



U.S. Department of Energy



Update on Office of Civilian Radioactive Waste Management (OCRWM) Science and Technology Program

Presented to:
Nuclear Waste Technical Review Board

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Outline

- **Background**
- **Science & Technology (S&T) Program Attributes**
- **Organization**
- **Funding and Performer Profiles**
- **Targeted Thrusts**
- **Advanced Technologies**
- **Reviews**
- **What's Next?**



Background

- **Third update to the Board since program inception**
- **Program is now institutionalized with a formal structure**
- **Fully integrated yet distinct from Yucca Mountain Project (YMP) design, analysis, and regulatory activities**
- **Funding trend is positive**
- **Senior management is committed to program**



S&T Program Mission and Drivers

- **Mission**

- “Provide advanced science and technology to continually enhance our understanding of the repository system and to reduce the cost and schedule for the OCRWM mission.”

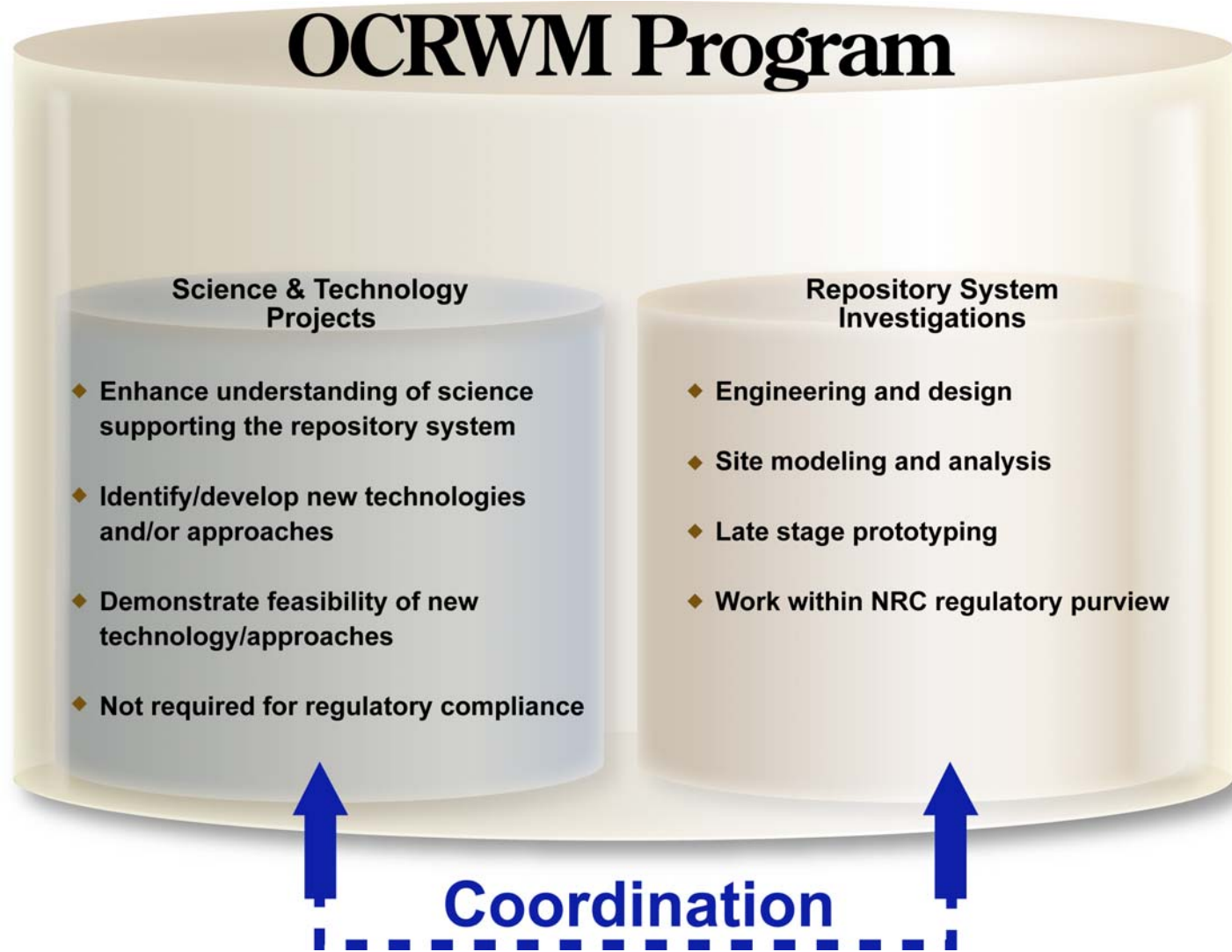
- **Drivers**

- Reduce costs
- Enhance understanding
- Keep current with nuclear industry best practices



