Savannah River National Laboratory™

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Status of Activities at SRNL to Waste Management Energy Facilities Contractor Operating Group

Ongoing Operations, New Challenges, and Strategic Initiatives

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EFCOG Waste Management Roundtable
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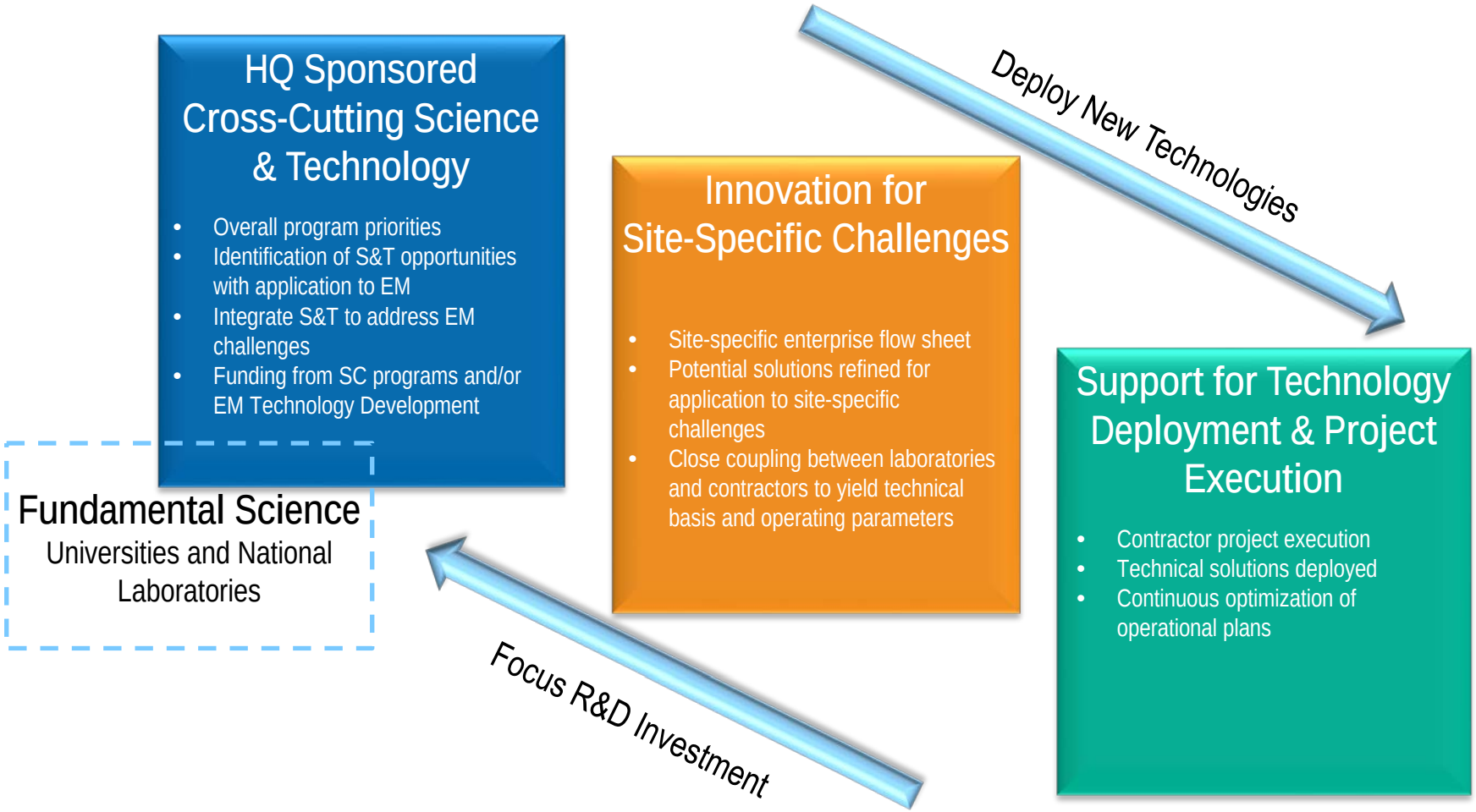
National Laboratory Engagement for Scientific & Technical Continuity for EM



Laboratory Engagement and Integration is Essential for Program Success

Case Study – Next Generation Solvent

HQ Sponsored Cross-Cutting Science & Technology

Office of Science & EMSP Funding
- Studies of calixarenes as selective binding agents for Cs

EM Technology Development Funding
- Development of process chemistry for removal of Cs from nuclear waste

Innovation for Site-Specific Challenges

EM Technology Development Funding
- Fundamental behavior and characteristics of solvent system
- System performance and operating window (defining expectations)

Site Funding
- Performance under site-specific chemistry
- Radiation stability of solvent systems
- Formulation adjustments for site-specific chemistry

Support for Technology Deployment & Project Execution

Site Funding
- Downstream impacts
- Hydraulic performance
- Full-scale testing

Implementation

Case Study – Advanced Simulation Capability for EM (ASCEM)

