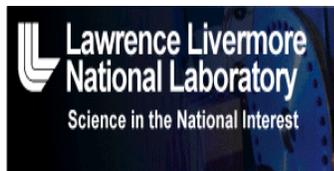
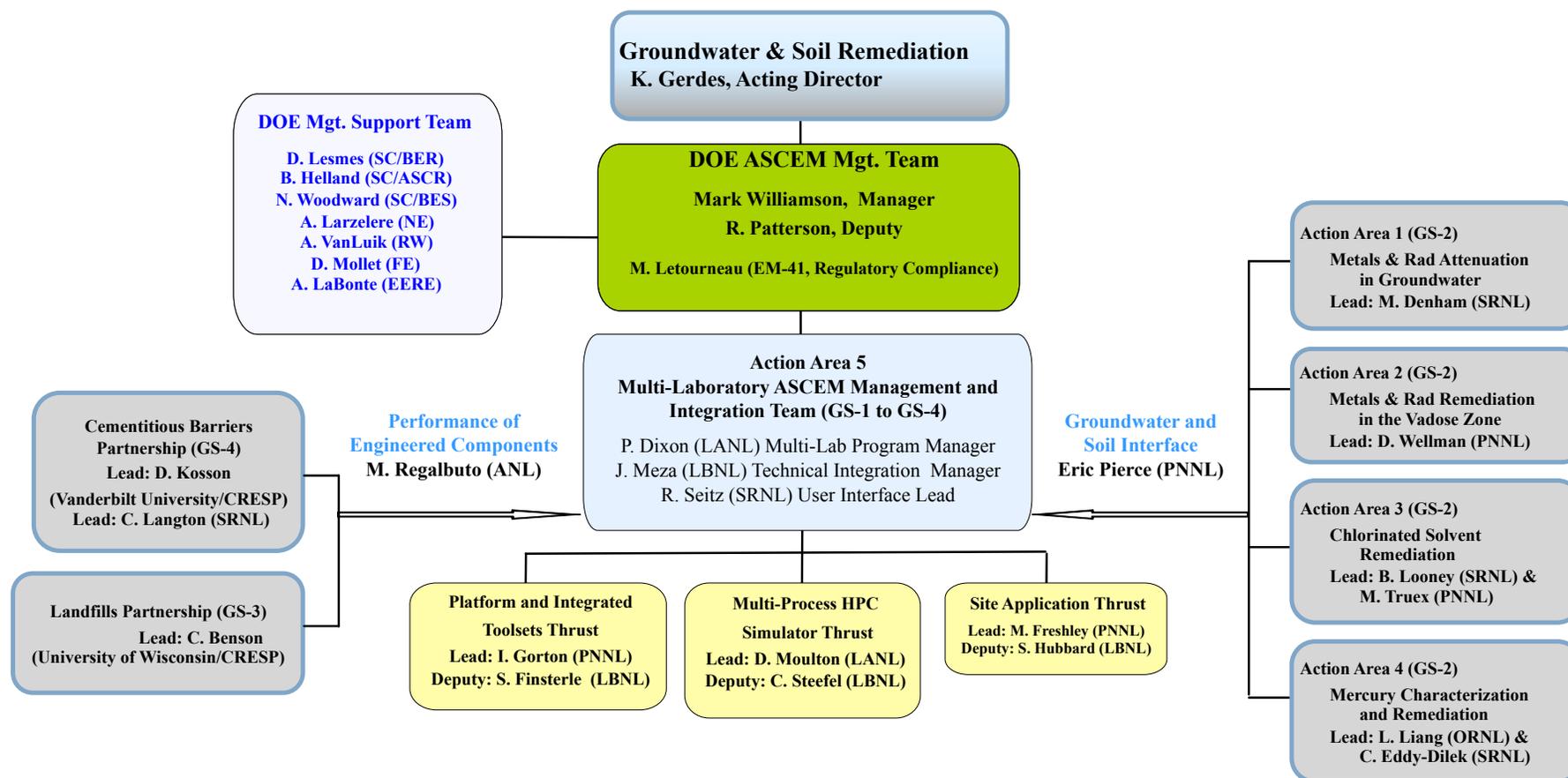


