



U.S. EPA: Office of Research & Development

The Regions and ORD: Working Together to INTEGRATE Science in Decision-Making

Region/ORD Science Summit
Atlanta, GA
September 25, 2002

Region/ORD Science Summit Briefing Book

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ORD Laboratory/Center Acronym Glossary

NCEA	National Center for Environmental Assessment
NCER	National Center for Environmental Research
NERL	National Exposure Research Laboratory
NHEERL	National Health and Environmental Effects Research Laboratory
NRMRL	National Risk Management Research Laboratory
OSP	Office of Science Policy

Synopsis of Region/ORD Science Summit

September 25, 2002

Region 4 Office, Atlanta, Georgia

Summit Theme: Opportunities for Region/ORD collaboration to enhance the use of science in Agency decision-making.

Executive Summary:

Region 4 hosted the Region/ORD Science Summit in their RA's office in Atlanta, Georgia on September 25, 2002 (see Attachment 1: Summit Agenda). Paul Gilman, AA for ORD, and Stan Meiburg, DRA for Region 4, co-chaired the meeting, which was attended by Regional DRAs and several senior ORD and Regional executives (see Attachment 2: List of Attendees).

The meeting opened with Region 4 and ORD presentations on problem-driven science - what does it mean for the Regions and ORD. Subsequent discussion focused on the importance of building effective networks among scientists in the Regions and ORD, as well as the need to build on existing ORD programs to address Regional science problems, e.g., the Regional Applied Research Effort and Regional Methods Programs (RARE), Science to Achieve Results (STAR) grantee meetings in each Region, and the Science Results Integration Program (see A. Actions below). One DRA suggested creating a Region/ORD exchange program for scientists.

During discussion of the contributions of science to Regional decision-making, all agreed that science informs these decisions but is seldom the sole driver. One DRA suggested that the Agency undertake an examination of past decisions to evaluate how science has been integrated, along with political, social, and economic factors, into EPA decisions.

The DRAs expressed interest in playing a larger role in the development of Agency science policy and in the appropriate use of good science in their Regions. To this end, it was decided that the DRAs in the Lead Regions for both Regional Science and Technology (RS&T) and ORD (currently Regions 2 and 4, respectively) would participate on the Science Policy Council and the DRA for Science and Technology would chair the National Regional Science Council (see also B. Actions below). The DRAs also agreed on the need to have a third DRA on the Science Policy Council and will determine the appropriate Region in the near future. These Regional assignments will be written into the Lead Region Program guidance.

Ira Leighton, Region 1 DRA, presented his Region's "Science Needs Survey" - why and how it was done and some of the key conclusions. As a result of this effort, Region 1 now has a consistent set of science priorities that it is using to influence Regional strategic planning, including a Regional consensus on the highest priority science issues it wants to work on with ORD, i.e., (1) quicker and more reliable hands-on technical support, (2) funding to support short term science/research needs that complement ORD's longer-term research, (3) a system to determine available technical expertise in the Agency, (4) a process that enables the Region to understand what products are coming out of ORD's research pipeline, and (5) greater opportunity to collaborate as partners in the STAR grants program.

The Regions expressed their interest in having a strong science advocate at EPA Headquarters and a separate budget for the RS&T program. Paul Gilman said that with documentation describing the critical role played by the RS&T program in achieving the Agency's mandates and the resources required to accomplish this role, he would take on this advocacy role. Dr. Gilman indicated that part of the solution would involve negotiations with the Program Offices regarding their appropriate roles in supporting the Regions' fiscal and technical needs (see C. Actions below).

Stan Meiburg and Paul Gilman closed the meeting with a summary of their recommended actions for addressing the Summit theme (see below). In addition, Dr. Gilman expressed his interest in working with the Regions to "get the word out" on high priority ORD science activities in their Regions. To this end, he suggested that the Regions, in addition to ORD, announce events, such as new ORD STAR grant awards, RARE successes, and collaborative EMAP projects with states.

Recommended Actions:

A. Enhancing Utility of ORD Science for the Regions

ACTION ITEMS	LEAD
1. More readily available technical support from ORD.	ORD to generate options; Must involve the Program Offices
2. Regions need a better understanding of how their problem-driven science needs feed ORD's core science program.	ORD
3. Conduct STAR grantee workshops in other Regions (modeled after upcoming event in Region 1). Similar events were requested for the Hazardous Substances Research Centers.	ORD/NCER
4. Expand the use of cooperative agreements in the STAR program to allow Regions the opportunity to participate more directly in ORD grants.	ORD/NCER
5. Additional ORD resources (beyond RARE) for developing rapid responses to major, time-critical science problems.	ORD, working with EPA Program Offices
6. Create "ORD Directory of Experts" to help build Region/ORD networks for addressing Regional science problems.	ORD
7. Fill the remaining 2 Hazardous Substances Technical Liaison positions in Regions 5 and 6.	ORD

B. Enhancing Regional Involvement in Agency Science

ACTION	LEAD
1. The Lead DRAs for both the RS&T program and ORD (currently Regions 2 and 4, respectively), and a third Region will participate as members of the Agency's Science Policy Council.	Stan Meiburg Bill Muszynski
2. The Lead DRA for the RS&T program will chair the National Regional Science Council.	Bill Muszynski
3. The Lead ORD Region will consider a Science Needs Survey similar to the one conducted by Region 1, utilizing the results for strategic planning purposes. Other Regions may do the same.	Stan Meiburg
4. Lead Regions will complete the selection of Regional representatives to the RCTs for the FY 05 research planning cycle.	Lead Region DRAs
5. The Agency needs to do 'succession planning' to prepare for the loss of scientific expertise due to the expected upcoming surge in workforce retirements.	Agency Science Advisor
6. Regions will work with ORD to identify opportunities to announce ORD grantee awards and other significant Region-specific science events.	DRAs and ORD

C. Strengthening Regional Labs

ACTION ITEMS	LEAD
1. Issue paper on the validation of environmental methods.	Region 2 with NEIC support
2. Characterization of the critical role that the RS&T program plays in helping the Agency meet its mandates, and an analysis of resources required to conduct this important work.	Jim Wiggins with RS&T Directors support
3. With information from above, the Agency Science Advisor will become an advocate for the RS&T program, including issues related to the budget, e.g., source, location and amount.	Paul Gilman
4. A cross-Agency Chemical Advisory Committee, to parallel the Biological Advisory Committee, should be created to share information on existing chemical methods and to identify and prioritize chemical methods needs.	RS&T Directors

REGION/ORD SCIENCE SUMMIT

September 25, 2002

Region 4 Office, Atlanta, Georgia

SUMMIT THEME

***Opportunities for Region/ORD Collaboration
to Enhance the Use of Science in Agency Decision-Making***

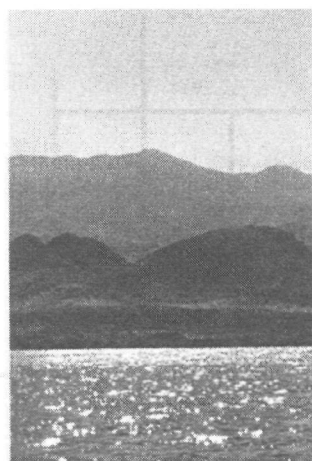
Agenda

- 8:30 **Welcome** (*Stan Meiburg*)
- 8:45 **Summit Goals - Reach Agreement on a Plan and/or Processes to:**
A. Enhance the utility of ORD science for Regional uses
B. Ensure appropriate national consistency on science issues
C. Share successful Region-specific applications of science with
 others (*Stan Meiburg and Paul Gilman*)
- 9:00 **Problem-Driven Science** - What does it mean to the Regions and
ORD?
 > Regional case study (*Elmer Akin*)
 > ORD's problem-driven research (*Bill Farland*)
- 10:00 **Break**
- Where the Rubber Meets the Road: Applying Science in the
Regions**
- 10:15 A. **How to make ORD Science more Useful to the Regions**
 > Recommendations from the Regions (*DRAs*)
 > Are we hitting the mark? Can we build on our successes?
 (*Paul Gilman and Kevin Teichman*)

- 11:15 B. **How to Use Science more Effectively in Decision-Making**
 > Challenges and opportunities for the use of science in
 Regional decision-making (*Ira Leighton Region I's Science*
 Survey, Goals, and Action Plan)
 > Cross-Regional and ORD collaboration on science issues,
 e.g. risk assessment/characterization, model applications,
 monitoring, and peer review (*Paul Gilman*)
- 12:30 **Lunch**
- 1:30 **How to Share Successful Region-Specific Applications of Science**
 with Others (*All*)
- 2:30 **Next Steps for Achieving Summit Goals** (*Stan Meiburg*)
- 3:00 **Adjourn**



PROBLEM-DRIVEN SCIENCE



REGIONAL CASE STUDY

ANNISTON PCB SITE

Background

Anniston is a town of about 25,000 residents in north Alabama near Birmingham. The Monsanto Company manufactured polychlorinated biphenyls (PCBs) at its Anniston facility from 1929 to 1971. A variety of PCB products were manufactured there under the trade name Aroclor (each product received a different number based on its chlorine content). Now recent environmental sampling has found Aroclors 1254, 1260 and 1268 to be the predominant PCB mixtures found in off-site soil and sediment samples.

The plant site is located in west Anniston, an area that has about 8,000 primarily low-income African-American residents. Much of the residential area is down gradient of the Monsanto plant and subject to temporary flooding during heavy rain events. It is believed that most of the off-site PCB contamination occurred from run-off and relocation of contaminated soil particles. However, the community believes that airborne transmission of PCBs was, and is, a major pathway of contamination in the residential areas. A number of citizen lawsuits against Monsanto (now Solutia) at various stages of litigation have hindered exposure and other investigations.

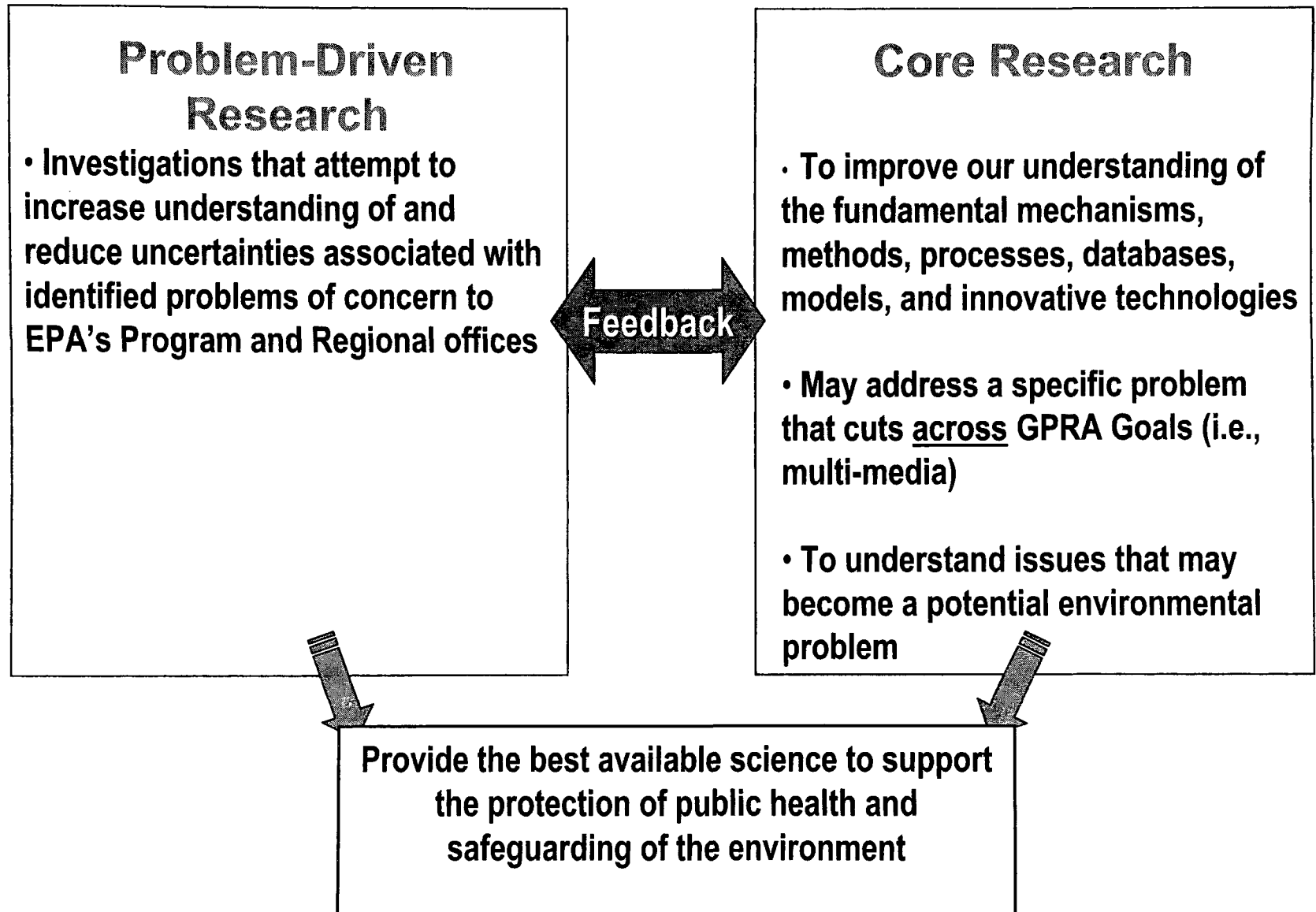
Research Opportunity

The community of west Anniston has been characterized as the most PCB-contaminated population known to exist. This characterization is based primarily on the findings of a data set of PCB blood samples taken from 2,970 clients in one lawsuit. About half had detectible PCB levels ranging as high as 2 mg/L total PCBs. There have not been any further studies on this population nor the greater west Anniston community to any significant degree.

Even though PCB manufacturing terminated in the United States in the 1970s, their widespread use and persistence in the environment has resulted in their presence in soil and sediment at many contaminated sites evaluated under the Superfund and RCRA regulatory programs. While risk-based values are available from animal studies for some Aroclors in the Agency's IRIS database, human data on many aspects of PCB exposure and toxicity are limited. This site provides research opportunities to address data gaps in the following areas:

1. Determine PCB congener blood profiles in exposed populations relative to Aroclor findings in surrounding environmental media and the appropriate application of dioxin TEQ values.
2. In coordination with ATSDR, conduct epidemiological studies of exposed populations relative to health effect end points in children and adults.
3. Evaluate life stage responses to PCB exposure.
4. Obtain human exposure data for determining priority congeners for conducting congener-specific toxicity studies for dioxin-like and non-dioxin like mechanisms of toxicity.
5. Determine congener blood profiles relative to inhalation vs. oral routes of exposure and Aroclor type.

SCIENCE FOR A PURPOSE



Examples of ORD's Problem-Driven Science

Goal 1

Research Activity	Lab/Center	Description	Completed/Estimated Completion
Air Quality Model Development	NERL	Development of air quality models for PM, ozone, and air toxics that can be used by States in the development and evaluation of control strategies.	Ongoing
Emissions Models and Methods	NRMRL	Development of methods and models to estimate emissions. These emission estimates are used by States and Regions to develop inventories and as input to air quality models.	Ongoing
IRIS Assessments	NCEA	Development of cancer and non-cancer dose-response assessments that States and Regions can use for risk assessments.	Ongoing
Monitoring Methods	NERL	Development of ambient monitoring methods, including a Federal Reference Method for PM, that can be used to determine whether areas are in attainment of NAAQS and to determine ambient concentrations of a variety of pollutants.	Ongoing

Examples of ORD's Problem-Driven Science

Goal 2

Research Activity	Lab/Center	Description	Completed/Estimated Completion
Beach Monitoring Study Report	NERL	The final report will describe the results of a comprehensive beach monitoring study conducted to evaluate various beach monitoring protocols, e.g., time of day, distance from shore, sample depth, etc.	December 2002
National Epidemiological and Environmental Assessment of Recreational Water Study	NERL/ NHEERL	Objectives are to develop a new generation of microbial indicators; conduct a series of epidemiologic studies to determine which microbial indicators are the best indicators of health risk; and develop a relationship between those indicators and health risk that can be used to develop new water quality criteria. This research is a high priority for regional Beach Program and WQS Coordinators.	2006
BEACH Program Coordinators Calls and Meetings	NERL/ NHEERL	ORD scientists participate in monthly BEACH Program calls with HQs and Regional staff. Research plans and results are communicated and technical questions are answered. Scientists also participate in program meetings.	Ongoing
TMDL Program	NERL/ NHEERL/ NRMRL/ NCEA	Technical support includes participation of ORD scientists in workgroups, such as the WARSS workgroup to address science issues associated with using geomorphological techniques, leading conference calls to discuss water quality modeling research and support, and assistance on specific TMDLs, such as the New York/New Jersey Harbor pathogens TMDL. Numerous research projects are underway to address needs identified by the NRC report and the "Twenty Needs Report" prepared by OWOW. Examples include methodologies for developing criteria for sedimentation and embedded sediment, research on improving water quality models, and BMP effectiveness studies.	Research: 2002 - 2008 Technical Support: ongoing

Examples of ORD's Problem-Driven Science

Goal 2 [continued]

Research Activity	Lab/Center	Description	Completed/Estimated Completion
Aquatic Life Ambient Water Quality Criteria. Dissolved Oxygen Criteria (Saltwater): Cape Cod to Cape Hatteras	NHEERL	Scientists from AED developed dissolved oxygen (DO) criteria to protect saltwater organisms from the effects of low DO. This criteria is innovative in that it protects specific life stages and also integrates exposure over time using a modeling framework rather than the historically applied duration/frequency concept. AED is currently assisting Region III/Chesapeake Bay Program Office in applying the DO criteria to the Bay to ensure protection of Bay-specific designated uses. The approach used in the Bay to implement the DO criteria will set a precedent for other regions to follow.	2000 and ongoing support to apply it regionally (Chesapeake Bay) and other coastal water of the US
Dissolved Oxygen Criteria (Saltwater): Cape Cod to Cape Hatteras		Established joint projects pertaining to small community wastewater treatment systems in Region 7: "Advanced Monitoring of Constructed Wetlands Performance in Nebraska" with the University of Nebraska-Lincoln, and "Application of Biological Aerated Filters to Meet NPDES Ammonia Limits for Small Communities" with Iowa State University.	Bay and other U.S. coastal water
Wastewater Treatment Technology Assistance	NRMRL	Established joint projects pertaining to small community wastewater treatment systems in Region 7: "Advanced Monitoring of Constructed Wetlands Performance in Nebraska" with the University of Nebraska-Lincoln, and "Application of Biological Aerated Filters to Meet NPDES Ammonia Limits for Small Communities" with Iowa State University.	
Mountaintop Removal Assessment	NERL	Provided Region 3 with data for EIS approval process	Completed
South Fork Broad River Monitoring Study	NERL	Provide Region 4 with fecal indicator rain event data to evaluate models	September 2004
Innovative Treatment of CAFO Wastewater Region 4	NRMRL	Established projects with the Tennessee Valley Authority's Environmental Research Center in Muscle Shoals, Alabama to evaluate the ability of TVA's ReCirculating Wetland system to treat CAFO wastewater.	

Examples of ORD's Problem-Driven Science

Goal 2 [continued]

Research Activity	Lab/Center	Description	Completed/Estimated Completion
Urban Stream Restoration Region 5	NRMRL	Participate in a joint project with the Northeast Ohio Regional Sewer District (NEORSO) pertaining to Progress Indicators and End Points to Guide Urban Stream Restoration Efforts. The NEORSO is leveraging our funding with 319 funding from Ohio EPA to develop guidelines.	Ongoing
Small Drinking Water Systems Treatment Technology	NRMRL	Research is being conducted to address the treatment technology needs of small systems, including treatment for arsenic, protozoans and MTBE. NRMRL also provides technical support to the regions. Example projects include field evaluation of small mobile package systems in Region 1, assistance in Puerto Rico, coordination with Region 5 on technology evaluations for systems contaminated with low concentrations of MTBE, and collaboration with Region 8 to develop a handbook for small systems.	Research: 2004-2007 Technical Support: Ongoing
Drinking Water Technical Support to Region 3	NRMRL	Aided in evaluating a Metro DC microbial contamination problem and helped to initiate a remote telemetry project. Implemented corrective action related to Coliform sp. violations in the Washington DC Water and Sewer Authority (WASA) water distribution system. As a result, a world-wide-web remote monitoring system on the DC distribution system was set-up through a collaborative effort among the WASA, Region and NRMRL.	Completed
Drinking Water Distribution System Technical Assistance	NRMRL	Example projects include coordinating with a small community in Region 9 to evaluate the water treatment disinfectant process to destroy and/or inactivate pathogenic organisms and to evaluate subsequent water quality problems associated with chloramination in a distribution system. Provided on-site assistance to several communities in Region 10 on corrosion-related problems and ways to mitigate impacts.	Ongoing

Examples of ORD's Problem-Driven Science

Goal 3

Research Activity	Lab/Center	Description	Completed/Estimated Completion
Report - Database of Body Burden Measurements of Pesticides and Toxic Chemicals	NCEA	Support future analysis of aggregate exposure and risk	2002
NHANES-Guidance for Use of Data in Risk Assessment	NCEA	Develop general guidance on how to access and use health and nutritional data from the National Health and Nutrition Examination Surveys to provide useful information for EPA risk assessment and policy needs.	
Children's Pesticide Exposure Measurement Program	NERL	Develop protocol for conducting an exposure analysis of ORD children's pesticide studies for all relevant pathways (includes EDCs, see Goals 8.2 and 8.3)	2002
		Develop protocol for conducting an assessment addressing critical aggregate exposure pathways: inhalation, dermal absorption, non-dietary exposure	2003
		Peer reviewed design for children's aggregate exposure field study (includes EDCs, see Goals 8.2 and 8.3)	2003
		Complete and report results of field monitoring study of CTEPP (Children's Total Exposure to Pesticides and Other Persistent Pollutants) to evaluate aggregate exposures of 260 young children in homes and daycare centers to persistent organic pollutants (Also Goals 8.2 and 8.3)	2003-2005

Examples of ORD's Problem-Driven Science

Goal 3 [continued]

Research Activity	Lab/Center	Description	Completed/Estimated Completion
Children's Pesticide Exposure Modeling Program (See Goal 8.2)	NERL	Upgrade and linkage of SHEDS and ERDEM models to allow user to characterize children exposure to dose linkages	2002-2004
		Analysis and report on factors for children's exposure that may lead to high-level, short-term exposure, with updates to Exposure Factor's Handbook	2003
		Modeling analysis of children's studies results to identify key uncertainties and critical data gaps associated with children's exposure to pesticides and other environmental contaminants	2004
		Analysis of existing children's exposure data for cumulative exposure to pesticides and other environmental contaminants	2007
Longitudinal Activity/ Dietary Consumption Survey	ALL	Collection of longitudinal activity and dietary consumption data on subpopulations (e.g., children, elderly) for modeling daily and seasonal variability inherent in human activities and dietary consumption patterns. This research will produce data that are not captured in previous and planned dietary or population surveys.	2005

Examples of ORD's Problem-Driven Science

Goal 4

Research Activity	Lab/Center	Description	Completed/Estimated Completion
Agricultural Health Study - Pesticide Exposure Study	NERL	NCI/NIEHS/EPA are currently performing a prospective epidemiological study of health on applicators and family members. NERL will produce data to evaluate NCI algorithms for assessing farm applicator exposures using questionnaires	2003-2005
Spray Drift Modeling	NERL	Update AgDrift/AGDISP to include orchard blast application, secondary volatilization, and transport	2004-2007
Ecological Modeling for Risk Assessment	NERL	Update PRZM, EXAMS, BASS modeling modules with improved user interfaces	2002-2004
Chiral Pesticides Methods	NERL	Advanced methods for measuring chiral pesticide and enhanced understanding of their fate and transport through the environment	2002-2004

Examples of ORD's Problem-Driven Science

Goal 5

Research Activity	Lab/Center	Description	Completed/Estimated Completion
Methods for Air Toxic VOCs	NERL	NERL, EPA is using Regional Methods Program funding to review the CDPHE method and to develop EPA guidance on methods to determine the concentration of toxic vapors in buildings near contaminated groundwater.	2003
Organotin Research Support to Region 4	NERL	An organotin manufacturing plant in South Carolina was suspected of being responsible for a major fish kill in one of its streams and poisoning of a municipal wastewater treatment plant. NERL applied a new analytical approach developed in-house to detect both dibutyl- and tributyl- tin compounds in water and fish from the affected stream for the state.	2000
Environmental Forensics for Regions	NERL	Ion Composition Elucidation (ICE), a high resolution mass spectrometry technique developed at NERL/LV, has helped identify sources of pollution in several Regions.	1996-2002
Evaluation of Fate and Transport of Gasoline Components in Long Island Aquifers	NERL	Information used by the state to develop improved approaches to site assessment.	Some calculators completed; others in 2006 with completion of field data evaluation system
Contaminated Sediments Fate and Transport Modeling	NERL	Technical assistance provided to the Region 1 RPM on the Housatonic River Superfund Site.	Ongoing
Contaminated Sediments Fate and Transport Modeling Research	NERL	Evaluation of existing contaminated sediment mass fate and transport models (FY03) in support of remedy selection and evaluation.	2003-2005
Site-Specific Technical Support	NERL	See Section IV.F. of the briefing book on ORD's Technical Support Centers	Ongoing
Sample Holding Time Re-evaluation	NERL	In response to Regional requests, several reports are being prepared to describe results of research to reevaluate sample holding times.	2005

Examples of ORD's Problem-Driven Science

Goal 5 [continued]

Research Activity	Lab/Center	Description	Completed/Estimated Completion
Operational and Long-term Monitoring at the New Bedford Harbor (NBH) Superfund Site	NHEERL	Over the last 15 years, AED scientists, in conjunction with EPA Region I and others, have developed and participated in, multiple operational and long-term monitoring programs at the NBH site. Collectively, these monitoring and associated research activities (e.g., PCB bioaccumulation) have provided EPA Region I with state-of-the-art techniques to most effectively and safely manage this \$350 million remediation.	Ongoing
Technical Assistance to Region 1	NHEERL	Consultation and research on TCDD and hexachlorozanthene bioaccumulation and toxicity (Centerdale, North Providence, RI)	2002
		Performed sediment TIE to determine causes of toxicity in contaminated sediments (Eastland Woolen Mills, Maine)	2002
Technical Assistance to Region 2	NHEERL	Hyde Park and other sites in Niagara Falls, NY, Region 2. Human health effects of dioxin-like chemicals for Lake Ontario	1993
		Long term studies of bioaccumulation and ecological effects of dioxin-like chemicals in Lake Ontario	2003
Technical Assistance to Region 4	NHEERL	Consultation on PCB ecological effects issues (Solutia-Anniston, AL)	2002
		Consultation for TCDD TRV: reviewed papers and provided technical guidance on selection of study	2002
Fox River/Green Bay Mass Balance Modeling	NHEERL	Developed a modeling framework, In-place Pollutant eXport (IPX), that simulated contaminated sediment transport as a function of physical parameters controlling sediment settling and resuspension. The framework withstood extensive review and provided forecasts to evaluate remediation alternatives for the Fox River Superfund site.	1995
		Technology transfer of modeling technology to OERR scientists and site managers for application to other high priority sites	2003

Examples of ORD's Problem-Driven Science

Goal 6

Research Activity	Lab/Center	Description	Completed/Estimated Completion
Gulf Coast Assessment	NCEA	Development of an assessment of the consequences of climate change and variability in the Gulf Coast	2004, 2008
Mid-Atlantic Assessment	NCEA	Development of an assessment of the consequences of climate change and variability in the Mid-Atlantic	2004, 2008
Great Lakes Assessment	NCEA	Development of an assessment of the consequences of climate change and variability in the Great Lakes	2004, 2008

Examples of ORD's Problem-Driven Science

Goal 8.3

Research Activity	Lab/Center	Description	Completed/Estimated Completion
Methods Development	NERL	Methods for measuring and quantifying alkylphenols are being developed in collaboration with RARE project with Regions 3 and 5	2003
Molecular Indicators of Exposure	NERL	DNA microarrays are being developed for characterizing first order effects associated with exposures to estrogen-like EDCs	2003-2005
		Training will be conducted for Regional Offices and methods will be used to characterize ecological exposures	2003
Field Studies Characterizing Extent of Ecological EDC Exposures	NERL	NERL is collaborating with Region 4 and NRMRL to characterize EDC exposures at Lake Hartwell, GA	2002-2003
		NERL is collaborating with NRMRL on a variety of wastewater treatment plants throughout the US, characterizing the extent of EDC exposures from these facilities	2002-2003
		NERL is collaborating with NHEERL and Canada exploring effects of EDC exposures in dosed Canadian lakes	2003
Field Studies to Characterize Children's Exposures to EDCs	NERL	Develop protocol for conducting an exposure analysis of ORD children's pesticide studies for all relevant pathways (includes EDCs, see Goals 8.2 and 8.3)	2002
		Peer reviewed design for children's aggregate exposure field study (includes EDCs, see Goals 8.2 and 8.3)	2002
		Complete and report results of field monitoring study of CTEPP (Children's Total Exposure to Pesticides and Other Persistent Pollutants) to evaluate aggregate exposures of 260 young children in homes and daycare centers to persistent organic pollutants (Also Goal 8.2)	2004-2005
EDC Workshop with ORD and Region 4	NRMRL	Produce a status report on the performance of Continuous Emission Monitors (CEMs) used to measure total gas-phase mercury and mercury speciation based on both lab and field testing.	2003

Examples of ORD's Core Science Relevant to Regional Problems

Goal 8.1

Research Activity	Lab/Center	Description	Completed/Estimated Completion
EMAP/R-EMAP/WEMAP	NERL	The primary aim of EMAP is to develop the technology to evaluate status and trends in aquatic resources nationally, and to work with EPA Regional Offices and other Federal agencies to demonstrate and implement monitoring. To this point, nearly all of EMAP's emphasis has been on monitoring applications in eastern regions of the U.S. And we anticipate that landscape/surface and coastal water relationships will be different in different regions of the country, especially in the western U.S. where topographical and climate are quite variable.	Ongoing
ReVA	NERL	The Regional Vulnerability Assessment (ReVA) program is an approach to regional scale, priority-setting assessment being developed by EPA's Office of Research and Development (ORD). ReVA will expand cooperation among the laboratories and centers of ORD, by integrating research on human and environmental health, ecorestoration, landscape analysis, regional exposure and process modeling, problem formulation, and ecological risk guidelines.	Ongoing

Examples of ORD's Core Science Relevant to Regional Problems

Goal 8.2

Research Activity	Lab/Center	Description	Completed/Estimated Completion
Characterizing Children's Aggregate and Cumulative Exposures to Environmental Contaminants	NERL	Develop protocol for conducting an exposure analysis of ORD children's pesticide studies for all relevant pathways (includes EDCs, see Goals 8.2 and 8.3)	2002
		Peer reviewed design for children's aggregate exposure field study (includes EDCs, see Goals 8.2 and 8.3)	2002
		Complete and report results of field monitoring study of CTEPP (Children's Total Exposure to Pesticides and Other Persistent Pollutants) to evaluate aggregate exposures of 260 young children in homes and daycare centers to persistent organic pollutants (Also Goal 8.2)	2003-2005
Exposure Methods	NERL	Immunoassay methods for rapid detection of pesticides and their metabolites	2002-2005
		State of the art methods for characterizing pesticides and metabolites in blood, breath, and urine	2003-2006
		Rapid array technologies for characterizing exposures to microbiologicals and other environmental contaminants	2002-2007

Examples of ORD's Core Science Relevant to Regional Problems

Goal 8.2 [continued]

Research Activity	Lab/Center	Description	Completed/Estimated Completion
Exposure Modeling (See Goal 3)	NERL	Upgrade and linkage of SHEDS and ERDEM	2002-2004
		models to allow user to characterize children exposure to dose linkages	2003
		Analysis and report on factors for children's exposure that may lead to high-level, short-term exposure, with updates to Exposure Factor's Handbook	2004
		Modeling analysis of children's studies results to identify key uncertainties and critical data gaps associated with children's exposure to pesticides and other environmental contaminants	2007
		Analysis of existing children's exposure data for cumulative exposure to pesticides and other environmental contaminants	2002-2003
		Analysis of data and modeling needs for assessing cumulative exposures	2004-2007
		Case studies to collect exposure data to address model development needs for addressing cumulative exposures	2004-2005
		Draft source to dose modeling framework with enhanced modeling modules for the various human compartments	2002-2007
NCER RFA That Closed on July 10, 2002, Entitled "Lifestyle and Cultural Practices of Tribal Populations and Risks from Toxic Substances in the Environment	NCER	Updated exposure databases (HEDS, CHAD) describing children and other susceptible subpopulations exposures to environmental contaminants and key factors influencing these exposures	
		This solicitation invites applications in two areas of current interest, the development of: 1) exposure and effects assessment methods that can be broadly applied across geographic regions and Tribal populations and 2) risk management strategies and options that will lead to reduction in risk from exposure. NCER expects to fund 3 to 4 projects which generally run 2 to 3 years.	Ongoing

Examples of ORD's Core Science Relevant to Regional Problems

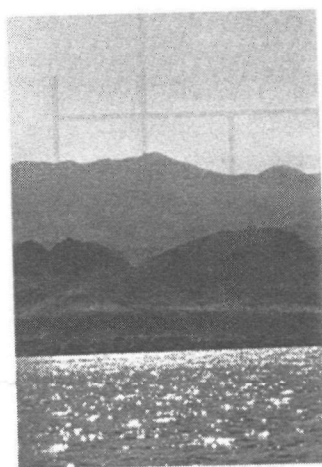
Goal 8.4

Research Activity	Lab/Center	Description	Completed/Estimated Completion
Pollution Prevention Regional Workshops	NRMRL	The Office of Research and Development published "An Organizational Guide to Pollution Prevention" (EPA/625/R-01/003) in August of 2001. In conjunction with this new document, ORD/NRMRL is sponsoring a series of interactive Workshops (one per Region) based on the principles and concepts produced in the Guide. ORD works in conjunction with each Region to customize the Workshop to address items of interest to the Region.	Regions 4, 7-10 completed August 2001-August 2002; Regions 1, 2, 3, and 5 will be held in 2003.
ETV Program	NRMRL	EPA and the Coast Guard signed a MOA to verify environmental technologies that address invasive species and are of mutual interest to both agencies.	June 2001



SOLUTIONS THROUGH SCIENCE

Solutions Through Science





ORD And The Regions: Providing Solutions Through Science

Collaboration with Local Scientists

Because a spatially extensive network of stream reference sites throughout the country did not exist, the EPA, along with other federal and state agencies, was not able to accurately evaluate the biological health of aquatic systems.

– Tina Laidlaw, Region 8 Water Quality Monitoring, Colorado

ORD is working to complete this network by 2004 through its Science to Achieve Results (STAR) extramural research program at Utah State and Michigan State Universities. For example, STAR grantee Charles Hawkins at Utah State University is working directly with Region 8 to establish an extensive network of stream reference sites throughout the country. Region 8 has been collecting data in South Dakota, Colorado and Montana in support of this effort. The expected outcome of this project will lead to the development of a national aquatic ecosystem classification for stream reference conditions, and allow for a more accurate and comparable evaluation of the biological health of aquatic systems across the country. Also as a result of Dr. Hawkins' extraordinary work, Region 8 and the Office of Water will co-fund the Western Regional Bioassessment Center at Utah State University. This Center will facilitate and improve interagency coordination with respect to western bioassessments, conduct Region-specific research and offer technical assistance to states and tribes.