HQ Sponsored Cross-Cutting Science & Technology

EM Technology Development
- Develop integrated tool set for a graded approach to modeling
- Tool set should be available in the public domain (freely available)
- Invest in demonstration problems linked to site needs

Office of Science Funding
- Biological & Environmental Research Subsurface Biogeochemical Research Terrestrial Ecosystem Science
- Energy Science
  - Geosciences
  - Separations and Analysis
  - Interfacial Molecular Science
- Other Basic Science Programs

Innovation for Site-Specific Challenges

EM Funding
- User liaison for interviews with Field Offices and site contractors to explore specific needs and potential areas for deployment
- Integration with Low-Level Waste Disposal Facility Federal Review Group
- ASCEM User Steering Committee provides DOE and Contractor Management perspectives

Site Funding
- Field office funding for technical assistance on specific problems (Idaho, Hanford, Paducah)
- AFRI in kind support for Deep Vadose Zone, F Area Seepage Basin, Mercury

Support for Technology Deployment & Project Execution

EM/Site Joint Funding
- ASCEM transitions to more focus on deployment and user testing
- ASCEM team supports site users on test implementation in parallel with on-going modeling activities
- Tank closure capabilities and demonstration need more attention
- Applications being discussed at Savannah River, Hanford, Oak Ridge, Los Alamos, and NNSS

Site Funding
- Direct involvement of Labs in regulatory modeling activities in support of waste disposal and tank closure (e.g., SRS and Portsmouth)

Implementation

SRNL Soil and Groundwater Remediation Program

SRNL has a mature and diverse soil and groundwater remediation program.

- SRS
  - Hazardous and radiological contaminants
  - All media and a wide variety of settings
  - >399 of 515 waste sites closed
  - >30 groundwater remediation operating systems
  - Extensive and robust environmental multimedia data management system
- Technical Assistance Program
  - Builds on success at SRS in developing and applying innovative and efficient technical solutions to challenging environmental problems
  - Have performed independent reviews and recommended diverse remedies at numerous sites both nationally and internationally
    - Since 2006, 25 teams have visited 11 DOE sites and made recommendations yielding ~$100M cost savings
    - Ukraine, Japan
    - Legacy Management and Department of the Interior

SRNL High Level Tank Waste Program

- SRNL develops and deploys technical solutions across the DOE Tank Waste complex based extensive experience at SRS
- SRS
  - High activity liquid waste
    - ~45% of sludge vitrified (3200 canisters)
    - ~8 million liters salt solution decontaminated
    - Four tanks emptied and grouted for closure
    - Two additional tanks emptied and ready for grouting for closure
  - Fuel basins
    - Two are in-situ decommissioned along with reactors
    - Three are de-inventoried
    - One open - continues to receive and safely store fuel
  - Low level waste trenches capped and closed
- Process flowsheet development and qualification
- Scaled testing and demonstration
- Deployment support
- Member of Tank Waste Corporate Board

SRNL Performance Assessment and Regulatory Support

- **Performance Assessment** – for a specific facility predicts the dose to hypothetical individual for thousands of years vs performance objectives (<25 mrem all pathways at 100 meters etc.)
- **Composite Analysis**
  - End state public dose projection of the cumulative interaction of all rad sources anticipated to remain at the site
  - Evaluated at the site boundary over the 1000 year assessment period
- **Special Analyses and Unreviewed Disposal Question Evaluations**
- **Other regulatory support (DOE-HQ, NRC, EPA, SCDHEC, CAB)**
- **Key Partnerships**
  - SRNL: Process Modeling & Computational Chemistry, Environmental Analysis, Material Science & Technology, ADS
  - SRNS: Environmental Compliance & Area Completion Projects
  - Universities: Texas A&M, UGA:SREL (Sorption Cr, Th, U etc.), Clemson
  - National Laboratories: (ASCEM: LANL, LBNL, PNNL, ORNL)
  - CBP (Joint initiative with CRESP and ICET)

EFCOG Initiative: Engagement of the National Labs

- Progress Report
  - Team members identified
    - Representing 3 national labs and 2 commercial labs
    - *Confirmation from management pending*
  - Monthly conference calls to be scheduled
  - Task areas being considered:
    - Right sizing the administrative burden on well known waste streams and waste forms
    - Acceptable knowledge process
      - ✓ Data and information on waste stream of known pedigree although collected for a non-waste related purpose
    - Identifying obstacles to meeting current expectations
      - ✓ Analytical interferences and alternative approaches

EFCOG Initiative: Engagement of the National Labs

- Path forward
  - Identify the range of issues and solicit best practices
  - Generate Case Study of challenges
  - Develop alternative approaches to meeting requirements
  - Publish white paper(s) outlining the case study, the resolutions achieved and recommended approaches to mitigate recurrence
- Feedback and Suggestions