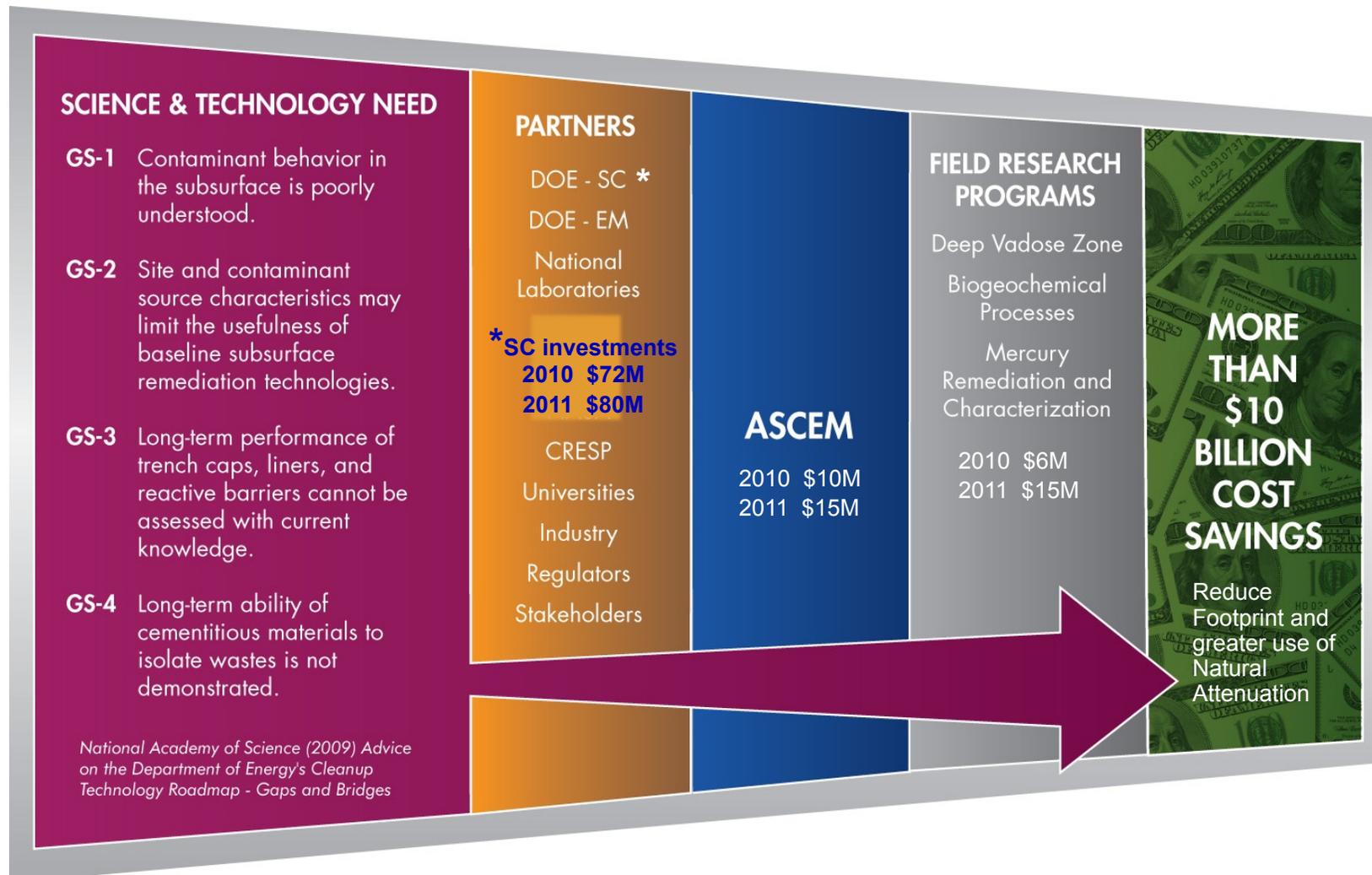
ASCEM National Laboratory Consortium



ASCEM Organizational Chart

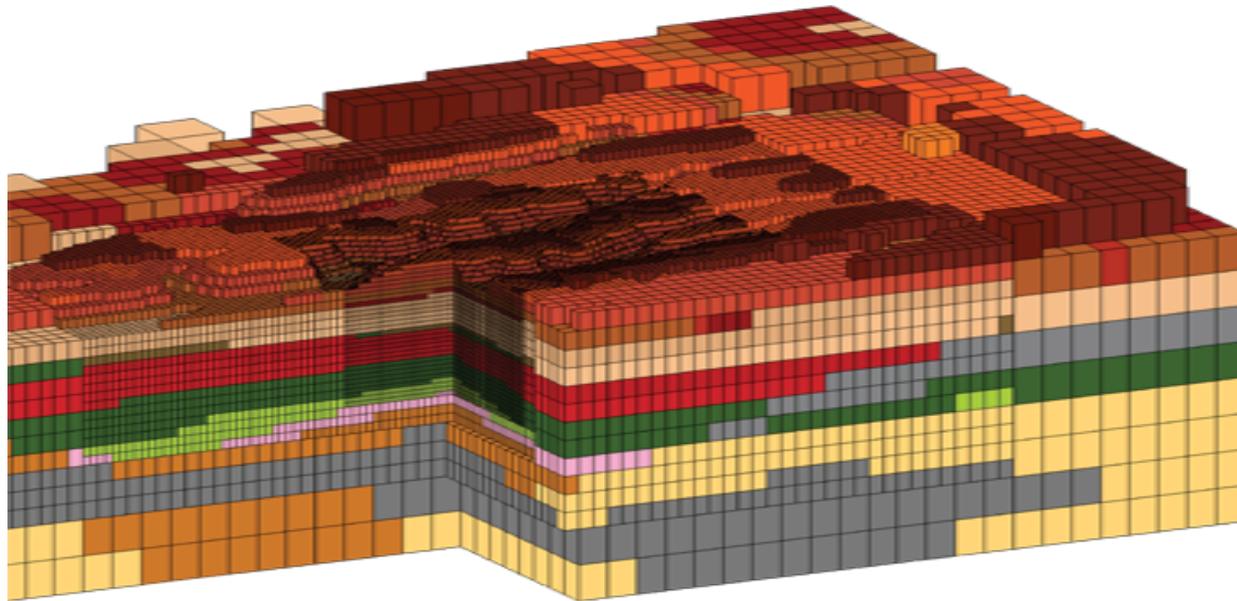