Region-Initiated Research Efforts

In the 1990s, Region 7's monitoring had indicated that pollution from charcoal kilns, previously exempted from Missouri's air pollution emission requirements, could significantly impact nearby residents.

– Art Spratlin, Region 7, Director of the Air, RCRA and Toxics Division

For assistance, Region 7 utilized ORD's Regional Applied Research Program (RARE), which provides each Region the opportunity to conduct high-priority research of its choosing through an ORD Lab or Center. In this case, a laboratory-scale charcoal kiln simulator was created to help characterize the chemical and physical properties of these emission plumes. Data from the simulator allowed Region 7 and Missouri to conclude that emission controls on charcoal kilns were necessary. Today, charcoal kiln operators are

complying with the requirements to control and reduce these emissions. It is anticipated that by 2004, more than 1 million pounds of particulates and other toxic air pollutants will be eliminated from the Missouri Ozark Region.

Regional Science Workshops

Invasive species, including those in ballast water discharges, are adversely impacting Region 10's ability to maintain the quality of its estuaries, successfully restore wetlands, and to increase endangered species populations.

– Elbert Moore, Region 10, Director, Office of Ecosystems and Communities

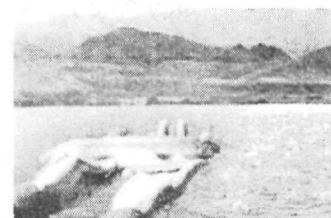
To help raise awareness about invasive species and identify related scientific issues, ORD worked with four Regions to develop their own workshops and followed up with an overall National workshop. This educational effort provided participants with a cross-Agency network they rely on to support their own Regional efforts and helped identify the unique skills EPA brings to invasive species research. The EPA Nonindigenous Species Working Group was also formed, which has coordinated Agency responses to the federal cross-agency council on this topic and provided direct technical assistance to Regional offices.

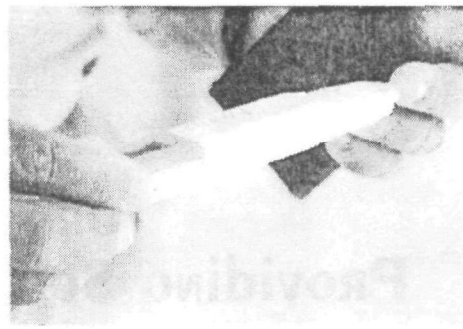
Superfund Site Cleanup – Technical Support

Acid mine drainage severely impacts stream quality at numerous mine sites throughout the Western United States. This problem had affected the aquatic habitat in French Creek and the Blue River, largely eliminating the trout population near the resort town of Breckenridge, Colorado.

– Victor Ketellapper, Region 8, Regional Project Manager

To assist, Region 8 called in ORD's Engineering Technical Support Center to evaluate and develop a low-cost treatment system. ORD evaluated a variety of treatment options and recommended a lime lagoon treatment that will effectively remove the acid mine drainage and restore the trout habitat. This solution will allow the Town of Breckenridge and Summit County to purchase more than 1,800 acres of land from the mining company so that this critical habitat can be preserved as open space. In addition to its





technical support centers, ORD's assistance is directed through its Hazardous Substances Research Centers and the Hazardous Substances Technical Liaison Program.

Ecosystem Priority Identification/Effectiveness Measurement

Until recently, most state monitoring programs were not designed to generate the kind of data necessary to satisfactorily meet several of the reporting requirements under the Clean Water Act.

– All EPA Regions

Through its Environmental Monitoring and Assessment Program (EMAP), ORD and Regional scientists worked together to develop sampling programs and bioassays to measure the condition of aquatic ecosystems. In the Mid-Atlantic Integrated Assessment, an on-site ORD team collaborated with Regional staff to complete the first unbiased assessment of water ecosystems in the area. Results from the assessment were key in planning priorities for the Region. Another EMAP program, the Western Pilot Study, uses similar techniques to assess water systems in 14 states. This five-year study will provide reports highlighting the ecological condition of water resources and transfer monitoring technology to national, regional, state and tribal personnel. As a result of this research, more states are incorporating EMAP sampling design and ecological methods into their monitoring programs.

Local, State and Regional Monitoring

The state of Nebraska realized that its water-monitoring program worked from an organizational standpoint. However, the method used showed there were water quality problems in a disproportionately large percentage of the state's waters.

– Nebraska, Region 7

For more accurate results, the state began using ORD's Regional EMAP (R-EMAP) approach in 1997. Using an EMAP statistical sampling design, scientists selected and monitored random stream segments. The state discovered a significant trend toward improved water clarity in the areas sampled, correcting the previous negatively biased reports.

New Technology Application

In early 2002, scientists and officials in the San Francisco Bay area suspected endocrine disrupting chemicals (EDCs) in wastewater discharges were affecting Bay fish.

– San Francisco Bay, Region 9

Through its Science Results Integration Initiative, ORD scientists worked with the local team to provide the latest information on the potential effects of EDCs. They identified several exposure bioassays under ORD development, conducted a hands-on technology demonstration, and provided training on basic molecular biology concepts and microbial source tracking. Region 9 now has a better understanding of the issue and can provide long-term improvements in water quality by incorporating new technologies. ORD looks forward to providing similar results on all levels – regional, state and tribal – as it continues the rollout of this initiative.

Methods Development

Excessive sedimentation is one of the primary sources of stream degradation in many EPA Regions. Even though sediments are one of the most common pollutants on impaired water body lists, the methods to quantitatively analyze and assess this property are lacking.

– All EPA Regions

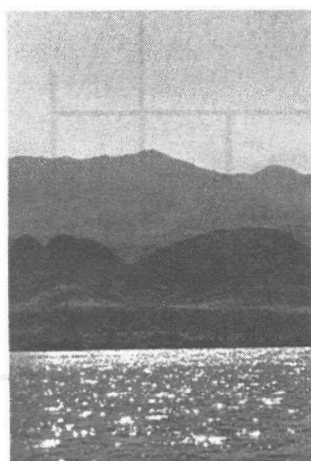
Under ORD's Regional Methods Program, the Regions requested that ORD develop an Excess Sediment Index. By using this information, Regions will be able to quantitatively and more accurately measure the changes in stream channel morphology and sedimentation. In Region 3, this protocol has been used to investigate sedimentation problems related to streams impacted by both mountaintop/valley fill and longwall coal mining. By 2004, Region 10 will have more than 1,000 sites collecting quantitative physical habit data (including sedimentation) as part of its R-EMAP program.





REGION SCIENCE

REGION SCIENCE



REGIONAL SCIENCE LIAISONS (RSLs) TO ORD

Regional Science Liaisons (RSLs) are Regional scientists who manage, implement and facilitate ORD's Regional Science Program. This program provides ORD with a clear understanding of the Regions' high-priority science issues and research needs. It supports the planning and conduct of this research and assists in applying ORD science results to risk assessment and decision-making for the Regions, states and tribes.

The RSL is responsible for leading the planning and conduct of Regional Science Topic Workshops, administering the Regional Applied Research Effort (RARE) program, and supporting the development of Regional input to the annual research planning process. He/She is expected to communicate science to the Regions, states and tribes through a variety of other mechanisms. Job tasks include coordinating visits and presentations by ORD scientists, working with STAR grant recipients, facilitating guest lectures, and organizing science fairs and training courses.

The RSL for Region 1 is:

Roger Hillger
USEPA-RAA
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Boston, MA 02114-2023
Ph: 617/918-1071 (Mon., Wed., Fri.)
Ph: 781/863-4342 (Tue., Thurs.)
Fx: 617/918-1029

The RSL for Region 2 is:

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USEPA
290 Broadway
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The RSL for Region 3 is:

Ron Landy
USEPA-3ES01
Environmental Science Center
701 Mapes Rd.
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Fx: 410/305-3095

The RSL for Region 4 is:

Tom Baugh
USEPA Region 4
61 Forsyth St. SW
Atlanta, GA 30303-8960
Ph: 404/562-8275
Fx: 404/562-8269

The RSL for Region 5 is:

David Macarus
USEPA B19J
77 W. Jackson Blvd.
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The RSL for Region 6 is:

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The RSL for Region 7 is:

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The RSL for Region 8 is:

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USEPA-Region 8
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Fx: 303/312-7828

The RSL for Region 9 is:

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USEPA-PMD-1
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Fx: 415/947-8025

The RSL for Region 10 is:

Roseanne Lorenzana
USEPA-OEA 095
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Fx: 206/553-0119

HAZARDOUS SUBSTANCES TECHNICAL LIAISON PROGRAM (HSTLP)

The Hazardous Substances Technical Liaison Program (HSTLP) was created in 1990 as a joint effort among ORD, the Regions and the Office of Solid Waste and Emergency Response (OSWER). The program's goals are to expand the technical support available to Regional staff and promote the incorporation of sound science and technology in Regional OSWER decisions and actions.

To accomplish these goals, there are Hazardous Substances Technical Liaisons (HSTLs) assigned to

one of eight Regions (Regions 1-4 and 7-10). These key personnel provide technical assistance, advice and training to the Regional OSWER staff and management. Among their tasks, they organize and facilitate workshops to address the Regions' high-priority science and technology issues, such as the recent "Decision Support Tools Workshop" and "Natural Attenuation of Groundwater Contamination Workshop."

The HSTL for Region 1 is:

Steve Mangion
U.S. EPA
One Congress St.
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The HSTL for Region 9 is:

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The HSTL for Region 3 is:

Norm Kulujian
U.S. EPA
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The HSTL for Region 8 is:

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SCIENCE TO ACHIEVE RESULTS (STAR)

RESEARCH GRANT PROGRAM

EPA's Science to Achieve Results (STAR) program funds research grants and graduate fellowships in numerous science and engineering disciplines. It allows the EPA to collaborate with the nation's best scientists and engineers on a local level, engaging them in targeted research to meet each Region's own high-priority needs.

Each year the agency receives about 3,000 to 3,500 STAR proposals, which undergo a competitive solicitation process and peer review. Out of those proposals, STAR typically awards 150 research grants and 40 joint research grants (with other federal and private-sector partners). This reach extends to approximately 280 universities and non-profit research institutions in all states, Guam, Puerto Rico and the District of Columbia.

Annually, EPA manages 500-600 active research grants and 300 fellowships. STAR partnerships have addressed a wide variety of environmental concerns since the program's inception in 1995. Today, it focuses on the health effects of particulate matter, drinking water, water quality, global change, ecosystem assessment and restoration, human health risk assessment, endocrine disrupting chemicals, pollution prevention and new technologies, children's health and socio-economic research.

EPA issues annual solicitations for Phase I and Phase II research proposals from science and technology-based firms. EPA uses this phased approach to help determine whether the research idea, often on high-risk advanced concepts, is technically feasible, whether the firm can do high-quality research, and whether sufficient progress has been made to justify a larger Phase II effort. Research topics include nanotechnology and pollution prevention, water and air pollution control, management of solid and hazardous waste, environmental monitoring and measurement, and bioterrorism detection and decontamination.

Under Phase I, the scientific merit and technical feasibility of the proposed concept is investigated. EPA plans to award firm-fixed-price Phase I contracts of \$80,000 with up to 10 months performance periods. Phase II contracts are limited to small businesses that have successfully completed Phase I. The objective of Phase II is to further develop and commercialize the concept proven feasible in Phase I. Competitive awards are based on the results of Phase I, the Phase II workplan and the commercialization potential of the Phase II technology. EPA plans to conduct the Phase II solicitation during Phase I and award Phase II contracts of \$225,000 or \$325,000 at the end of the Phase I contract period.

Small Business Innovation Research (SBIR)

The Environmental Protection Agency (EPA) is one of 10 federal agencies that participate in the SBIR Program established by the Small Business Innovation Development Act of 1982. The purpose of this Act was to strengthen the role of small businesses in federally funded R&D and help develop a stronger national base for technical innovation. Joint ventures and limited partnerships are eligible for SBIR awards, provided the entity created qualifies as a small business.

Region I

Active Projects:

- Science To Achieve Results (STAR) Grants
- Science To Achieve Results (STAR) Fellowships
- Small Business Innovation Research

August 16, 2002

#	Identifier	Abstract	Principal Investigator	Institution	Grant Representative	Grant Amount	Project Period	State
1	68D00209SBIR	Gas Turbine Engine Performance Monitor for Reduced Emissions	Markham, James R.	Advanced Fuel Research Inc.	Manager, SBIR Program	\$224,946	January 2000 - January 2002	CT
4	68D02004SBIR	Low-Cost Mercury Sorbents Derived From Waste Tires	Wojtowicz, Marek	Advanced Fuel Research Inc.	Manager, SBIR Program	\$69,999	January 2002 - January 2002	CT
5	68D01012SBIR	Cryptosporidium Detection System	Fernandez, Salvador M.	Glencia Inc.	Manager, SBIR Program	\$70,000	January 2001 - January 2001	CT
8	R828174Grant	Tracking Persistent Organic Pollutants (POPs) Through Biotic and Abiotic Processes in the Environment	Mattina, Mary; Jane Incorvia; Eitzer, Brian; Simon, Ted	Connecticut Agricultural Experiment Station	Shapiro, Paul	\$194,622	January 2000 - June 2002	CT
9	R829405Grant	Mechanistic Role of Plant Root Exudates in the Phytoremediation of Persistent Organic Pollutants	White, Jason C.; Gage, Daniel J.; Gent, Martin P.N.; Mattina, Mary; Jane Incorvia; Smets, Barth F.	Connecticut Agricultural Experiment Station, University of Connecticut	Lasat, Mitch	\$401,241	January 2001 - October 2004	CT
11	68D02027SBIR	Nanofibrous Manganese Dioxide for Volatile Organic Compounds	Xiao, Danny	Inframmat Corporation	Manager, SBIR Program	\$70,000	January 2002 - January 2002	CT
15	R827635Grant	Microbiological and Physicochemical Aspects of Mercury Cycling in the Coastal/Estuarine Waters of Long Island Sound and Its River-Seawater Mixing Zones	Fitzgerald, William F.; Visscher, Pieter T.	University of Connecticut	Stelz, Bill	\$592,035	January 1999 - September 2002	CT
16	R828170Grant	Control of Mercury Emissions from Coal-Fired Power Plants	Helble, Joseph J.; Sarofim, Adel F.	University of Connecticut, University of Utah	Shapiro, Paul	\$224,642	January 2000 - June 2002	CT
17	R828167Grant	Soot, Precursor Particle and Higher Hydrocarbon Production in Flames	Pfefferle, Lisa; Fillipov, Andrei; McEnally, Charles	Yale University	Shapiro, Paul	\$224,170	January 2000 - July 2002	CT
18	U915764Fellow	Culturing Urban Ecology: Strategic Linkages of Environment and Cultural Identity in Urban River Restoration, The Upper Bagmati Basin, Kathmandu, Nepal	Rademacher, Anne M.	Yale University	Edwards, Jason		January 2000 - January 2003	CT

19	68D01007SBIR	<u>Remote Sensing Instrument for On-Road Heavy-Duty Diesel NOx and PM Emissions</u>	McManus, J. Barry	Aerodyne Research Inc.	Manager, SBIR Program	\$70,000	January 2001 - January 2001	MA
20	68D00270SBIR	<u>A Noncryogenic Tunable Diode Laser Monitor for On-Road Vehicle Emissions</u>	Nelson, David D.	Aerodyne Research Inc.	Manager, SBIR Program	\$224,899	January 2000 - January 2002	MA
21	68D99030SBIR	<u>A Noncryogenic Tunable Diode Laser Monitor for On-Road Vehicle Emissions</u>	Nelson, David D.	Aerodyne Research Inc.	Manager, SBIR Program	\$70,000	January 1999 - January 2000	MA
22	68D02009SBIR	<u>The Application of MASC Technology to the Problem of Contaminant Monitoring for the Water and Wastewater Industries</u>	Orser, Cindy S.	Areta Technologies	Manager, SBIR Program	\$70,000	January 2002 - January 2002	MA
25	R828824Grant	<u>Determinants of Environmental Compliance: Plant, Firm, and Enforcement Factors</u>	Gray, Wayne B.; Shadbegian, Ronald J.	Clark University	Carrillo, Susan	\$276,883	January 2001 - April 2004	MA
27	68D99041SBIR	<u>Aluminate-Silicate-Based Antifouling Coatings</u>	Walsh, M. Alex	E Paint Company	Manager, SBIR Program	\$70,000	January 1999 - January 2000	MA
28	68D00272SBIR	<u>Aluminum-Silicate-Based Antifouling Coating</u>	Walsh, M. Alex	E Paint Company	Manager, SBIR Program	\$225,000	January 2000 - January 2002	MA
29	R828596Grant	<u>Casa de Salud: A Model For Engaging Community</u>	Frishtman, Kay Berthold; Dee, Serena; Latowsky, Gretchen	Family Service Inc.	Fields, Nigel	\$792,383	January 2000 - October 2004	MA
31	68D01054SBIR	<u>Reduced Cost Sewer Pipe Refining Using Ultrasonic Tape Lamination</u>	Roylance, Margaret E.	Foster-Miller Inc.	Manager, SBIR Program	\$224,867	January 2001 - January 2003	MA
33	68D00239SBIR	<u>Permanent Primer/Replaceable Topcoat Aircraft Coating System With Minimum VOC and Chromium Exposure</u>	Kovar, Robert F.	Foster-Miller Inc.	Manager, SBIR Program	\$69,935	January 2000 - January 2001	MA
34	68D02024SBIR	<u>Environmentally Compliant Corrosion-Activated Inhibitor System for Aluminum Alloys</u>	Dorogy, William	Foster-Miller Inc.	Manager, SBIR Program	\$69,978	January 2002 - January 2002	MA
35	R827447Grant	<u>Mechanisms of Age-dependent Ozone Induced Airway Dysfunction</u>	Shore, Stephanie; Laporte, Johanne; Murthy, G.G. Krishna; Want, Matt; Johnston, Richard	Harvard School of Public Health	Deener, Kacey	\$852,937	January 1999 - June 2002	MA
36	R828036Grant	<u>Mycobacterium avium Complex in Drinking Water: Detection, Distribution, and Routes of Exposure</u>	Ford, Timothy E.; Arbeit, Robert D.	Harvard School of Public Health, Boston University	Nolt-Helms, Cynthia	\$516,879	January 2000 - January 2003	MA
37	R829437Grant	<u>Dioxins, Male Pubertal Development and Testis Function</u>	Hauser, Russ	Harvard School of Public Health	Reese, David H.	\$2,252,427	January 2001 - November 2005	MA

38	<u>R827353C001 Centers</u>	<u>Ambient Particle Health Effects: Exposure, Susceptibility, and Mechanisms</u>	Koutrakis, Petros; Brain, Joseph D.; Burge, Harriet A.; Butler, James P.; Catalano, Paul; Christiani, David; Dockery, Douglas W.; Evans, John S.; Godleski, John J.; Gold, Diane R.; Graham, John; Hammitt, James K.; Kelsey, Karl; Kobzik, Lester; Schwartz, Joel; Speizer, Frank E.; Spengler, John D.; Stone, Peter; Suh, Helen H.; Verrier, Richard; Ware, James	Harvard University	Katz, Stacey; Robarge, Gail	\$7,747,040	January 1999 - May 2004	MA
39	<u>R827353C002 Centers</u>	<u>Quantifying Exposure Error and its Effect on Epidemiological Studies</u>	Suh, Helen H.	Harvard University	Katz, Stacey; Robarge, Gail	\$7,747,040	January 1999 - May 2004	MA
40	<u>R827353C003 Centers</u>	<u>Differentiating Health Effects of Particles from Outdoor and Indoor Sources</u>	Gold, Diane R.; Stone, Peter	Harvard University	Katz, Stacey; Robarge, Gail	\$7,747,040	January 1999 - May 2004	MA
41	<u>R827353C004 Centers</u>	<u>Examining Conditions in the Elderly Which Predispose Towards Acute Adverse Effects of Particulate Exposures</u>	Schwartz, Joel	Harvard University	Katz, Stacey; Robarge, Gail	\$7,747,040	January 1999 - May 2004	MA
42	<u>R827353C005 Centers</u>	<u>Assessing Life-Shortening Associated with Exposure to Particulate Matter</u>	Schwartz, Joel	Harvard University	Katz, Stacey; Robarge, Gail	\$7,747,040	January 1999 - May 2004	MA
43	<u>R827353C006 Centers</u>	<u>Investigating Chronic Effects of Exposure to Particulate Matter</u>	Dockery, Douglas W.	Harvard University	Katz, Stacey; Robarge, Gail	\$7,747,040	January 1999 - May 2004	MA
44	<u>R827353C008 Centers</u>	<u>Differentiating the Roles of Particle Size, Particle Composition, and Gaseous Co-Pollutants on Cardiac Ischemia</u>	Godleski, John J.	Harvard University	Katz, Stacey; Robarge, Gail	\$7,747,040	January 1999 - May 2004	MA
45	<u>R827353C010 Centers</u>	<u>Relating Changes in Blood Viscosity, Other Clotting Parameters, Heart Rate, and Heart Rate Variability to Particulate and Criteria Gas Exposures</u>	Speizer, Frank E.	Harvard University	Katz, Stacey; Robarge, Gail	\$7,747,040	January 1999 - May 2004	MA
47	<u>68D00275SBIR</u>	<u>Photocatalytic AIR Cleaner for Indoor Air Pollution Control</u>	Kittrell, J. R.	KSE Inc.	Manager, SBIR Program	\$225,000	January 2000 - January 2002	MA
48	<u>R828172Grant</u>	<u>Eddy-Correlation Measurement of Size-Segregated and Composition-Resolved Aerosol Depositional Flux Using an Aerosol Mass Spectrometer</u>	Smith, Kenneth A.	Massachusetts Institute of Technology	Shapiro, Paul	\$225,000	July 2000 - July 2002	MA
49	<u>R828192Grant</u>	<u>Characterization and Minimization of Fine Particulate Emissions from Waste Incinerators by Real-Time Monitoring of Size-Resolved Mass and Chemical Composition</u>	Smith, Kenneth A.; Worsnop, Douglas R.	Massachusetts Institute of Technology	Shapiro, Paul	\$335,000	January 2000 - January 2003	MA
50	<u>R828630Grant</u>	<u>Evaluation of Phase II Compliance with Title IV of the 1990 Clean Air Act Amendments</u>	Ellerman, A. Denny; Joskow, Paul L.; Montero, Juan Pablo; Schmalensee, Richard	Massachusetts Institute of Technology	Clark, Matthew	\$289,477	January 2000 - March 2003	MA

56	68D01057SBIR	<u>Innovative Ultraviolet Light Source for Disinfection of Drinking Water</u>	Schaefer, Raymond B.	Phoenix Science and Technology Inc.	Manager, SBIR Program	\$225,000	January 2001 - January 2003	MA
57	68D00279SBIR	<u>Handheld Laser-Based Sensor for Remote Detection of Gas Leaks</u>	Frish, Michael B.	Physical Sciences Inc.	Manager, SBIR Program	\$224,812	January 2000 - January 2002	MA
58	68D00204SBIR	<u>Field Screening Detector for Metals in Soil</u>	Hunter, Amy J.R.	Physical Sciences Inc.	Manager, SBIR Program	\$224,990	January 2000 - January 2002	MA
60	68D99063SBIR	<u>Handheld Laser-Based Sensor for Remote Detection of Gas Leaks</u>	Frish, Michael B.	Physical Sciences Inc.	Manager, SBIR Program	\$69,997	January 1999 - January 2000	MA
65	R827583Grant	<u>Integrated Environmental Futures for the U.S.</u>	Bernow, Stephen; Dougherty, William; Heaps, Charles; Kartha, Sivan; Raskin, Paul; Stutz, John; White, Allen; Cleetus, Rachel; Rajan, Sudhir Chella	Tellus Institute	Clark, Matthew	\$150,000	January 1999 - January 2000	MA
66	R827450Grant	<u>Infrastructure Systems, Services, and Climate Change: Integrated Impacts and Response Strategies for the Boston Metropolitan Area</u>	Kirshen, Paul; Ruth, Matthias	Tufts University, Boston University, University of Maryland	Manty, Dale; Turner, Vivian	\$899,985	September 1999 - September 2002	MA
67	R828043Grant	<u>Development and Evaluation of Methods for the Concentration, Separation, Detection, and Viability/Infectivity of Three Protozoa from Large Volume of Water</u>	Tzipori, Saul; Buckholt, Michael; Widmer, Giovanni; Zuckermann, Udi; Sheoran, Abhineet	Tufts University	Nolt-Helms, Cynthia	\$525,000	January 2000 - January 2003	MA
68	R829608Grant	<u>An Investigation of Compliance Behavior and Enforcement of Emissions Trading Programs Using Experimental Analyses</u>	Murphy, James; Stranlund, John	University of Massachusetts	Clark, Matthew	\$227,860	January 2002 - December 2003	MA
69	R828580Grant	<u>Springfield Surface Water Action Monitoring Partnership (Sswamp)</u>	Galluzzo, Katie; Beattie, Mike; Cabral, Diedre; Godfrey, Paul	University of Massachusetts - Boston	Stevens, Madalene	\$356,262	January 2000 - January 2002	MA
71	68D02016SBIR	<u>Low-Cost Machining Without Cutting Fluids</u>	Rozzi, Jay C.	Creare Incorporated	Manager, SBIR Program	\$69,891	January 2002 - January 2002	NH
72	R829582Grant	<u>The Economics of Environmental Taxes: Using First-Best Models in a Second-Best World</u>	Howarth, Richard B.	Dartmouth College	Clark, Matthew	\$67,887	January 2002 - December 2003	NH
74	68D01026SBIR	<u>A Novel Treatment Method of Drinking Water</u>	Milde, Helmut	Ion Physics Corporation	Manager, SBIR Program	\$70,000	January 2001 - January 2001	NH
75	R827407Grant	<u>Early Signs & Determinants of Biotoxins (Microcystins) in Lakes</u>	Sasner, John J.; Haney, James F.; Ikawa, Miyoshi; Schloss, Jeff	University of New Hampshire - Main Campus	Manty, Dale		August 1999 - August 2000	NH
76	R826731Grant	<u>Continuous Micro-Sorting of Complex Waste Plastics Particle Mixtures Via Liquid-Fluidized Bed Classification (LFBC) for Waste Minimization and Recycling</u>	Calo, Joseph M.	Brown University	Karn, Barbara	\$265,000	January 1999 - March 2002	RI

78	R828629Grant	<u>Designing Incentives that Strengthen Local Capacity for Land Development with Open Space and Healthy Ecosystems: Environmental Impact Fees</u>	Swallow, Stephen K.	University of Rhode Island	Clark, Matthew	\$103,821	January 2001 - January 2003	RI
79	R829384Grant	<u>Economics of Conserving Ecosystem Integrity with Residential Development around Vernal Pools</u>	Swallow, Stephen K.; Paton, Peter	University of Rhode Island	Clark, Matthew	\$200,017	January 2002 - January 2003	RI
80	R829368Grant	<u>Dynamics, Variability and Patterns of Harmful and Red Tide Bloom-species in Narragansett Bay: Ecological Analysis of a 38-year Time Series</u>	Smayda, Theodore J.; Borkman, David; Li, Yaqin	University of Rhode Island	Perovich, Gina	\$348,912	January 2001 - March 2004	RI

Region 2

Active Projects:

- Science To Achieve Results (STAR) Grants
- Science To Achieve Results (STAR) Fellowships
- Small Business Innovation Research

August 16, 2002

#	Identifier	Abstract	Principal Investigator	Institution	Grant Representative	Grant Amount	Project Period	State
2	68D01061SBIR	<u>Drift Mitigation by Optimization of Wingtip Modification</u>	Teske, Milton E.	Continuum Dynamics Inc.	Manager, SBIR Program	\$224,980	January 2001 - January 2003	NJ
4	R827440Grant	<u>Ingestion of Pesticides by Children in an Agricultural Community on the U.S./Mexico Border</u>	Shalat, Stuart L.; Buckley, Brian T.; Calvin, James A.; Donnelly, Kirby C.; Freeman, Natalie C.G.; Garcia, Deliana; Robson, Mark	University of Medicine and Dentistry of New Jersey, Environmental and Occupational Health Sciences Institute, Robert Wood Johnson Medical School	Saint, Chris	\$710,231	January 1999 - September 2002	NJ
7	R827915Grant	<u>The Redox Cycle of Mercury in Natural Waters</u>	Morel, Francois M.M.; Morel, Francois M.	Princeton University	Stelz, Bill	\$726,318	November 1999 - October 2002	NJ
8	U915719Fellow	<u>Environmental Covariability, Demographic Connectivity, and the Dynamics of Pacific Salmon (Oncorhynchus Spp.) Populations</u>	Regetz, James	Princeton University	Morehouse, Karen		January 2000 - January 2003	NJ
9	R829585Grant	<u>Electronic Tags for Product Lifecycle Management</u>	Thomas, Valerie; Wagner, Sigurd	Princeton University	Karn, Barbara	\$240,000	January 2002 - December 2004	NJ
10	R828177Grant	<u>Atmospheric Dry Particle Deposition of POPs and Trace Metals in an Urban- and Industrially-Impacted Mid-Atlantic Estuary (AEOLUS B Mid-Atlantic)</u>	Eisenreich, Steven J.; Holsen, Thomas M.	Rutgers SUNJ	Shapiro, Paul	\$230,000	January 2000 - July 2002	NJ
11	R827288Grant	<u>Integrating Models of Citizens Perceptions, Metal Contaminants, and Wetlands Restoration in an Urbanizing Watershed</u>	Tucker, Robert K.; Hawkins, George S.; Jaffe, Peter R.; Johnson, Branden B.; PFlugh, Kerry K.	Stony Brook Millstone Watershed Association, Princeton University, Rutgers University - New Brunswick	Levinson, Barbara	\$749,954	March 1999 - March 2002	NJ
12	R829391Centers	<u>Center for Childhood Neurotoxicology and Assessment</u>	Lambert, George H.	University of Medicine and Dentistry of New Jersey, Columbia University	Saint, Chris	\$6,751,466	January 2001 - October 2006	NJ

14	R828733Grant	Modeling Heat and Air Quality Impacts of Changing Urban Land Uses and Climate	Kinney, Patrick L.; Avissar, Roni; Rao, S. Trivikrama; Small, Christopher; Soleki, William D.	Columbia University, Montclair State University, Rutgers University, State University of New York	Manty, Dale	\$1,496,418	January 2000 - August 2003	NY
15	R829367Grant	Viruses as a Regulator of Harmful Algal Bloom Activity: Aureococcus anophagefferens as a Model System	Gastrich, Mary Downes; Anderson, O.R.; Gobler, Christopher; Wilhelm, Steven W.	Columbia University, Long Island University - Southampton College, University of Tennessee - Knoxville	Perovich, Gina	\$210,232	January 2002 - July 2005	NY
16	R827952Grant	Statistical Modeling of Waterborne Pathogen Concentrations	Stedinger, Jery	Cornell University	Fields, Nigel	\$305,493	January 2000 - January 2003	NY
17	R828902Grant	Impact of Invasive Plants on Abundance and Fitness of Salamanders	Blossey, Bernd	Cornell University	Senft, Amanda	\$446,959	August 2001 - August 2004	NY
18	R827674Grant	Effects of N Deposition on Gaseous N Loss from Temperate Forest Ecosystems	Groffman, Peter M.; Adams, Mary Beth; Fernandez, Ivan; Potter, Christopher; Rustad, Lindsey; Verchot, Louis V.	Institute of Ecosystem Studies, USDA Forest Service, University of Maine	Perovich, Gina	\$894,361	January 1999 - September 2002	NY
19	R827446Grant	Improving Human Health Risk Assessment for Tetrachloroethene by Using Biomarkers and Neurobehavioral Testing in Diverse Residential Populations	Storm, Jan; Aldous, Kenneth; Gensburg, Lenore; Lin, Shao; Levin, Stephen M.; Welles, Wanda Lizak	New York State Department of Health	Deener, Kacey	\$610,790	January 1999 - September 2002	NY
20	R827997Grant	A Source-Oriented Evaluation of the Combined Effects of Fine Particles and Copollutants	Ito, Kazuhiko; Thurston, George D.	New York University	Katz, Stacey; Robarge, Gail	\$478,522	February 2000 - February 2004	NY
21	R828045Grant	Brominated DBP Formation and Speciation Based on the Specific UV Absorbance Distribution of Natural Waters	Kilduff, Ph.D, James E.; Karanfil, Ph.D, Tanju	Rensselaer Polytechnic Institute, Clemson University	Noit-Helms, Cynthia	\$391,473	January 2000 - January 2003	NY
22	R827929Grant	Improved Simulation of Advection and Dispersion of Urban Air Toxics	Walcek, Chris	SUNY Albany	Katz, Stacey; Robarge, Gail	\$347,991	January 1999 - January 2002	NY
23	R827961Grant	A High Performance Analytic Element Model: GIS Interface, Calibration Tools, and Application to the Niagara Falls Region	J. Rabideau, Alan; Becker, Matthew; Flewelling, Douglas; Jankovic, Igor	SUNY Buffalo	Edwards, Jason		January 2000 - February 2003	NY
24	R829598Grant	Material Selection in Green Design and Environmental Cost Analysis	Lin, Li; VanBenschoten, John E.; Vena, John	SUNY Buffalo	Karn, Barbara	\$325,000	January 2002 - December 2004	NY
25	R829007Grant	Occurrence and Fate of Pharmaceuticals and Personal Care Products in Groundwater Environments	Brownawell, Bruce J.; Iden, Charles R.	State University of New York at Stony Brook	Noit-Helms, Cynthia	\$495,955	September 2001 - September 2004	NY
26	R827918Grant	Voluntary Environmental Standards: Furthering Moral Suasion While Preventing Moral Hazard	King, Andrew; Radner, Roy R.; Shaver, James; Myles; Barnett, Michael; Lenox, Michael; Terlaak, Ann	Stern School of Business New York University, University of California - Santa Barbara	Carrillo, Susan	\$236,390	January 1999 - January 2001	NY
28	R827633Grant	Chemical and Biological Control of Mercury Cycling in Upland, Wetland and Lake Ecosystems in the Northeastern U.S.	Driscoll, Charles T.; Munson, Ronald; Newton, Robert; Yavitt, Joseph	Syracuse University, Cornell University, Smith College, Tetra Tech Inc.	Stelz, Bill	\$786,680	January 1999 - October 2002	NY

29	R828046 <u>Grant</u>	<u>Pulmonary and Systemic Effects of Inhaled Ultrafine Particles in Senescent Rats with Cardiovascular Disease</u>	Elder, Alison C.P.; Couderc, Jean-Philippe; Frampton, Mark W.; Oberdörster, Günter; Zareba, Wojciech	University of Rochester	Katz, Stacey; Robarge, Gail	\$408,859	March 2000 - March 2003	NY
30	U915817 <u>Fellow</u>	<u>Environmental Health Education and Promotion Initiative to Develop Technical, Managerial and Financial Capacity in Communities Served by Small Water Systems</u>	Guerrero-Preston, Rafael E.	University of Puerto Rico - Central Administration	Broadway, Virginia		January 2000 - January 2003	PR

Region 3

Active Projects:

- Science To Achieve Results (STAR) Grants
- Science To Achieve Results (STAR) Fellowships
- Small Business Innovation Research

