Data and model considerations
  - Field, laboratory and demonstration projects, including monitoring
- **Challenges associated with different levels of resources in different countries**
- **Realism and conservatism**

Path Forward

- **Collecting examples of good practices and challenges in topical areas**
- **Examples organized by timing in life cycle, type of disposal facility, waste type, level of development, etc.**
- **Prepare overview report regarding safety case in context of life cycle of a disposal facility**
- **Prepare topical reports on key areas of interest in individual working areas**
- **Potential to link PRISM efforts with the Community of Practice**

Graded and Iterative Approach

Modeling Detail
Screening **(simplified, “bulletproof”)**
Assessment **(compliance, detail as needed)**
Process-specific **(input for compliance model)**



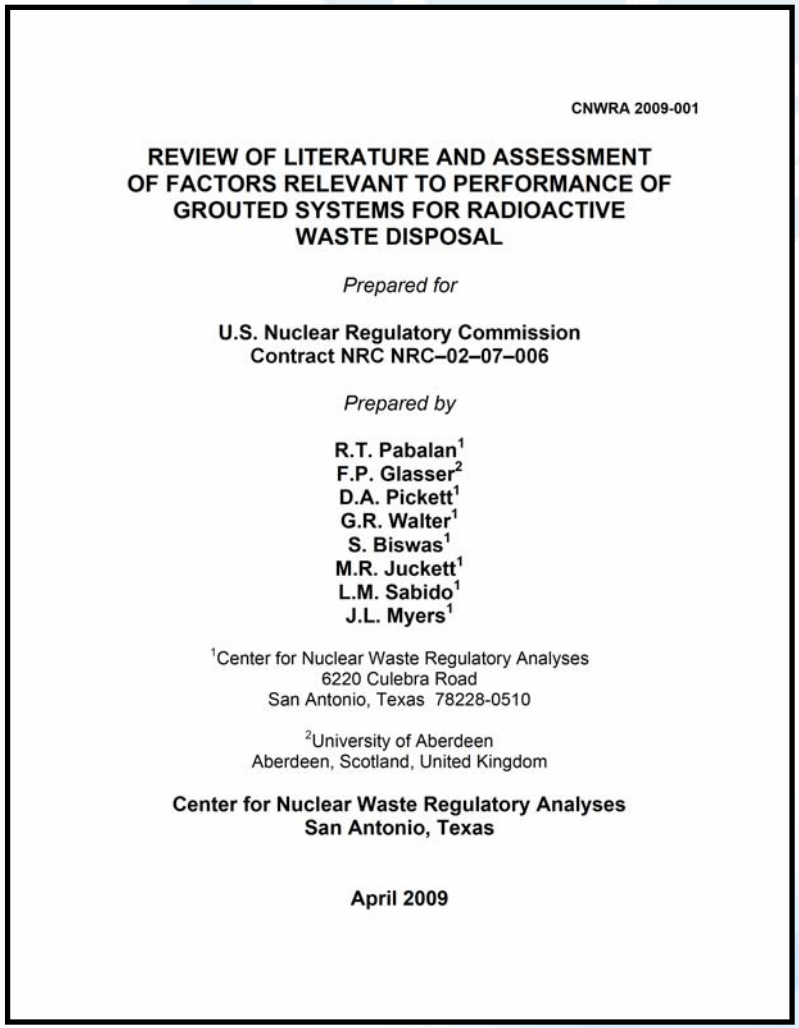
Start simple, add complexity as needed for specific aspects of the problem.

Sensitivity (“importance”) analysis to prioritize areas for more detailed consideration (data, models, etc.)

Data requirements increase for different levels of detail.

Recent US Activities

- **Center for Nuclear Waste Regulatory Analysis Report**
- **Planning for update to DOE Order 435.1 is underway**
  - Opportunity to address new developments from past 10 years
- **Complex Wide Review**
  - Opportunity to identify needs that could be addressed in DOE Order 435.1 update