The Role of ASCEM in the DOE-EM Clean-up Mission



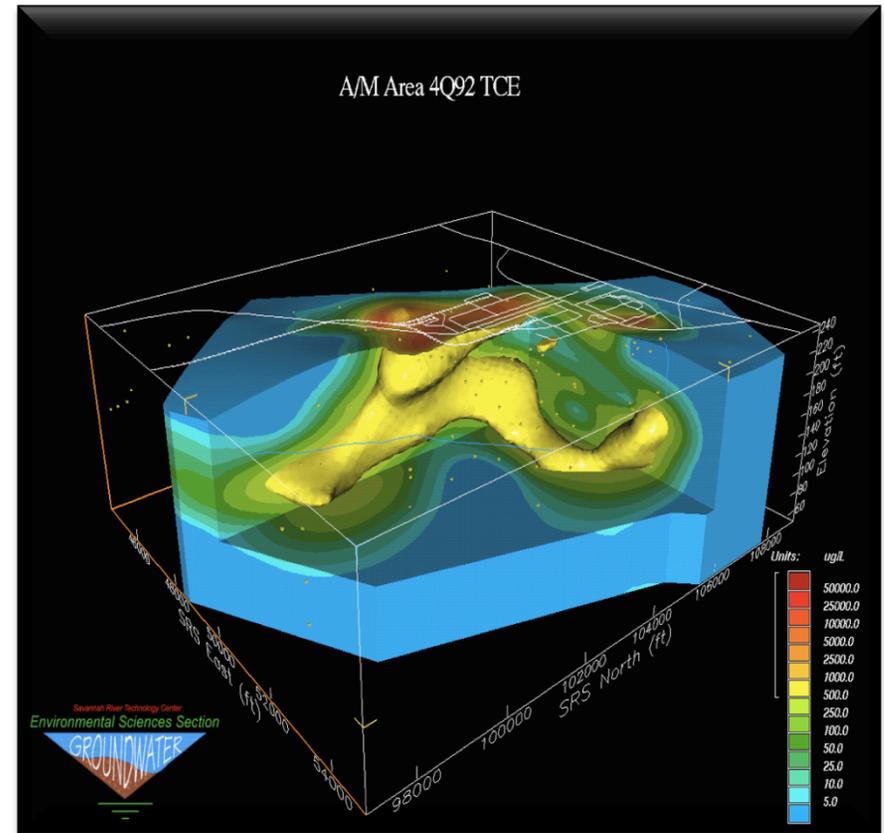
What is ASCEM?