August 16, 2002

#	Identifier	Abstract	Principal Investigator	Institution	Grant Representative	Grant Amount	Project Period	State
1	R828132Grant	<u>Preparation of Superferromagnetic Lanthanide Nanoparticulate Magnetic Refrigerants</u>	Wagner, Michael; J. Bennett, Lawrence H.	George Washington University	Karn, Barbara	\$254,557	January 2000 - May 2003	DC
2	R829626Grant	<u>Dendritic Nanoscale Chelating Agents: Synthesis, Characterization, Molecular Modeling and Environmental Applications</u>	Diallo, Mamadou; S. Balogh, Lajos; Goddard, William A.; Johnson, James H.	Howard University, California Institute of Technology, University of Michigan	Savage, Nora	\$400,000	January 2002 - December 2004	DC
3	R827921Grant	<u>Indicators of Ecosystem Value: Deriving Units of Exchange for Habitat Trades, Banking, and Preservation Priorities</u>	Boyd, James; Simpson, R. David	Resources for the Future	Clark, Matthew	\$273,000	January 1999 - December 2001	DC
4	R828628Grant	<u>Efficiency and Distributional Consequences of the Allocation of Tradable Emission Allowances</u>	Burtraw, Dallas; Fischer, Carolyn; Pizer, Billy	Resources for the Future	Clark, Matthew	\$251,000	January 2000 - September 2002	DC
5	R827585Grant	<u>Electronic Environmental Democracy: The Future of Information Technology in Participatory Environmental Management</u>	Davies, J. Clarence; Beierle, Thomas C.	Resources for the Future	Carrillo, Susan	\$147,631	January 1999 - March 2000	DC
6	68D01014SBIR	<u>MTBE Removal From Drinking Water</u>	Bowser, John; Bower, John	Compact Membrane Systems Inc.	Manager, SBIR Program	\$70,000	April 2001 - September 2001	DE

8	68D00230	<u>SBIR Diesel Fuel Desulfurization</u>	Nemser, Stuart	<u>Compact Membrane Systems Inc.</u>	Manager, SBIR Program	\$70,000	January 2000 - January 2001	DE
9	68D02012	<u>SBIR Enhanced VOC Oxidation</u>	Nemser, Stuart	<u>Compact Membrane Systems Inc.</u>	Manager, SBIR Program	\$70,000	April 2002 - September 2002	DE
10	68D02013	<u>SBIR Retrofitting Diesel Electrical Generators for Emission Reduction</u>	Nemser, Stuart	<u>Compact Membrane Systems Inc.</u>	Manager, SBIR Program	\$70,000	April 2002 - September 2002	DE
11	68D02014	<u>SBIR Membranes for Air Venting and Retaining VOCs in Gasoline Storage Tanks</u>	Nemser, Stuart	<u>Compact Membrane Systems Inc.</u>	Manager, SBIR Program	\$70,000	April 2002 - September 2002	DE
12	R829576	<u>Grant Composite Resins and Adhesives from Plants</u>	Wool, R. P.	<u>University of Delaware</u>	Richards, April	\$325,000	January 2002 - December 2004	DE
13	R829624	<u>Grant Synthesis, Characterization and Catalytic Studies of Transition Metal Carbide Nanoparticles as Environmental Nanocatalysts</u>	Shah, S. Ismat; Chen, Jingguang G.	<u>University of Delaware</u>	Savage, Nora	\$350,000	January 2002 - December 2004	DE
14	R829622	<u>Grant Elemental Composition of Freshly Nucleated Particles</u>	Johnston, Murray V.	<u>University of Delaware</u>	Savage, Nora	\$390,000	January 2002 - December 2004	DE
16	R827653	<u>Grant Understanding the Role of Sulfur in the Production and Fate of Methylmercury in Watersheds</u>	Mason, Robert P.; Gilmour, Cynthia C.	<u>Chesapeake Biological Laboratory, Academy of Natural Sciences, University of Maryland Center for Environmental Science</u>	Stelz, Bill	\$779,786	January 1999 - September 2002	MD
18	68D02026	<u>SBIR A Portable Flow Cytometer Suitable for the Rapid Detection of Adenovirus in Wastewater</u>	Kulaga, Henrietta	<u>GEOMET Technologies Inc.</u>	Manager, SBIR Program	\$70,000	April 2002 - September 2002	MD

19	R828731Grant	<u>Implications of Climate Change for Regional Air Pollution, Health Effects and Energy Consumption Behavior</u>	Ellis, J. H.; Hobbs, Benjamin F.; Joutz, F.; Patz, J. F.; Samet, J.; Schwab, M.	John Hopkins University, George Washington University	Manty, Dale	\$1,376,739	January 2000 - August 2003	MD
20	R829011Grant	<u>Study of Particle and Pathogen Removal During Bank Filtration of River Waters</u>	Bouwer, Edward J.; Aboites, R.; LeChevallier, M.W.; O'Melia, Charles R.; Schwab, K.J.	John Hopkins University	Nolt-Helms, Cynthia	\$536,316	August 2001 - August 2004	MD
21	R829004Grant	<u>Pharmaceuticals and Antiseptics: Occurrence and Fate in Drinking Water, Sewage Treatment Facilities, and Coastal Waters</u>	Roberts, A. Lynn; Bouwer, Edward J.	John Hopkins University	Nolt-Helms, Cynthia	\$524,890	January 2001 - August 2004	MD
22	R828772C001 Centers	<u>EPA Center for Hazardous Substances in Urban Environments</u>	Bouwer, Edward J.; Alavi, Hedy; Baker, Joel E.; Ball, William P.; Carley, Robert; Chen, Guangming; Fairbrother, Howard; Haag, George; Helble, Joseph J.; MacKay, Allison; Mason, Robed; Meneveau, Charles; Nikolaidis, Nik; O'Melia, Charles R.; Oguntimein, G. B.; Ondov, John M.; Parlange, Marc; Perkins, Chris; Roberts, A. Lynn; Sattler, Barbara; Smets, Barth F.; Stone, Alan T.; Williams, Sedley	John Hopkins University, Morgan State University, University of Connecticut, University of Maryland - College Park	Lasat, Mitch	\$6,000,000	January 2001 - December 2005	MD
23	R828164Grant	<u>Mechanistic Investigations of Fe(0) Reactions with Organoaldehydes</u>	Roberts, A. Lynn; Fairbrother, D. H.	John Hopkins University	Krishnan, S. Bala	\$225,000	January 2000 - August 2002	MD
24	R827110Grant	<u>A Genetic Test for Vulnerability to Inbreeding Depression in Right Whales and Elephant Seals</u>	Hare, Matthew P.; Palumbi, Stephen R.	University of Maryland, Harvard University	Manty, Dale		May 1999 - April 2001	MD
25	R827169Grant	<u>Whole Watershed Health and Restoration: Applying the Patuxent and Gwynns Falls Landscape Models to Designing a Sustainable Balance Between Humans and the Rest of Nature</u>	Costanza, Robert; Boumans, Roelof; Maxwell, Thomas; Villa, Ferdinando; Voinov, Alexey; Wainger, Lisa	University of Maryland	Stelz, Bill	\$699,916	January 1999 - February 2001	MD

26	R829087Grant	<u>Modeling the Individual and Interactive Risks to an Amphibian Population Resulting from Breeding Site Contamination and Terrestrial Habitat Loss</u>	Rowe, C. L.; Hopkins, William A.	University of Maryland, University of Georgia	Senft, Amanda	\$280,059	January 2002 - December 2003	MD
27	R827972Grant	<u>Over-compliance in Point Source Water Pollution</u>	Horowitz, John K.	University of Maryland - College Park	Clark, Matthew	\$59,316	December 1999 - December 2000	MD
28	R828012Grant	<u>The Spatial Patterning of Land Use Conversion: Linking Economics, Hydrology and Ecology to Evaluate the Effects of Alternative Future Growth Scenarios on Stream Ecosystems</u>	Palmer, Margaret A.; Bockstael, Nancy; Moglen, Glenn E.; Ness, Keith; VanPoff, N. LeRoy; Wiegand, Cameron	University of Maryland - College Park, Colorado State University, Department of Environmental Protection Montgomery County	Stelz, Bill	\$1,125,212	January 2000 - May 2003	MD
29	R828037Grant	<u>Molecular Detection and Environmental Survey of Vegetative and Coccolid Helicobacter Pylori</u>	Shahamat, M.; Bradley, B.; Levin, M.; Robb, F.; Sowers, K.	University of Maryland - College Park	Nolt-Helms, Cynthia	\$522,145	January 2000 - January 2003	MD
30	R829366Grant	<u>Grazing and Windows of Opportunity for Dinoflagellate Blooms</u>	Stoecker, Diane K.; Boicourt, William C.; Roman, Michael R.	University of Maryland Center for Environmental Science, Horn Point Laboratory	Perovich, Gina	\$428,184	January 2002 - December 2004	MD
31	R827831Grant	<u>Response of Methylmercury Production and Accumulation to Changes in Hg Loading: A Whole-ecosystem Mercury Loading Study</u>	Gilmour, Cynthia C.; Heyes, Andrew; Mason, Robert P.; Rudd, John M.	Academy of Natural Sciences, Canada Department of Fisheries and Oceans, Chesapeake Biological Laboratory, University of Maryland Research Centers, University of Maryland	Stelz, Bill	\$848,029	January 1999 - September 2002	PA
32	R827920Grant	<u>Continued Development of Methods for Characterizing and Ranking Health, Safety, and Environmental Risks</u>	Morgan, Granger; Dekay, Michael; Fischbeck, Paul	Carnegie Mellon University	Carrillo, Susan	\$235,504	December 1999 - December 2001	PA
33	R828631Grant	<u>Multi-Lateral Emissions Trading: Political Economy and Firm Response</u>	Farrell, Alex; Dowlatabadi, Hadi; Epple, Dennis; Farrow, Scott	Carnegie Mellon University	Clark, Matthew	\$149,366	January 2000 - August 2002	PA
34	R828128Grant	<u>Designing for Environment: A Multi-objective Optimization Framework Under Uncertainty</u>	Diwekar, Urmila	Carnegie Mellon University	Kam, Barbara	\$274,424	January 2000 - March 2003	PA

35	R828021 Grant	<u>Linking Environmental and Social Performance Measurement for Management at National and Watershed Levels: Modeling and Statistical Approaches</u>	Farrow, Scott; Bondelid, Tim; Schultz, Martin; Sinnott, James; Small, Mitchell J.; Solow, Andrew R.; VanHoutven, George	Carnegie Mellon University, Research Triangle Institute, Woods Hole Oceanographic Institution	Stelz, Bill	\$649,864	October 2000 - September 2003	PA
36	R829407 Grant	<u>Environmental Management Systems: Informing Organizational Decisions</u>	Lave, Lester; Hendrickson, Chris	Carnegie Mellon University	Carrillo, Susan	\$323,265	January 2001 - October 2003	PA
37	R829580 Grant	<u>Towards Elimination of Transition Metals and VOCs from the Environmentally Benign Materials Made by Atom Transfer Radical Polymerization (ATRP)</u>	Matyjaszewski, Krzysztof	Carnegie Mellon University	Richards, April	\$350,000	January 2002 - December 2004	PA
38	R829589 Grant	<u>Analysis and Management of Fluxes in Bacillus Pathways for Pesticide and Protein Production</u>	Grossmann, Ignacio E.; Domach, Michael M.	Carnegie Mellon University	Richards, April	\$180,000	January 2002 - December 2004	PA
39	R829604 Grant	<u>Ultrasensitive Pathogen Quantification in Drinking Water Using Highly Piezoelectric PMN-PT Microcantilevers</u>	Shih, Wan Y.; Lee, Y.; Mutharasan, R.; Shih, W.H.	Drexel University	Kam, Barbara	\$449,713	January 2002 - December 2004	PA
40	R827445 Grant	<u>Molecular Characterization of a Biological Threshold in Developmental Toxicity</u>	Knudsen, Thomas B.; Charlap, Jeffrey H.; Craig, Robert C.	Jefferson Medical College	Deener, Kacey	\$207,170	January 1999 - September 2002	PA
41	68D00243 SBIR	<u>Investigation of Diode Lasers for On-Aircraft Decoating Applications</u>	Lancaster, Frederick A.	LANCOP Advanced Systems Inc.	Manager, SBIR Program	\$68,769	January 2000 - January 2001	PA
42	R828163 Grant	<u>Evaluating a New Class of Imprinted Sorbent Materials for Toxic Metals Removal</u>	SenGupta, Arup K.; Miller, Alfred	Lehigh University	Krishnan, S. Bala	\$193,000	January 2000 - June 2002	PA
43	R829625 Grant	<u>Nanoscale Bimetallic Particles for In Situ Remediation</u>	Zhang, Wei-xian	Lehigh University	Savage, Nora	\$300,000	January 2002 - December 2004	PA

44	R827640Grant	<u>Stream Plethodontid Assemblage Response (SPAR) Index: Development, Application, and Verification in the MAHA</u>	Brooks, Robert P.; Rocco, Brian L.; Rocco, Gian L.	Pennsylvania State University - Main Campus, Penn State Coop. Wetlands Center	Senft, Amanda	\$397,304	January 1999 - June 2002	PA
45	R827956Grant	<u>Mechanistic-based Watershed Modeling for Evaluation of Ecosystem Conditions</u>	Yeh, Gour-TsyhGwo, J. P. Schayek, Lily	Pennsylvania State University - Main Campus, University of Central Florida	Edwards, Jason	\$888,637	October 2000 - September 2003	PA
45	R828684Grant	<u>Development, Testing, and Application of Ecological and Socioeconomic Indicators for Integrated Assessment of Aquatic Ecosystems of the Atlantic Slope in the Mid-Atlantic States</u>	Brooks, Robert P.; Brinson, Mark M.; Gallegos, Charles L.; Havens, Kirk; Hershner, Carl; Hines, Arson; Jordan, Thomas E.; Marra, Peter P.; McElfish, James M.; Nizeyimana, Egide; O'Connor, Robert E.; Rheinhardt, Rick D.; Shortle, James S.; Thornton, Kent; Vamell, Lyle M.; Wardrop, Denise; HellerWeller, Donald E.; Whigham, Dennis F.	Pennsylvania State University - Main Campus, East Carolina University, Environmental Law Institute, Smithsonian Environmental Research Center, Virginia Institute of Marine Science	Levinson, Barbara	\$8,000,000	January 2001 - January 2005	PA
46	R827994Grant	<u>Cardiovascular Responses to Particulate Air Pollution</u>	Liao, Duanping; Chinchilli, Vernon M.; Heiss, Gerardo; Shy, Carl; Xie, Sharon; Whitsel, Eric	Pennsylvania State University - Main Campus	Katz, Stacey; Robarge, Gail	\$607,630	January 2000 - January 2003	PA
47	R829581Grant	<u>Diminishing Materials Use and Air Pollutants in Foundries via an Integrated Advanced Oxidation Process: Characterization of Materials and Pollutants at the Nano-Scale</u>	Cannon, Fred S.; Komameni, Sridhar; Voigt, Robert C.	Pennsylvania State University - Main Campus	Richards, April	\$325,000	January 2002 - December 2004	PA
48	R829605Grant	<u>Green Engineering of Dispersed Nanoparticles: Measuring and Modeling Nanoparticle Forces</u>	Velegol, Darrell; Fichthorn, Kristen	Pennsylvania State University - Main Campus	Kam, Barbara	\$370,000	January 2002 - January 2004	PA
49	R828159Grant	<u>Molecular Tracers of Contaminant Sources to Surface Water Drinking Supplies</u>	Standley, Laurel J.; Kaplan, Louis A.; Newbold, J. Denis	Stroud Water Research Center, Inc	Krishnan, S. Bala	\$220,000	January 2000 - April 2002	PA
50	R829601Grant	<u>A Bioengineering Approach to Nanoparticle based Environmental Remediation</u>	Strongin, Daniel R.; Douglas, Trevor; Schoonen, Martin A.A.	Temple University, Montana State University, SUNY at Stony Brook	Kam, Barbara	\$399,979	January 2002 - January 2005	PA

51	68D01046SBIR	<u>Planar Heat Pipe Preheater/Substrate for Low NOx Catalytic Combustion</u>	Calaman, Doug	Thermacore Inc.	Manager, SBIR Program	\$70,000	April 2001 - September 2001	PA
52	R828599Grant	<u>Molecular Epidemiology of Hypospadias</u>	Manson, Jeanne M.; Artlett, Carol; Carr, Michael; Daskalakis, Constantine; Devoto, Marcella	Thomas Jefferson University	Deener, Kacee	\$2,962,288	January 2000 - July 2005	PA
53	R828131Grant	<u>Biocatalytic Polyester Synthesis</u>	Russell, Alan J.	University of Pittsburgh - Main Campus	Karn, Barbara	\$375,000	January 2000 - March 2003	PA
54	R828581Grant	<u>Real-Time Internet Visualization and Environmental Reporting Network (RiverNet): the Upper Susquehanna/Lackawanna American Heritage River</u>	Tomaine, James; Bruns, Dale; Krehely, Robert	Wyoming Valley Sanitary Authority, PA, Wilkes University	Stevens, Madalene	\$399,909	January 2001 - December 2002	PA
56	68D01059SBIR	<u>Polymer-Based Competitive Flow Sensor Detects Contaminants in the Field</u>	Coolbaugh, M. Todd	American Research Corporation of Virginia	Manager, SBIR Program	\$225,000	January 2001 - January 2003	VA
57	68D02007SBIR	<u>Chromium-Free Conversion Coating Technologies for Light Metals</u>	Coolbaugh, M. Todd	American Research Corporation of Virginia	Manager, SBIR Program	\$70,000	April 2002 - September 2002	VA
58	68D00235SBIR	<u>Low Cost In Situ Technique for Mercury Removal</u>	Rainer, Norman B.	Dynaphore Inc.	Manager, SBIR Program	\$64,500	January 2000 - January 2001	VA
59	68D01016SBIR	<u>A New Biosensor for Rapid Identification of Bacterial Pathogens</u>	Tabacco, Mary Beth	Echo Technologies Inc.	Manager, SBIR Program	\$69,733	April 2001 - September 2001	VA
60	68D02018SBIR	<u>Transgenic Citrate-Producing Plants for Lead Phytoremediation</u>	Elless, Mark P.	Edenspace Systems Corporation	Manager, SBIR Program	\$69,660	April 2002 - September 2002	VA

62	68D00245SBIR	<u>Optical Fiber-Based, Multianalyte Detection System for Simultaneous Screening of Endocrine Disruptors</u>	Jones, Mark	Luna Innovations Inc., F and S Inc	Manager, SBIR Program	\$69,953	January 2000 - January 2001	VA
63	R828133Grant	<u>Aqueous Polyglycol Solutions as Environmentally Benign Solvents in Chemical Processing</u>	Kirwan, Donald J.; Gainer, John L.	University of Virginia	Karn, Barbara	\$335,000	January 2000 - May 2003	VA
64	R828225Grant	<u>Ecohab: Pfiesteria Or Fungus? Etiology Of Lesions In Menhaden</u>	Shields, Jeffrey; Haas, Larry; Kator, Howard; Vogelbein, Wolfgang K.	Virginia Institute of Marine Science	Perovich, Gina	\$508,937	June 2000 - June 2003	VA
65	R827953Grant	<u>Assessing the Effects of Multiple Stressors in Environmental Monitoring Programs</u>	Smith, Eric; Ye, Keying	Virginia Polytechnic Institute and State Univ	Fields, Nigel	\$266,388	January 1999 - September 2002	VA
66	R827400Grant	<u>Field and Laboratory Studies of the Effects of Polychlorinated Biphenyls and Other Persistent Organic Pollutants on Thyroid Function During Avian Development</u>	McNabb, F.M. Anne	Virginia Polytechnic Institute and State Univ	Reese, David H.	\$256,587	January 1999 - July 2001	VA
67	R829555Grant	<u>Benign Processing of Polymers Plasticized with Absorbed Carbon Dioxide</u>	Baird, Donald	Virginia Polytechnic Institute and State Univ	Richards, April	\$325,000	January 2002 - December 2004	VA

Region 4

Active Projects:

- Science To Achieve Results (STAR) Grants
- Science To Achieve Results (STAR) Fellowships
- Small Business Innovation Research

August 19, 2002

#	Identifier	Abstract	Principal Investigator	Institution	Grant Representative	Grant Amount	Project Period	State
1	R827072C010 Centers	<u>Effects Of Variation in River Discharge and Wind-Driven Resuspension on Lower Trophic Levels of the Mobile Bay Ecosystem</u>	Kiene, Ronald P.; Cowan, Jean; Pennock, Jonathan R.; Thomas, Florence	Alabama Center for Estuarine Studies	Perovich, Gina	\$258,580	January 1999 - August 2002	AL
2	R827072C012 Centers	<u>Effects of Salinity Stress on Natural and Anthropogenically-Derived Bacteria in Estuarine Environments</u>	Kiene, Ronald P.	Alabama Center for Estuarine Studies	Perovich, Gina	\$54,500	January 1999 - September 2000	AL
3	R828583Grant	<u>Providing Timely Public Access to Daily Air Quality Information about Birmingham, AL and Its Regional Environment</u>	Bell, Sam; Dillard, Randy; Gillani, Noor V.; Howard, Chris; McHenry, John; Norris, W.B.	Jefferson County Department of Health, AL, Jefferson County Department of Health, North Carolina Supercomputing Center, University of Alabama in Huntsville	Stevens, Madalene	\$299,989	January 2001 - December 2002	AL
4	R828257Grant	<u>Investigation of Room Temperature Ionic Liquids as Environmentally Benign Solvents for Industrial Separations (TSE99-A)</u>	Rogers, Robin D.; Katritzky, Alan R.	University of Alabama, University of Florida	Kam, Barbara	\$375,000	January 2000 - April 2003	AL
5	R827072C001 Centers	<u>Fluorescent Whitening Agents As Facile Pollution Markers In Shellfishing Waters</u>	Cioffi, Eugene A.	University of South Alabama	Perovich, Gina		January 1999 - September 2001	AL
6	R827072C002 Centers	<u>Red Snapper Demographics on Artificial Reefs: The Effect of Nearest-Neighbor Dynamics</u>	Cowan, James H.; Shah, Arvind	University of South Alabama	Perovich, Gina		January 1999 - September 2000	AL

7	R827072C003 Centers	<u>Stabilization of Eroding Shorelines in Estuarine Wave Eliminates with Constructed Fringe Wetlands Incorporating Offshore Breakwaters</u>	Douglass, Scott L.; Stout, Judy P.	University of South Alabama	Perovich, Gina	January 1999 - September 2000	AL
8	R827072C004 Centers	<u>Interaction Between Water Column Structure and Reproduction in Jellyfish Populations Of Mobile Bay (SGER)</u>	Graham, William M.	University of South Alabama	Perovich, Gina	January 1999 - September 2000	AL
9	R827072C005 Centers	<u>Effects of Variation In River Discharge and Wind-Driven Resuspension on Higher Trophic Levels in the Mobile Bay Ecosystem</u>	Cowan, James H.	University of South Alabama	Perovich, Gina	January 1999 - September 2000	AL
10	R827072C006 Centers	<u>Results of Zooplankton Component</u>	Graham, William M.	University of South Alabama	Perovich, Gina	January 1999 - September 2000	AL
11	R827072C007 Centers	<u>Benthic Study Component</u>	Valentine, John F.	University of South Alabama	Perovich, Gina	January 1999 - September 2000	AL
12	R827072C009 Centers	<u>Fisheries-induced changes in the structure and function of shallow water 'nursery habitats'; an experimental assessment</u>	Heck, Kenneth L.; Cowan, James H.; DeVries, D.; Valentine, John F.	University of South Alabama	Perovich, Gina	January 1999 - September 2000	AL
13	R827072C011 Centers	<u>Evaluation of Alabama Estuaries as Developmental Habitat for Juvenile Sea Turtles</u>	Nel, David; Marion, Ken; Wibbels, Thane	University of South Alabama	Perovich, Gina	January 1999 - September 2000	AL
14	R827072C013 Centers	<u>The Role of Land-Use/Land-Cover and Sub-estuarine Ecosystem Nitrogen Cycling in the Regulation of Nitrogen Delivery to a River Dominated Estuary; Mobile Bay, Alabama</u>	Pennock, Jonathan R.; Kiene, Ronald P.; Lehrter, John	University of South Alabama	Perovich, Gina	January 1999 - September 2000	AL
15	R827072C014 Centers	<u>Environmental Attitudes of Alabama Coastal Residents: Public Opinion Polls and Environmental Policy</u>	Picou, J. Steven; Formichella, Cecelia; Johnson, G. David; Nicholls, Keith	University of South Alabama	Perovich, Gina	January 1999 - September 2000	AL

16	R829094 Grant	<u>Evaluating Multiple Stressors in Loggerhead Sea Turtles: Developing A Two-Sex Spatially Explicit Model</u>	Wyneken, Jeanette; Crowder, Larry B.; Epperly, Sheryan; Snover, Melissa	Florida Atlantic University - Boca Raton, Duke University	Senft, Amanda	\$349,421	September 2001 - September 2004	FL
17	R827643 Grant	<u>Multi-level Indicators of Ecosystem Integrity in Alpine Lakes of the Sierra Nevada</u>	Oris, James T.; Bailer, A. John; Guttman, Sheldon I.; Miller, Glenn C.; Reuter, John E.	Miami University, University of California - Davis, University of Nevada - Reno	Senft, Amanda	\$894,627	September 1999 - December 2002	FL
18	R828830 Grant	<u>Prevalence and Survival of Microorganisms in Shoreline Interstitial Waters: A Search for Indicators of Health Risks</u>	Rogerson, Andrew; Estiobu, Nwadiuto; McCorquodale, Don	Nova Southeastern University Oceanographic Center, Florida Atlantic University - Boca Raton	Nolt-Helms, Cynthia	\$312,570	January 2001 - July 2003	FL
20	68D01066 SBIR	<u>System to Deliver Halon Equivalent, Hydrogen Fluoride Controlled, Supplemented HFC Gases in Fire Sensitive, Lightweight Plastic Extinguishers</u>	MacElwee, Donald B.	Powsus Inc.	Manager, SBIR Program	\$224,000	January 2001 - January 2003	FL
22	R827956 Grant	<u>Mechanistic-based Watershed Modeling for Evaluation of Ecosystem Conditions</u>	Yeh, Gour-Tsyh Gwo, J.P.; Schayek, Lily	Pennsylvania State University - Main Campus, University of Central Florida	Edwards, Jason	\$888,637	October 2000 - September 2003	PA
23	R827641 Grant	<u>Biogeochemical Indicators of Watershed Integrity and Wetland Eutrophication</u>	Reddy, K. R.; DeBusk, W.F.; Fisher, M.M.; Graham, W.; Keenan, L. W.; Lowe, E.F.; Ogram, A.; Prenger, J. P.	University of Florida, St. Johns River Water Management District	Senft, Amanda	\$639,410	January 1999 - September 2002	FL
24	R827441 Grant	<u>Fetal Metabolism of Aflatoxin B1 and Susceptibility to Childhood Cancer</u>	Gallagher, Evan	University of Florida	Deener, Kacee	\$523,123	January 1999 - June 2002	FL
25	R828898 Grant	<u>Bio pollution by the Green Mussel, Perna viridis, in the Southeastern United States</u>	Baker, Shirley M.; Baker, Patrick; Benson, Amy; Marelli, Dan; Nunez, Jose; Philips, Edward; Williams, James	University of Florida, Florida Fish and Wildlife Conservation Commission, Florida Marine Research Institute, U.S. Geological Survey	Senft, Amanda	\$447,602	January 2001 - May 2004	FL
26	R829602 Grant	<u>Simultaneous Environmental Monitoring and Purification Through Smart Particles</u>	Sigmund, Wolfgang M.; Mazyck, David; Wu, Chang-Yu	University of Florida	Karn, Barbara	\$390,000	October 2002 - September 2005	FL

27	R827453Grant	<u>Assessment of the Consequences of Climate Change on the South Florida Environment</u>	Harwell, Mark A.; Ault, Gerald S.; Cropper, Wendell P.; DeAngelis, Donald; Drum, Deborah; Gentile, John H.; Letson, David; Luo, Jlangang; Obeysekera, Jayantha; Ogden, John C.; Tosini, Steven; Wang, John; Wolfe, Willifred; Lirman, Diego	University of Miami, Center for Marine and Environmental Analyses, Rosenstiel School of Marine and Atmospheric Science, South Florida Water Management District, USGS Biological Resources Division	Manty, Dale; Turner, Vivian	\$889,579	January 1999 - September 2002	FL
28	R828020C001Centers	<u>National Center for Caribbean Coral Reef Research (NCORE) - Administrative</u>	McManus, John W.	University of Miami	Perovich, Gina		December 1999 - December 2003	FL
29	R828020C004Centers	<u>Physical Oceanographic Studies</u>	Lee, Tom	University of Miami	Perovich, Gina		December 1999 - December 2003	FL
30	R828020C005Centers	<u>Impacts of Nutrients on Reefs in the Florida Keys</u>	Swart, Peter	University of Miami	Perovich, Gina		December 1999 - December 2003	FL
31	R829599Grant	<u>Nanosensors for Detection of Aquatic Toxins</u>	Gawley, Robert E.	University of Miami	Karn, Barbara	\$350,000	January 2002 - February 2005	FL
32	R828829Grant	<u>Understanding the Sources and Fate of Conventional and Alternative Indicator Organisms in Tropical Waters</u>	Harwood, Valerie J.; Rose, Joan	University of South Florida	Nolt-Helms, Cynthia	\$388,335	January 2001 - August 2003	FL
33	U915823Fellow	<u>Complex Sphingolipid Involvement in the Expression of CYP1A1 Activity in MC-Exposed HepG2 Cells</u>	Peters, DeMia E.	Clark Atlanta University	Broadway, Virginia		January 2000 - January 2002	GA
34	R829213Grant	<u>Multiple Pollutants and Risk of Cardiac and Respiratory Emergency Department Visits in Atlanta</u>	Tolbert, Paige; Flanders, Dana; Klein, Mitchel; Lyles, Robert; Mulholland, James; Russell, Armistead G.; Ryan, P. Barry; Todd, Knox; Waller, Lance	Emory University	Katz, Stacey	\$1,238,940	January 2002 - December 2004	GA

35	R827028Grant	<u>Development and Evaluation of Modeling Techniques for the Study of Interactions between Urban and Point Source Plumes and Regional Atmospheres in the Formation of Secondary Pollutants</u>	Odman, M. Talat; McRae, D. Scott	Georgia Institute of Technology, North Carolina State University	Shapiro, Paul	\$468,324	January 1999 - January 2002	GA
36	R828207Grant	<u>Computational Requirements of Statistical Learning within a Decision-Making Framework for Sustainable Technology</u>	Chen, Victoria C.P.; Chang, Michael E.; Johnson, Ellis L.; Lee, Eva K.Y.	Georgia Institute of Technology	Karn, Barbara	\$335,000	January 2000 - June 2003	GA
37	R828130Grant	<u>Nearcritical Water as a Reaction Solvent</u>	Eckert, Charles A.; Brown, James; Bush, David; Griffith, Kris; Hallett, Jason; Lesutis, Heather; Liotta, C. L.; Nolen, Shane; Pollet, Pamela; Smith, Griffin; West, Kevin	Georgia Institute of Technology	Karn, Barbara	\$397,910	January 2000 - June 2003	GA
38	R826772Grant	<u>Improved Photolytic Rate Measurements at PAMS Sites</u>	Rodgers, Michael O.; Pearson, James R.	Georgia Institute of Technology	Shapiro, Paul	\$168,930	March 1999 - March 2001	GA
39	R829554Grant	<u>Removal of Photoresist and Post-Plasma Etch Sidewall Films Using Supercritical and Subcritical CO2 with Additives</u>	Hess, Dennis W.	Georgia Institute of Technology	Savage, Nora	\$325,000	January 2002 - December 2004	GA
41	U915799Fellow	<u>Phytochemical Inhibition of Chemical Carcinogens</u>	Odum, Rosaline Y.	Morehouse School of Medicine	Broadway, Virginia		January 2000 - January 2003	GA
42	R828007Grant	<u>The Impact of Lawn Care Practices on Aquatic Ecosystems in Suburban Watersheds</u>	Armbrust, Kevin; Black, Marsha; Gragson, Ted; Keeler, Andrew; Meyer, Judy L.; Noblet, Raymond; Shuman, Larry; West, Dee; Williams, James B.	University of Georgia	Stelz, Bill	\$893,849	January 2000 - February 2003	GA
43	R829006Grant	<u>The Environmental Occurrence, Fate, and Ecotoxicity of Selective Serotonin Reuptake Inhibitors (SSRIs) in Aquatic Environments</u>	Armbrust, Kevin; Black, Marsha	University of Georgia	Nolt-Helms, Cynthia	\$522,892	January 2001 - August 2004	GA
44	R829396Grant	<u>Measurements and Models of Longitudinal Dietary Intake of Pyrethroid and Organophosphate Insecticides By Children</u>	MacIntosh, David L.; Hassan, Sayed; Kerr, William L.; Ryan, P. Barry	University of Georgia, Emory University	Deener, Kacey	\$659,764	January 2001 - August 2004	GA

45	R829086Grant	<u>Models and Mechanisms: Understanding Multiple Stressor Effects on an Amphibian Population</u>	Palmer, Brent D.; Crowley, Philip; Eiskus, Adria; Shepherd, Brian; Sih, Andy	University of Kentucky	Senft, Amanda	\$522,832	January 2001 - July 2004	KY
46	R829621Grant	<u>Membrane-Based Nanostructured Metals for Reductive Degradation of Hazardous Organics at Room Temperature</u>	Bhattacharyya, Dibakar; Bachas, Leonidas G.; Ritchie, Stephen M.C.	University of Kentucky, University of Alabama	Savage, Nora	\$345,000	January 2002 - December 2004	KY
47	R829607Grant	<u>Urban Regeneration through Environmental Remediation: Valuing Market Based Incentives for Brownfields Development</u>	Meyer, Peter B.	University of Louisville	Clark, Matthew	\$277,388	January 2002 - February 2004	KY
49	R828017Grant	<u>Assessing Levels of Intermittent Exposures of Children to Flea Control Insecticides from the Fur of Dogs</u>	Chambers, Janice E.; Boone, J. Scott; Boyle, Carolyn R.; Tyler, John W.	Mississippi State University	Saint, Chris	\$712,010	January 2000 - December 2002	MS
50	R828717Grant	<u>Environmental Risks to Children's Health: Parents' Risk Beliefs, Protective Behavior, and Willingness to Pay</u>	Dickie, Mark; Gerking, Shelby	University of Southern Mississippi, University of Wyoming	Clark, Matthew	\$347,373	January 2001 - December 2003	MS
51	R827401Grant	<u>Endocrine Disruption in Marine Gastropods by Environmental Chemical Mixtures</u>	McClellan-Green, Patricia D.; Gershwin, M. Eric; Hendrickx, Andrew G.	Duke University	Reese, David H.	\$430,672	January 1999 - August 2002	NC
52	R828784Grant	<u>Integrating Economic and Ecological Models Across Spatial Scales to Assess Aquatic Species Vulnerability to Timber Harvest and Land Use Change in Freshwater Streams of the Southeastern U.S.</u>	Schaberg, Rex; Abt, Robert; Cubbage, Fred; Halpin, Pat; Hershey, Anne	Duke University, North Carolina State University, University of North Carolina at Greensboro	Perovich, Gina	\$399,658	January 2001 - April 2003	NC
53	R828686Grant	<u>Spatial and Temporal Models for Environmental Health Effects</u>	Clyde, Merlise	Duke University	Fields, Nigel	\$557,859	December 2001 - November 2004	NC
54	R829012Grant	<u>Effectiveness of UV Irradiation for Pathogen Inactivation in Surface Waters</u>	Linden, Karl G.; Sobsey, Mark D.	Duke University, University of North Carolina at Chapel Hill	Nolt-Helms, Cynthia	\$524,848	August 2001 - August 2004	NC