Distinction Between S&T and YMP Activities

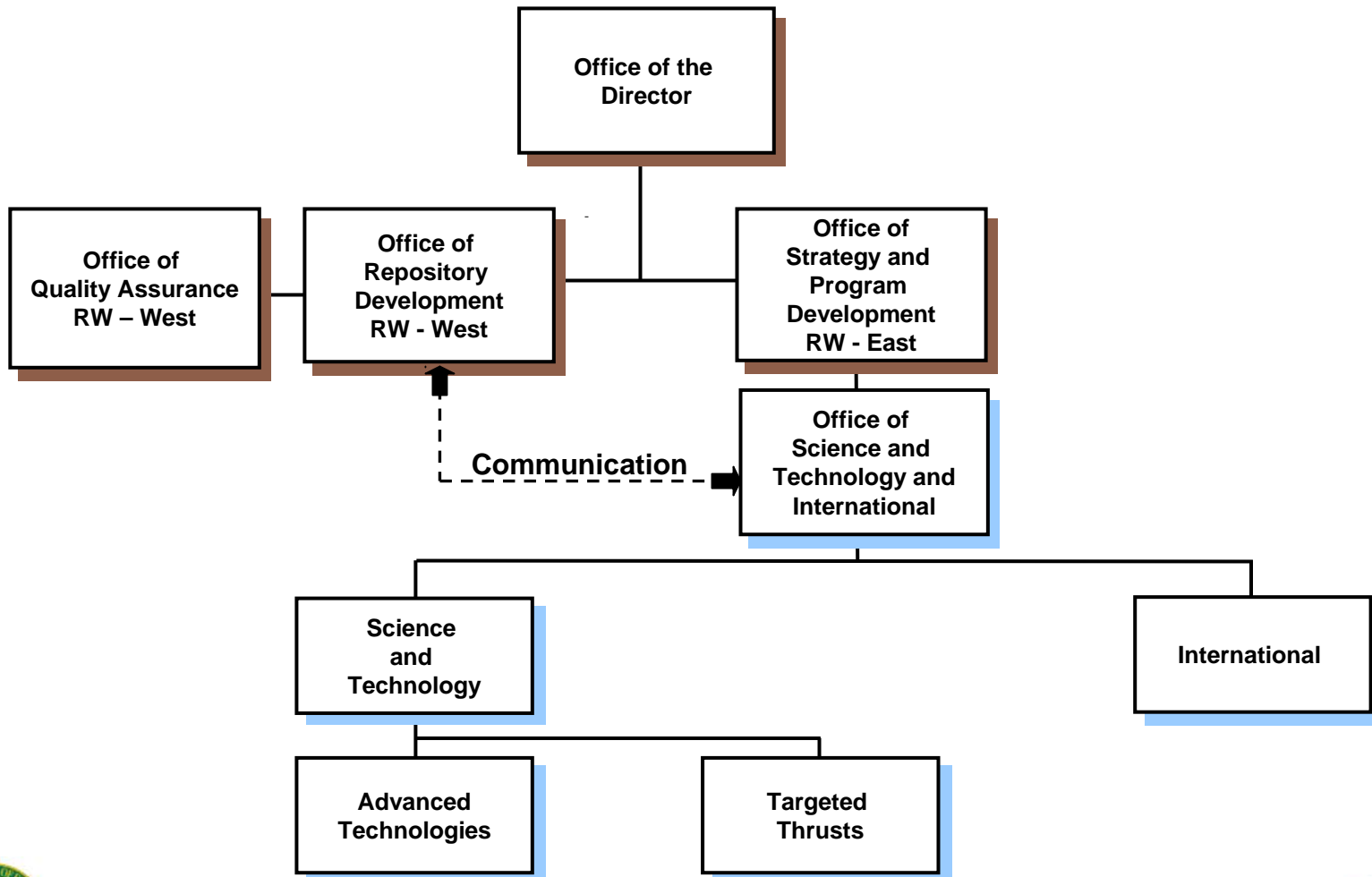
OCRWM Program



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OCRWM (RW) Office of Science and Technology and International (OST&I) Organization