*ASCEM is a state-of-the-art **scientific tool and approach** for understanding and predicting contaminant fate and transport in natural and engineered systems. ASCEM is a modular and open source HPC tool that will enable robust and standardized development of performance and risk assessments for EM cleanup/closure activities.*

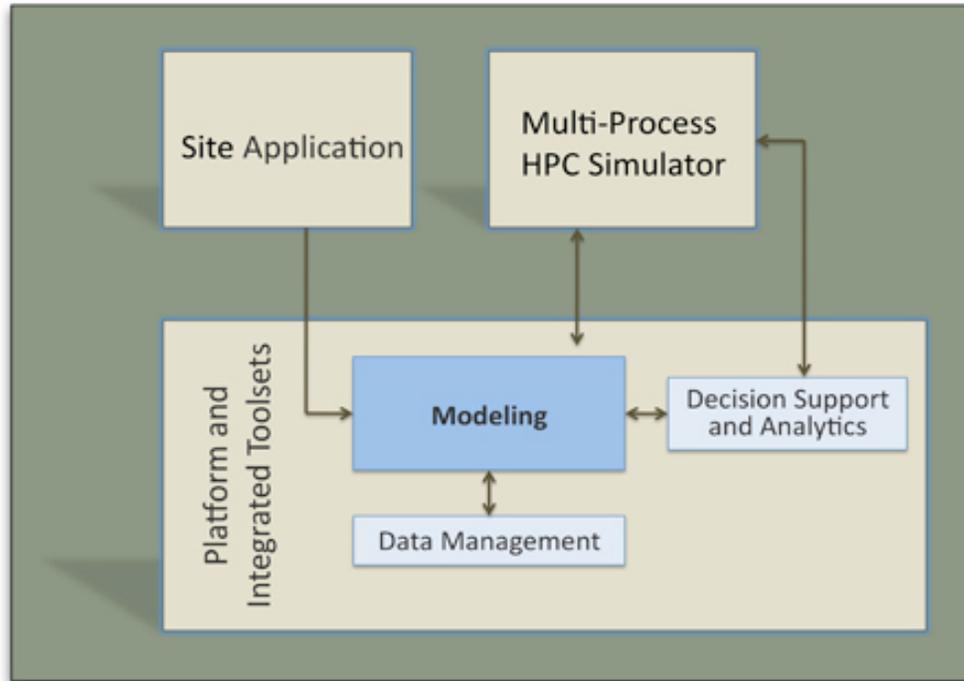


ASCEM Project Goals

- Provide DOE EM with transformational and enduring next-generation Risk and Performance Assessment Models
- Capability to reduce “conservative assumptions” and “abstractions” in current modeling approaches
- Improve consistency of PA methods and applications across the EM complex
- Support the maintenance of existing simplified Risk/PA models through UQ and sensitivity analyses



ASCEM Overall Structure



➤ Site Applications

- Demonstration sites
- Actively engage site user community to develop and test ASCEM tools