55	R829399Grant	<u>Developmental Neurotoxicity in Offspring Induced by Combined Maternal Exposure of Rats to Nicotine and Chlorpyrifos</u>	Abou-Donia, Mohamed B.	Duke University Medical Center	Deener, Kacee	\$750,000	January 2001 - September 2004	NC
56	R828721Grant	<u>Evaluating the Dissemination and Impact of Toxics Release Inventory Data</u>	Vasu, Michael; Atlas, Mark; Dimock, Michael	North Carolina State University	Carrillo, Susan	\$196,197	January 2000 - November 2002	NC
58	R827580Grant	<u>Closing the Gaps in the Regulation of Municipal Solid Waste Landfills: Defining the End of the Post-Closure Monitoring Period and the Future Stability of Leachate Recirculation Landfills</u>	Barlaz, Morton A.; Gabr, Mohammed A.	North Carolina State University	Stelz, Bill	\$145,213	September 1999 - December 2000	NC
59	R828785Grant	<u>Regional Vulnerability of Forest Resources to Current and Projected Environmental Stresses in the Southeastern U.S.</u>	Abt, Robert	North Carolina State University	Perovich, Gina	\$399,365	March 2001 - March 2003	NC
60	R829370Grant	<u>Behaving Drifters as <i>Gymnodinium breve</i> mimics</u>	Kamykowski, Daniel; Janowitz, Gerald S.; Wolcott, Thomas G.	North Carolina State University	Perovich, Gina	\$423,493	January 2001 - September 2004	NC
61	R829508Grant	<u>Measuring Economics Benefits for Amenity Consequences of Land Cover Changes</u>	Smith, V. Kerry; Palmquist, Raymond B.; Phaneuf, Daniel J.	North Carolina State University	Clark, Matthew	\$299,855	January 2001 - September 2004	NC
62	R827444Grant	<u>Study of Exposure and Body Burden of Children of Different Ages to Pesticides in the Environment</u>	Raymer, J. H.; Akland, G. G.; Clayton, C. Andrew; Pellizzari, E. D.; Wilcosky, T.	Research Triangle Institute	Saint, Chris	\$819,063	January 1999 - August 2002	NC
63	R829397Grant	<u>Longitudinal study of Children's Exposure to Permethrin</u>	Hu, Y.; Akland, G. G.; Raymer, J.H.	Research Triangle Institute	Deener, Kacee	\$754,664	January 2001 - November 2004	NC
64	R829344Grant	<u>Behavioral Reactions to Ozone Alerts: What Do They Tell Us About Willingness-to-Pay for Children's Health?</u>	Mansfield, Carol; Crawford-Brown, Douglas; Houtven, George; VanJohnson, F. Reed; Pekar, Zachary	Research Triangle Institute, University of North Carolina at Chapel Hill	Clark, Matthew	\$310,000	January 2002 - January 2004	NC

65	R828176 Grant	<u>Predicting Day and Nighttime Aerosol Yields from Biogenic Hydrocarbons with a Gas/Particle Phase Kinetic Model</u>	Karens, Richard M.; Jaoul, Mohammad; Jeffries, Harvey E.	University of North Carolina at Chapel Hill	Shapiro, Paul	\$225,000	July 2000 - July 2002	NC
66	R827955 Grant	<u>An Object-Oriented Model for Nitrogenous Pollutants from Swine Waste Land Application</u>	Whalen, Stephen C.; Jeffries, Harvey E.; Miller, C. T.	University of North Carolina at Chapel Hill	Edwards, Jason	\$345,533	January 1999 - September 2002	NC
67	R827957 Grant	<u>Development of a Surface Water Object-Oriented Modeling System (SWOOMS) for the Neuse River Estuary, North Carolina</u>	Lueftich, Jr., Richard A.; Alperin, M.; Bowen, J.; Buzzelli, C.; Jeffries, Harvey E.; Paerl, Hans; Stotts, David	University of North Carolina at Chapel Hill, University of North Carolina at Charlotte	Edwards, Jason	\$897,859	January 1999 - September 2002	NC
68	R828677 Grant	<u>Atlantic Coast Environmental Indicators Consortium</u>	Paerl, Hans; Bolcourt, William C.; Fonseca, Mark; Harding, Jr., Lawrence W.; Hopkinson, Chuck; Houde, Edward D.; Kenworthy, Judson; Lueftich, Jr., Richard A.; Morris, James T.; Roman, Michael R.; Torres, Raymond	University of North Carolina at Chapel Hill, University of Maryland Center for Environmental Science, University of South Carolina at Columbia	Levinson, Barbara	\$5,812,315	February 2001 - February 2005	NC
69	R827959 Grant	<u>An Object-Oriented Integrating Framework for Multi-discipline Ecosystem Modeling</u>	Stotts, David; Coats, Carly; Galluppi, Kenneth J.; Prins, Jan F.	University of North Carolina at Chapel Hill	Edwards, Jason	\$863,049	January 1999 - September 2002	NC
70	R829014 Grant	<u>Impact of Residual Pharmaceutical Agents and their Metabolites in Wastewater Effluents on Downstream Drinking Water Treatment Facilities</u>	Weinberg, Howard S.; Meyer, M.T.; Singer, Philip C.; Sobsey, Mark D.	University of North Carolina at Chapel Hill, U.S. Geological Survey	Nolt-Helms, Cynthia	\$524,992	August 2001 - August 2004	NC
71	R829214 Grant	<u>Mechanisms of Air Pollutant-Induced Pulmonary Inflammation: Effects of Zinc on EGFR Receptor Function</u>	Graves, Lee M.; Wu, Weidong	University of North Carolina at Chapel Hill	Katz, Stacey	\$874,125	November 2001 - November 2004	NC
72	R829440 Grant	<u>Environmental Management Systems: Do Formalized Management Systems Produce Superior Performance?</u>	Andrews, Richard N.; Amaral, Deborah	University of North Carolina at Chapel Hill	Carrillo, Susan	\$340,000	November 2001 - November 2003	NC

73	R829586Grant	<u>Dry Lithography: Environmentally Responsible Processes for High Resolution Pattern Transfer and Elimination of ImageCollapse using Positive Tone Resists</u>	DeSimone, Joseph M.	University of North Carolina at Chapel Hill	Richards, April	\$347,898	January 2001 - January 2004	NC
74	R829428Grant	<u>Activation of Ki-ras During Transplacental Carcinogenesis</u>	Miller, Mark Steven	Wake Forest University School of Medicine, Wake Forest University School of Medicine, Winston-Salem, NC	Deener, Kacee	\$902,111	January 2001 - September 2004	NC
75	R828045Grant	<u>Brominated DBP Formation and Speciation Based on the Specific UV Absorbance Distribution of Natural Waters</u>	Kilduff, Ph.D, James E.; Karanfil, Ph.D, Tanju	Rensselaer Polytechnic Institute, Clemson University	Nolt-Helms, Cynthia	\$391,473	January 2000 - January 2003	SC
76	R828157Grant	<u>Tailoring Activated Carbon Surfaces for Water, Wastewater and Hazardous Waste Treatment Operations</u>	Karanfil, Ph.D, Tanju; Kilduff, Ph.D, James E.	Clemson University	Krishnan, S. Bala	\$223,978	January 2000 - May 2002	SC
77	R829603Grant	<u>Plasmon Sensitized TiO2 Nanoparticles as a Novel Photocatalyst for Solar Applications</u>	Chumanov, George	Clemson University	Karn, Barbara	\$320,000	January 2002 - June 2005	SC
78	R827581Grant	<u>Coal Combustion Wastes: New Concerns About an Old Problem</u>	Congdon, Justin D.; Rowe, C. L.; Hopkins, William A.	Savannah River Ecology Laboratory, University of Georgia, Chesapeake Biological Laboratory	Stelz, Bill	\$67,698	August 1999 - August 2000	SC
79	R827397Grant	<u>Environmentally-Mediated Endocrine Disruption in Estuarine Crustaceans: A 3-Taxon Multi-Generational Study of Sediment-Associated EDC Effects from the Genetic to Population Levels</u>	Chandler, G. Thomas; Ferry, Ph.D, John L.; Fulton, Ph.D, Michael H.; Quattro, Joseph M.; Scott, Geoffrey I.; Wirth, Ph.D, Edward F.	University of South Carolina at Columbia, NOAA /GLERL	Reese, David H.	\$1,265,102	January 1999 - March 2002	SC
80	68D01009SBIR	<u>Reducing Diesel Soot With an Atmospheric Plasma Metallic Filter</u>	Kelly-Wintenberg, Kimberly	Atmospheric Glow Technologies	Manager, SBIR Program	\$64,557	January 2001 - September 2001	TN
82	68D00278SBIR	<u>An Economical Alternative for Sorting Polymers on the Small Materials Recovery Facility (MRF) Level</u>	Sommer, Edward J.	National Recovery Technologies Inc.	Manager, SBIR Program	\$225,000	January 2000 - January 2002	TN

83	88D01065	SBIR Sensor Fusion for Contaminant Detection and Removal From Plastics Recycle Streams	Sommer, Edward J.	National Recovery Technologies Inc.	Manager, SBIR Program	\$225,000	January 2001 - January 2003	TN
84	88D01036	SBIR A Process for Online Quality Control of Recycled Plastic Flake	Sommer, Edward J.	National Recovery Technologies Inc.	Manager, SBIR Program	\$70,000	January 2001 - September 2001	TN
87	88D02021	SBIR Development of High Surface Area Material and Filter Media	Doshi, Jayesh	eSpin Technologies Inc.	Manager, SBIR Program	\$69,995	January 2002 - September 2002	TN

Region 5

Active Projects:

- Science To Achieve Results (STAR) Grants
- Science To Achieve Results (STAR) Fellowships
- Small Business Innovation Research

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#	Identifier	Abstract	Principal Investigator	Institution	Grant Representative	Grant Amount	Project Period	State
2	R828169Grant	Engineering Environmentally Benign Solvent Systems	Broadbelt, Linda J.; Khan, Shumalla; Zhang, Qizhi	Northwestern University	Shapiro, Paul	\$223,199	January 2000 - August 2002	IL
3	R828562Grant	Metabolic Engineering of Solvent Tolerance in Anaerobic Bacteria	Papoutsakis, E. T.; Welker, N.E.	Northwestern University	Richards, April	\$180,000	January 2000 - May 2003	IL
4	R829402Grant	Center for Integrating Statistical and Environmental Science	Stein, Michael; Amit, Yali; Beletsky, Dmitry; Chay, Kenneth; Dukic, Vanja; Dwyer, Greg; Eshel, Gidon; Frederick, John; Greenstone, Michael; Kotamarthi, Rao; Lesht, Barry; McCullagh, Peter; Meng, Xiao-Li; Naureckas, Edward; Pfister, Cathy; Rathouz, Paul; Reinsel, Gregory; Schwab, David; Solway, Julian; Tiao, George; Weatherhead, Elizabeth; Wootton, Timothy; Wuebbles, Donald J.	University of Chicago, Argonne National Laboratory, NOAA/GLERL, University of California - Berkeley, University of Colorado-Boulder, University of Illinois at Urbana, University of Michigan, University of Wisconsin - Madison	Levinson, Barbara	\$6,250,049	December 2002 - November 2007	IL
5	R828541Grant	New Methods for Assessment of Pollution Prevention Technologies: Integration of Failure Modes and Effects Analysis (FMEA), Life Cycle Analysis (LCA), and Petri Net Modeling	He, David; Olson, Walter	University of Illinois at Chicago	Kam, Barbara	\$250,000	August 2000 - August 2003	IL

6	U915833Fellow	<u>Effects of Urban Habitat Fragmentation in Small Mammals</u>	Pergams, Oliver R.	University of Illinois at Chicago	Broadway, Virginia		January 2000 - January 2003	IL
7	R827919Grant	<u>Business-led Environmental Management: Economic Incentives and Environmental Implications</u>	Khanna, Madhu; Thurston, Deborah	University of Illinois at Urbana	Carrillo, Susan	\$241,516	December 1999 - December 2001	IL
8	R827451Grant	<u>Integrated Assessment of Climate Change Impact in the Mackinaw River Watershed, Illinois</u>	Herricks, Edwin E.; Donaghy, Kieran P.; Eheart, J. Wayland; Orland, Brian	University of Illinois at Urbana Pennsylvania State University - Main Campus	Manty, Dale; Turner, Vivian	\$867,595	January 1999 - September 2002	IL
9	R829553Grant	<u>Green Oxidation Catalysts for Fine Chemical Synthesis</u>	Shapley, Patricia A.	University of Illinois at Urbana	Savage, Nora	\$325,000	January 2002 - December 2004	IL
14	R828952Grant	<u>Looking Inside the Black Box: Microlevel Empirical Analyses of the Impact of State and Federal Policy Instruments on Hazardous Waste Generation and Management</u>	Good, David; Richards, Kenneth	Indiana University	Clark, Matthew	\$180,917	January 2001 - March 2003	IN
15	R829587Grant	<u>Flow Control and Design of Environmentally Benign Spray Systems</u>	Plesniak, Michael W.; Frankel, Steven H.; Sojka, Paul E.	Purdue University - Main Campus	Richards, April	\$350,000	January 2002 - December 2004	IN
16	R829609Grant	<u>An Experimental Study of Transactions Costs, Liability Rules and Point-Nonpoint Source Trading in Environmental Markets</u>	Cason, Timothy N.	Purdue University - Main Campus	Clark, Matthew	\$144,136	January 2002 - December 2003	IN
17	R828899Grant	<u>Predicting the Identity, Spread, and Impact of Future Non-Indigenous Species in the Great Lakes</u>	Lodge, David M.; Dwyer, Greg	University of Notre Dame University of Chicago	Senft, Amanda	\$450,000	May 2001 - April 2004	IN

18	68D01011SBIR	<u>Portable Fast GC System for Field Environmental Monitoring and Measurement Problems</u>	Klemp, Mark A.	Chromatofast Inc.	Manager, SBIR Program	\$70,000	January 2001 - September 2001	MI
19	68D01013SBIR	<u>Extraction and Recovery of Pure Nickel Metal From Hazardous Plating Sludge</u>	May, William	Climax Research Services	Manager, SBIR Program	\$70,000	January 2001 - September 2001	MI
22	R827922Grant	<u>Web-Based Methods for Valuing Wetland Services</u>	Hoehn, John P.; Kaplowitz, Michael D.; Lupi, Frank	Michigan State University	Clark, Matthew	\$227,758	January 1999 - September 2002	MI
23	R827402Grant	<u>Developmental Exposure to Endocrine Disruptors: Fertility and Gene Expression Profiles</u>	Zacharewski, Timothy	Michigan State University	Reese, David H.	\$738,712	January 1999 - August 1999	MI
24	R827965Grant	<u>Detroit—Ann Arbor Metro Public Information Project</u>	Kenyon, Cindy; Head, Rebecca; Moore, Leon; Rubin, Laura; Score, Mike; Sweat, Mike; VanderMeulen, Joe; Wades, Jim	Michigan State University	Stevens, Madalene	\$725,968	January 2000 - December 2001	MI
25	R829216Grant	<u>Effects of Airborne Particles on Allergic Airway Disease</u>	Harkema, Jack; Sioutas, Constantinos	Michigan State University, University of Southern California	Katz, Stacey	\$854,702	October 2001 - October 2004	MI
26	68D02035SBIR	<u>Value-Added Composites From Foundry Industry Waste Materials</u>	Merrington, Adrian	Resource Recovery Corporation of West Michigan	Manager, SBIR Program	\$70,000	January 2002 - September 2002	MI

27	R828626Grant	<u>Introducing Markets for Green Products: Product Demand, Environmental Quality & Economic Welfare</u>	Moore, Michael R.; Kotchen, Matthew J.	University of Michigan	Clark, Matthew	\$68,042	January 2001 - September 2002	MI
28	R828246Grant	<u>Superheated Water and Steam Degreasing of Working Stocks, Parts, and Equipment in Machining, Manufacturing and Production Processes and Operations</u>	Weber, Walter J.	University of Michigan	Karn, Barbara	\$320,000	January 2000 - August 2003	MI
29	R828231Grant	<u>Membrane Introduction Mass Spectrometry Studies of Halogenated Cyano Byproduct Formation in Drinking Water</u>	Olson, Terese M.	University of Michigan	Noit-Helms, Cynthia	\$334,666	January 2000 - January 2003	MI
30	U915780Fellow	<u>Subsurface Compositional Simulation Incorporating Solute-Chemistry Dependent Constitutive Relationships: Implications for Site-Assessment and Remediation</u>	Phelan, Thomas J.	University of Michigan	Thompson, Delores		January 2000 - January 2003	MI
31	R827632Grant	<u>Photo Induced Reduction of Mercury In Lakes, Wetlands, and Soils</u>	Nriagu, Jerome O.; Keeler, Gerald J.; Lehrman, John; Lindberg, Steve; Zhang, Hong	University of Michigan - Ann Arbor, Oak Ridge National Laboratory	Stelz, Bill	\$865,771	January 1999 - August 2002	MI
32	R829395Grant	<u>Meconium is - A Promising Tool to Detect Fetal Exposure to Environmental Toxins</u>	Ostrea, Enrique M.; Ager, Joel; Bielawski, Dawn; Villanueva-Uy, Esterlita	Wayne State University	Deener, Kacee	\$726,411	January 2001 - August 2004	MI
33	R827584Grant	<u>Sustainability and Risk of Fragmented Habitats: Development and Regulatory Variables in Shoreline</u>	Lemberg, David; Fraser, Rolland	Western Michigan University	Clark, Matthew	\$104,042	January 1999 - June 2000	MI

34	R827987 Grant	<u>Optimal Experimental Design for Nonmarket Choice Experiments</u>	Kanninen, Barbara J.	Hubert H. Humphrey Institute of Public Affairs	Clark, Matthew	\$61,014	January 2000 - June 2002	MN
35	R827630 Grant	<u>Methylmercury Sources to Lakes in Forested Watersheds: Has Enhanced Methylation Increased Mercury in Fish Relative to Atmospheric Deposition?</u>	Swain, Edward B.; Almerding, Jim; Cotner, Jim; Engstrom, Daniel; Harris, Reed; Jeremiason, Jeff; Nater, Edward; Brezonik, Patrick L.	Minnesota Pollution Control Agency, St. Croix Watershed Research Station	Stelz, Bill	\$847,690	January 1999 - September 2002	MN
36	R828579 Grant	<u>Lake Access: Managing Urban Runoff Using Real-Time, Community-Based Monitoring to Improve Lake Water Quality</u>	Barten, John; Axler, Richard; Hagley, Cindy; Host, George E.; Liukkonen, Barbara; Munson, Bruce; Owen, Christopher	Suburban Hennepin Regional Park District, MN, Minnehaha Creek Watershed District, University of Minnesota - Duluth	Stevens, Madalene	\$480,690	January 2000 - January 2002	MN
37	R827928 Grant	<u>Hazardous Air Pollutant Mixtures: Measuring and Modeling Complex Exposure</u>	Adgate, John L.; Church, Timothy; Pratt, Greg; Ramachandran, Gurumurthy; Sexton, K.; Zhang, Junfeng	University of Minnesota, Minnesota Pollution Control Agency, University of Medicine and Dentistry of New Jersey	Katz, Stacey; Robarge, Gail	\$510,012	December 1999 - December 2002	MN
38	R829620 Grant	<u>Ion-Induced Nucleation of Atmospheric Aerosols</u>	McMurry, Peter H.; Eisele, Fred	University of Minnesota	Savage, Nora	\$400,000	January 2002 - December 2004	MN
39	R827642 Grant	<u>Effects of Forest Fragmentation on Community Structure and Metapopulation Dynamics of Amphibians</u>	Johnson, Lucinda; Boone, Randall; Gross, John; Johnson, Catherine	University of Minnesota - Duluth, Colorado State University	Senft, Amanda	\$769,623	January 1999 - November 2002	MN
40	R828777 Grant	<u>Protocols for Selection of Classification System and Reference Conditions: A Comparison of Methods</u>	Schuldt, Jeffrey A.; Ciborowski, Jan; Host, George E.; Johnson, Lucinda; Richards, Carl	University of Minnesota - Duluth	Levinson, Barbara	\$707,404	March 2001 - March 2004	MN

41	R828675Grant	<u>Development of Environmental Indicators of Condition, Integrity, and Sustainability in the Coastal Regions of the US Great Lakes Basin</u>	Nlomi, Gerald J.; Axler, Richard; Hanowski, JoAnn M.; Host, George E.; Howe, Robert W.; Johnson, Lucinda; Johnston, Carol A.; Kingston, John C.; Regal, Ronald R.; Richards, Carl; Swackhamer, Deborah L.	University of Minnesota - Duluth, University of Minnesota - Twin Cities, University of Wisconsin - Green Bay	Levinson, Barbara	\$6,000,000	January 2001 - January 2005	MN
42	R829363Grant	<u>Pesticide Exposures of Preschool Children Over Time</u>	Wilson, Nancy K.; Chuang, Jane C.; Lyu, Christopher; Strauss, Warren J.	Battelle Memorial Institute	Saint, Chris	\$1,340,414	January 2001 - September 2005	OH
45	68D00274SBIR	<u>Cost Competitive Functional Trivalent Chromium Plating Process To Replace Hexavalent Chromium Plating</u>	Renz, Robert P.	Faraday Technology, Inc.	Manager, SBIR Program	\$225,000	January 2000 - January 2002	OH
46	R828083Grant	<u>Mechanism of Non-genotoxic Occupational Carcinogens</u>	Pereira, Michael A.	Medical College of Ohio	Reese, David H.	\$834,714	April 2000 - April 2003	OH
47	R828627Grant	<u>Testing the Potential to Implement Collective Enforcement Agreements in Point-Nonpoint Source Pollution Trading and Voluntary Incentive Agreements</u>	Sohngen, Brent; Randall, Alan	Ohio State University - Main Campus	Clark, Matthew	\$200,291	January 2000 - August 2002	OH
48	R828611Grant	<u>Biomarkers and Neurobehavioral Effects of Perinatal Exposure to Chlorpyrifos and Other Organophosphate Insecticides</u>	Wilkins, J.; Dietrich, Kim; Jacobson, Sandra; Lindsay, R.; Moeschberger, M.; Nishioka, M.; Weghorst, C.	Ohio State University - Main Campus, University of Cincinnati - Main Campus, Wayne State University	Deener, Kacey	\$1,126,463	November 2001 - January 2004	OH
49	R828171Grant	<u>Development of a Membrane-Based Electrostatic Precipitator</u>	Pasic, Hajrudin; Alam, Khairul; Bayless, David; Ingram, David	Ohio University - Main Campus	Shapiro, Paul	\$225,000	January 2000 - July 2002	OH

51	68D99068SBIR	<u>A New NOx, HC, and Small Particle Filter With a Regeneration-In-Place Capability for Stationary Diesel-Engine Applications</u>	Nelson, Sid	Sorbent Technologies Corporation	Manager, SBIR Program	\$70,000	January 1999 - January 2000	OH
52	68D01075SBIR	<u>A Low-Cost, High-Temperature Mercury Sorbent for Coal-Fired Power Plants</u>	Nelson, Sid	Sorbent Technologies Corporation	Manager, SBIR Program	\$225,000	January 2001 - January 2003	OH
53	68D00280SBIR	<u>A New NOx, HC, and Small Particle Filter With a Regeneration-In-Place Capability for Stationary Diesel Engine Applications</u>	Nelson, Sid	Sorbent Technologies Corporation	Manager, SBIR Program	\$225,000	January 2000 - January 2002	OH
54	R828189Grant	<u>Mechanistic Studies of the Transformation of Polychlorinated Dibenzo-p-Dioxins via Hydroxyl Radical Attack</u>	Taylor, Philip H.	University of Dayton	Shapiro, Paul	\$320,000	January 2000 - September 2003	OH
55	R828190Grant	<u>Trace-level Measurement of Complex Combustion Effluents and Residues using Multi-dimensional Gas Chromatography-Mass Spectrometry (MDGC-MS)</u>	Rubey, Wayne A.; Striebig, Richard; Taylor, Philip H.	University of Dayton	Shapiro, Paul	\$335,000	January 2000 - May 2003	OH
56	R828175Grant	<u>Oxidative Transformation of Model Oxygenated Hazardous Air Pollutants</u>	Taylor, Philip H.; Marshall, Paul	University of Dayton	Shapiro, Paul	\$215,900	July 2000 - July 2002	OH
57	R828206Grant	<u>Development of a Heterogeneous Catalyst for Hydroformylation in Supercritical CO2</u>	Abraham, Martin A.; Davies, Julian A.; Mason, Mark R.	University of Toledo	Karn, Barbara	\$315,000	January 2000 - June 2003	OH

60	R827629Grant	<u>Watershed Influences on Transport, Fate, and Bioavailability of Mercury in Lake Superior</u>	Hurley, James P.; Armstrong, D.E.; Back, Richard C.; Shafer, M. M.; Rolfhus, Kristofer R.	University of Wisconsin - Madison, Lake Superior State University, Wisconsin Department of Natural Resources	Stelz, Bill	\$829,384	January 1999 - September 2002	WI
61	R828010Grant	<u>Alternative Urbanization Scenarios for an Agricultural Watershed: Design Criteria, Social Constraints, and Effects on Groundwater and Surface Water Systems</u>	Lathrop, Richard C.; Bahr, Jean M.; Bradbury, Kenneth R.; Greb, Steven R.; LaGro, Jr., James A.; Nelson, Edward B.; Nowak, Peter; Potter, Kenneth W.; Zedler, Joy B.	University of Wisconsin - Madison, Wisconsin Department of Natural Resources	Stelz, Bill	\$886,105	January 2000 - January 2003	WI
62	R829085Grant	<u>Evaluating the Impact of Multiple Stressors on Common Loon Population Demographics - An Integrated Laboratory and Field Approach</u>	Meyer, Michael W.	Wisconsin Department of Natural Resources	Senft, Amanda	\$480,759	January 2001 - March 2005	WI

Region 6

Active Projects:

- Science To Achieve Results (STAR) Grants
- Science To Achieve Results (STAR) Fellowships
- Small Business Innovation Research

August 19, 2002

#	Identifier	Abstract	Principal Investigator	Institution	Grant Representative	Grant Amount	Project Period	State
1	R828009Grant	<u>PULSES - The Importance of Pulsed Physical Events for Watershed Sustainability in Coastal Louisiana</u>	Day, John; Cable, Jaye; Fry, Brian; Justic, Dubravko; Kemp, Paul; Reyes, Enrique; Temple, Paul; Twilley, Robert	Louisiana State University, University of Southwestern Louisiana, University of Louisiana at Lafayette	Stelz, Bill	\$899,995	February 2000 - February 2003	LA
3	R828191Grant	<u>Toward the Development of a Detailed Mechanism of Transition Metal Catalyzed Formation of PCDD/F from Combustion Generated Hydrocarbons</u>	Dellinger, Barry	Louisiana State University	Shapiro, Paul	\$345,000	January 2000 - June 2003	LA
4	R828772C003Centers	<u>Hazardous Substance Research Center/South and Southwest</u>	Reible, Danny; Edge, Billy; Fitzpatrick, Leigh; Hughes, Joe	Louisiana State University, Rice University	Lasat, Mitch	\$899,999	January 2001 - September 2006	LA
5	R828129Grant	<u>Forming Carbon-Carbon Bonds in Water and Other Alternative Media</u>	Li, Chao-Jun	Tulane University of Louisiana	Kam, Barbara	\$310,000	January 2000 - May 2003	LA
7	68D99082SBIR	<u>High-Performance, Low-Global-Warming Refrigerants for Domestic Refrigerators</u>	Nimitz, Jonathan S.	Environmental Technology and Education Center Inc.	Manager, SBIR Program	\$224,966	January 1999 - January 2001	NM
8	R828565Grant	<u>Fundamental Studies of Wood Interface Modification for Formaldehyde Pollution Avoidance and Prevention</u>	Melster, John J.	Forest Products Research Center	Kam, Barbara	\$324,254	September 2000 - September 2003	NM

9	U915800Fellow	Treatment of Arsenic Contaminated Drinking Water	Sanchez, Cassia M.	New Mexico State University	Broadway, Virginia		January 2000 - January 2001	NM
12	88D02038SBIR	Rapid, Specific, Sensor System for Pathogens in Water	Tiernan, Timothy C.	TPL Inc.	Manager, SBIR Program	\$69,046	April 2002 - September 2002	NM
13	R828070Grant	An Integrated GIS Framework for Water Reallocation and Decision Making in the Upper Rio Grande Basin	Matthews, Olen Paul; Brookshire, David S.; Campana, Michael E.; Chermak, Janie; Cullen, Brad T.; Gregory, Kirk; Krause, Kate; Scuderi, Louis A.; Snell, Seth	University of New Mexico	Stefz, Bill	\$409,977	January 2000 - February 2003	NM
14	R827963Grant	The Tulsa Air and Water Quality Information System	Kltz, Hilary; Jeffries, Rhonda; Pinc, Gaylon; Potter, William; Kurklin, Joanne; Purser, Jane	City of Tulsa, Indian Nations Council of Government, Oklahoma Department of Environmental Quality, U.S. Geological Survey, University of Tulsa	Stevens, Madalene	\$500,000	January 2000 - December 2001	OK
15	88D02023SBIR	Development and Preliminary Validation of a Rapid Progesterin-Based Endocrine Disruption Screening Assay	Fort, Douglas J.	Fort Environmental Laboratories Inc.	Manager, SBIR Program	\$70,000	April 2002 - September 2002	OK
16	R828210Grant	Wastewater Reuse and Zero Discharge Cycles In Process Plants	Bagajewicz, Miguel J.; Savelski, Mariano	University of Oklahoma	Kam, Barbara	\$99,988	June 2000 - June 2001	OK
17	R829005Grant	The Influence of Amphiphilic Molecules on the Environmental Fate and Transport of Pharmaceuticals	G. Kibbey, Tohren C.; Sabatini, David A.	University of Oklahoma	Nolt-Helms, Cynthia	\$316,600	January 2001 - August 2004	OK
18	88D01027SBIR	Novel Method for Ferrate Production	Denvir, Adrian J.	Lynntech Inc.	Manager, SBIR Program	\$70,000	April 2001 - September 2001	TX
22	88D00203SBIR	New Environmentally Benign Heteropolymolybdate Conversion Coatings for Aluminum Alloys	Minevski, Zoran	Lynntech Inc.	Manager, SBIR Program	\$225,000	January 2000 - January 2002	TX

23	68D01056	<u>SBIR A Novel Method for Converting a Negative Value Waste into a Commodity Chemical</u>	Denvir, Adrian J.	Lynntech Inc.	Manager, SBIR Program	\$225,000	January 2001 - January 2003	TX
24	68D01064	<u>SBIR A New Microfluidic System for the Determination of Cryptosporidium Oocysts in Water</u>	Hodko, Dalibor	Lynntech Inc.	Manager, SBIR Program	\$225,000	January 2001 - January 2003	TX
27	68D02030	<u>SBIR A Universal Technique for Antimicrobial Surface Preparation Using Quaternary Ammonium-Functionalized Dendrimers</u>	Krause, Wendy E.	Lynntech Inc.	Manager, SBIR Program	\$70,000	January 2002 - January 2002	TX
30	R828903	<u>Grant Chinese Tallow Invasions into the Endangered Coastal Prairie: Causes and Consequences</u>	Siemann, Evan; Grace, James; Rogers, William	Rice University	Senft, Amanda	\$381,687	January 2001 - May 2004	TX
31	R828209	<u>Grant New Sensor Technology for Reducing Emissions from Automobiles</u>	Taylor, Henry F.	Texas A & M University	Karn, Barbara	\$220,000	January 2000 - April 2003	TX
32	R828180	<u>Grant Development of All-Solid-State Sensors for Measurement of Nitric Oxide and Carbon Monoxide Concentrations by Optical Absorption</u>	Walther, Thomas; Caton, Jerry; Lucht, Robert P.	Texas A & M University	Shapiro, Paul	\$225,000	January 2000 - June 2002	TX
33	R828135	<u>Grant Homogeneous Catalysis in Supercritical Carbon Dioxide with Fluoroacrylate Copolymer Supported Catalysts</u>	Akgerman, Aydin; Fackler Jr, John P.	Texas A & M University, Texas Engineering Experiment Station	Karn, Barbara	\$315,000	January 2000 - May 2003	TX
34	R827582	<u>Grant Exploring the Environmental Impacts of the E-merging Digital Economy: Towards an Informational Ecology for the Greening of Electronic Commerce</u>	Sui, Daniel Z.	Texas A & M University	Stelz, Bill	\$69,777	January 1999 - September 2000	TX
35	R829369	<u>Grant Gymnodinium breve in the Gulf of Mexico: Gyroxanthin-based Estimates of Carbon-Specific Growth Rates Under Varying Environmental Conditions</u>	Richardson, Tammi L.; Pinckney, James L.	Texas A & M University	Perovich, Gina	\$100,387	November 2001 - November 2004	TX

36	R828208Grant	<u>Development of Life Cycle Inventory Modules for Semiconductor Processing</u>	Murphy, Cynthia F.; Allen, David T.	University of Texas	Kam, Barbara	\$325,000	January 2000 - March 2003	TX
37	R827964Grant	<u>Paso del Norte Environmental Monitor</u>	Kooshian, Charles; Gonzalez-Ayala, Salvador; Gray, Robert	University of Texas	Stevens, Madalene	\$494,935	January 2000 - January 2001	TX
38	R829009Grant	<u>Riverbank Filtration Effectiveness In an Arid Environment</u>	Langford, Richard P.; Pillai, Suresh; Schulze-Makuch, Dirk	University of Texas, Texas A & M University	Nolt-Helms, Cynthia	\$437,418	January 2001 - August 2004	TX
39	R829180Grant	<u>Infectivity and Virulence of Cryptosporidium Non-parvum Species in Healthy Adult Volunteers</u>	Chappell, Cynthia L.; DuPont, Herbert L.; Janecki, A.; Okhuysen, Pablo C.; Tzipori, Saul; Widmer, Giovanni	University of Texas, Tufts University	Nolt-Helms, Cynthia	\$524,540	January 2001 - August 2004	TX
40	R828035Grant	<u>Infectivity and Virulence of Cryptosporidium Genotype H Oocysts in Healthy Adult Volunteers</u>	Chappell, Cynthia L.; Okhuysen, Pablo C.; Tzipori, Saul; Widmer, Giovanni	University of Texas Health Science Center-Houston	Nolt-Helms, Cynthia	\$503,884	January 2000 - January 2003	TX
41	R827677Grant	<u>Regional Ecological Resource Assessment of the Rio Grande Riparian Corridor: A Multidisciplinary Approach to Understanding Anthropogenic Effects on Riparian Communities in Semi-arid Environments</u>	Raney, Jay; Crawford, Melba; Gonzales-Ramos, Javier; Judd, Frank; Leonard, Robert; Neuenschwander, Amy; Pault, Gene; Rieken, Eric; Sullivan, Jeri; Tremblay, Thomas; White, William	University of Texas at Austin, University of Texas - Pan American, University of Texas at Brownsville	Perovich, Gina	\$642,496	January 1999 - August 2002	TX
42	R827930Grant	<u>Municipal Sewers as Sources of Hazardous Air Pollutants</u>	Corsi, Richard L.	University of Texas at Austin	Katz, Stacey; Robarge, Gail	\$298,798	January 2000 - December 2002	TX

Region 7

Active Projects:

- Science To Achieve Results (STAR) Grants
- Science To Achieve Results (STAR) Fellowships
- Small Business Innovation Research

