

Update on OCRWM's Science and Technology Program



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S&T Program***



S & T Program Objectives

- Improve existing and develop new technologies to:
 - Achieve savings in the waste management system schedule and life-cycle costs
 - Achieve efficiencies in the waste management system (transportation, waste handling, disposal)
- Increase understanding of repository performance

Philosophy

- The longer view (3 - 5 - 10 years or longer)
- Explicitly distinct from the mainline OCRWM activities
- The scope is very broad: To support all OCRWM activities
- S&T should resist the tendency to get tied up with shorter-term issues
- Goal is to institutionalize the Science & Technology objectives as an enduring OCRWM activity

Relationship of S&T with Other Ongoing OCRWM Technical Work

- We have developed a clear distinction between the scope of the S&T Program and the scope of the main Project technical work (License Application, Performance Confirmation, Testing & Evaluation, etc.)

- S&T projects are characterized by:
 - Longer-term work
 - Outcomes are less assured
 - Work is not needed to support the License Application or to support OCRWM's interactions with the U.S. NRC during the license-review period
 - Aim: Improvements in design or operations can be incorporated later

Approach

- FY 2003: A few initial projects (\$1.7 million)
- FY 2004: We have launched a major S&T Program (\$25 million this year)
- Planning a public solicitation (Request For Proposals)
- International collaborations are being sought and encouraged

Initial FY 2003 Work

- We started a few projects in FY 2003 (total \$1.7 million)
 - Advanced protective coatings (with DOD-DARPA)
 - Advanced welding method for waste packages
 - Analogue study at Peña Blanca, Mexico
 - Analogue study at the Nevada Test Site
 - Decay heat effect on in-drift environment
 - Decay heat effect on in-package environment
 - Improved seismic modeling of the site
 - Novel “getter” for Tc and other radionuclides
 - Improved modeling of seepage into the drifts

FY 2004 Funding Processes

- Two different funding processes
 - DOE National Laboratories + U.S. Geological Survey
 - directed funding
 - based on special capabilities
 - Private sector (universities, private firms, institutes, etc.)
 - initial open solicitation soon (Request for Proposals)

FY 2004 S&T Program

■ This Year (FY 2004), Main S&T “Program Thrust” Areas

- Advances in Materials
- Natural System (UZ and SZ flow and transport, seismic, colloids, analogues)
- Robotics and Sensors
- Drift Engineering
- Source Term

Advances in Materials

- Surface Amorphous Metal coatings, with DOD-DARPA
- Welding Technologies
 - Advanced Electron-Beam Welding
 - Scoping Study of Other Methods
- Advanced Corrosion Science
- Getters
- Advanced Materials in the Drifts
- Advanced Cementitious Materials: Scoping Study

Natural Systems Areas

- Unsaturated Zone Phenomena
- Saturated Zone Phenomena
- Colloids
- Seismic Hazard
- Analogues: Peña Blanca, Nevada Test Site

Unsaturated Zone

■ Fracture/Matrix Interactions

- Field & laboratory studies
- Theoretical & computational studies (including scaling)
- Workshop for specialists

■ Drift Shadow Studies

- Off-site analogues
- Lithophysae at Yucca Mountain
- Scaled laboratory samples

Saturated Zone

■ SZ Transport Studies

- Carbon-14 groundwater analyses
- Better integration of site and regional flow models

■ SZ Hydrological Parameters

- Lab sorption reversibility studies
- Natural-gradient tracer test
- Planning for long-term pumping test in the volcanics

Advanced Robotics

- Robotics Technology: Scoping Study
- Collaboration with DOE-NNSA “University Research Program in Robotics” to develop advanced robotics technologies:
 - Manipulators
 - Control systems
 - Mobile systems
 - High-radiation environments

Collaborations with DOE's Office of Science

- Goal is to identify areas where DOE's Office of Science and OCRWM can work on joint projects, or use common capabilities, to advance mutual objectives.
- Successful Corrosion meeting in July 2003
- Planning an Unsaturated Zone Phenomena meeting in the spring
- Discussing a "Getter" meeting sometime soon

Summary

- We have confirmed the original vision that many S&T opportunities exist:
 - Advanced alternative technologies
 - Advanced methods of analysis
- The FY 2004 S&T Program is pursuing many of these opportunities already
- Other opportunities are being developed now and will receive support in the future