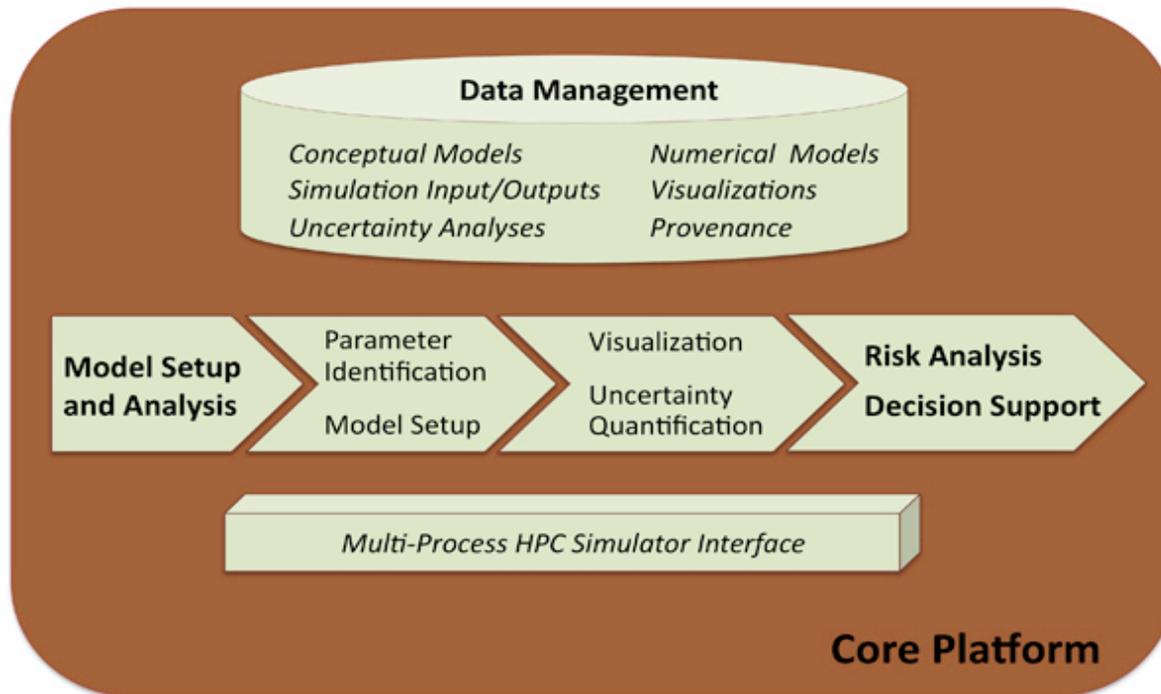
➤ Platform and Integrated Toolsets

- Facilitate model development and execution, parameter estimation, uncertainty quantification, decision support, and risk analysis

➤ Multi-Process High Performance Computing Simulator

- Develop a modular simulation capability for barrier and waste form degradation, multiphase flow and reactive transport

Platform & Integrated Toolset: Goals and Approach



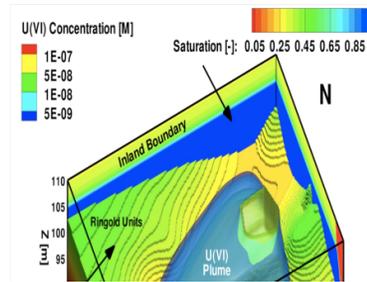
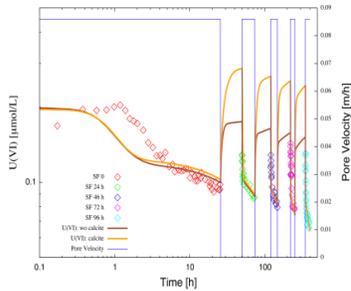
Goals:

- Facilitate and manage a wide range of heterogeneous modeling and simulation data from the HPC simulator
- Provide support for conceptual/numerical model development and analysis tasks

Approach:

- Create a collaborative user environment to support site application teams
- Integrate with the HPC core to support parameter estimation, uncertainty quantification, risk analysis, and decision support
- Provide advanced visualization, analysis and data access/management tools