August 19, 2002

#	Identifier	Abstract	Principal Investigator	Institution	Grant Representative	Grant Amount	Project Period	State
1	R828156Grant	Effect of the Gasoline Oxygenate Ethanol on the Migration and Natural Attenuation of BTEX Compounds in Contaminated Aquifers	Alvarez, Pedro J.J.	University of Iowa	Krishnan, S. Bala	\$194,878	January 2000 - May 2002	IA
2	R829600Grant	Development of Nanocrystalline Zeolite Materials as Environmental Catalysts: From Environmentally Benign Synthesis to Emission Abatement	Larsen, Sarah C.; Grassian, Vicki H.	University of Iowa	Kam, Barbara	\$350,000	January 2002 - December 2004	IA
3	R829090Grant	Assessment of Extinction Risk in Dynamic Landscapes	With, Kimberly A.	Kansas State University	Senft, Amanda	\$219,415	October 2001 - October 2003	KS
4	R828772C004 Centers	Great Lakes, Mid-Atlantic, and Great Plains Hazardous Substance Research Center for Integrated Remediation Using Managed Natural Systems (CIRUMNS): A University/EPA/Industry Partnership	Banks, Margaret K.; Alleman, Jim; Bishop, Paul; Burken, Joel; Chapelle, Frank; Dutta, Sisir; Fitch, Mark; Gordon, Milton P.; Leven, Blaze; Love, Nancy; Newman, Lee; Novak, John; Reddi, Lakshmi; Rogstad, Steven; Rugh, Clayton; Schwab, A. Paul; Sham, Jodi R.; Stevens, Am; Widdowson, Mark	Kansas State University, Central State University, Haskell Indian Nations University, Howard University, Michigan State University, Purdue University - Main Campus, University of Cincinnati - Main Campus, University of Missouri - Rolla, Virginia Polytechnic Institute and State Univ	Lasat, Mitch	\$6,000,000	January 2000 - September 2005	KS
5	R828828Grant	Shaping Corporate Environmental Behavior and Performance: The Impact of Enforcement and Non-Enforcement Tools	Earnhart, Dietrich H.; Ebihara, Tatsuji; Glicksman, Robert; Halder-Markel, Donald	University of Kansas	Carrillo, Susan	\$341,234	December 2001 - November 2004	KS

Region 7

Active Projects:

- Science To Achieve Results (STAR) Grants
- Science To Achieve Results (STAR) Fellowships
- Small Business Innovation Research

August 19, 2002

#	Identifier	Abstract	Principal Investigator	Institution	Grant Representative	Grant Amount	Project Period	State
1	R828156Grant	Effect of the Gasoline Oxygenate Ethanol on the Migration and Natural Attenuation of BTEX Compounds in Contaminated Aquifers	Alvarez, Pedro J.J.	University of Iowa	Krishnan, S. Balu	\$194,878	January 2000 - May 2002	IA
2	R829600Grant	Development of Nanocrystalline Zeolite Materials as Environmental Catalysts: From Environmentally Benign Synthesis to Emission Abatement	Larsen, Sarah C.; Grassian, Vicki H.	University of Iowa	Kam, Barbara	\$350,000	January 2002 - December 2004	IA
3	R829090Grant	Assessment of Extinction Risk in Dynamic Landscapes	With, Kimberly A.	Kansas State University	Senft, Amanda	\$219,415	October 2001 - October 2003	KS
4	R828772C004 Centers	Great Lakes, Mid-Atlantic, and Great Plains Hazardous Substance Research Center for Integrated Remediation Using Managed Natural Systems (CIRUMNS): A University/EPA/Industry Partnership	Banks, Margaret K.; Alleman, Jim; Bishop, Paul; Burken, Joel; Chapelle, Frank; Dutta, Sisir; Fitch, Mark; Gordon, Milton P.; Leven, Blaze; Love, Nancy; Newman, Lee; Novak, John; Reddi, Lakshmi; Rogstad, Steven; Rugh, Clayton; Schwab, A. Paul; Sham, Jodi R.; Stevens, Am; Widdowson, Mark	Kansas State University, Central State University, Haskell Indian Nations University, Howard University, Michigan State University, Purdue University - Main Campus, University of Cincinnati - Main Campus, University of Missouri - Rolla, Virginia Polytechnic Institute and State Univ	Lasat, Mitch	\$6,000,000	January 2000 - September 2005	KS
5	R828828Grant	Shaping Corporate Environmental Behavior and Performance: The Impact of Enforcement and Non-Enforcement Tools	Earnhart, Dietrich H.; Ebihara, Tatsuji; Clicksman, Robert; Halder-Markel, Donald	University of Kansas	Carrillo, Susan	\$341,234	December 2001 - November 2004	KS

6	R829008	Grant	<u>Fate and Effects of Fluoroquinolone Antibacterial Agents in Aquatic Ecosystems</u>	Graham, David W.; Larive, Cynthia K.; Lydy, Michael; deNoyelles, Frank	University of Kansas	Nolt-Helms, Cynthia	\$520,976	August 2001 - August 2004	KS
7	R828211	Grant	<u>St. Louis: Monitoring Environmental Parameters in a Community at Risk</u>	Forlaw, Blair; Kindleberger, Charles; McGraw, Kevin; Pelli, Sonya; Reardon, Ken	East - West Gateway Coordinating Council	Stevens, Madalene	\$335,000	January 2000 - January 2001	MO
9	68D02022	SBIR	<u>Real-Time Analysis of Metals in Aqueous Waste Streams</u>	Thomas, Rhys N.	Fayette Environmental Services Inc.	Manager, SBIR Program	\$70,000	April 2002 - September 2002	MO
11	R829436	Grant	<u>Study of Phthalates in Pregnant Woman and Children</u>	Swan, Shanna H.	University of Missouri - Columbia	Reese, David H.	\$2,779,164	January 2001 - July 2005	MO
12	U915754	Fellow	<u>Fate and Transport of 17 B-Estradiol in Karst Aquifers of the Ozark Plateau</u>	Peterson, Eric W.	University of Missouri - St Louis	Boddie, Georgette		January 2000 - January 2003	MO
13	R828635	Grant	<u>Development and Implementation of a Comprehensive Lake and Reservoir Strategy for Nebraska as a Model for Agriculturally Dominated Ecosystems</u>	Holz, John C.; Bogardi, Istvan; Fritz, Sherilyn C.; Gitelson, Anatoly A.; Hoagland, Kyle D.; Merchant, James W.; Rundquist, Donald C.	University of Nebraska at Lincoln	Levinson, Barbara	\$1,224,706	January 2001 - December 2003	NE

Region 8

Active Projects:

- Science To Achieve Results (STAR) Grants
- Science To Achieve Results (STAR) Fellowships
- Small Business Innovation Research

August 19, 2002

#	Identifier	Abstract	Principal Investigator	Institution	Grant Representative	Grant Amount	Project Period	State
3	68D01058SBIR	High Capacity Sorbent for Removal of Mercury from Flue Gas	Turchi, Craig S.	ADA Technologies Inc.	Manager, SBIR Program	\$224,976	January 2001 - January 2003	CO
6	68D01060SBIR	Sample Conditioning System for Real-Time Mercury Analysis	Sjostrom, Sharon M.	Apogee Scientific Inc.	Manager, SBIR Program	\$225,000	January 2001 - January 2003	CO
9	R827449Grant	An Integrated Assessment of the Effects of Climate Change on Rocky Mountain National Park and its Gateway Community: Interactions of Multiple Stressors	Hobbs, N. Thompson; Baron, Jill S.; Coughenour, Michael B.; Covich, Alan; Loomis, John; Olima, Dennis; Stohlgren, Thomas J.; Theobald, David M.; Weller, Stephan; Cooper, David J.; McDuff, Mallory	Colorado State University	Manty, Dale; Turner, Vivian	\$894,846	January 1999 - September 2002	CO
10	R828636Grant	Hierarchical Physical Classification of Western Streams: Predicting Biological Condition in Terms of Key Environmental Processes Bridging Local to Ecoregional Scales	Bledsoe, Brian P.; Poff, N. LeRoy; Wohl, Ellen E.	Colorado State University	Levinson, Barbara	\$788,144	January 2001 - January 2004	CO
11	R828610Grant	Chlorotriazine Protein Binding: Biomarkers of Exposure & Susceptibility	Andersen, Melvin E.; Tessari, John D.	Colorado State University	Deener, Kacee	\$710,617	January 2000 - May 2003	CO

Region 8

Active Projects:

- Science To Achieve Results (STAR) Grants
- Science To Achieve Results (STAR) Fellowships
- Small Business Innovation Research

August 19, 2002

#	Identifier	Abstract	Principal Investigator	Institution	Grant Representative	Grant Amount	Project Period	State
3	68D01058SBIR	High Capacity Sorbent for Removal of Mercury from Flue Gas	Turchi, Craig S.	ADA Technologies Inc.	Manager, SBIR Program	\$224,976	January 2001 - January 2003	CO
6	68D01060SBIR	Sample Conditioning System for Real-Time Mercury Analysis	Sjostrom, Sharon M.	Apogee Scientific Inc.	Manager, SBIR Program	\$225,000	January 2001 - January 2003	CO
9	R827449Grant	An Integrated Assessment of the Effects of Climate Change on Rocky Mountain National Park and its Gateway Community: Interactions of Multiple Stressors	Hobbs, N. Thompson; Baron, Jill S.; Coughenour, Michael B.; Cowich, Alan; Loomis, John; Ojima, Dennis; Stohlgren, Thomas J.; Theobald, David M.; Weller, Stephan; Cooper, David J.; McDuff, Mallory	Colorado State University	Manty, Dale; Turner, Vivian	\$894,846	January 1999 - September 2002	CO
10	R828636Grant	Hierarchical Physical Classification of Western Streams: Predicting Biological Condition in Terms of Key Environmental Processes Bridging Local to Ecoregional Scales	Bledsoe, Brian P.; Poff, N. LeRoy; Wohl, Ellen E.	Colorado State University	Levinson, Barbara	\$788,144	January 2001 - January 2004	CO
11	R828610Grant	Chlorotriazine Protein Binding: Biomarkers of Exposure & Susceptibility	Andersen, Melvin E.; Tessari, John D.	Colorado State University	Deener, Kacey	\$710,617	January 2000 - May 2003	CO

12	R829095Grant	<u>Applying Spatial and Temporal Modeling of Statistical Surveys to Aquatic Resources</u>	Urquhart, N. Scott; Brelt, F. Jay; Davis, Richard A.; Gitelman, Alix I.; Herlihy, Alan T.; Hoeting, Jennifer A.; Iyer, Harsharan K.; Johnson, Stephen; Loftis, James C.; Reich, Robin M.; Ritter, Kerry J.; Stevens, Don L.; Theobald, David M.; Weisberg, Steven B.	Colorado State University, Oregon State University, Southern California Coastal Water Research Project Authority	Levinson, Barbara	\$2,998,331	January 2001 - September 2005	CO
13	R829429Grant	<u>Impact of Phthalates on the Male: Frog and Rabbit Models</u>	Rao Veeramachaneni, D. N.	Colorado State University	Deener, Kacey	\$852,709	January 2001 - September 2004	CO
14	68D01018SBIR	<u>Regenerable Catalytic Sorbents for the Removal of Mercury From Flue Gas</u>	White, James H.	Eltron Research Inc.	Manager, SBIR Program	\$69,996	April 2001 - September 2001	CO
15	68D01019SBIR	<u>Miniaturized Electrochemical Sensor for Cr(VI) in Groundwater and Surface Water</u>	Cepak, Veronica M.	Eltron Research Inc.	Manager, SBIR Program	\$69,999	April 2001 - September 2001	CO
17	68D01017SBIR	<u>Nontoxic Exotic Species/Organic Compound Waterway Contamination Control</u>	James, Patrick I.	Eltron Research Inc.	Manager, SBIR Program	\$69,994	April 2001 - September 2001	CO
20	68D00273SBIR	<u>Ionic Liquids as Alternative Solvents for Industrial Alkylation Chemistry</u>	Carter, Michael T.	Eltron Research Inc.	Manager, SBIR Program	\$224,997	January 2000 - January 2002	CO
21	68D02020SBIR	<u>Fiber Optic DNAPL Monitor</u>	Carter, Michael T.	Eltron Research Inc.	Manager, SBIR Program	\$69,996	April 2002 - September 2002	CO
22	68D00205SBIR	<u>A New Coating Method and Apparatus To Reduce Waste and Hazards in Plating</u>	Sunthakar, Mandar	IonEdge Corporation	Manager, SBIR Program	\$225,000	January 2000 - January 2002	CO

23	68D00276SBIR	<u>A Novel Approach To Prevention of Acid Rock Drainage (ARD)</u>	Olson, Gregory J.	Little Bear Laboratories Inc.	Manager, SBIR Program	\$224,941	January 2000 - January 2002	CO
26	68D01034SBIR	<u>Nano-Engineered Hazardous Metal-Free Electronic Components</u>	Hooker, Matthew; Yadav, Tapes	Nanomaterials Research Corporation	Manager, SBIR Program	\$70,000	April 2001 - September 2001	CO
27	68D99060SBIR	<u>Real-Time Analytical Technology for Environmental Applications</u>	Miremadi, Bijan	Nanomaterials Research Corporation	Manager, SBIR Program	\$70,000	January 1999 - January 2000	CO
29	68D00256SBIR	<u>AGCS Sensor for Gas Leak Detection</u>	Wamsley, Paula R.; Nelson, Loren D.	OPHIR Corporation	Manager, SBIR Program	\$69,958	January 2000 - January 2001	CO
31	68D00281SBIR	<u>An Improved Sorbent for Mercury Abatement</u>	Bell, William L.	TDA Research Inc.	Manager, SBIR Program	\$225,000	January 2000 - January 2002	CO
32	68D01045SBIR	<u>Nanocomposite Anchored Plasticizers</u>	Myers, Andrew	TDA Research Inc.	Manager, SBIR Program	\$70,000	April 2001 - September 2001	CO
33	68D02037SBIR	<u>Fluorine-Free Hybrid Surfactants for Fire-Fighting Foams</u>	Luebben, Silvia D.	TDA Research Inc.	Manager, SBIR Program	\$70,000	April 2002 - September 2002	CO
34	R828178Grant	<u>Lagrangian Modeling of Plume Dispersal in the Urban Boundary Layer</u>	Weil, Jeffrey C.	University of Colorado at Boulder, Cooperative Institute for Research in Environmental Sciences	Shapiro, Paul	\$172,773	January 2000 - August 2002	CO
35	R829010Grant	<u>Microbial Pathogen Removal During Riverbank Filtration</u>	Ryan, Joseph N.; Elimelech, Menachem; Harvey, Ronald W.	University of Colorado at Boulder, U.S. Geological Survey, Yale University	Nolt-Helms, Cynthia	\$506,006	January 2001 - August 2004	CO

Region 9

Active Projects:

- Science To Achieve Results (STAR) Grants
- Science To Achieve Results (STAR) Fellowships
- Small Business Innovation Research

August 19, 2002

#	Identifier	Abstract	Principal Investigator	Institution	Grant Representative	Grant Amount	Project Period	State
1	R827676Grant	<u>A Hierarchical Patch Dynamics Approach to Regional Modeling and Scaling</u>	Wu, Jianguo; Green, Douglas	Arizona State University - West, Arizona State University - Main Campus	Perovich, Gina	\$629,540	October 1999 - October 2002	AZ
2	R829623Grant	<u>A Nanocontact Sensor for Heavy Metal Ion Detection</u>	Tao, Nongjian	Arizona State University - Main Campus	Savage, Nora	\$375,000	January 2002 - December 2004	AZ
3	R828576Grant	<u>Community Water Quality Information System For A New And Sustainable Water Supply</u>	Pearthree, Marie S.; Chavez, Kathleen; Chesser, Sharyn; Davis, Stephen E.; Hines, Stefani; Johnson, Freda; Kaneen, Richard; MacNeill, Elizabeth; Matthewson, Charles H.; McGuire, Michael J.; Pepper, Ian L.; Rosen, Jeffrey S.; Wisrenga, Peter J.	Pima County Wastewater Management Department, University of Arizona	Stevens, Madalene	\$400,000	January 2001 - July 2002	AZ
4	R828168Grant	<u>Fundamentals of Mercury Speciation Kinetics: A Theoretical and Experimental Study</u>	Wendt, Jost O.L.; Blowers, Paul	University of Arizona	Shapiro, Paul	\$225,000	January 2000 - August 2002	AZ
5	R828732Grant	<u>Climatic and Human Impacts on Fire Regimes in Forests and Grasslands of the U.S. Southwest</u>	Morehouse, Barbara J.; Christopherson, Gary L.; Orr, Barron J.; Overpeck, Jonathan T.; Swetnam, Thomas W.; Yool, Stephen R.	University of Arizona	Manty, Dale	\$1,260,993	January 2000 - January 2003	AZ

6	R828826Grant	<u>Organizational Structures, Citizen Participation, and Corporate Environmental Performance</u>	Grant, Don	University of Arizona	Carrillo, Susan	\$35,123	January 2001 - May 2002	AZ
7	R827443Grant	<u>Vulnerability of Young Children to Organophosphate Pesticides and Selected Metals Through Intermittent Exposures in Yuma County, Arizona</u>	O'Rourke, Mary Kay; Aguirre A.; Freeman, Natalie C.G.; Lebowitz, Michael; Nishioka, M.	University of Arizona, Rutgers University	Saint, Chris	\$712,313	January 1999 - April 2002	AZ
8	R827150Grant	<u>Restoring and Maintaining Riparian Ecosystem Integrity in Arid Watersheds: Meeting the Challenge through Science and Policy Analysis</u>	Maddock, Thomas; Baker, Victor R.; Colby, Bonnie G.; Glennon, Robert J.; Stromberg, Julie; Rogers, James E.	University of Arizona, Arizona State University - Main Campus	Stelz, Bill	\$849,638	January 1999 - January 2002	AZ
9	R829013Grant	<u>Giardia/Cryptosporidium Transport and Fate During Subsurface Infiltration: Integrated Laboratory and Field Study</u>	Brusseau, Mark; Blanford, William; Gerba, Charles P.	University of Arizona	Noit-Helms, Cynthia	\$519,725	January 2001 - August 2004	AZ
10	68D01008SBIR	<u>Optical Monitor for Noninvasive, Chemical- and Size-Differentiated Characterization of Airborne Aerosols</u>	Lord III, Harry C.	Air Instruments and Measurements Inc.	Manager, SBIR Program	\$69,783	January 2001 - September 2001	CA
11	68D02010SBIR	<u>Instrument Development for Real-Time Measurement of Particulate Concentration and Primary Particle Size in Diesel Engine Exhaust Using a Novel Implementation of Laser-Induced Incandescence</u>	Bachalo, William D.	Artium Technologies Inc.	Manager, SBIR Program	\$69,992	January 2002 - September 2002	CA
12	R828292Grant	<u>Gene-environment interaction and human malformations</u>	Shaw, Gary M.; Carmichael, Suzan L.; Finnell, Richard H.; Lammer, Edward J.; Torfs, Claudine P.	California Birth Defects Monitoring Program	Deener, Kacey	\$3,373,557	January 2000 - June 2005	CA
14	68D99079SBIR	<u>Reburning With Additive Injection of High-Level NOx Control</u>	Benedict, Laksham	EERGC	Manager, SBIR Program	\$225,000	January 1999 - January 2001	CA
17	68D02028SBIR	<u>Combinatorial Screening of High-Efficiency Catalysts for Large-Scale Production of Pyrolytic Carbon Nanotubes</u>	Xiang, Xiao Dong	Intematix Corporation	Manager, SBIR Program	\$69,957	January 2002 - September 2002	CA

18	R827998Grant	<u>Health Effects of long-Term Exposure to Particles and Other Air Pollutants in Elderly Nonsmoking California Residents</u>	Knutsen, Synnove F.; Abbey, David E.; Beeson, Larry	Loma Linda University	Katz, Stacey; Robarge, Gail	\$763,910	January 2000 - February 2003	CA
19	68D01029SBIR	<u>A Membrane Process To Recover and Use Methane Emissions</u>	Costa, Andre Da	Membrane Technology and Research Inc.	Manager, SBIR Program	\$70,000	January 2001 - September 2001	CA
20	68D01028SBIR	<u>Recovery and In-Process Recycle of Product and Feedstocks From Oxo Plant Reactor Purge Gas</u>	Morisato, Atsushi	Membrane Technology and Research Inc.	Manager, SBIR Program	\$70,000	January 2001 - September 2001	CA
21	68D01030SBIR	<u>Combined Centrifugal Separator/Membrane Ultrafiltration System for Shipboard Treatment of Bilge and Ballast Water</u>	Mairal, Anurag	Membrane Technology and Research Inc.	Manager, SBIR Program	\$70,000	January 2001 - September 2001	CA
23	68D00277SBIR	<u>Recovery of Catalyst Vapors From Foundry Cold Box Core Machines</u>	Wijmans, J. G.	Membrane Technology and Research Inc.	Manager, SBIR Program	\$225,000	January 2000 - January 2002	CA
24	R828042Grant	<u>Development and Evaluation of Procedures for Detection of Infectious Microsporidia in Source Waters</u>	Rochelle, Paul A.; Leitch, Gordon; Visvesvara, Govinda	Metropolitan Water District of Southern California, Morehouse School of Medicine	Nolt-Helms, Cynthia	\$294,635	January 2000 - January 2002	CA
25	68D02034SBIR	<u>A New Compact Portable Field Instrument for Continuous Real-Time Measurement of Trace Organic Air Pollution Emissions Using Jet-REMPI Mass Spectrometry</u>	Margalith, Eli	OPOTEK Inc.	Manager, SBIR Program	\$69,995	January 2002 - January 2002	CA
26	68D00261SBIR	<u>A Portable Sensor for Minimizing Hazardous Waste in the Composite Prepreg Industry</u>	Prado, Pablo J.	Quantum Magnetix Inc.	Manager, SBIR Program	\$69,917	January 2000 - September 2001	CA
27	R827644Grant	<u>Integrative Indicators of Ecosystem Condition and Stress across Multiple Trophic Levels in the San Francisco Estuary</u>	Dugdale, Richard C.; Arp, Alissa J.; Bollens, Stephen Morgan; Julian, David; Kimmerer, Wim; Thompson, Janet K.; Wilkerson, Frances P.	San Francisco State University, Romberg Tiburon Center, U.S. Geological Survey, University of Florida	Senft, Amanda	\$881,062	January 1999 - September 2002	CA

28	R827927 Grant	<u>Characterization of Urban Air Toxics Sources in Support of HAPs Emission Control Strategies</u>	Coggiola, Dr. Michael J.; Crosley, Dr. David R.; Faris, Dr. Gregory W.; Oser, Dr. Harald	Sri International	Katz, Stacey; Robarge, Gail	\$506,742	January 1999 - November 2002	CA
29	R827634 Grant	<u>Processes Controlling the Chemical/Isotopic Speciation and Distribution of Mercury from Contaminated Mine Sites</u>	Brown Jr., Gordon E.; Grottmund, Daniel; Gustin, Mae Sexauer; Ireland, Trevor R.; Kim, Christopher S.; Rytuba, James J.; Lowry, Greg	Stanford University, University of Nevada - Reno, U.S. Geological Survey	Stelz, Bill	\$708,634	January 1999 - September 2002	CA
30	R829362 Grant	<u>Estimating Longitudinal Aggregate and Cumulative Exposure and Intake Dose for Young Children</u>	Leckie, James O.	Stanford University	Saint, Chris	\$540,709	January 2001 - September 2004	CA
31	R828193 Grant	<u>Products of Incomplete Combustion in the Incineration of Brominated Hydrocarbons</u>	Senkan, Sellm M.	UCLA	Shapiro, Paul	\$350,000	January 2000 - June 2003	CA
32	68D99073 SBIR	<u>Novel Catalytic Air Cleaner for Removal of VOCs and Particulates From Indoor Air</u>	Scott, David J.	Ultramet	Manager, SBIR Program	\$70,000	January 1999 - January 2000	CA
33	R827448 Grant	<u>Vulnerability Assessment of San Joaquin Basin Water Supply, Ecological Resources, and Rural Economy Due to Climate Variability and Extreme Weather Events</u>	Dracup, John A.; Grober, Leslie; Howitt, Richard; Oswald, William	University of California - Berkeley, Central Valley Regional Water Quality Control Board, University of California - Davis, University of California - Los Angeles	Manty, Dale; Turner, Vivian	\$859,654	January 1999 - June 2002	CA
34	R828827 Grant	<u>Tracking Deterrent Messages in Environmental Enforcement</u>	Kagan, Robert A.; Gunningham, Neil; Thornton, Dorothy	University of California - Berkeley	Carrillo, Susan	\$349,981	June 2001 - May 2003	CA
35	U915721 Fellow	<u>Prescribed Burning Impacts on Riparian and Stream Environments</u>	Rogers, Leah A.	University of California - Berkeley	Morehouse, Karen		January 2000 - January 2003	CA
36	R829597 Grant	<u>Computer-Aided Hybrid Models for Environmental and Economic Life-Cycle Assessment</u>	Horvath, Arpad; Eyerer, Peter; Hendrickson, Chris	University of California - Berkeley, Carnegie Mellon University, University of Stuttgart	Kam, Barbara	\$325,000	January 2002 - December 2004	CA

37	R829627Grant	<u>Electrolysis and Ion Exchange for the In Process Recycling of Copper from Semi-Conductor Processing Solutions</u>	Doyle, Fiona M.; Evans, James W.	University of California - Berkeley	Savage, Nora	\$325,000	January 2002 - December 2004	CA
38	R829612Grant	<u>The Use of Marketable Permits for Pesticide Control</u>	Zilberman, David	University of California - Berkeley	Clark, Matthew	\$175,217	January 2002 - January 2003	CA
39	R829665Grant	<u>Valuing Reduced Asthma Morbidity in Children</u>	Hanemann, Michael	University of California - Berkeley, University of Massachusetts - Amherst	Clark, Matthew	\$328,205	January 2002 - January 2003	CA
40	R827932Grant	<u>An Integrated Modeling Framework for Analyzing Wetlands Policies</u>	Weinberg, Marca; Wilen, James; Quinn, James	University of California - Davis	Clark, Matthew	\$125,000	January 1999 - September 2002	CA
41	R827404Grant	<u>Endocrine Disruption in Adolescence</u>	Golub, Mari S.; Gershwin, M. Eric; Hendrickx, Andrew G.	University of California - Davis	Reese, David H.	\$670,805	January 1999 - August 2002	CA
42	R828676Grant	<u>A Western Center for Estuarine Indicators Research which will Develop Indicators of Wetlands Ecosystem Health</u>	Anderson, Susan L.; Cherr, Gary N.; Morgan, Steven; Nisbet, Roger M.	University of California - Davis, University of California - Santa Barbara	Levinson, Barbara	\$5,998,221	January 2000 - September 2004	CA
43	R828038Grant	<u>Prevalence and Distribution of Genotypes of Cryptosporidium Parvum in Feedlot in the Western United States</u>	Atwill, Edward R.; Elmi, C.; Epperson, W.P.; Grotelueschen, D. M.; Hoar, Bruce; McCluskey, B.J.; Sischo, William M.; Smith, B.	University of California - Davis, South Dakota State University, University of Nebraska at Lincoln, Oklahoma State University - Main Campus	Nolt-Helms, Cynthia	\$248,461	January 2000 - March 2002	CA
44	R827442Grant	<u>Increased Vulnerability of Neonates to Naphthalene and its Derivatives</u>	Fanucchi, Michelle V.; Buckpitt, Alan; Plopper, Charles	University of California - Davis	Deener, Kacey	\$374,543	January 1999 - September 2002	CA
45	R827995Grant	<u>Health Effects of Concentrated Ambient Particles from the Central Valley of California</u>	Pinkerton, Kent E.; Sioulas, Constantinos	University of California - Davis, University of Southern California	Katz, Stacey; Robarge, Gail	\$633,328	January 2000 - January 2003	CA

46	R828896Grant	<u>Hybridization Between an Invasive Exotic and a Declining Native Amphibian: Molecular Characterization, Ecological Dynamics, and Genetic Remediation</u>	Shaffer, Howard B.; Fitzpatrick, Benjamin; Koenig, Walter D.; Voss, S. Randal	University of California - Davis	Senft, Amanda	\$433,708	August 2001 - August 2004	CA
47	R829215Grant	<u>Health Effects of Airborne Particulate Matter and Gases</u>	Pinkerton, Kent E.; Aust, Ann; Buckpitt, Alan; Kennedy, Ian M.; Lighty, JoAnn; Veranth, John	University of California - Davis, University of Utah, Utah State University	Katz, Stacey	\$833,481	January 2001 - September 2004	CA
48	U915768Fellow	<u>Influence of Aggregate Versus Dispersed Live Tree Retention on an Arboreal Forage Lichen</u>	Rambo, Thomas R.	University of California - Davis	Rosenthal, Sheila		January 2000 - January 2003	CA
49	R827398Grant	<u>Frog Deformities: Role of Endocrine Disruptors During Development</u>	Gardiner, David M.; Blumberg, Bruce	University of California - Irvine	Reese, David H.	\$1,194,536	January 1999 - September 2002	CA
50	R828011Grant	<u>Identification and Control of Non-Point Sources of Microbial Pollution in a Coastal Watershed</u>	Sanders, Brett; Horne, Alex; Keller, Robin; Sobsey, Mark D.; Grant, Stanley B.	University of California - Irvine, University of California - Berkeley, University of North Carolina at Chapel Hill	Stelz, Bill	\$895,234	January 2000 - July 2003	CA
51	R829439Grant	<u>Latent Effects of Gestational Exposure to Heptachlor</u>	Baker, Dean	University of California - Irvine	Reese, David H.	\$1,931,310	January 2002 - February 2005	CA
52	R827637Grant	<u>Developing an Indicator for Nutrient Supply In Tropical and Temperate Estuaries, Bays, and Coastal Waters Using the Tissue Nitrogen and Phosphorus Content of Macroalgae</u>	Fong, Peggy	University of California - Los Angeles	Senft, Amanda	\$399,335	January 1999 - July 2002	CA

53	R827352C001 <u>Centers</u>	<u>Southern California Center for Airborne Particulate Matter (SCCAMP)</u>	Froines, John R.; Avol, Edward L.; Cass, Glen; Cho, Arthur K.; Cohen, Yoram; Colome, Steven D.; Eastmond, David A.; Eldering, Annmarie; Friedlander, Sheldon; Gaudeman, William; Gong, Henry; Grosser, Stella C.; Hankinson, Oliver; Hinds, William C.; Kleinman, Michael T.; Nel, Andre E.; Peters, John M.; Phalen, Robert; Que Hee, Shane S.; Ritz, Beate R.; Sioutas, Constantinos; Thomas, Duncan C.; Turco, Richard; Venkatesan, M. Indira; Winer, Arthur M.; Yu, Rong Chun; Ziemann, Paul J.	<u>University of California - Los Angeles, California Institute of Technology, Rancho Los Amigos Medical Center, University of California - Irvine, University of California - Riverside, University of Southern California</u>	Katz, Stacey; Robarge, Gail	\$8,715,583	January 1999 - May 2004	CA
54	R829485Grant	<u>Not All Deaths are Created Equal: Understanding Individual Preferences for Reductions in Morbidity-Mortality Events</u>	DeShazo, J. R.; Cameron, Trudy	<u>University of California - Los Angeles</u>	Clark, Matthew	\$360,756	January 2001 - September 2003	CA
55	R828160Grant	<u>Biosensors for Field Monitoring of Organophosphate Pesticides</u>	Mulchandani, Ashok; Chen, Wilfred; Wang, Joseph	<u>University of California - Riverside, New Mexico State University</u>	Krishnan, S. Bala	\$227,169	January 2000 - May 2002	CA
56	R828173Grant	<u>Development of a Thermal Desorption Mass Spectrometric Method for Measuring Vapor Pressures of Low-Volatility Organic Aerosol Compounds</u>	Ziemann, Paul J.	<u>University of California - Riverside</u>	Shapiro, Paul	\$84,111	January 2000 - July 2002	CA
57	R828134Grant	<u>Zeolite Coatings by In-Situ Crystallization as an Environmentally Benign Alternative to Chromate Conversion and Anodization Coatings</u>	Yan, Yushan	<u>University of California - Riverside</u>	Richards, April	\$250,316	January 2000 - December 2002	CA
58	R828040Grant	<u>Development of a Rapid, Quantitative Method for the Detection of Infective Coxsackie and Echo Viruses in Drinking Water</u>	Yates, M. V.; Chen, Wilfred; Mulchandani, Ashok	<u>University of California - Riverside</u>	Nolt-Helms, Cynthia	\$321,784	January 2000 - September 2002	CA

59	R828901Grant	<u>Abiotic Controls on Invasive Species and Biodiversity: Comparison of Forest and Shrubland</u>	Meixner, Thomas; Allen, Edith B.; Fenn, Mark; Poth, Mark	University of California – Riverside	Senft, Amanda	\$448,122	July 2001 - July 2004	CA
60	R829404Grant	<u>Evaluation of Monoterpene Producing Plants for Phytoremediation of PCB and PAH Contaminated Soils</u>	Crowley, David E.; Borneman, James	University of California – Riverside	Lasat, Mitch	\$393,135	January 2001 - October 2004	CA
61	R829606Grant	<u>Nanoscale Biopolymers with Tunable Properties for Improved Decontamination and Recycling of Heavy Metals</u>	Chen, Wilfred; Matsumoto, Mark; Mulchandani, Ashok	University of California – Riverside	Karn, Barbara	\$390,000	January 2002 - January 2005	CA
62	R829619Grant	<u>Nanostructured Porous Silicon and Luminescent Polysiloxes as Chemical Sensors for Carcinogenic Chromium(VI) and Arsenic(V)</u>	Trogler, William C.; Sailor, Michael J.	University of California - San Diego	Savage, Nora	\$400,000	January 2002 - December 2004	CA
63	R829088Grant	<u>Individual Variability, Environmental Stressors, and Sampling Uncertainty in Wildlife Risk Assessment</u>	Kendall, Bruce E.; Fox, Gordon A.	University of California - Santa Barbara, University of South Florida	Senft, Amanda	\$426,954	January 2001 - August 2004	CA
64	R827999Grant	<u>Acute Cardiopulmonary Responses to Fine Particulate Pollution and Copollutant Oxidant Gase in Los Angeles</u>	Gong, Henry; Sloutas, Constantinos	University of Southern California, Rancho Los Amigos Medical Center	Katz, Stacey; Robarge, Gail	\$613,894	March 2000 - March 2003	CA
65	R828008Grant	<u>Integrating Coral Reef Ecosystem Integrity and Restoration Options with Watershed-based activities in the Tropical Pacific Islands and the Societal Costs of Poor Land-use Practices</u>	Richmond, Robert H.; Hamnett, Dr.Michael; Wolanski, Dr.Eric	University of Guam, University of Hawaii at Honolulu	Steiz, Bill	\$795,249	January 2000 - December 2002	GU
66	R829093Grant	<u>Habitat Degradation and Introduced Diseases Stress the Endangered Hawaii Akepa</u>	Freed, Leonard A.; Cann, Rebecca L.; Goff, Lee M.	University of Hawaii at Manoa	Senft, Amanda	\$510,375	January 2001 - June 2004	HI

Region 10

Active Projects:

- Science To Achieve Results (STAR) Grants
- Science To Achieve Results (STAR) Fellowships
- Small Business Innovation Research