CNWRA 2009-001

REVIEW OF LITERATURE AND ASSESSMENT OF FACTORS RELEVANT TO PERFORMANCE OF GROUTED SYSTEMS FOR RADIOACTIVE WASTE DISPOSAL

Prepared for

U.S. Nuclear Regulatory Commission
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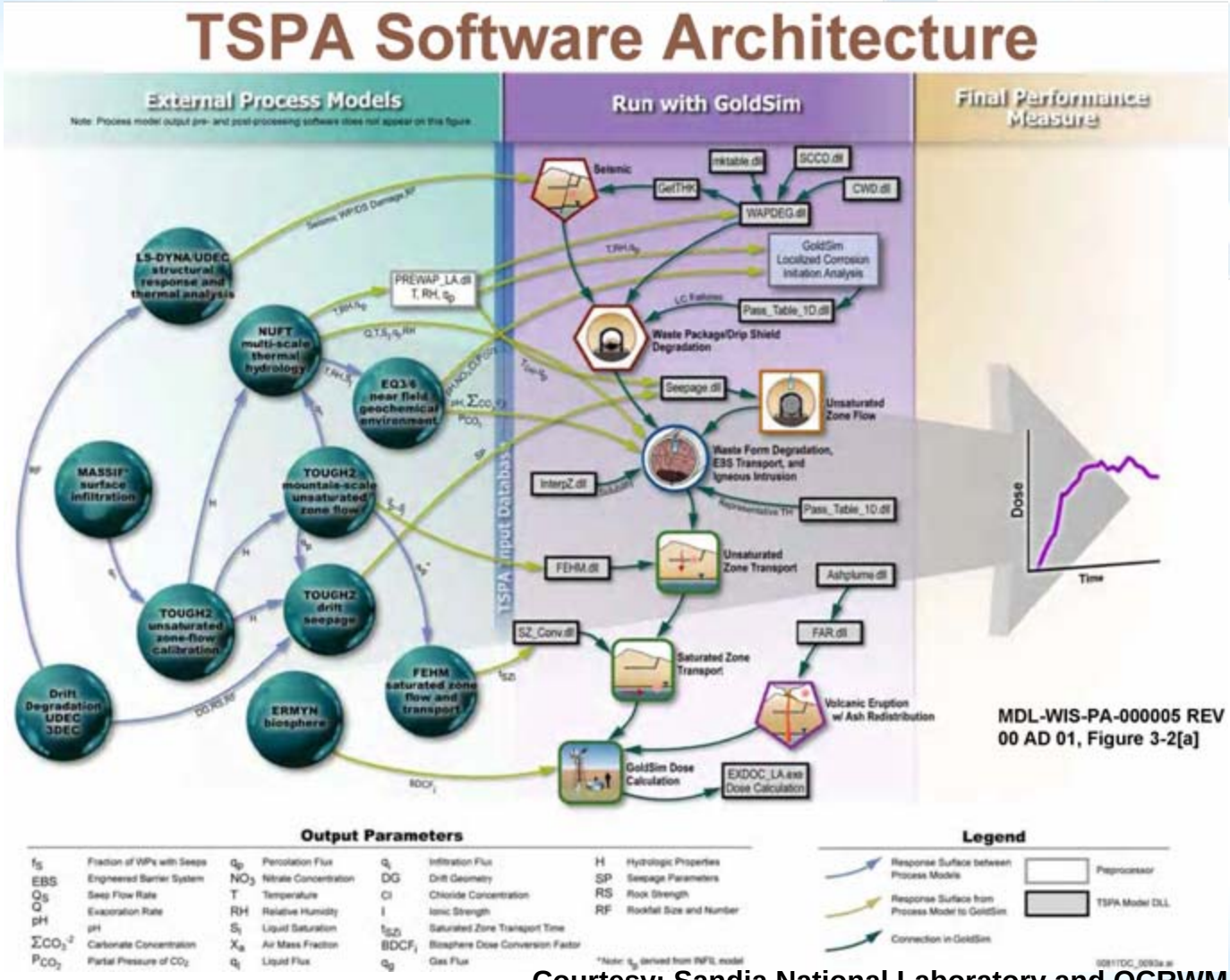
Summary

- **IAEA project illustrates similarity of challenges globally**
- **PRISM is addressing role of PA as one part of a package of information supporting decisions**
  - Models and data in context of different levels of resources is one key area of discussion (graded and iterative approach)
  - Tension between programmatic and scientific needs
  - Sensitivity or importance analysis plays a key role
- **Update of DOE Order 435.1 is opportunity to address new developments over past 10 years**

QUESTIONS?

Link Between Process and Assessment Models (YMP)



Courtesy: Sandia National Laboratory and OCRWM