Multi-Process HPC Simulator



Wide Range of Complexity

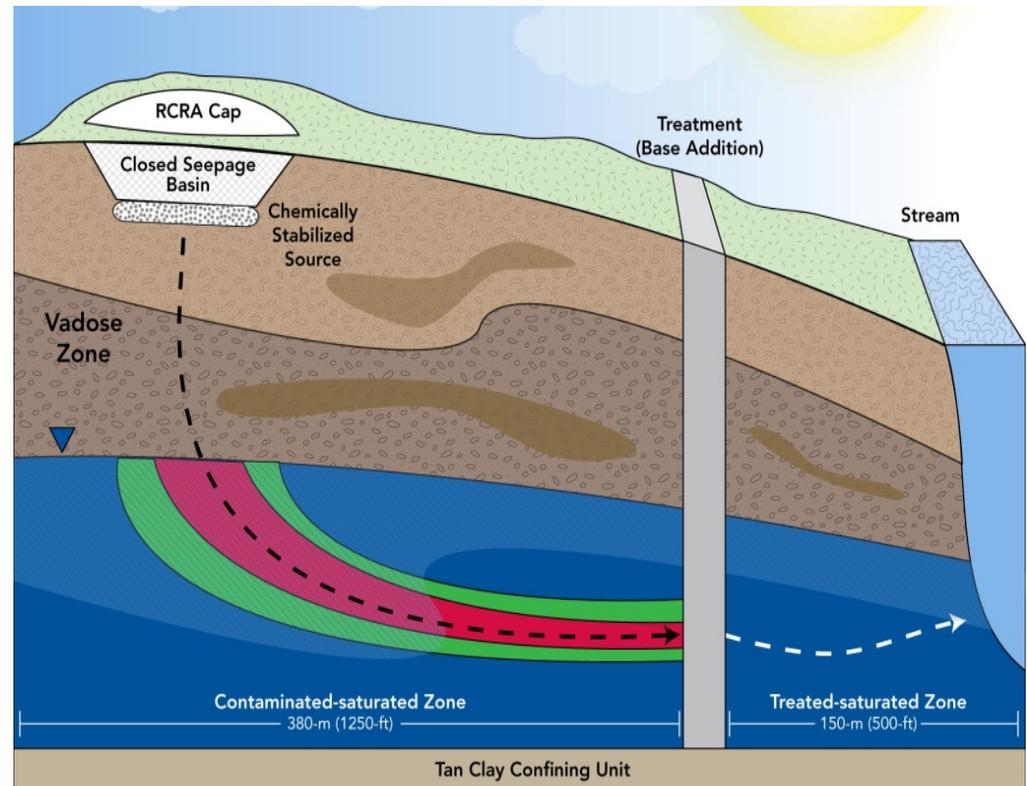


Wide Range of Platforms

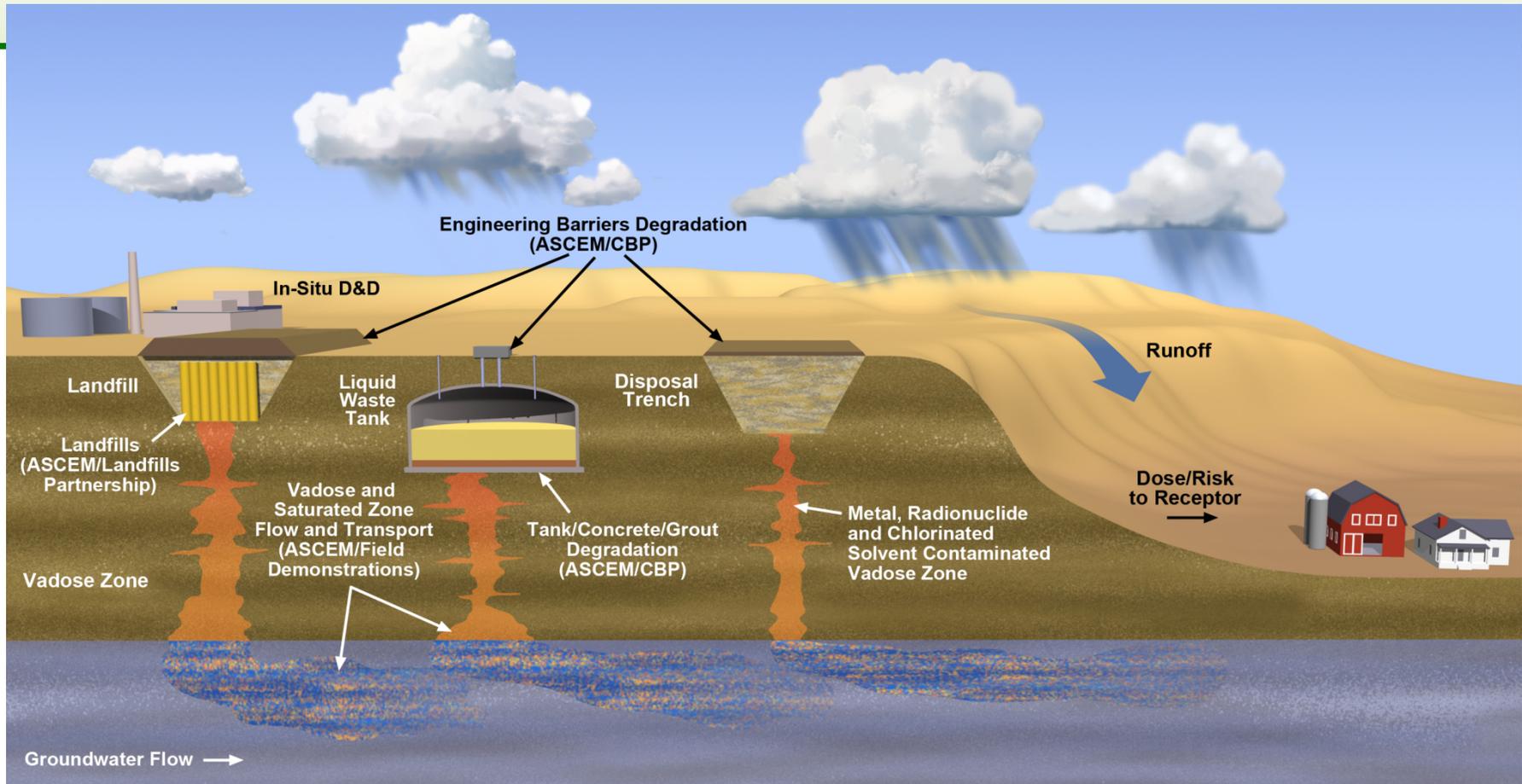
- Modular HPC simulation capability for waste form and engineered barrier degradation, multiphase flow, and reactive transport
- Efficient, robust simulation from supercomputers to laptops
- Design and build for emerging multi-core and accelerator-based systems
- Open-source project with strong community engagement

Site Applications Scope

- Provide site data for model development, testing and validation
- Provide sites for demonstrating the platform and HPC simulator
- Establish and maintain interfaces with end users
- Solicit input to requirements specification and development activities