August 19, 2002

#	Identifier	Abstract	Principal Investigator	Institution	Grant Representative	Grant Amount	Project Period	State
1	68D01043SBIR	<u>Development of Recycled Glass Paving Materials</u>	Kirby, Robert J.	Sandhill Industries	Manager, SBIR Program	\$62,300	January 2001 - September 2001	AK
2	68D99033SBIR	<u>Clean Internal Combustion Engine Emissions With Catalytic Ignition System and Water-Alcohol Fuels</u>	Cherry, Mark A.	Aqualytic Technologies Inc.	Manager, SBIR Program	\$70,000	January 1999 - January 2000	ID
3	R828158Grant	<u>Fundamental and Applied Chemistry Relevant to the Use of Humic</u>	Von Wandruszka, Ray	University of Idaho	Krishnan, S. Bala	\$188,697	January 2000 - June 2002	ID
4	R827931Grant	<u>Understanding Observed Differences in Time-Preference Rates</u>	Gregory, Robin; Slovic, Paul; Arvai, Joseph; Burns, Katie; Finucane, Melissa; Knetsch, Jack; Lichtenstein, Sarah; Peters, Ellen	Decision Science Research Institute Inc.	Clark, Matthew	\$228,463	September 1999 - September 2001	OR
5	R827639Grant	<u>Molecular Detection of Anaerobic Bacteria as Indicator Species for Fecal Pollution in Water</u>	Field, Katharine G.	Oregon State University	Senft, Amanda	\$223,829	January 1999 - October 2002	OR
6	R828309Grant	<u>Regional Analysis of Net Ecosystem Productivity of Pacific Northwest Forests: Scaling Methods, Validation and Results Across Major Forest Types and Age Classes</u>	Law, B. E.; Acker, S.; Cohen, W.; Daly, C.; Harmon, M. E.; Turner, D.; Unsworth, M.	Oregon State University	Perovich, Gina	\$1,848,927	January 2000 - June 2003	OR

7	<u>R828772C005C</u> <u>enters</u>	<u>Western Region Hazardous Substance Research Center for Developing In-Situ Processes for VOC Remediation in Groundwater and Soils</u>	Semprini, Lewis	Oregon State University	Lasat, Mitch	\$900,000	January 2001 - May 2006	OR
8	<u>R829096Grant</u>	<u>National Research Program on Design-Based/Model-Assisted Survey Methodology for Aquatic Resources</u>	Stevens, Don L.; Brelidt, F. Jay; Conquest, Loveday; Courbois, Jean-Yves; Gitelman, Alex; Herlihy, Alan T.; Hughes, Robert; Lesser, Virginia; Munoz-Hernandez, Breda; Murtaugh, Paul; Opsomer, Jean; Sifneos, Jean; Smith, Ruben; Urquhart, N. Scott	Oregon State University, Colorado State University, Iowa State University, University of Washington	Levinson, Barbara	\$2,989,884	October 2001 - October 2005	OR
9	<u>R829610Grant</u>	<u>Reappraisal of the Welfare and Policy Implications of Environmental Taxation with Preexisting Revenue-raising Taxes</u>	Jaeger, William K.	Oregon State University	Clark, Matthew	\$99,062	January 2002 - January 2005	OR
10	<u>R827898Grant</u>	<u>A nonparametric Bayesian approach for quantifying herbicide exposure in streams</u>	Qian, Song S.; Pan, Yangdong; Pratt, James R.	Portland State University	Fields, Nigel	\$166,519	November 1999 - November 2001	OR
11	<u>R828179Grant</u>	<u>A New Application of the Fundamental Physics of Atmospheric Pressure Ionization Mass Spectrometry to Ozone and Fine Particulate Formation Mechanisms</u>	O'Brien, R. J.; Atkinson, Dean B.	Portland State University	Shapiro, Paul	\$223,574	January 2000 - June 2002	OR
13	<u>R827454Grant</u>	<u>Impact of Climate on the Lower Yakima River Basin</u>	Vall, Lance; Branch, Kristi; Dauble, Dennis; Leung, L Ruby; Saxton, Keith; Scott, Mike; Stockle, Claudio; Wigmosta, Mark	Battelle Memorial Institute, Pacific Northwest Division, Washington State University	Manty, Dale	\$869,364	April 2000 - April 2003	WA
14	<u>R828044Grant</u>	<u>Bioavailability of Haloacetates in Human Subjects</u>	Schultz, Irvin R.; Bull, Richard J.; Poet, Torka; Shangraw, Robert	Battelle Memorial Institute, Pacific Northwest Division	Nolt-Helms, Cynthia	\$524,928	September 2000 - September 2003	WA
15	<u>R828039Grant</u>	<u>Detection of Emerging Microbial Contaminants in Source and Finished Drinking Water</u>	Chandler, Darrell P.; DeLeon, Ricardo	Battelle Memorial Institute, Pacific Northwest Division, Metropolitan Water District of Southern California	Nolt-Helms, Cynthia	\$517,818	January 2000 - January 2003	WA

16	R828608Grant	<u>Development of a Physiologically Based Pharmacokinetic/ Pharmacodynamic (PBPK/PD) Model to Quantitate Biomarkers of Exposure for Organophosphate Insecticides</u>	Timchalk, Charles; Campbell, James A.; Poet, Torka	Battelle Memorial Institute, Pacific Northwest Division	Deener, Kacee	\$733,174	January 2001 - December 2003	WA
18	68D00241SBIR	<u>Removal of Mercury and Other Heavy Metals of Industrial and Contaminated Site Waste Waters by Organic Chelation, Coprecipitation, and High Efficiency Particulate Removal</u>	Bloom, Nicolas S.; Hensman, Carl E.	Frontier Geosciences Inc.	Manager, SBIR Program	\$70,000	January 2000 - January 2001	WA
19	68D01062SBIR	<u>Removal of Mercury and Other Heavy Metals of Industrial and Contaminated Site Waste Waters by Organic Chelation, Coprecipitation and High-Efficiency Particulate Removal</u>	Bloom, Nicolas S.; Hensman, Carl E.	Frontier Geosciences Inc.	Manager, SBIR Program	\$225,000	January 2001 - September 2003	WA
20	68D02025SBIR	<u>A Portable Spectrometer for the Accurate Determination of Arsenic in Waters</u>	Gurleyuk, Hakan	Frontier Geosciences Inc.	Manager, SBIR Program	\$70,000	January 2002 - September 2002	WA
21	R828825Grant	<u>Normative, Social, and Calculated Motivations for Compliance: Marine Facilities and Water Pollution</u>	May, Peter J.	University of Washington	Carrillo, Susan	\$227,303	June 2001 - June 2004	WA
22	R827355Centers	<u>Northwest Research Center for Particulate Air Pollution and Health University of Washington</u>	Koenig, Jane Q.; Checkoway, Harvey; Clalborn, Candis; Covert, David; Kalman, Dave; Kaufman, Joel; Kavanagh, Terrance J.; Larson, Timothy V.; Liu, Sally; Luchtel, Daniel L.; Lumley, Thomas; Rosenfeld, Michael; Sheppard, Lianne; Siscovick, David	University of Washington, Washington State University	Katz, Stacey; Robarge, Gail	\$8,288,977	January 1999 - May 2004	WA
23	R827355C002C enters	<u>Health Effects of PM in Susceptible Populations</u>	Koenig, Jane Q.; Jansen, Karen; Kaufman, Joel; Larson, Timothy V.; Liu, Sally; Lumley, Thomas; Sheppard, Lianne; Sullivan, Jeff; Trenga, Carol; Budge, Matt; Mar, Therese; Schildcrout, Jonathan; Slaughter, C. W.	University of Washington	Katz, Stacey; Robarge, Gail	\$8,288,977	January 1999 - May 2004	WA

24	<u>R827355C003C enters</u>	<u>Personal PM Exposure Assessment</u>	Liu, Sally; Claiborn, Candis; Gundel, Lara; Larson, Timothy V.	University of Washington, Washington State University	Katz, Stacey; Robarge, Gail	\$8,288,977	January 1999 - May 2004	WA
25	<u>R827355C004C enters</u>	<u>Dosimetry Assessment: Aerosol Number, Size Distribution, and Dosimetry Measurements and Modeling</u>	Covert, David; Elléman, Rob; Kim, Eugene; Larson, Timothy V.	University of Washington	Katz, Stacey; Robarge, Gail	\$8,288,977	January 1999 - May 2004	WA
26	<u>R827355C001C enters</u>	<u>Epidemiologic Study of Particulate Matter and Cardiopulmonary Mortality</u>	Kaufman, Joel; Checkoway, Harvey; Koenig, Jane Q.; Sheppard, Lianne; Siscovick, David	University of Washington	Katz, Stacey; Robarge, Gail	\$8,288,977	January 1999 - May 2004	WA
27	<u>R827355C005C enters</u>	<u>Mechanisms of Toxicity of PM Using Transgenic Mouse Strains</u>	Luchtel, Daniel L.; Ladiges, Warren; Larson, Timothy V.; Lewtas, Joellen	University of Washington	Katz, Stacey; Robarge, Gail	\$8,288,977	January 1999 - May 2004	WA
28	<u>R827675Grant</u>	<u>Application of Remotely-sensed Data To Regional Analysis and Assessment of Stream Temperature in the Pacific Northwest</u>	Burges, Stephen J.; Booth, Derek B.; Gillespie, Alan R.	University of Washington – Seattle	Perovich, Gina	\$998,395	January 2000 - March 2003	WA
29	<u>R828606Grant</u>	<u>Saliva Bio-monitoring for Organophosphorus Pesticide Exposures in Children</u>	Fenske, Richard; Lu, Chun; Lu, Alex	University of Washington – Seattle	Deener, Kacey	\$742,597	January 2000 - August 2003	WA
30	<u>R827149Grant</u>	<u>Integrating Salmon Habitat Restoration and Flood Hazard Initiatives: Societal/Biophysical Estimators for the Cedar River and Implications for Regional Rivers</u>	Wissmar, Robert C.; Fluharty, David L.; Leschine, Thomas M.	University of Washington – Seattle	Stelz, Bill	\$749,991	January 1999 - January 2002	WA
31	<u>R827405Grant</u>	<u>Endocrine Disruptors and Testis Development</u>	Skinner, Michael K.	Washington State University	Reese, David H.	\$534,583	January 1999 - July 2002	WA
32	<u>R829406Grant</u>	<u>Physiological Mechanisms of Estuarine Sediment Oxidation by Spartina Cordgrasses</u>	Lee, Raymond	Washington State University	Lasat, Mitch	\$110,307	January 2001 - October 2004	WA

Regional Applied Research Effort (RARE) PROGRAM

The Regional Applied Research Effort (RARE) Program is one approach EPA takes to promote collaboration between the Regions and ORD. The goals of the program are to:

- Provide the Regions with near-term research on high-priority, Region-specific science needs;
- Improve collaboration between Regions and ORD Labs and Centers; and
- Build a foundation for future scientific interaction.

Annually, ORD provides about \$100,000 to each Region to develop a research topic. That topic is then submitted to a specific ORD laboratory or center as an extramural research proposal. Once approved, the research is conducted as a joint effort with ORD researchers and Regional staff working together to meet Region-specific needs. Each Region's Regional Science Liaison (RSL) coordinates RARE program activities and is responsible for ensuring the research results are effectively communicated and utilized in the Region.

Regional Applied Research Effort (RARE) PROGRAM

REGION 1 RARE PROGRAMS

Project Title	Lab/Center	Division	Year Project Initiated	Status
EPA New England Toxic Sediments Inventory.	NHEERL	AED	2001	Active
Immunochemical Methods Development and Evaluation.	NERL	ESD	1997	Active
Investigations into the Causes of Amphibian Malformations in the Lake Champlain Basin.	NHEERL	M-CED	2000	Active
Mercury cycling in New England estuaries: A collaborative study in Great Bay, New Hampshire.	NERL	ESD	1998	Active
The Role of Natural Processes Towards Arsenic Mobilization in Landfill Leachate Plumes, Central Massachusetts: An integrated Approach Employing GIS, Relational Databases, and Thermodynamic Chemical Equilibrium Modeling.	NRMRL	SPRD	2001	Active
Alternatives to Traditional On-site Wastewater Treatment: A Demonstration Project.	NRMRL	WSWRD	1991	Completed
Aquatic Macro-Invertebrates in Urbanizing Wetlands: Further Development of Wetland Water Quality Standards and Biological Criteria.	NHEERL	WED	1994	Completed
Assessment in Changes in the Chlorinated Organic Compound Concentrations in Endangered Whales.	NHEERL	AED	1993	Completed
Boston Harbor Ecosystem Recovery.	NHEERL	AED	1993	Completed
Development and Field Testing of Underwater Radiation Detection Instrumentation for use in Risk Assessment.	NERL	ESD	1992	Completed
Development of a Forest Canopy and Land Use Data System for Biogenic Hydrocarbons for Biogenic Hydrocarbons.	NRMRL	APPCD	1990	Completed
Evaluation of Remote Sensing Devices for the Purpose of Developing Cost-Effective and Accurate Emission Inventory Methods.	NCER	Peer Review	1995	Completed
Field Evaluation of Global Positioning Equipment.	NERL	ESD	1991	Completed
Field Test of NOAA/NURP Platform to Conduct Underwater Surveys for Assessing Risks.	NHEERL	AED	1992	Completed
Pilot Home Asthma Intervention Study in Boston Public Housing.	NRMRL	APPCD	1999	Completed

REGIONAL Applied Research Effort (RARE) PROGRAM

REGION 2 RARE PROGRAMS

Project Title	Lab/Center	Division	Year Project Initiated	Status
American Lobster Mortalities in Long Island Sound.	NHEERL	AED	2000	Active
Macroinvertebrate Protocols on Estuaries in New Jersey.	NHEERL	AED	2001	Active
Airborne Sources of Nitrogen Species and Toxic Particulates in the Waters of Long Island Sound.	NERL	AMD	1992	Completed
Development of Gene Probes for Detection of Crptosporidium Oocysts in Water.	NERL	MCEARD	1992	Completed
Historic Loading Estimates for Lake Ontario.	NHEERL	M-CED	1991	Completed
Identification of Organic Contaminants in Sediments.	NHEERL	AED	1994	Completed
Laboratory Directed Research and Development Project in Support of the New York and New Jersey Harbor Sediment Decontamination Program.	NRMRL	WSWRD	1997	Completed
Mercury Speciation Quality Control Procedures for Water, Soil, Sediment, and Tissue.	NRMRL	LRPCD	1993	Completed
Model Support for Study on Loadings in Lake Ontario.	NHEERL	M-CED	1990	Completed
Multilaboratory Comparison and Validation Study of Chlorophyll Methods.	NERL	MCEARD	1995	Completed
Puerto Rico Groundwater Tracing Study.	NCEA	NCEA WDC	1992	Completed
Relationship of THM Precursors in Source Water to Distribution Systems.	NRMRL	WSWRD	1999	Completed

REGIONAL Applied RESEARCH Effort (RARE) PROGRAM

REGION 3 RARE PROGRAMS

Project Title	Lab/Center	Division	Year Project Initiated	Status
Data Collection Manager Module of Region 3's Multi-criteria Integrated Resource Assessment (MIRA) Environmental Decision Making Approach.	NERL	ESD	2002	Active
Delaware Estuary PCB Model.	NERL	ERD	2001	Active
Environmental Consequences of the Use of Veterinary Antimicrobials in Concentrated Animal Feedlot Operations.	NHEERL	GED	1999	Active
Innovative Approaches to Improve the TMDL Process: Using Alternative Watershed Sampling Designs to Measure and Classify Exposure to Natural and Anthropogenic Determinants of Ecological Condition.	NERL	EERD	2001	Active
Innovative Approaches to TMDLs-Part 2.	NERL	EERD	2002	Active
Evaluation of Amphibian Malformations in the Lake Champlain Basin with the Vermont Department of Environmental Conservation.	NHEERL			Active
Phiesteria Piscicida Impacts.	NHEERL	ND	2000	Active
Response of Pfisteria Piscicida, Microbial Predators and Prey, and Fish to Common Dithiocarbamate Fungicides and Heavy Metals.	NHEERL	GED	1999	Active
Application of Geographic Information Systems to Environmental Health Needs Assessment.	NERL	HEASD	1995	Completed
Assessing Aerosol Acidity Exposure and Neutralization in Pittsburgh Metropolitan Area.	NERL	HEASD	1993	Completed
Chesapeake Bay Pesticides Index and Registry Project.	NHEERL	M-CED	1989	Completed
Collaborative Methods Development Work Between USGS and EPA in the Pocomoke River Basin MD and Neuse River Basin NC.	NHEERL	GED	1999	Completed

REGIONAL Applied RESEARCH Effort (RARE) PROGRAM

REGION 3 RARE PROGRAMS [continued]

Project Title	Lab/Center	Division	Year Project Initiated	Status
Development of the Scientific Basis for Promulgation of Bay-wide Dissolved Oxygen, Light Penetration, Nutrient and Suspended Sediment Water Quality Standards for Chesapeake Bay.	NHEERL	AED	1998	Completed
Ecoregion Index of Biological Integrity.	NERL	EERD	1992	Completed
Evaluation of Migration Techniques for Non-Radon Indoor Air Pollutants.	NRMRL	APPCD	1990	Completed
Evaluation of the Potential Impacts of Surface Mining Activities on Instream Ecological Resources.	NERL	EERD	1990	Completed
Investigations of the Effects of Cyclic Dissolved Oxygen on Estuarine Organisms.	NHEERL	AED	1993	Completed
NOx Control Technology Costs for Coal-Fired Boilers.	NRMRL	APPCD	1992	Completed
Risk Assessment of Habitat and Biodiversity in the Pocono Region of Pennsylvania.	NHEERL	WED	1992	Completed
Study of Environmental Equity Using Human Environmental Effects and Exposure Indicators.	NERL	HEASD	1994	Completed
Use of Biological Communities as Indicators of Nutrient Enrichment and Toxic Contamination in Middle Atlantic Coastal Estuaries.	NHEERL	AED	1997	Completed
Wetland Mapping and Assessment.	NERL	ESD	1989	Completed

Regional Applied Research Effort (RARE) PROGRAM

REGION 4 RARE PROGRAMS

Project Title	Lab/Center	Division	Year Project Initiated	Status
The Use of an Automated Ribotyping Assay for Identification and Source Tracking of Microbial Water Quality Indicators: A Florida Gulf Coast Ecosystem and Human Health Study.	NERL	MCEARD	2001	Active
Vertical Atmospheric Profile of Mercury Species Over South Florida.	NRMRL	APPCD	1999	Active
Development of Methods for the Detection of Speciated Mercury Emissions Using a Continuous Emissions Monitor.	NERL	HEASD	1996	Completed
Distribution and Control of Mercury Methylation in the Everglades.	NERL	ERD	1994	Completed
Identification and Control of Toxicity Sources in Industrial Discharges and Stormwater Runoff at Calvert City Industrial Complex.	NHEERL	M-CED	1990	Completed
Investigation on Specific Rates of Mercury Transformations as a Source of Methylmercury Contamination in the Florida Everglades.	NHEERL	GED	1991	Completed
Investigations to Determine the Minimum Dissolved Oxygen Requirements of Saltwater Animals Inhabiting Estuaries of the Gulf of Mexico and Southeast Atlantic Ocean.	NHEERL	AED	1992	Completed

REGIONAL Applied Research Effort (RARE) PROGRAM

REGION 5 RARE PROGRAMS

Project Title	Lab/Center	Division	Year Project Initiated	Status
Emissions Profile Characterization of Lake Michigan Pollutant Sources - Part I.	NRMRL	APPCD	2000	Active
Emissions Profile Characterization of Lake Michigan Pollutant Sources - Part II.	NERL	HEASD	2000	Active
Emissions Profile Characterization of Lake Michigan Pollutant Sources - Part III.	NERL	HEASD	2000	Active
Identifying and Predicting Diving Plume Behavior at Groundwater Sites Containing MTBE: Part 1 Supplemental Funding for Activities in FY 2002.	NRMRL	SPRD	2001	Active
Identifying and Predicting Diving Plume Behavior at Groundwater Sites Contaminated with MTBE: Part 1.	NRMRL	SPRD	2001	Active
Identifying and Predicting Diving Plume Behavior at Groundwater Sites Contaminated with MTBE: Part 2.	NRMRL	SPRD	2001	Active
Remediation of Radium from Contaminated Soil.	NRMRL	SPRD	1997	Active
Biochemistry and Genetics of Polychlorinated Biphenyl Degradation by Bacteria.	NERL	MCEARD	1990	Completed
Columbus Ohio Incinerator, Soil Dioxin Study.	NERL	ESD	1995	Completed
Feasibility Study for Treating PCB-Contaminated River Sediments in Steel-Making Blast Furnaces.	NRMRL	LRPCD	1990	Completed
Field Evaluation of Aquatic Ecosystems to Pesticide Stress.	NHEERL	M-CED	1991	Completed
Holding Times for Sediment Biotest Procedures.	NHEERL	M-CED	1993	Completed
Investigation of the Role of UV Radiation in Frog Malformations.	NHEERL	M-CED	1998	Completed
Model Assessment of the Annual Atmospheric Deposition of Toxic Metals to Lake Michigan.	NERL	AMD	1992	Completed
Saginaw Bay Targeting, Pollution Prevention and Source Reduction Project.	NERL	ESD	1994	Completed
Sediment and Fish Sample Analysis to Determine Historical Loadings for Lake Ontario for a Wide Range of Anthropogenic Organic Chemicals.	NHEERL	M-CED	1990	Completed

REGIONAL Applied RESEARCH Effort (RARE) PROGRAM

REGION 6 RARE PROGRAMS

Project Title	Lab/Center	Division	Year Project Initiated	Status
Ambient Air Toxics in Houston-Galveston Area with High and Low TRI Emissions - A Pilot Study of Temporal and Spatial Concentrations Using Passive Sampling Devices (PSDs).	NERL	HEASD	1999	Active
Ambient Air Toxics in Houston-Galveston Area with High and Low TRI Emissions - Phase II of A Pilot Study of Temporal and Spatial Concentrations Using Passive Sampling Devices (PSDs).	NERL	HEASD	2002	Active
Data Collection and Processing of Landscape Assessments in the White River Basin, AR.	NERL	ESD	2000	Active
Development of Preliminary Hydrology Calibration for Tensas River Basin with HSPF	NERL	ESD	1997	Active
Ecoregion Delineation in Texas.	NHEERL	WED	2002	Active
Bottlenose Dolphin Mortality in the Gulf of Mexico: Toxicological and Pathological Analysis.	NHEERL	AED	1991	Completed
Conduct a Synoptic Assessment of the White River and Yazoo River Basins in Arkansas.	NHEERL	WED	1994	Completed
Coupling Landscape Characterization and Water Quality Modeling in the Tensas River Basin as a Pilot for Understanding and Reducing Nutrient Impacts on Hypoxia in the Gulf of Mexico.	NERL	ERD	1998	Completed
Development and Evaluation of Borehole Flowmeter Techniques.	NRMRL	SPRD	1990	Completed
Development of a Geographic Information Data Network for Natural Resource Conservation in the Lower Mississippi Alluvial Valley in Arkansas.	NHEERL	WED	1995	Completed
Development of Pesticides Total Exposure Model for Region 6.	NERL	ESD	1992	Completed
Effects of Hydroperiod on Nitrification and Plant Growth.	NRMRL	SPRD	1994	Completed
Estimation of Population Exposure to Pesticides in Region 6 Using Exposure Models and Existing Databases.	NERL	ESD	1991	Completed
Field Comparison of Portable Gas Chromatographs.	NERL	MCEARD	1994	Completed
Iron Treatment of Lead-Contaminated Media.	NRMRL	LRPCD	1993	Completed
Landscape Assessment of the Tensas River Basin, LA.	NERL	ESD	1997	Completed
Manual on Microbial Rock Plant Filters - Region 6.	NRMRL	WSWRD	1992	Completed

REGIONAL Applied Research Effort (RARE) PROGRAM

REGION 7 RARE PROGRAMS

Project Title	Lab/Center	Division	Year Project Initiated	Status
Advanced Monitoring of Constructed Wetlands Performance in Nebraska.	NRMRL	WSWRD	1998	Active
Application of Biological Aerated Filters to Meet NPDES Ammonia Limits for Small Communities.	NRMRL	WSWRD	2001	Active
Ecoregionalization of Missouri and Development Map/poster of Level III and IV Ecoregions in of Missouri and Iowa.	NHEERL	WED	2000	Active
High Performance Side-Stream Nitrification of Municipal Biosolids Treatment Decants.	NRMRL	TTSD	2000	Active
Long-Term Detention for the Stabilization of Wastewater Biosolids for Small Communities.	NRMRL	TTSD	2001	Active
Pathogen Removal Characteristics in Constructed Wetlands Systems.	NRMRL	WSWRD	1999	Active
Production of Biopesticides from Wastewater Plant Biosolids.	NRMRL	TTSD	2002	Active
Urban Remote Sensing for Land Use Change and Impacts.	NERL	ESD	2001	Active
Agroecosystem Indicator Study - Region 7.	NERL	ERD	1991	Completed
Charcoal Kiln Emission.	NRMRL	APPCD	1997	Completed
Chronic Effects of Atrazine Background Levels on Platte River Algae.	NHEERL	M-CED	1994	Completed
Hydrologic Modeling of Cheyenne Bottoms Wetland.	NERL	ERD	1994	Completed
Investigation of Global Positioning Systems Single Frequency Hardware.	NRMRL	SPRD	1993	Completed
MicroWell Demonstration Project - Vadose Zone Investigation and Ground-Water Profiling Using Microwells at the North Landfill Subsite, Hastings, NE.	NRMRL	SPRD	1997	Completed
Missouri River Benthic Fish Study.	NHEERL	M-CED	1998	Completed
Regional Lead-Risk Reduction Initiative.	NERL	HEASD	1992	Completed

REGIONAL Applied RESEARCH Effort (RARE) PROGRAM

REGION 7 RARE PROGRAMS [continued]

Project Title	Lab/Center	Division	Year Project Initiated	Status
Spatial Metrics for Ecological Land Type Associations in Region 7.	NERL	ESD	1999	Completed
Study of the Effect of Redox Conditions for Transformation of Carbon Tetrachloride.	NRMRL	SPRD	1990	Completed
Study of the Role of Deep-Rooted Poplar Trees in Adding Organic Carbon to Soil for Pesticides and Toxic Organics Removal.	NERL	ERD	1990	Completed
The Fate and Degradation of the Herbicides Alachlor and Atrazine in Flooded Wetlands Seasonally.	NHEERL	M-CED	1993	Completed
The Fate of Atrazine in a Wet Meadow in the Central Platte Valley Alluvium of Nebraska.	NRMRL	SPRD	1994	Completed

REGIONAL Applied RESEARCH Effort (RARE) PROGRAM

REGION 8 RARE PROGRAMS

Project Title	Lab/Center	Division	Year Project Initiated	Status
Developing a Landscape Approach to Evaluation of Wetland Condition in the Southern Rocky Mountains: Phase I.	NHEERL	WED	2000	Active
Developing a Landscape Approach to Evaluation of Wetland Condition in the Southern Rocky Mountains: Phase II.	NHEERL	WED	2001	Active
Effects of Biosolids Application on Erosion Control and Ecosystem Recovery Following the Buffalo Creek Fire - Part I.	NRMRL	TTSD	1998	Active
Effects of Biosolids Application on Erosion Control and Ecosystem Recovery Following the Buffalo Creek Fire - Part II.	NRMRL	TTSD	2000	Active
Level IV Ecoregion Delineation for the State of Wyoming.	NHEERL	WED	2001	Active
Source Water Control within the Mary Murphy Mine.	NRMRL	STD	2000	Active
Accuracy and Effectiveness of the HC Channel of a Remote Emissions Sensor.	NERL	HEASD	1993	Completed
Assessment of the Functions and Values of Irrigated Wetlands in Region 8.	NHEERL	WED	1992	Completed
Crested Butte Woodstove Replacement Project.	NRMRL	APPCD	1989	Completed
Development and Potential Fate of Leachate at Small Landfills in the Arid West.	NRMRL	LRPCD	1993	Completed
Field-screening Methods for UST sites.	NERL	ESD	1989	Completed
Groundwater Sampling for Volatile Organics.	NRMRL	SPRD	1993	Completed
Montana Sub-ecoregion Delineation Phase I.	NHEERL	WED	1997	Completed
Montana Sub-ecoregion Delineation Phase II.	NHEERL	WED	1998	Completed
Montana Sub-ecoregion Delineation Phase III.	NHEERL	WED	2000	Completed
Nyland Homes Low Emission Residence Field Study.	NERL	HEASD	1992	Completed
Radon Mitigation in Mountain Residences.	NRMRL	APPCD	1993	Completed
Sub-Ecoregion Delineation - Utah.	NHEERL	WED	1999	Completed
Sub-Ecoregion Delineation for North Dakota/ South Dakota.	NHEERL	WED	1994	Completed
Use of Waste Heat to Increase the Mobility/Recovery of Light Nonaqueous-Phase Liquids (LNAPL).	NRMRL	SPRD	1994	Completed

REGIONAL Applied RESEARCH Effort (RARE) PROGRAM

REGION 9 RARE PROGRAMS

Project Title	Lab/Center	Division	Year Project Initiated	Status
Bioremediation of Mixed Vapor Phase Contaminants from Soils and Groundwater.	NRMRL	LRPCD	1999	Active
Development of a Field Sensor Method for detecting Perchlorate in Soil and Groundwater.	NERL	MCEARD	2001	Active
Evaluation of Dioxin-Like Emissions from Residential Wood Combustion.	NRMRL	APPCD	2001	Active
Human Exposure to Methyl Tertiary Butyl Ether (MTBE) While Bathing with Contaminated Water.	NERL	HEASD	1998	Active
Water Quality Effects of Dust Suppressants.	NERL	ESD	2000	Active
Applicability of New Marine Recreational Water Quality Standards in Guam.	NERL	ESD	1992	Completed
Assessment of Chronic Toxicity in California's Ambient Waters.	NHEERL	M-CED	1989	Completed
Bioavailability of Mercury to Fish in the Presence of Humic Substances in Clear Lake.	NHEERL	M-CED	1995	Completed
Development and Validation of a Year-round Acute Toxicity Bioassay for Hawaiian Ocean Discharges Using an Indigenous Fish Species.	NHEERL	GED	1992	Completed
Development of a 10-Day Amphipod Bioassay for Hawaii to Evaluate <i>Grandidierella Japonica</i> and <i>Corophium insidiosum</i> as Sediment Toxicity Test Species.	NHEERL	WED	1994	Completed
Development of a Water Quality and Systems Analysis of a Packaging Drinking Water Treatment Plant for Very Small Water Systems.	NRMRL	WSWRD	1991	Completed
Do Fecal Indicator Bacteria Multiply in the Soil Environments of Hawaii?	NRMRL	WSWRD	1995	Completed
Evaluation of Lower Truckee River Geomorphologic Response to Disturbance.	NERL	ESD	1994	Completed

REGIONAL Applied RESEARCH Effort (RARE) PROGRAM

REGION 9 RARE PROGRAMS [continued]

Project Title	Lab/Center	Division	Year Project Initiated	Status
Groundwater/Surface Water Interactions, Pilot Study: Still Water Basin in Western Nevada.	NERL	ESD	1993	Completed
Improved Methods for Collection and Interpretation of Data for Characterization at Hazardous Waste Sites.	NERL	ESD	1992	Completed
Model Correlation of Pesticide Usage and Atmospheric Residue for Assessing Risk and Minimizing Exposure.	NERL	HEASD	1997	Completed
Radon Prevention in New School Construction.	NRMRL	APPCD	1993	Completed
TIE Evaluation with the Mysid (<i>Holmesimysis costata</i>) Test.	NHEERL	WED	1994	Completed
TIE Evaluation with the Sea Urchin and Sand Dollar Tests.	NHEERL	WED	1994	Completed
Vernal Pool Creation and Restoration in California.	NHEERL	WED	1993	Completed

Regional Applied Research Effort (RARE) PROGRAM

REGION 10 RARE PROGRAMS

Project Title	Lab/Center	Division	Year Project Initiated	Status
Development of Arsenic Speciation Techniques For Edible Biota.	NERL	MCEARD	1997	Active
Diagnostic Evaluation of Air Quality Models Using Advanced Methods with Specialized Observations of Selected Ambient Species -Part II.	NERL	AMD	2002	Active
GIS Analysis to Characterize Wetland Patterns in Support of Modeling Native Amphibian Populations.	NHEERL	WED	1998	Active
Wetland Management and Lentic Amphibian Communities: The Role of Landscape Context, Hydrology and Exotic Species - Part I.	NHEERL	WED	1998	Active
Alaska North Slope Restoration Research Strategy Plan.	NHEERL	WED	1991	Completed
Blue Mountains Ecological Assessment (OR, WA, ID).	NHEERL	WED	1993	Completed
Columbia Basin Ecological Assessment (WA, OR, ID).	NHEERL	WED	1992	Completed
Effects of Sulfanylurea Herbicides on Fruit Development in Cherries.	NHEERL	WED	1991	Completed
Evaluation of Benthic Invertebrate Metrics for Region 10 Streams East of the Cascades.	NHEERL	WED	1994	Completed
Field Study of Ultra Violet Disinfection.	NRMRL	TTSD	1989	Completed
Freshwater Wetland Restoration and Creation Efforts: Application to Successful Mitigation Banking.	NHEERL	WED	1993	Completed
Log Yard Wastes as a Soil Amendment for the Revegetation Reclamation of Smelterville Flats in the Silver Valley of Idaho.	NRMRL	LRPCD	1991	Completed
Mapping Hydraulic Connection in Fractured Basalt Aquifers: Establishing Ground and Surface Water Links in the Deschutes Basin, Oregon.	NERL	ESD	1994	Completed
Methods to Monitor Groundwater/Surface Water Interaction in the Deschutes Basin, Oregon.	NERL	ESD	1995	Completed
Performance Evaluation of WYND Valley 3.o.	NERL	AMD	1989	Completed
Site Evaluation of Wetland Restoration Protocol in Pacific Northwest Estuaries.	NHEERL	WED	1990	Completed

Regional Applied Research Effort (RARE) PROGRAM

REGION 10 RARE PROGRAMS [continued]

Project Title	Lab/Center	Division	Year Project Initiated	Status
Stream Habitat Restoration in a Large River Basin: Prioritizing Rehabilitation Options Based on Degree of Disturbance and Recovery Time.	NERL	ERD	1996	Completed
Synoptic Approach to Wetland Designation.	NHEERL	WED	1989	Completed
Testing Macroinvertebrate Bioassessment Protocols for Use in Regional Assessments of Stream Ecological Condition.	NHEERL	WED	1992	Completed
TIE Evaluation Procedures for Bivalve Mollusks.	NHEERL	WED	1994	Completed
Vadose Zone Monitoring by Immunoassay Analysis for Evaluating the Effectiveness of Pesticide Best Management Practices.	NERL	ESD	1992	Completed

Regional Methods Program

The Regional Methods (RM) Program works similarly to EPA's RARE program in that it provides the Regions with near-term research support on high-priority, Region-specific science. But as RARE emphasizes the research as a whole, RM focuses on developing the methods necessary for the Regions to meet their monitoring and enforcement objectives.

Each year, ORD designates approximately \$700,000 to support RM. As part of the program, the Regional Science & Technology Directors sponsor an annual ranking of environmental measurement (method) needs from across the 10 Regions. Regional and ORD scientists jointly develop the individual research projects to address those needs, helping to improve the cooperation and understanding between the two groups.