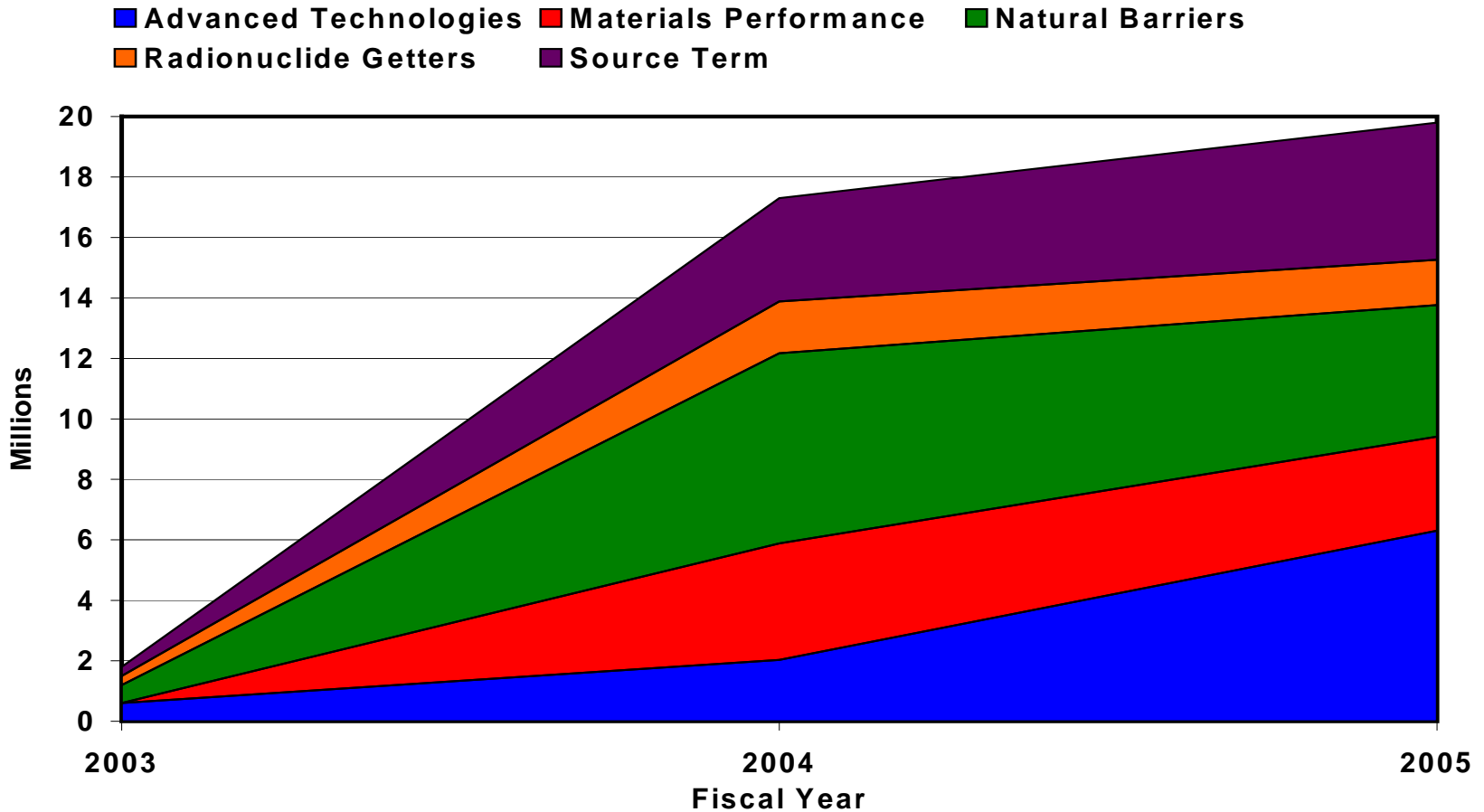


Targeted Thrust Concept

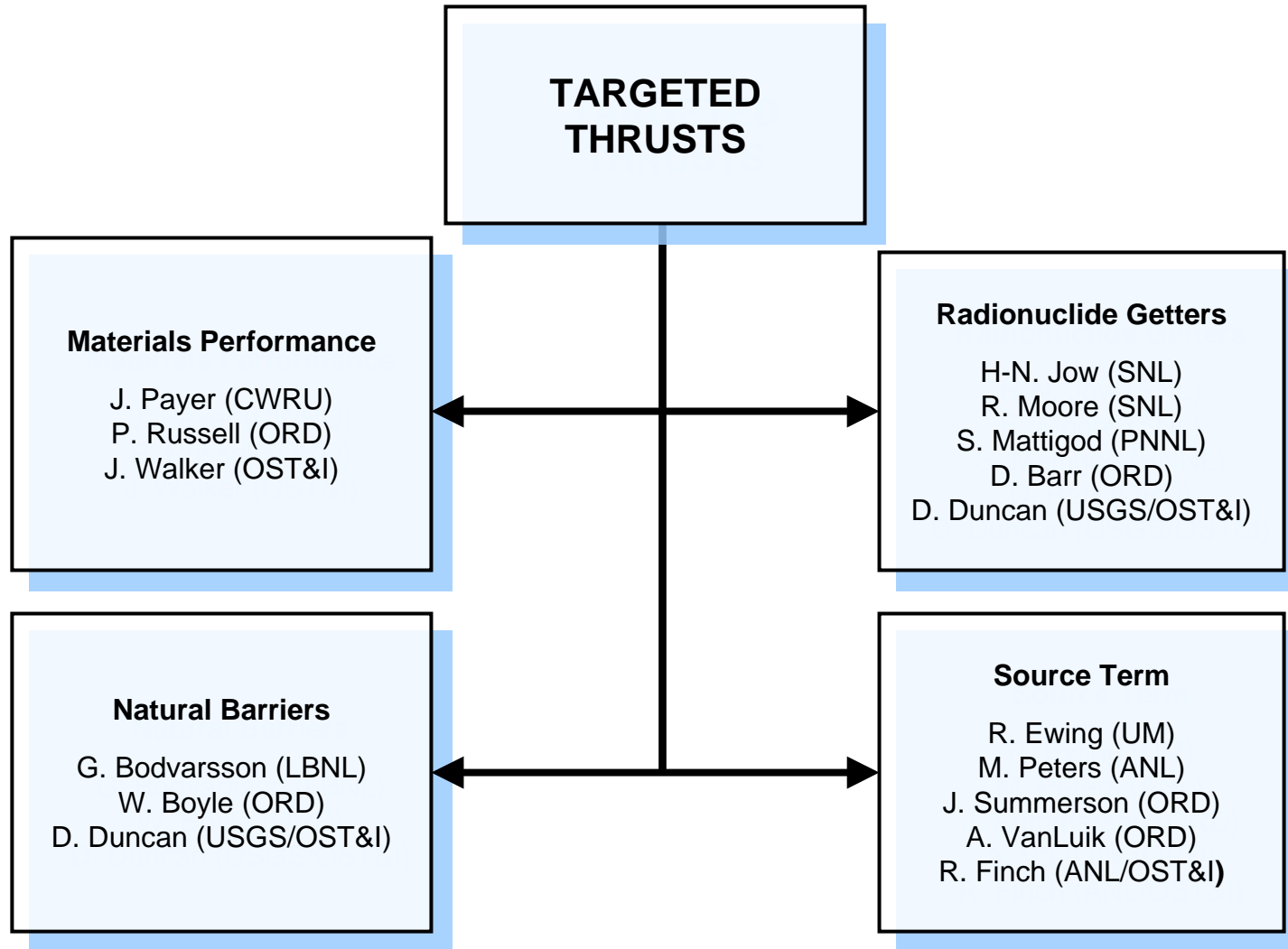
- **Targeted on key applied research initiatives to support overall OCRWM mission**
- **Leadership provided by internationally recognized experts from national laboratories and academic institutions**
- **YMP representatives assure coordination and integration with Project's activities**
- **OST&I manager designated for each thrust**
- **Additional thrusts may be developed as other initiatives are identified**



OCRWM S&T Program Funding



Current Targeted Thrusts



Materials Performance Targeted Thrust

- **Objective - enhance the understanding of material corrosion performance and explore technical enhancements**
- **Corrosion processes in thin films, particulates, and deposits**
 - **Effects of moisture on corrosion performance of metals**
- **Evolution of corrosion damage by localized corrosion**
 - **Initiation, propagation, and arrest phenomena particularly for crevice corrosion of metals**
- **Evolution of the environment on metal surfaces**
 - **Moisture content, distribution, and chemical composition on metal surfaces**