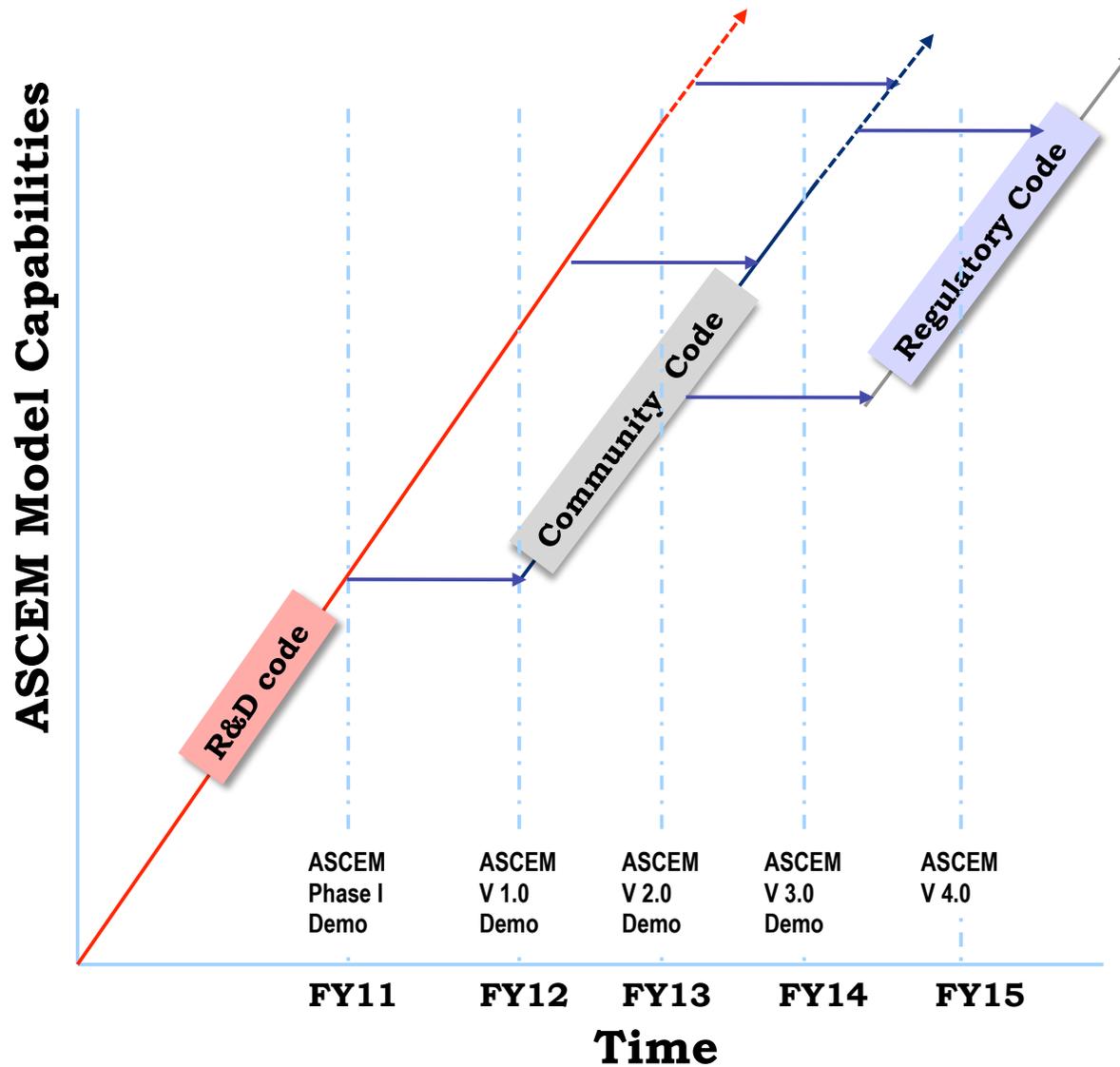


ASCEM Application Areas



- **Mission is to support PA's and RA's for complex EM cleanup sites**
- **Early Mission: “technically underpin” existing EM RA's and PA's**
Modeling to support areas of greatest uncertainty in this system.
- **Inform strategic data collection for model improvement**

ASCEM Software Life Cycle



Current Status of ASCEM

- **Developed ASCEM Charter and FY10 Implementation Plan**
- **ASCEM FY10-FY15 Integrated Implementation Plan is under going peer review next week**
- **Requirements for Process Models (in DOE review)**
- **Requirements for Platform and Integrated Toolsets (in DOE review)**
- **Requirements and Design for HPC Framework and Toolsets (in DOE review)**
- **ASCEM QA plan under development**
- **Phase 1 Demonstration December 2010**

Conclusions and Thank You

- **The ASCEM capability will leverage recent advancements in high performance computing technologies and the considerable science investment the Office of Science is making in this area**
- **ASCEM will be used in combination with advanced remediation strategies to reduce risk, cost, and time-line for site closure across the EM complex**
- **Integration of ASCEM with field site demos and CBP will help to create a transformational, systems-based technical solution that allows standardization of performance assessments for EM**
- **Working with the other DOE offices such as SC, FE and NE, ASCEM will coordinate and leverage the considerable expertise occurring within these areas to reduce overall lifecycle costs associated with the development of this EM capability**

ASCEM Contacts

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Backup Slides

Performance Projection