Following are ongoing RM projects:

RM Region 1

Developing Methods for Biological Indicators in Transition Zones Between Aquatic Resources (NHEERL-AED)

RM Region 2

Rapid Biosurvey/Bioassessment Methods for Large Rivers (NERL-EERD)

Development of Whole Sediment Toxicity Identification and Evaluation Methods (NHEERL-MED/AED)

RM Region 3

Exploring the Efficiency and Capability of HRMS, LRMS, and ECD to Expanded Method 1668 or 8082 for PCBs and PBDE Congeners to Meet Regional Regulatory and Policy Needs (NHEERL-AED)

Arsenic Speciation Methods (NERL-ESD)

Development of Quantitative Index of Excessive Sedimentation (NHEERL-WED)

RM Region 4

Development of Analytical Methods for Alkylphenol Ethoxylates (NERL-HEASD)

Improved Air Sampling (NERL-HEASD)

Development of a Predictive Model for Toxicity of Metal Mixtures to Aquatic Fauna (NHEERL-MED)

RM Region 5

Development of Diagnostic Indicators of Stream Impairment Due to Nutrients (NHEERL-MED)

RM Region 6

Methods for Assessing Changes in Organisms Exposed to Contaminated Sediments (NERL-EERD)

Comparison of Sediment Elutriate Acute and Chronic Toxicity Testing with Ceriodaphnia and Fathead Minnows with Bulk Sediment Tests Using Hyalella azteca and Chironomus tentans (NERL-EERD)

Refinement of the Bivalve (*Mulinia lateralis*) Sediment Toxicity Test (NHEERL-GED)

RM Region 7

Indicators of Stream Stress Due to Fluctuations in Dissolved Oxygen Levels (NHEERL-WED)

Air Holding Times (NERL-HEASD)

VOCs in Solid Matrices (NERL-ESD)

Evaluation of the Importance of Pyrolysis By-Products on the Bioavailability of PAHs to Benthic Organisms (NHEERL-AED)

RM Region 8

Methods Development for Detection of pptV Concentrations of Selected VOCs (NERL-HEASD)

Pesticide Field Tests (NERL-ESD)

RM Region 9

No RM methods currently being utilized

RM Region 10

Re-evaluation of Applicability of Agency Sample Holding Times (NERL-ESD)

Upgrade of ESP Model for Estimating PM, PM₁₀, and PM_{2.5} Control Performance (NRMRL-APPC)

Regional Science Topic Workshops

Each year, the EPA sponsors its Regional Science Topic Workshop series. These educational seminars are conducted to establish a better cross-Agency understanding of the science applicable to specific Region-selected human health and/or ecological topics. They provide EPA scientists with direct access to a network of colleagues, which allows the continuous exchange of information and ideas as the Agency moves forward in research, risk management and further education.

As part of the program, the Regions can select up to three high-priority science issues for workshops every year. These workshops address those science issues of greatest importance to the Regions on the selected topic area. Each workshop is planned and conducted by a team of Regional, ORD, and other interested EPA scientists, led by a Regional chairperson, and

facilitated by one or more RSLs. Participants maintain the cross-Agency science networks they establish at the workshops through planned post-workshop projects and activities. These activities include the identification of collaborative research opportunities, creation of information-sharing mechanisms like interactive Web sites, and development of science fact sheets for Regional use.

During the past three years, workshops have been held on asthma, communicating ORD science, the Fully Integrated Environmental Location Decision Support (FIELDS) system, nonindigenous species, pesticides, endocrine disruptors, emerging pathogens, aquatic life criteria, critical ecosystems and air toxics. A cumulative risk workshop is scheduled for November 4-8, 2002, in Dallas, TX.

REGIONAL SCIENCE Topic Workshops

1999 Regional Science Workshops

"Asthma: The Regional Science Issues"

June 15 - 17, 1999 in Washington, DC

75 attendees, including 22 from ORD and 27 from the Regions

"Communicating Science Info-Fair"

October 27 - 28, 1999 in Washington, DC

36 on-site/31 off-site attendees, including 19 from ORD and 42 from the Regions

"FIELDS 2000" - The Fully Integrated Environmental Location Decision Support

January 19 - 20, 2000 in Chicago

Approximately 150 attendees from: EPA Regions, states, academia, and environmental/engineering consultants; 5 from ORD

"Regional Nonindigenous Species (NIS) Workshops" (5)

September 22, 1999 in Denver

October 20-21, 1999 in Chicago

November 9-10, 1999 in Tampa

December 14, 1999 in San Francisco

June 6-7, 2000 in Ft. Meade, MD

35 - 75 attendees at each workshop from EPA Regions, other federal agencies, and states

2000 Regional Science Workshops

"National Nonindigenous Species Workshop"

June 12 - 13, 2000 in Washington, DC

90 attendees, including 21 from ORD and 22 from the Regions

"Region/ORD Pesticides Workshop"

October 31 - November 2, 2000 in Chicago

116 attendees, including 33 from ORD and 73 from the Regions (21 via Placeware)

"Region/ORD Endocrine Disruptors Workshop"

May 1 - 3, 2001 in Atlanta

93 attendees, including 28 from ORD and 47 from the Regions (18 via Placeware)

2001 Regional Science Workshops

"Emerging Pathogens"

September 5 - 7, 2001 in Ft. Meade, MD

105 attendees, including about 40 from the Regions and 35 from ORD

"Aquatic Life and Piscivorous Wildlife Workshop"

December 4 - 7, 2001 in Seattle

95 attendees, including about 35 from the Regions and 25 from ORD

2002 Regional Science Workshops

"Critical Ecosystems"

June 17 - 20, 2002 at the Keystone Center, Co

72 attendees, including about 35 from the Regions and 18 from ORD

"Air Toxics Exposure Workshop"

June 25 - 27, 2002, in San Francisco

100 attendees, including about 50 from the Regions and 16 from ORD

"Cumulative Risk"

To be held November 4 - 8, 2002 in Dallas, TX

REGIONAL ENVIRONMENTAL MONITORING AND ASSESSMENT PROGRAM (R-EMAP)

The Environmental Monitoring and Assessment Program (EMAP) is a multi-pronged research approach to the development and utilization of ecological monitoring as a necessary and critical component of environmental management and protection. The Regional-EMAP program (R-EMAP) takes it a step further as each of the Agency's Regions and ORD works in partnership to evaluate and build on the EMAP approach. It's used as a tool for providing information on the condition of our nation's environment in a manner directly applicable to resource managers.

The goals of R-EMAP are to:

- Assist in incorporating the latest science on ecological monitoring into the Regional, state, tribal and local decision-making process;
- Advance the science of ecological monitoring as a tool for Regional, state and local problem formulation in risk assessments; and,
- Measure the ecological results of risk management option selection.

The R-EMAP program has helped develop and demonstrate important aspects of several new approaches, including alternative ways to design and analyze monitoring information. These alternatives provide results that are statistically valid and can be used to characterize environmental conditions at the Regional scale with known levels of confidence. Information from R-EMAP has also helped several states respond to listing and delisting requirements under Section 303(d) and reporting under Section 305 (b) of the Clean Water Act. More information about specific R-EMAP projects can be obtained by accessing the EMAP Web site (www.epa.gov/emap/remap).

Region-Specific Support, Includes:

Region 1 – Evaluating the condition of New England's Wadeable streams.

Region 2 – Conducting a New York/New Jersey harbor study, Cohansey-Maurice Watershed assessment, and an environmental assessment of Barnegat Bay, NJ.

Region 3 – Determining a watershed-based design frame for estimating the biotic integrity of West Virginia streams.

Region 4 – Conducting an assessment of the Everglades ecosystem and evaluating the condition of southeastern Wadeable streams.

Region 5 – Conducting an ecological assessment of invasive and aggressive plant species in the coastal wetlands of the Laurentian Great Lakes.

Region 7 – Conducting a probabilistic survey of Iowa stream resources and evaluating probability-based monitoring design within Missouri's statewide resource assessment and monitoring program.

Regions 8, 9 and 10 – Developing reference conditions and use of intensification sites in the EMAP Western Pilot Design.

Superfund Site Support

Region One

ORD works closely with each Region to support the cleanup of contaminated Superfund sites. Specifically, it provides site-specific technical support for characterization, modeling, monitoring, assessment and remediation of contaminated sites under Superfund, and in some cases, under RCRA Corrective Actions. Information on Region-specific support is detailed below, followed by a detailed overview of those specific elements under the "Contaminated Site – Site-Specific Technical Support" umbrella.

Region 1 Superfund Support:

Groundwater/Vadose Zone Sampling for VOCs (Raymark Site, Stratford, CT) – ORD and Region 1 are working together to evaluate the migration pathways and upward movement of organic vapors from the groundwater through the vadose zone, and ultimately, into the basements of adjacent homes. The initial phase included technical and advisory support primarily around activities at the Raymark Site. The contractor-proposed work plan was reviewed along with the final report for design and installation of mitigation systems to reduce VOC contaminants in affected buildings. Work is now under way to evaluate and design mitigation systems for four more houses. At a less urgent pace, 80 additional houses in the same development are being evaluated for potential indoor air contamination resulting from the contaminated groundwater. These results will be used to correlate with other data (i.e., air, soil gas) to better assess predictive transport models. Additionally, the ORD Ground Water Technical Support Center is developing a protocol for sub-slab testing to support assessment and mitigation of vapor intrusion. This protocol incorporates vapor sampling and air permeability testing. (NRMRL)

Hexachloroxanthene Consultation (Centerdale Superfund Site, North Providence, RI) – This site is contaminated with TCDD and high levels of a hexachloroxanthene. Hexachloroxanthene is "dioxin-like" in structure. Bioaccumulation and toxicity testing were completed with ORD's technical guidance. This process was used to determine if hexachloroxanthene should be of concern in the remediation of the site. (NHEERL)

PCB Dermal Absorption Evaluation (Housatonic River Superfund Site, Pittsfield, MA) – Since summer of 2001, ORD has been helping evaluate the dermal absorption of PCBs from contaminated sediments. This has included the review of a primate study contracted by GE. ORD, GE and Regional representatives met in November to discuss the study and follow-up experiments. (NCEA)

Contaminated Sediment Modeling – ORD has provided contaminated sediment modeling in support of the Housatonic River site clean-up efforts. This includes advising the RPM and appropriate modeling contractors on: 1.) significant sediment transport mechanisms that affect the transport of sorbed PCBs, e.g., bedload transport, settling; 2.) model grid needed to simulate both in-bank and out-of-bank events for evaluation of proposed remedial alternatives; and 3.) model development needed to simulate the significant physico-chemical processes affecting PCB transport. (NERL)

MNA Assessment Potential for Arsenic (Woburn Site, Woburn, MA) – The recently completed project supported the Industriplex Superfund Site cleanup. It focused on assessing the monitored natural attenuation (MNA) potential for arsenic for the past three years. New scientific information was learned during the study regarding associations of arsenic with different iron minerals as well as improved methods to characterize sites for MNA for arsenic. Successful completion of this project will directly assist the Region in determining what actions are required to clean up the site. Several publications are anticipated from this effort. (NRMRL)

Risk-Based Sediment Quality Guidelines for PAH Mixtures – At a Region 1 Superfund site, sediments were contaminated with a complex mixture of PAHs. ORD applied newly developed methods on assessing the risk of PAH mixtures in sediments. This work will aid the Region in developing risk-based numerical guidelines for use in the site ecological risk assessment. (NHEERL)

Chlorinated Solvents/Petroleum Hydrocarbons Recovery (Loring AFB) – A field scale demonstration of steam injection into fractured bedrock for the

Superfund Site Support

recovery of chlorinated solvents and petroleum hydrocarbons is being conducted by the Maine Department of Environmental Protection, EPA Region 1, EPA ORD (SITE program), and the Loring AFB Conversion Agency. This project has included extensive characterization of the fractured bedrock system in preparation for the steam injection that will begin mid-August, 2002. The steam injection is expected to recover a significant amount of the contaminant mass residing in the fracture network. (NRMRL/NERL)

Identification of Sediment Toxicants – Sediments were known to be toxic at one Region Superfund site, but the specific causes were undetermined. The toxicity was correlated with concentrations of several chemicals. By applying newly developed identification methods, it was determined that dieldrin caused the toxicity to midge larva. This enabled the Region to design remedial action goals focused specifically on those chemicals responsible for toxicity. (NHEERL)

Hazardous Substance Research Centers – The Center for Hazardous Substances in Urban Environments was established to address contaminants and sources that are known to be prevalent in urban environments. Focusing on the upper mid-Atlantic to the Northeast, the mission of this Center is twofold: 1.) to promote a better understanding of physical, chemical and biological processes for detecting, assessing and managing risks associated with the use and disposal of hazardous substances in urban environments; and, 2.) to disseminate the results of the Center's research and provide technical expertise to various stakeholders including community groups, municipal officials, EPA, state and local regulators, and industry. Research will focus on emissions of mercury, other toxic metals and organic compounds from incinerators, landfills and Brownfields sites; chromium, arsenic, nickel, zinc and cadmium in waters and soils; and hydrophobic organic compounds in waters, soils and sediments. The Center's outreach components will foster partnering with stakeholders to encourage two-way flow of information regarding urban environmental issues and decisions concerning risk assessment and management. Examples include a

community advisory board, Regional workshops, high school internships and an interactive multimedia CD-ROM, environmental assessment of Brownfields sites in Baltimore, and the maintenance of a professionally designed Web site to foster Internet sharing of activities and results. (NCER)

Soil Venting Assessment (Picillo Farm Site, Coventry, RI) – The ORD Ground Water Technical Support Center is assessing the long-term effectiveness of a soil venting system. The Picillo Farm soil venting system is probably the most carefully scrutinized and monitored venting system in the United States. (NRMRL)

Operational and Long-Term Monitoring (New Bedford Harbor Superfund Site) – During the last 15 years, ORD, in conjunction with EPA Region 1 and others, has developed and participated in multiple operational and long-term monitoring programs at this site. Collectively, these monitoring and associated research activities included, deployment of mussels, subsequent chemical analysis of those mussels in and around New Bedford Harbor (PCB bioaccumulation), and a historical assessment of New Bedford Harbor. This research has provided the Region with state-of-the-art techniques to most effectively and safely manage this \$350 million remediation. (NHEERL)

Modeling Effort Reviews (Dover Landfill Site, Dover, NH) – Currently ORD's Ground Water Technical Support Center is reviewing and commenting on ongoing modeling efforts at the site. Future research related to evaluating groundwater/surface water relationships is planned. This will involve the installation of temporary small diameter piezometers to evaluate hydraulic head variations with depth in the vicinity of a wetlands area and seeps associated with the Cocheco River. (NRMRL)

Biofilter Phytobed Assistance (Resolve Site, North Dartmouth, MA) – This project includes technical support on the biofilter phytobed (BFPB). The BFPB is an innovative technology that involves pumping and treating of groundwater containing chlorinated compounds into an at-grade phytoremediation treatment cell. The cell is specifically designed for

Superfund Site Support

anaerobic and aerobic treatment. Pilot-scale construction is underway. (NRMRL)

Natural Attenuation Evaluation (Camp Edwards/Otis Air Force Base, Cape Cod, MA) – The Regional RPM requested ORD provide assistance in evaluating the feasibility of implementing natural attenuation. It is being reviewed as the remedial remedy for groundwater contamination at this site. (NERL)

Elizabeth and Ely Mines – Engineering Technical Support Center staff has worked with the RPM, the State, the Army Corps of Engineers and several other groups on various remedial alternatives for these sites. A team of outside experts in anaerobic and aerobic treatment systems reviewed the sites for two days, discussing the pros and cons of semi-passive remediation with the core team. This expertise helps the team decide which alternative may be the most feasible, and what steps are necessary over the next two years to implement them. (NRMRL)

SITE Demonstrations – One ORD goal is to identify, demonstrate, assess and disseminate information about innovative and alternative environmental monitoring, measurement and characterization technologies, and innovative and alternative remediation technologies. This information is passed along to developers, remediation site managers and regulators. It fosters the development of lower cost characterization and monitoring technologies and remediation technologies for soil, soil gas, sediment, surface water and groundwater. The current list of Regional needs for characterization and monitoring includes biosensors for chlorinated solvents, geophysical techniques for the non-invasive determination of dense non-aqueous phase liquids (DNAPLs) in the subsurface, technologies to determine water quality parameters such as dissolved oxygen, ecological sampling devices, and field toxicity tests. A reassessment of EPA Regional needs is planned in FY03 and selected technologies/needs will be given high priority in the selection of future SITE demonstrations. Current priorities for remediation technologies, which are revised annually by a broad stakeholder group, focus on sites that have contaminated sediments, DNAPLs, acid mine drainage, manufactured gas plants and pesticides sites. Priority contaminants include chlorinated solvents, PCBs, PAHs and metals. For Region 1, the FY02 SITE Program is either currently conducting or completing field demonstrations at

three sites. All three technologies, in three different states, are designed to treat chlorinated solvents in-situ. (NERL and NRMRL)

Contaminated Sediment Mass Fate and Transport Models Evaluation – This effort will describe the currently available sediment/contaminant fate and transport models. The highest ranked models will be evaluated for multiple classes of receiving waters. Where weaknesses are identified during the model evaluation, modules will be enhanced or created for the top-ranked contaminated sediment fate and transport models for major water resource classes. Possibilities include simulations for groundwater advective flow under and through a cap, compressive effects of adding additional mass to the underlying sediments from a cap, natural gas escaping from the organic compounds in the sediments, and cap scour and displacement. (NERL)

Support Via Technical Review Workgroup – ORD provides support to all regions through the Technical Review Workgroup. This group assists Regional risk assessors in the application of the Integrated Exposure Uptake Biokinetic model for lead in children and to the Combustion Technical Assistance Center. (NCEA)

Other Region 1 Superfund Support:

- Reviewed a groundwater closure plan for Union Chemical site in South Hope, ME. (NERL)
- Reviewed aquifer models that are and/or will be used to determine appropriate remedial approaches for the Savage Well Municipal Water Supply in Milford, NH. (NERL)
- Conducting measurements of toxic emissions from a New Hampshire landfill used by children as a soccer field. (NRMRL)
- On-site testing and evaluation to determine air pathways of potential pollutants at old Superfund sites. (NRMRL)
- Support for cleanup of Solvent Recovery Services, Silresim and Brownfields sites. (NRMRL)
- Developing approach to incorporate bioavailability in site-specific risk assessments and treatment performance. (NRMRL)
- Will soon be conducting field evaluations at appropriate sites, and developing design, operation and monitoring approaches for landfill bioreactors. (NRMRL)

Superfund Site Support

Region Two

ORD works closely with each Region to support the cleanup of contaminated Superfund sites. Specifically, it provides site-specific technical support for characterization, modeling, monitoring, assessment and remediation of contaminated sites under Superfund, and in some cases, under RCRA Corrective Actions. Information on Region-specific support is detailed below, followed by a detailed overview of those specific elements under the "Contaminated Site – Site-Specific Technical Support" umbrella.

Region 2 Superfund Support:

World Trade Center Assistance – The events of September 11, 2001, had a significant impact on Region 2 as concerns arose surrounding air pollution and health effects. Activities included monitoring, conducting a study on the toxicological effects of fine Particulate Matter, modeling of the fire and debris plume, and evaluation of the resulting environmental pollution.

Following are more detailed overviews:

- Sampling was conducted of the dust and air at various locations surrounding the WTC disaster site. Dust samples were analyzed for particle constituents. Air samples were analyzed for semi-volatiles, volatiles, dioxins and furans. These analyses examined the potential effects of the fire and debris plume. (NERL)
- A study was conducted using laboratory mice to determine how exposure to the contaminants measured and collected in lower Manhattan may cause adverse health effects. (NHEERL)
- The plume of dust and burning debris from the WTC was reconstructed to model, and possibly predict, the levels of contaminants that were present in the air immediately following the towers collapse. Monitoring and meteorological data will be used to estimate exposures. (all ORD laboratories with academic institutions)

- Currently ORD is in the process of evaluating environmental pollution from the WTC disaster through a draft and final report. These reports will discuss the monitoring results, uncertainties associated with the data, and possible data gaps in an attempt to begin to characterize the possible health concerns of potentially exposed individuals. A more extensive evaluation of additional data will be included in a report projected to be available late spring 2003. (NCEA)

Other WTC support, includes:

- Preparing fact sheets on PM Health Effects of Lower Manhattan and NYC area for posting on EPA public Web site.
- Determining siting of air pollution monitors in Lower Manhattan to augment data collection for risk evaluation of air emissions from Ground Zero.
- Providing advice on health benchmarks used as criteria for evaluating potential hazardous exposures to air pollutants in lower Manhattan area.
- Providing preliminary evaluation of then available air pollution monitoring data to ascertain if air pollution values for particulate matter, its sub-constituents (e.g., lead, other metals, dioxin, etc.), or other volatile organic compounds exceeded (a) typical background levels for NYC/other urban areas; or, (b) health benchmark values indicative of increased health risk for chronic exposure effects.

Treatment at Active Manufacturing Building (Olean Site) – ORD is working with Region 2 to determine the optimal treatment technique for a dense nonaqueous phase liquid (DNAPL) source located under an active manufacturing building at the Olean Site, south of Buffalo, NY. This project led to a DNAPL Recovery under an active manufacturing building in Region 9. ORD has actively worked on the Olean site for nine years. (NRMRL)

Long Island Aquifer Gasoline Component Fate and Transport Evaluation – This project provides information on contaminant behavior and for the development of field data evaluation approaches.

Superfund Site Support

This information is also used by the state to develop improved site assessment approaches. Some results have been encapsulated into the online calculators at <http://www.epa.gov/athens/onsite>. These calculators have been used in many states, EPA Regions and the private sector. The ultimate product is software "Tools for Analysis of Contaminated Sites (TACS)" that evaluates data using a coordinated data management system and suite of models. (NERL)

Hazardous Substance Research Centers – The Center for Hazardous Substances in Urban Environments was established to address contaminants and sources that are known to be prevalent in urban environments. Focusing on the upper mid-Atlantic to the Northeast, the mission of this Center is twofold: 1.) to promote a better understanding of physical, chemical and biological processes for detecting, assessing and managing risks associated with the use and disposal of hazardous substances in urban environments; and, 2.) to disseminate the results of the Center's research and provide technical expertise to various stakeholders including community groups, municipal officials, EPA, state and local regulators, and industry. Research will focus on emissions of mercury, other toxic metals, and organic compounds from incinerators, landfills and Brownfields sites; chromium, arsenic, nickel, zinc and cadmium in waters and soils; and hydrophobic organic compounds in waters, soils and sediments. The Center's outreach components will foster partnering with stakeholders to encourage two-way flow of information regarding urban environmental issues and decisions concerning risk assessment and management. Examples include a community advisory board, Regional workshops, high school internships, and an interactive multimedia CD-ROM, environmental assessment of Brownfields sites in Baltimore, and the maintenance of a professionally designed Web site to foster Internet sharing of activities and results. (NCER)

Injection-Extraction Soil Venting (Solvent Savers Site) – ORD has actively worked on this site for six years, assisting Region 2 in assessing the performance of an injection-extraction soil venting project. A 3-D interpolation was used to distinguish reduction, rather than homogenization, for the injection-extraction nature of the system. (NRMRL)

The Remediation Technologies Development Forum – Under the leadership of the Technology Innovation Office, OSWER has sites in Regions 2, 3, 5, 6, 7, 9, 10. Work is progressing to determine hydrocarbon degradation by phytotechnologies using a standard protocol. (NRMRL)

SITE Demonstrations – One ORD goal is to identify, demonstrate, assess and disseminate information about innovative and alternative environmental monitoring, measurement and characterization technologies, and innovative and alternative remediation technologies. This information is passed along to developers, remediation site managers and regulators. It fosters the development of lower cost characterization and monitoring technologies and remediation technologies for soil, soil gas, sediment, surface water and groundwater. The current list of Regional needs for characterization and monitoring includes biosensors for chlorinated solvents, geophysical techniques for the non-invasive determination of dense non-aqueous phase liquids (DNAPLs) in the subsurface, technologies to determine water quality parameters such as dissolved oxygen, ecological sampling devices and field toxicity tests. A reassessment of EPA Regional needs is planned in FY03 and selected technologies/needs will be given high priority in the selection of future SITE demonstrations. Current priorities for remediation technologies, which are revised annually by a broad stakeholder group, focus on sites that have contaminated sediments, DNAPLs, acid mine drainage, manufactured gas plants and pesticides sites. Priority contaminants include chlorinated solvents, PCBs, PAHs and metals. For Region 2, the SITE Program completed a GIS technology demonstration in FY02. (NERL and NRMRL)

Contaminated Sediment Mass Fate and Transport Models Evaluation – This effort will describe the currently available sediment/contaminant fate and transport models. The highest ranked models will be evaluated for multiple classes of receiving waters. Where weaknesses are identified during the model evaluation, modules will be enhanced or created for the top-ranked contaminated sediment fate and transport models for major water resource classes. Possibilities include simulations for groundwater advective flow under and through a cap, compressive effects of adding additional mass to the underlying

SUPERfund Site Support

sediments from a cap, natural gas escaping from the organic compounds in the sediments, and cap scour and displacement. (NERL)

Support Via Technical Review Workgroup – ORD provides support to all Regions through the Technical Review Workgroup. This group assists Regional risk assessors in the application of the Integrated Exposure Uptake Biokinetic model for lead in children and to the Combustion Technical Assistance Center. (NCEA)

Other Region 2 Superfund Support:

- Ongoing phytotechnology work on Kin-buc Landfill SF site in Edison, NJ (NRMRL)
- Reviewed a remedial design work plan for a contaminated bedrock bioremediation system at Caldwell Trucking in Fairfield Township, NJ. (NERL)
- Computed the EPC Risk Term at Cornell Dubilier Electronics in South Plainfield, NJ. (NERL)
- Reviewed a suggested Creel/Angler survey at Diamond Alkali in Newark, NJ. (NERL)
- Evaluated the geostatistical approaches used by the PRPs at Hillards Creek/Sherwin Williams in Gibbsboro, NJ. (NERL)
- Developing approach to incorporate bioavailability in site-specific risk assessments and treatment performance. (NRMRL)
- Will soon be conducting field evaluations at appropriate sites, and developing design, operation and monitoring approaches for landfill bioreactors. (NRMRL)

SUPERFUND SITE SUPPORT

REGION THREE

ORD works closely with each Region to support the cleanup of contaminated Superfund sites. Specifically, it provides site-specific technical support for characterization, modeling, monitoring, assessment and remediation of contaminated sites under Superfund, and in some cases, under RCRA Corrective Actions. Information on Region-specific support is detailed below, followed by a detailed overview of those specific elements under the "Contaminated Site – Site-Specific Technical Support" umbrella.

Region 3 Superfund Support:

Landfill Gas Extraction (Keystone, PA & Pittsburgh, PA) – ORD is supervising an enhanced landfill gas-extraction removal system from a former landfill north of Baltimore, MD. It has actively worked on this site for four years. This year, ORD has also begun assisting with the design and construction of an enhanced landfill gas recovery system at the Bettis RCRA Site near Pittsburgh. (NRMRL)

PCB Conversion Proposal Review – Currently a proposal is under review that calls for converting PCB-contaminated material into feedstock at the Eastern Diversified Metals Superfund Site. Preliminary analysis suggests the polymeric reactions required to destroy or encapsulate the PCBs are not possible. (NCEA/OSP)

Dioxin Investigation (Metachem Industries/Standard Chlorine of Delaware) – ORD is currently planning to develop a sampling plan for investigating dioxin in soils and sediments at Metachem Industries/Standard Chlorine of Delaware. (NERL/OSP)

Bioventing Studies (New Castle, DE) – For the past six years, ORD has studied the bioventing system at the Delaware Sand & Gravel Site, near New Castle, DE. A 3-D interpolation was used to distinguish reduction, rather than homogenization, for the injection-extraction nature of the system. (NRMRL)

Monitoring Study Development – ORD has consulted with the Region about developing monitoring studies for the Occidental Chemical Site. The studies would determine whether a fire at the site may have led to the formation of dioxin. (NCEA/OSP)

Evaluating Post-Remedial Action Monitoring Data – At a Region 3 Superfund site, groundwater pump-and-treat was selected as part of the remedy. The effectiveness of the groundwater treatments was monitored through the use of whole effluent toxicity testing. When unacceptable levels of toxicity were detected, studies were required to identify and correct the cause of toxicity. ORD provided input to the Region on the studies' technical appropriateness and validity. (NHEERL)

Hazardous Substance Research Center – The Great Lakes, Mid-Atlantic and Great Plains Hazardous Substance Research Center for Integrated Remediation Using Managed Natural Systems was established to support collaborative research and technology transfer efforts within EPA Regions 3, 5 and 7. The Center will focus on integrated, low-cost remediation technologies that improve risk management by removing contaminants from the environment and restoring ecosystem quality, thereby enhancing site redevelopment options. This mission will be accomplished through an extensive university/EPA/industry partnership involving a multidisciplinary research program. Comprehensive technology transfer and outreach programs will integrate new knowledge and technology for use by industries, communities and government. The Center also has a strong commitment to diversity issues and will provide opportunities for minority students and faculty from three minority institutions to become involved in research, outreach and technology transfer programs. (NCER)

The Remediation Technologies Development Forum – Under the leadership of the Technology Innovation Office, OSWER has sites in Regions 2, 3, 5, 6, 7, 9, 10. Work is progressing to determine hydrocarbon degradation by phytotechnologies using a standard protocol. (NRMRL)

SITE Demonstrations – One ORD goal is to identify, demonstrate, assess and disseminate information about innovative and alternative environmental monitoring, measurement and characterization technologies and innovative and alternative remediation technologies. This information is passed along to developers, remediation site managers and regulators. It fosters the development of lower cost characterization and monitoring technologies and remediation technologies

Superfund Site Support

for soil, soil gas, sediment, surface water and groundwater. The current list of Regional needs for characterization and monitoring includes biosensors for chlorinated solvents, geophysical techniques for the non-invasive determination of dense non-aqueous phase liquids (DNAPLs) in the subsurface, technologies to determine water quality parameters such as dissolved oxygen, ecological sampling devices and field toxicity tests. A reassessment of EPA Regional needs is planned in FY03 and selected technologies/needs will be given high priority in the selection of future SITE demonstrations. Current priorities for remediation technologies, which are revised annually by a broad stakeholder group, focus on sites that have contaminated sediments, DNAPLs, acid mine drainage, manufactured gas plants and pesticides sites. Priority contaminants include chlorinated solvents, PCBs, PAHs and metals. For Region 3, the SITE Program completed initial sampling and evaluation of an innovative capping technology at Dover AFB. (NERL and NRMRL)

Contaminated Sediment Mass Fate and Transport Models Evaluation – This effort will describe the currently available sediment/contaminant fate and transport models. The highest ranked models will be evaluated for multiple classes of receiving waters. Where weaknesses are identified during the model evaluation, modules will be enhanced or created for

the top-ranked contaminated sediment fate and transport models for major water resource classes. Possibilities include simulations for groundwater advective flow under and through a cap, compressive effects of adding additional mass to the underlying sediments from a cap, natural gas escaping from the organic compounds in the sediments, and cap scour and displacement. (NERL)

Support Via Technical Review Workgroup – ORD provides support to all Regions through the Technical Review Workgroup. This group assists Regional risk assessors in the application of the Integrated Exposure Uptake Biokinetic model for lead in children and to the Combustion Technical Assistance Center. (NCEA)

Other Region 3 Superfund Support:

- Extensive technical assistance on Welsh Rd. landfill to determine technical feasibility of ET cover on Superfund site. (NRMRL)
- Developing approach to incorporate bioavailability in site-specific risk assessments and treatment performance. (NRMRL)
- Will soon be conducting field evaluations at appropriate sites, and developing design, operation and monitoring approaches for landfill bioreactors. (NRMRL)

Superfund Site Support

Region Four

ORD works closely with each Region to support the cleanup of contaminated Superfund sites. Specifically, it provides site-specific technical support for characterization, modeling, monitoring, assessment and remediation of contaminated sites under Superfund, and in some cases, under RCRA Corrective Actions. Information on Region-specific support is detailed below, followed by a detailed overview of those specific elements under the "Contaminated Site – Site-Specific Technical Support" umbrella.