Natural Barriers Targeted Thrust

- **Objective - enhance the understanding of natural system processes and explore technical enhancements**
- **Unsaturated Zone Processes**
 - Nature and distribution of flow paths
 - Seepage
 - Matrix diffusion/sorption
 - Episodicity
 - Drift-shadow effect
- **Saturated Zone Processes**
 - Matrix diffusion
 - Dilution and sorption
 - Plume characteristics in saturated zones
 - Non-oxidizing environments in saturated zones



Source Term Targeted Thrust

- **Objective - enhance the understanding of the release mechanisms of key radionuclides from spent nuclear fuel (SNF) and explore technical enhancements**
- **Engineered materials and radionuclide sequestration**
 - **Corrosion effects on chemistry and radionuclide release processes**
- **Secondary alteration phases**
 - **Effects of environment on the formation, evolution, and radionuclide incorporation**
- **Matrix dissolution**
 - **Oxidation and dissolution of SNF and evolution of surface conditions**



Radionuclide Getters Targeted Thrust

- **Objective - Development of new materials for radionuclide absorbers or adsorbers (getters)**
- **In-package getters**
 - Nanoporous and mesoporous materials
- **In-drift getters**
 - Tailored minerals, metal oxides, double layer hydroxides
- **Getter manufacturing and systems analysis**
 - Scale-up, fabrication, and implementation



FY 2005 Targeted Thrust New Starts

- **Natural Barriers**
 - Unsaturated zone near-field processes
 - Saturated zone processes
- **Source Term**
 - Secondary alteration phases and radionuclide release
 - International source term programs for collaboration on understanding release of key radionuclides



FY 2005 Advanced Technologies Activities

- **Advanced Welding for Waste Package Closure**
- **Advanced Waste Package Materials and Fabrication**
- **Advanced Understanding of Seismic Hazard**
- **Advanced Remote Material Handling/Robotics Technologies**
- **Advanced Tunneling Technology**



Review Process

- **Project selection reviews**
 - Conducted by Advanced Technologies and Targeted Thrusts to develop funding recommendations to OST&I management
- **Advanced Technologies and Targeted Thrust Program Reviews**
 - External subject matter experts provide technical assessments
- **S&T Programmatic Evaluation Panel**
 - 7-member, external, senior-level panel reviews overall program to provide guidance on program direction and investment strategy



What's Next?

- **Funding**
- **Integration & Transitioning Projects**
- **Prioritization**
- **Public Outreach/Communications**

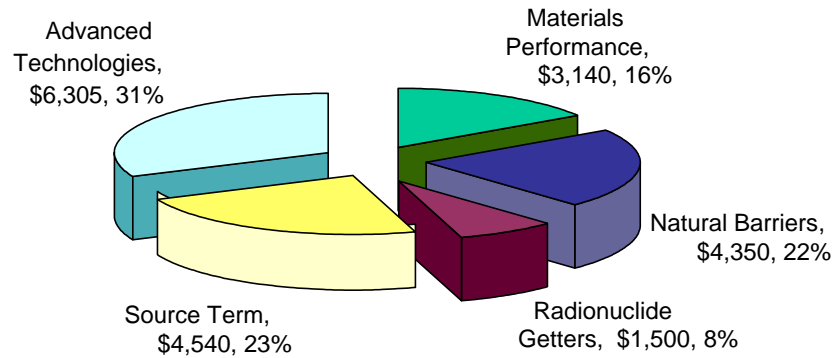


BACKUP SLIDES

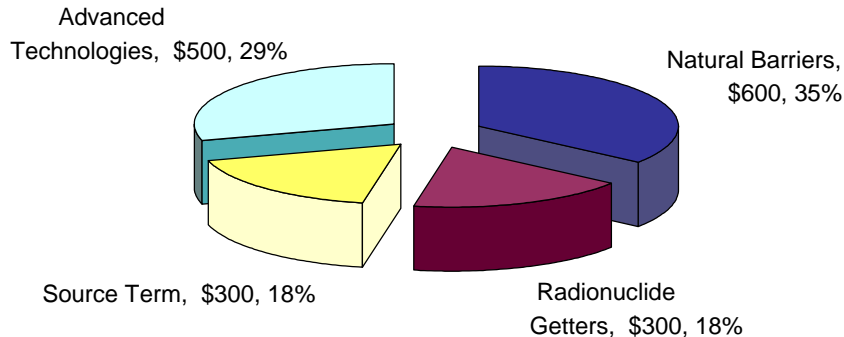


OCRWM S&T Program Funding

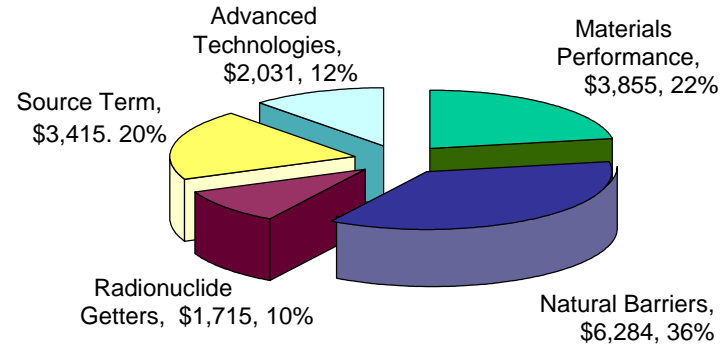
FY 2005 (\$K) = \$19,835



FY 2003 (\$K) = \$1,700

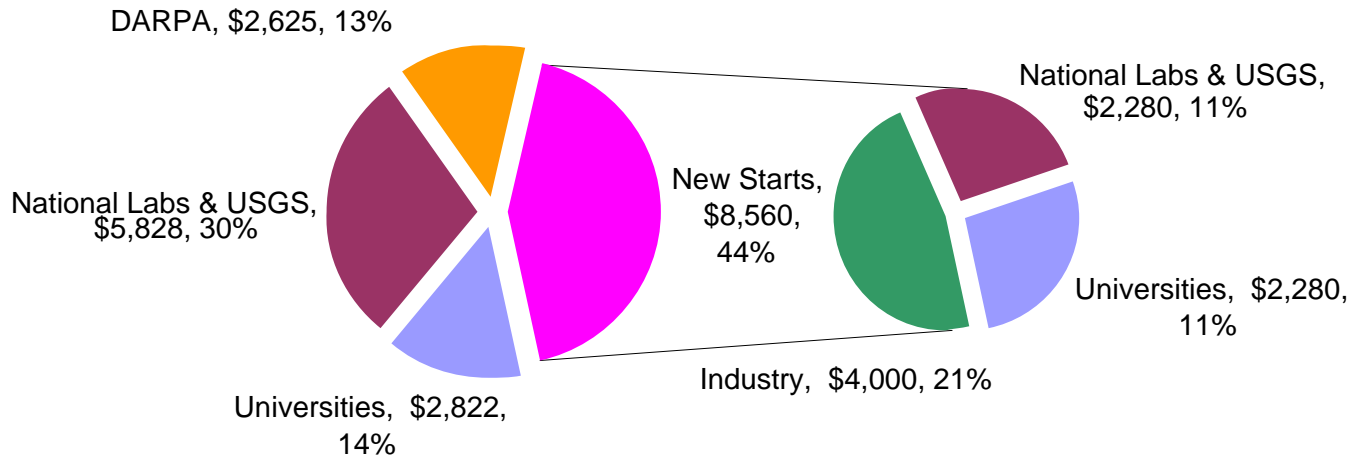


FY 2004 (\$K) = \$17,300

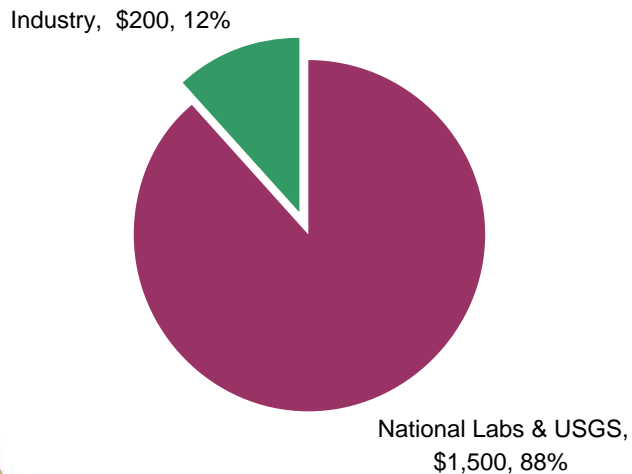


OCRWM S&T Program Performers

FY 2005 S&T Performers (\$K) = \$19,835



FY 2003 S&T Performers (\$K) = \$1,700



FY 2004 S&T Performers (\$K) = \$17,300