Region 4 Superfund Support:

Toxaphene Aging Research – Based on Region 4 interest in the risk associated with the aging of toxaphene at a specific site, a research project was initiated to assess whether aging changes the genotoxicity characteristics of commercial technical toxaphene (CTT) in soils. Based on initial findings that toxaphene was bioavailable to the organisms present in the soil and resulted in the degradation of toxaphene, it was decided to initiate a second phase. The follow-up phase involves the identification of the biodegradation products (anaerobic/aerobic conditions) of CTT in soil under laboratory conditions. These results will be contrasted with those isolated from fish found at the site of sediment contamination in Region 4 using GC-MS. Subsequently, the toxicity associated with these biodegradation products will be assessed in terms of mutagenicity using the Ames Salmonella test. (NCEA)

PCB Effect Consultation (Anniston, AL) – At the Solutia Superfund Site, ORD is consulting on the effects of PCBs. Namely, its expertise is in offering guidance on the PCB ecological effects endpoints for setting remediation plans. (NHEERL)

Source Testing (Tampa, FL) – An oil-fired boiler, a coal-fired boiler and a municipal incinerator will be tested to determine emissions. This testing will also support the State of Florida and Region 4 by assisting in the development of receptor modeling source signatures. (NRMRL)

Remediation Technology Testing (Distler Brickyard Site) – At this Superfund Site, ORD tested an innovative remediation technology called the chitin-fracing technology. The new innovation involved the creation of highly permeable sand – and electron donor (chitin)-filled fractures in the subsurface to increase the permeability of the formation and provide an electron donor for anaerobic reductive dechlorination of chlorinated solvents. Based on the positive and encouraging results obtained from the Phase I test, a Phase II proposal was prepared that would provide up to \$500K to the Site over a period of approximately two years. It is expected that the Phase II work would represent the majority of the implementation of the final groundwater remedy. (NERL)

Columbia Nitrogen Superfund Site (Charleston, SC) – Installation will soon begin of a pilot scale iron-compost permeable reactive barrier. This will help evaluate treatment of impacted groundwater prior to its discharge into the tidal marsh. (NRMRL)

Macalloy Corporation Superfund Site (Charleston, SC) – ORD is currently exploring the use of a reductant it has developed to treat hexavalent chromium source areas and dissolved phase groundwater plumes at the site. To date, two pilot studies have been completed. Additionally, ORD is reporting and interpreting the results from chemical analysis and toxicity testing of sediments from Shipyard Creek. (NHEERL/NRMRL)

Tower Chemical – Working with Region 4 staff, ORD reviewed and commented on two groundwater treatment proposals for Florida's Tower Chemical site that were the subject of a congressional inquiry. Much of the groundwater contamination is unidentified, so the potential risk assessment options were reviewed. On-site toxicity testing of the complex mixture was recommended as well as QSAR for estimating possible toxicity of chemicals related to those already identified. Based on this information, predictions were made for 20 different toxic endpoints (cancer/non-cancer) and for log P using the TOPKAT/QSAR model. Many of these endpoints (cancer, mutagenicity, developmental

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effects, etc.) are qualitative in nature and based on probability, while many of the other endpoints are quantitative in nature (e.g. LD₅₀, LOAEL). Such predictions should ultimately help in the prioritization of chemicals present in site wells, especially those not found in the IRIS database. (NRMRL/NCEA/OSP)

Hazardous Substance Research Center – The objective of the South and Southwest Hazardous Substance Research Center is to provide basic and applied research, technology transfer and community outreach that addresses hazardous substance problems, especially the engineering management of contaminated sediments and other problems of special interest, to communities within EPA Regions 4 and 6. Due to past and present toxic releases, these regions face serious hazardous substance problems and also contain a significant fraction of the wetlands and inland waters found in the United States. The research themes of the Center include: addressing the physical, chemical and biological availability of contaminants in sediments, evaluating and enhancing biotransformation processes in sediments, and improving the science of risk management for contaminated sediments. The main objective of the research will be to improve the effectiveness of remedial approaches by seeking to understand and minimize contaminant release and exposure. The research projects will evaluate the bioavailability of desorption-resistant contaminants, develop improved approaches for in-situ containment and treatment, assess contaminant losses during removal and episodic storm events, and evaluate phyto-remediation for wetlands and confined disposal facilities. The research program will be complemented by a technology transfer and outreach effort focused nationally on contaminated sediments and their management, but regionally with respect to the broad range of hazardous substance issues that impact communities in the South and Southwest. Outreach efforts will focus on providing technical assistance to environmentally troubled communities in the Region to enable them to better understand and participate in decisions being made about their hazardous substance problems. (NCER)

Landfill Bioreactor Field-Testing – An operating landfill in Louisville, KY, is the initial site in a multi-year cooperative research project where landfill bioreactors will be field-tested. Building on previous ORD research, this project will allow direct observation of two methods of bioreactor systems. The first is a retrofitted anaerobic system using nitrified leachate injection. The second method utilizes a sequential approach where the waste is first degraded in a brief aerobic stage followed by anaerobic conditions. (NRMRL)

Regional Environmental Forensics – ORD's Ion Composition Elucidation (ICE), a high-resolution mass spectrometry technique has helped identify sources of pollution in several Regions. ICE can determine the chemical formula for compounds not in mass spectrometric databases. Recently, it identified a family of compounds in water from Superfund site monitoring wells near Lake Apopka, FL, for Region 4. Some compounds were probably formed by bacteria, while other compounds contained chlorine atoms resulting from pesticide manufacturing (ongoing research). In previous work for Region 2, ICE led to identification of byproducts of a polymerization process that leached from a Superfund site. The byproducts seeped into a municipal well servicing 50,000 people near Toms River, NJ, where an increased incidence of childhood cancer had been observed. (NERL)

Brunswick Wood Preserving Site – Continuous intensive expert technical support was provided during the development of an innovative proposed remedy and ROD. The remedy includes use of solidification and stabilization. This creates a cap combined with two calcium-based clay slurry walls to contain the source areas. Also, in situ chemical oxidation is being used to treat a pentachlorophenol plume. (NRMRL)

Camilla Wood Treating Site – In FY03, ORD is planning a joint effort with the Region to conduct field characterization activities to evaluate and ultimately select a remedy. ORD will be providing expert technical support and equipment in a timely manner to expedite and save costs. (NRMRL)

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Warren County Landfill – ORD is participating with Region 4 and North Carolina in the detoxification of the PCB-contaminated soil disposed of in the Warren County Landfill. Using the Base Catalyzed Decomposition (BCD) process, the state has elected to dig up and treat approximately 40,000 cubic yards of soil from its TOSCA-approved landfill. ORD generated the work plan, the health and safety plan and the QAPP for this project. It is also providing the stack and air sampling and analysis for the TOSCA certification of the BCD process, and will continue to provide technical oversight of this final remediation project. (NRMRL)

Alternative Cover Assessment Project (ACAP) – ORD's multi-site work on the alternative cover assessment project (ACAP) has locations in Regions 4,5,7,8,9,10. This work is to determine infiltration rates at landfills and evaluate alternative cover options. (NRMRL)

SITE Demonstrations – One ORD goal is to identify, demonstrate, assess and disseminate information about innovative and alternative environmental monitoring, measurement and characterization technologies, and innovative and alternative remediation technologies. This information is passed along to developers, remediation site managers and regulators. It fosters the development of lower cost characterization and monitoring technologies and remediation technologies for soil, soil gas, sediment, surface water and groundwater. The current list of Regional needs for characterization and monitoring includes biosensors for chlorinated solvents, geophysical techniques for the non-invasive determination of dense non-aqueous phase liquids (DNAPLs) in the subsurface, technologies to determine water quality parameters such as dissolved oxygen, ecological sampling devices, and field toxicity tests. A reassessment of EPA Regional needs is planned in FY03 and selected technologies/needs will be given high priority in the selection of future SITE demonstrations. Current priorities for remediation technologies, which are revised annually by a broad stakeholder group, focus on sites that have contaminated sediments, DNAPLs, acid mine drainage, manufactured gas plants and pesticides

sites. Priority contaminants include chlorinated solvents, PCBs, PAHs and metals. For Region 4, the SITE Program completed the demonstration of three different in-situ DNAPL treatment technologies at the NASA Cape Canaveral site, Launch Complex 34. Two additional in-situ DNAPL treatment technologies were initiated during FY02. The SITE Monitoring and Measurement Technology Program is planning a demonstration of characterization and monitoring techniques at the DOE Oak Ridge National Laboratory. (NERL and NRMRL)

Contaminated Sediment Mass Fate and Transport Models Evaluation – This effort will describe the currently available sediment/contaminant fate and transport models. The highest ranked models will be evaluated for multiple classes of receiving waters. Where weaknesses are identified during the model evaluation, modules will be enhanced or created for the top-ranked contaminated sediment fate and transport models for major water resource classes. Possibilities include simulations for groundwater advective flow under and through a cap, compressive effects of adding additional mass to the underlying sediments from a cap, natural gas escaping from the organic compounds in the sediments, and cap scour and displacement. One potential Region 4 demonstration site is Lake Hartwell, a 56,000-acre reservoir at the headwaters of the Savannah River. The Sangamo Weston Superfund site is located on Twelve Mile Creek, a tributary on the Seneca River branch of Hartwell. Application of the refined modeling framework would: 1.) be an excellent test of the upgraded models' abilities to simulate the long-term (1-10 years) transport of contaminated sediments in a reservoir, and 2.) enable a performance evaluation by the upgraded models of remediation methods proposed for the PCB contamination in Lake Hartwell. (NERL)

Support Via Technical Review Workgroup – ORD provides support to all Regions through the Technical Review Workgroup. This group assists Regional risk assessors in the application of the Integrated Exposure Uptake Biokinetic model for lead in children and to the Combustion Technical Assistance Center. (NCEA)

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Other Region 4 Superfund Support:

- Providing consultation for the Weyerhaeuser Superfund Site. (NHEERL)
- Reviewed papers and provided technical guidance on selection of study for TCDD TRV. (NHEERL)
- Investigated pressure response and chlorinated compound destruction from the field pilot, and now field scale, C-Sparge ozonization process at the Rochester Site near Greenville, SC. (NRMRL)
- Providing assistance for the Sangamo Weston/Lake Hartwell Superfund site. (NRMRL)
- Determining air pathways of potential pollutants at old Superfund sites. One site is in Ohio, and the evaluation will be similar to those being done in Region 1 (NRMRL)
- Established ACAP test plot on a federal facility in Albany, GA. (NRMRL)
- Conducting a three-year project to determine comparative effectiveness of landfill covers. (NRMRL)
- Conducted training in Chattanooga for Regional, State and local staffs on Phytoremediation. (NRMRL)
- Providing ongoing technical assistance on two sites in Charleston, SC. (NRMRL)
- Developing approach to incorporate bioavailability in site-specific risk assessments and treatment performance. (NRMRL)
- Will soon be conducting field evaluations at appropriate sites, and developing design, operation and monitoring approaches for landfill bioreactors. (NRMRL)

Superfund Site Support

Region Five

ORD works closely with each Region to support the cleanup of contaminated Superfund sites. Specifically, it provides site-specific technical support for characterization, modeling, monitoring, assessment and remediation of contaminated sites under Superfund, and in some cases, under RCRA Corrective Actions. Information on Region-specific support is detailed below, followed by a detailed overview of those specific elements under the "Contaminated Site – Site-Specific Technical Support" umbrella.

Region 5 Superfund Support:

Velsicol/Michigan Chemical Superfund Site (St. Louis, MI) – ORD is providing technical assistance in evaluating the integrity of the physical containment system (slurry wall) at the site. Portions of the site have been instrumented with pressure transducers to characterize hydraulic head responses within the containment system to external stimuli (e.g., dewatering of adjacent source removal cells in the Pine River). (NRMRL)

Technical Support for Development of Groundwater Remediation Targets – At a Region 5 industrial site, groundwater was contaminated by a variety of organic compounds associated with a coking facility. This groundwater was flowing toward a nearby river and upwelling through the sediments. Newly developed methods on assessing the risk of complex mixtures were applied to help the Region and industry develop remedial action goals that would protect the sediments from becoming unacceptably contaminated. (NHEERL)

Chemical and Biological Treatment (East Chicago, IN) – Currently an investigation is underway on the treatability of the highly contaminated Indiana Harbor Canal. A combination of chemical and biological treatment would be used to destroy the high levels of weathered crude and refined oil contaminating the harbor. The study is a cooperative agreement with Fisheries and Oceans-Canada and its subcontractor, Washington University, St. Louis. A QA plan has been written and endorsed and preliminary experiments on reactions of peroxide and contaminants, along with Microtox toxicity assays, have begun. (NRMRL)

Development of Risk-Based Sediment Quality Guidelines for Complex Mixtures – At a Region 5 Superfund site, sediments were contaminated with a complex mixture of chlorobenzenes, PAHs and other organic compounds. Newly developed methods on assessing the risk of complex mixtures in sediments were applied to aid the Region in developing risk-based numerical guidelines for use in the site ecological risk assessment. (NHEERL)

Hazardous Substance Research Center – The Great Lakes, Mid-Atlantic and Great Plains Hazardous Substance Research Center for Integrated Remediation Using Managed Natural Systems was established to support collaborative research and technology transfer efforts within EPA Regions 3, 5 and 7. The Center will focus on integrated, low-cost remediation technologies that improve risk management by removing contaminants from the environment and restoring ecosystem quality, thereby enhancing site redevelopment options. This mission will be accomplished through an extensive university/EPA/industry partnership involving a multidisciplinary research program. Comprehensive technology transfer and outreach programs will integrate new knowledge and technology for use by industries, communities and government. The Center also has a strong commitment to diversity issues and will provide opportunities for minority students and faculty from three minority institutions to become involved in research, outreach and technology transfer programs. (NCER)

Lower Fox River/Green Bay Mass Balance Study – The U.S. EPA and ORD were charged with the facilitation and implementation of the mathematical modeling goals for predictive forecasts. Thus they were influential in all aspects of the 10-year study to satisfy the needs of the modeling construct. Superfund required extensive documentation on the objectives, planning process, partners, committee structure and members, meetings, field design, field sampling, laboratory analyses, laboratory quality assurance, database design and population, database quality assurance, mathematical modeling construct and scenarios, model forecasts and quality assurance, reports, publications, technical presentations, and public meetings. Documentation was provided,

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which summarized all aspects of the study, providing EPA's scientific basis for settlement and the announcement of sediment remediation for PCBs in the lower Fox River/Green Bay complex. (NHEERL)

The Remediation Technologies Development Forum – Under the leadership of the Technology Innovation Office, OSWER has sites in Regions 2, 3, 5, 6, 7, 9, 10. Work is progressing to determine hydrocarbon degradation by phytotechnologies using a standard protocol. (NRMRL)

Alternative Cover Assessment Project (ACAP) – ORD's multi-site work on the alternative cover assessment project (ACAP) has locations in Regions 4, 5, 7, 8, 9, 10. This work is to determine infiltration rates at landfills and evaluate alternative cover options. (NRMRL)

SITE Demonstrations – One ORD goal is to identify, demonstrate, assess and disseminate information about innovative and alternative environmental monitoring, measurement and characterization technologies, and innovative and alternative remediation technologies. This information is passed along to developers, remediation site managers and regulators. It fosters the development of lower cost characterization and monitoring technologies and remediation technologies for soil, soil gas, sediment, surface water and groundwater. The current list of Regional needs for characterization and monitoring includes biosensors for chlorinated solvents, geophysical techniques for the non-invasive determination of dense non-aqueous phase liquids (DNAPLs) in the subsurface, technologies to determine water quality parameters such as dissolved oxygen, ecological sampling devices, and field toxicity tests. A reassessment of EPA Regional needs is planned in FY03 and selected technologies/needs will be given high priority in the selection of future SITE demonstrations. Current priorities for remediation technologies, which are revised annually by a broad stakeholder group, focus on sites that have contaminated sediments, DNAPLs, acid mine drainage, manufactured gas plants and pesticides sites. Priority contaminants include chlorinated solvents, PCBs, PAHs and metals. For

Region 5, the SITE Program is conducting four field demonstrations. Three technologies are for sediment treatment and one technology is a phytoremediation technique for metals treatment. (NERL and NRMRL)

Contaminated Sediment Mass Fate and Transport Models Evaluation – This effort will describe the currently available sediment/contaminant fate and transport models. The highest ranked models will be evaluated for multiple classes of receiving waters. Where weaknesses are identified during the model evaluation, modules will be enhanced or created for the top-ranked contaminated sediment fate and transport models for major water resource classes. Possibilities include simulations for groundwater advective flow under and through a cap, compressive effects of adding additional mass to the underlying sediments from a cap, natural gas escaping from the organic compounds in the sediments, and cap scour and displacement. (NERL)

Support Via Technical Review Workgroup – ORD provides support to all Regions through the Technical Review Workgroup. This group assists Regional risk assessors in the application of the Integrated Exposure Uptake Biokinetic model for lead in children and to the Combustion Technical Assistance Center. (NCEA)

Other Region 5 Superfund Support:

- Initiating collaboration with Region 5 to develop a PCB profile in sediments and soil for Superfund sites. (NCEA)
- Advised on use of non-native plants in Superfund mitigation. (NHEERL)
- Working with Region to develop risk management options for underground storage tank sites contaminated with oxygenates. (NRMRL)
- Developing approach to incorporate bioavailability in site-specific risk assessments and treatment performance. (NRMRL)
- Will soon be conducting field evaluations at appropriate sites, and developing design, operation and monitoring approaches for landfill bioreactors. (NRMRL)

Superfund Site Support

Region Six

ORD works closely with each Region to support the cleanup of contaminated Superfund sites. Specifically, it provides site-specific technical support for characterization, modeling, monitoring, assessment and remediation of contaminated sites under Superfund, and in some cases, under RCRA Corrective Actions. Information on Region-specific support is detailed below, followed by a detailed overview of those specific elements under the "Contaminated Site – Site-Specific Technical Support" umbrella.

Region 6 Superfund Support:

Process Identification – ORD will identify the processes that control natural attenuation at CAH Solvent Spill Sites. This work will consist of site characterization studies at TCE plume locations at Galena AFB, Alaska, and Tinker AFB, Oklahoma. The studies will help determine the specific site conditions that will allow complete natural biological degradation of chlorinated solvents to ethene and those conditions that do not permit any, or only partial, dechlorination to dichloroethene. The presence of *Dehalococcoides* bacteria will also be determined at each site. (NRMRL)

Hazardous Substance Research Center – The objective of the South and Southwest Hazardous Substance Research Center is to provide basic and applied research, technology transfer and community outreach that addresses hazardous substance problems, especially the engineering management of contaminated sediments and other problems of special interest to communities within EPA Regions 4 and 6. Due to past and present toxic releases, these Regions face serious hazardous substance problems and also contain a significant fraction of the wetlands and inland waters found in the United States. The research themes of the Center include: addressing the physical, chemical and biological availability of contaminants in sediments, evaluating and enhancing biotransformation processes in sediments, and improving the science of risk management for contaminated sediments. The main objective of the research will be to improve the effectiveness of remedial approaches by seeking to understand and minimize contaminant release and exposure. The research projects will evaluate the bioavailability of

desorption-resistant contaminants, develop improved approaches for in-situ containment and treatment, assess contaminant losses during removal and episodic storm events, and evaluate phyto-remediation for wetlands and confined disposal facilities. The research program will be complemented by a technology transfer and outreach effort focused nationally on contaminated sediments and their management, but Regionally with respect to the broad range of hazardous substance issues that impact communities in the South and Southwest. Outreach efforts will focus on providing technical assistance to environmentally troubled communities in the Region to enable them to better understand and participate in decisions being made about their hazardous substance problems. (NCER)

The Remediation Technologies Development Forum – Under the leadership of the Technology Innovation Office, OSWER has sites in Regions 2, 3, 5, 6, 7, 9, 10. Work is progressing to determine hydrocarbon degradation by phytotechnologies using a standard protocol. (NRMRL)

SITE Demonstrations – One ORD goal is to identify, demonstrate, assess and disseminate information about innovative and alternative environmental monitoring, measurement and characterization technologies, and innovative and alternative remediation technologies. This information is passed along to developers, remediation site managers and regulators. It fosters the development of lower cost characterization and monitoring technologies and remediation technologies for soil, soil gas, sediment, surface water and groundwater. The current list of Regional needs for characterization and monitoring includes biosensors for chlorinated solvents, geophysical techniques for the non-invasive determination of dense non-aqueous phase liquids (DNAPLs) in the subsurface, technologies to determine water quality parameters such as dissolved oxygen, ecological sampling devices, and field toxicity tests. A reassessment of EPA Regional needs is planned in FY03 and selected technologies/needs will be given high priority in the selection of future SITE demonstrations. Current priorities for remediation technologies, which are revised annually by a broad stakeholder group, focus on sites that have contaminated sediments, DNAPLs, acid mine

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drainage, manufactured gas plants and pesticides sites. Priority contaminants include chlorinated solvents, PCBs, PAHs and metals. For Region 6, the SITE Program is completing the demonstration of two in-situ biotreatment technologies for PCB-contaminated soils for the Lower Colorado River Authority. (NERL and NRMRL)

Contaminated Sediment Mass Fate and Transport

Models Evaluation – This effort will describe the currently available sediment/contaminant fate and transport models. The highest ranked models will be evaluated for multiple classes of receiving waters. Where weaknesses are identified during the model evaluation, modules will be enhanced or created for the top-ranked contaminated sediment fate and transport models for major water resource classes. Possibilities include simulations for groundwater advective flow under and through a cap, compressive effects of adding additional mass to the underlying sediments from a cap, natural gas escaping from the organic compounds in the sediments, and cap scour and displacement. (NERL)

Support Via Technical Review Workgroup – ORD provides support to all regions through the Technical Review Workgroup. This group assists Regional risk assessors in the application of the Integrated Exposure Uptake Biokinetic model for lead in children and to the Combustion Technical Assistance Center. (NCEA)

Other Region 6 Superfund Support:

- Conducted "Introduction to Phytoremediation" course in Austin, TX. (NRMRL)
- Developing approach to incorporate bioavailability in site-specific risk assessments and treatment performance. (NRMRL)
- Will soon be conducting field evaluations at appropriate sites, and developing design, operation and monitoring approaches for landfill bioreactors. (NRMRL)

SUPERFUND SITE SUPPORT

REGION SEVEN

ORD works closely with each Region to support the cleanup of contaminated Superfund sites. Specifically, it provides site-specific technical support for characterization, modeling, monitoring, assessment and remediation of contaminated sites under Superfund, and in some cases, under RCRA Corrective Actions. Information on Region-specific support is detailed below, followed by a detailed overview of those specific elements under the "Contaminated Site – Site-Specific Technical Support" umbrella.

Region 7 Superfund Support:

Solvent Evaporation Testing – Clandestine manufacturing of methamphetamine (an illegal drug) at homes poses a serious health and safety threat to innocent children, public officers, emergency responders and individuals who are manufacturing the drug. Large volumes of toxic solvents are used so there is a risk of exposure to hazardous chemicals. Per request from Region 7, ORD performed eight solvent evaporation tests in the Indoor Air Quality Test House in Cary, NC. The solvents tested included toluene, acetone and naphtha (also called Colman fuel). The final results were provided to the Region following data quality review. The test results are being used in the Region's Quantitative Risk Assessment to estimate the potential health risk(s) associated with exposure to chemicals used during the production of methamphetamine. (NRMRL)

Omaha Lead – As part of its support efforts of the Omaha Lead site, ORD is providing GIS support. This includes map generation and statistical analysis of lead levels in general and sensitive populations in the area around the newly proposed NPL site. The Regional HSTL will conduct a peer review of some site work conducted by a consultant. (NERL/OSP)

Evaluation of Recently Developed Push Probe Sensors – Probe sensors are being developed and improved by an Air Force contractor that will distinguish between BTEX components and detect CAHs such as TCE. ORD is conducting field-testing to correlate sensor responses with TPH and TCE meters. More tests have been scheduled for Offutt AFB, Nebraska and King Salmon AFB, Alaska. (NRMRL)

Hazardous Substance Research Center – The Great Lakes, Mid-Atlantic and Great Plains Hazardous Substance Research Center for Integrated Remediation Using Managed Natural Systems was established to support collaborative research and technology transfer efforts within EPA-Regions 3, 5 and 7. The Center will focus on integrated, low-cost remediation technologies that improve risk management by removing contaminants from the environment and restoring ecosystem quality, thereby enhancing site redevelopment options. This mission will be accomplished through an extensive university/EPA/industry partnership involving a multidisciplinary research program. Comprehensive technology transfer and outreach programs will integrate new knowledge and technology for use by industries, communities and government. The Center also has a strong commitment to diversity issues and will provide opportunities for minority students and faculty from three minority institutions to become involved in research, outreach and technology transfer programs. (NCER)

Soil-Pb Evaluation – ORD continues its involvement with Region 7 and other researchers to evaluate soil-Pb site-specific bioavailability and alteration of soil-Pb bioavailability by in situ treatment techniques. This work is expanding to address issues of ecosystem risk of soil-Pb. (NRMRL)

Soil Vapor Extraction – ORD is currently monitoring soil vapor extraction performance conducted under an active manufacturing site at the Coleman Site, Wichita, KS. Work at this site has been going on for five years. (NRMRL)

The Remediation Technologies Development Forum – Under the leadership of the Technology Innovation Office, OSWER has sites in Regions 2, 3, 5, 6, 7, 9, 10. Work is progressing to determine hydrocarbon degradation by phytotechnologies using a standard protocol. (NRMRL)

Alternative Cover Assessment Project (ACAP) – ORD's multi-site work on the alternative cover assessment project (ACAP) has locations in Regions 4, 5, 7, 8, 9, 10. This work is to determine infiltration rates at landfills and evaluate alternative cover options. (NRMRL)

Superfund Site Support

SITE Demonstrations – One ORD goal is to identify, demonstrate, assess and disseminate information about innovative and alternative environmental monitoring, measurement and characterization technologies, and innovative and alternative remediation technologies. This information is passed along to developers, remediation site managers and regulators. It fosters the development of lower cost characterization and monitoring technologies and remediation technologies for soil, soil gas, sediment, surface water and groundwater. The current list of Regional needs for characterization and monitoring includes biosensors for chlorinated solvents, geophysical techniques for the non-invasive determination of dense non-aqueous phase liquids (DNAPLs) in the subsurface, technologies to determine water quality parameters such as dissolved oxygen, ecological sampling devices, and field toxicity tests. A reassessment of EPA Regional needs is planned in FY03 and selected technologies/needs will be given high priority in the selection of future SITE demonstrations. Current priorities for remediation technologies, which are revised annually by a broad stakeholder group, focus on sites that have contaminated sediments, DNAPLs, acid mine drainage, manufactured gas plants and pesticides sites. Priority contaminants include chlorinated solvents, PCBs, PAHs and metals. For Region 7, the SITE Program is currently planning a field demonstration of an electrokinetics technology at Offutt AFB. (NERL and NRMRL)

Contaminated Sediment Mass Fate and Transport Models Evaluation – This effort will describe the currently available sediment/contaminant fate and transport models. The highest ranked models will be evaluated for multiple classes of receiving waters. Where weaknesses are identified during the model evaluation, modules will be enhanced or created for the top-ranked contaminated sediment fate and transport models for major water resource classes. Possibilities include simulations for groundwater advective flow under and through a cap, compressive effects of adding additional mass to the underlying sediments from a cap, natural gas escaping from the organic compounds in the sediments, and cap scour and displacement. (NERL)

Support Via Technical Review Workgroup – ORD provides support to all Regions through the Technical Review Workgroup. This group assists Regional risk assessors in the application of the Integrated Exposure Uptake Biokinetic model for lead in children and to the Combustion Technical Assistance Center. (NCEA)

Other Region 7 Superfund Support:

- Developing approach to incorporate bioavailability in site-specific risk assessments and treatment performance. (NRMRL)
- Will soon be conducting field evaluations at appropriate sites, and developing design, operation and monitoring approaches for landfill bioreactors. (NRMRL)

SUPERFUND SITE SUPPORT

Region Eight

ORD works closely with each Region to support the cleanup of contaminated Superfund sites. Specifically, it provides site-specific technical support for characterization, modeling, monitoring, assessment and remediation of contaminated sites under Superfund, and in some cases, under RCRA Corrective Actions. Information on Region-specific support is detailed below, followed by a detailed overview of those specific elements under the "Contaminated Site – Site-Specific Technical Support" umbrella.

Region 8 Superfund Support:

Asarco Superfund Site (E. Helena, MT) – This site is an old smelter site where there are high levels of arsenic endangering public water supplies. Per Region 8's request, ORD engaged in a cooperative project to conduct a field pilot test of in situ permeable reactive barrier (PRB) technology for the remediation of arsenic in the site's ground water. This was the first field test of PRBs for arsenic. (NRMRL)

Ecological Risk Assessment – As Region 8 prepared for the ecological risk assessment of a large and highly contentious Superfund Site, it turned to ORD for technical support. This included conducting extensive analyses of available toxicity data, attending technical meetings with state representatives, and making recommendations for chemical concentrations associated with different levels of risk to fish in the river system. (NHEERL)

Evaluation of Toxicity Data for Superfund Site – As part of evaluating a Region 8 Superfund site, a number of water samples from the site were evaluated for toxicity to fish and analyzed for various metals. Technical assistance was provided in interpreting the toxicity data and determining which metals were, most likely, the cause of toxicity. This information revealed that this issue should be evaluated further in the site risk assessment. (NHEERL)

Hazardous Substance Research Center – The Rocky Mountain Regional Hazardous Substance Research Center for Remediation of Mine Waste Sites will focus on the geochemical, biological, hydrological/mineralogical

and engineering aspects of environmental problems associated with mining and mine wastes. The goal of the Center will be to develop new or improved methods or technologies that are cost effective and lead to cleanups that are protective of human health and the environment. A common theme for the environmental problems associated with mining is the contamination of all media (air, ground water, soil, sediments and surface water) resulting from a host of metals and a wide variety of sources. The types of contamination and the specific processes required to address mine waste problems are identified within the structure of five focus areas: site characterization and contaminant transport/transformation; surface water and sediment transport; treatment processes; technologies; and ecological and human health toxicity. Each of these focus areas is an essential component of the remediation process, and will include basic and applied research. Mathematical and physical models will be used to better understand processes and to help extend the results of the basic research to field demonstrations and applications. Training, technology transfer and outreach programs will focus on the development of new technologies. These programs will provide educational information to allow communities to make informed decisions concerning environmental contamination. The project will also provide technical assistance to communities and other stakeholders with the ultimate goal of redeveloping Brownfields sites. (NCER)

In-Situ Biological Degradation – ORD has worked with Region 8 to install soil fractures and conduct treatability studies for in-situ biological degradation. The aim of the research is to improve understanding of As chemistry as it relates to the mobilization of As in the environment. The site in Ronan, MT, has been completed with final sampling during the week of August 5. Data are being/will be shared with the Regional Offices. Several papers have already been written on interim project data. ORD equipment and personnel worked at the site under Regional sponsorship. (NRMRL)

TRV Development – ORD assisted in the development of TRVs for use in screening level risk assessments at Superfund sites. Literature searches were conducted

SUPERfund Site Support

and evaluations of test result quality were presented in peer-reviewed publications for various chemicals including lead, nickel, selenium, vanadium, copper, chromium, cadmium, beryllium, barium, dieldrin, DDT, pentachlorophenol and arsenic. (NHEERL)

Rocky Mountain Arsenal – To assist the Region, ORD's SITE Program evaluated the ability of the innovative technology, In Situ Thermal Destruction (ISTD), to remove contamination from soil. The contamination of interest is in the South Plants area of the Arsenal in a 45-by-94-by-10-ft pit called the Hex Pit, in which distillation bottoms from the production of hexachlorocyclopentadiene were dumped. The ISTD system was mobilized on site, with installation of 266 heater-only or heater-vacuum wells to heat the subsurface soils. The vaporized contaminants were to be treated by a flameless thermal oxidizer. In March 2002, approximately two weeks into the heating phase, significant corrosion in the aboveground piping was found, and the system was turned off. ORD is now helping determine the cause of the corrosion. Planning for Hex Pit sampling has begun, with the sampling event expected to take place in the next month or six weeks. In the meantime, two technologies designed to treat chlorinated solvents in-situ were competed at the site. For more information on the SITE program, see the SITE Demonstration description later in this section. (NRMRL)

Ten Mile Creek Sites – In Region 8, ORD brought in a team of outside experts in anaerobic and aerobic treatment systems to discuss semi-passive remediation alternatives for the Ten Mile Creek sites. The group is looking at ways to treat the leachate either passively or semi-passively in the future, and is now conducting treatability studies. A semi-passive pilot system will be built in 2002. It is scheduled to go online in 2003 in an area where there is no power and no access from November to May. Two other locations are under review, and ORD is conducting preliminary studies. It is anticipated that another remedial pilot will be built in this area in 2002 or 2003 for further testing. (NRMRL)

Alternative Cover Assessment Project (ACAP) – ORD's multi-site work on the alternative cover assessment project (ACAP) has locations in Regions 4, 5, 7, 8, 9, 10. This work is to determine infiltration rates at landfills and evaluate alternative cover options. (NRMRL)

SITE Demonstrations – One ORD goal is to identify, demonstrate, assess and disseminate information about innovative and alternative environmental monitoring, measurement and characterization technologies, and innovative and alternative remediation technologies. This information is passed along to developers, remediation site managers and regulators. It fosters the development of lower cost characterization and monitoring technologies and remediation technologies for soil, soil gas, sediment, surface water and groundwater. The current list of Regional needs for characterization and monitoring includes biosensors for chlorinated solvents, geophysical techniques for the non-invasive determination of dense non-aqueous phase liquids (DNAPLs) in the subsurface, technologies to determine water quality parameters such as dissolved oxygen, ecological sampling devices, and field toxicity tests. A reassessment of EPA Regional needs is planned in FY03 and selected technologies/needs will be given high priority in the selection of future SITE demonstrations. Current priorities for remediation technologies, which are revised annually by a broad stakeholder group, focus on sites that have contaminated sediments, DNAPLs, acid mine drainage, manufactured gas plants and pesticides sites. Priority contaminants include chlorinated solvents, PCBs, PAHs and metals. (NERL and NRMRL)

Contaminated Sediment Mass Fate and Transport Models Evaluation – This effort will describe the currently available sediment/contaminant fate and transport models. The highest ranked models will be evaluated for multiple classes of receiving waters. Where weaknesses are identified during the model evaluation, modules will be enhanced or created for the top-ranked contaminated sediment fate and transport models for major water resource classes. Possibilities include simulations for groundwater advective flow under and through a cap, compressive

SUPERfund SITE Support

effects of adding additional mass to the underlying sediments from a cap, natural gas escaping from the organic compounds in the sediments, and cap scour and displacement. (NERL)

Support Via Technical Review Workgroup – ORD provides support to all Regions through the Technical Review Workgroup. This group assists Regional risk assessors in the application of the Integrated Exposure Uptake Biokinetic model for lead in children and to the Combustion Technical Assistance Center. (NCEA)

Other Region 8 Superfund Support:

- Providing active support for Lowry Landfill, a former tire pile area. (NRMRL)
 - Completed another field demonstration for treatment of acid mine drainage contamination. (NRMRL)
 - Developing approach to incorporate bioavailability in site-specific risk assessments and treatment performance. (NRMRL)
 - Will soon be conducting field evaluations at appropriate sites, and developing design, operation and monitoring approaches for landfill bioreactors. (NRMRL)
- Designed a monitoring plan for Superfund site in Laramie, WY. (NRMRL)

SUPERFUND SITE SUPPORT

REGION NINE

ORD works closely with each Region to support the cleanup of contaminated Superfund sites. Specifically, it provides site-specific technical support for characterization, modeling, monitoring, assessment and remediation of contaminated sites under Superfund, and in some cases, under RCRA Corrective Actions. Information on Region-specific support is detailed below, followed by a detailed overview of those specific elements under the "Contaminated Site – Site-Specific Technical Support" umbrella.

Region 9 Superfund Support:

McCormick & Baxter Superfund Site – A steam injection treatability study was recently completed for the McCormick & Baxter Superfund site in Stockton, CA. This former wood treatment facility has an estimated 1 million gallons of creosote and other wood treating wastes in the subsurface, extending to a depth greater than 200 feet. The treatability study showed that steam injection can effectively recover 70 to 99 percent of the creosote contaminants, depending on the composition of the creosote and the texture of the soil. In addition, it was shown that oxidation of creosote components can occur at the temperatures achieved during steam injection remediation. (NRMRL)

Hazardous Substance Research Center – The Western Region Hazardous Substance Research Center for Developing In-situ Processes for VOC Remediation in Groundwater and Soils will focus on subsurface contamination problems associated with volatile organic chemicals (VOC), with an emphasis on chlorinated solvents. VOCs have emerged as a major groundwater contamination problem facing EPA's Regions 9 and 10 and the nation. Research projects have been developed in four focus areas: anaerobic reductive processes, aerobic cometabolism, physical and chemical abiotic processes and site characterization. Mathematical and physical modeling will be key components of each focus area. The Center's research will focus on a variety of projects including: anaerobic reductive processes for the remediation of TCE at high concentrations; experimental and modeling studies related to chemical delivery and product

removal during in-situ anaerobic treatment; and, factors that influence sustainability of the aerobic cometabolism of chlorinated with mixed and pure cultures grown on butane (to name a few). The technology transfer and outreach programs have three activities that include: taking new technologies from the laboratory to the field, and technical outreach to communities in Regions 9 and 10 with special emphasis on Brownfields. (NCER)

Montrose Superfund Site – A thermal remediation treatability study is being planned for the Montrose Superfund Site in Torrance, CA. The treatability study will evaluate the use of steam injection or electrical heating to remediate DNAPLs from contaminated site soils. This research project will begin this fall with the collection of contaminated soil samples. (NRMRL)

Performance Monitoring (Port Hueneme, CA) – A field investigation at a site located near Los Angeles was conducted to evaluate the effectiveness of enhanced bioremediation of MTBE in groundwater. Working with Region 9, the state of California and the U.S. Department of Defense, ORD designed, constructed and operated the 30-month investigation. It was completed in March 2002, and the final report is in preparation. (NRMRL)

Del Monte Superfund Site (Oahu, HI) – ORD is providing support on the phytoremediation treatment unit. Pesticide contaminated groundwater from a perched aquifer is pumped into the phytoremediation treatment unit. Bench- and pilot-scale treatability studies support the selection of this technology as the final remedy. (NRMRL)

Mine Site Evaluations – Work has been busy as ORD conducts chemical analyses to see if certain remedial technologies can be used at the Rio Tinto, Yerington, Anaconda, Leviathan and Colorado Hill mine sites. A demonstration project is being conducted to compare various chemical and biological semi-passive treatments such as biphasic treatment, lime lagoons, sulfide-reducing bioreactors and aerobic polishers to treat acid mine drainage. (NRMRL)

Superfund Site Support

Valley Wood – ORD provided input on soil cleanup levels for arsenic and associated excavation levels. (NRMRL)

Cooper Drum – ORD was called in to the Cooper Drum site to help assess the applicability of enhanced bioremediation and monitored natural attenuation (MNA) remedies. It also reviewed the Remedial Investigation/Feasibility Study (RI/FS). (NRMRL)

The Remediation Technologies Development Forum – Under the leadership of the Technology Innovation Office, OSWER has sites in Regions 2, 3, 5, 6, 7, 9, 10. Work is progressing to determine hydrocarbon degradation by phytotechnologies using a standard protocol. (NRMRL)

Alternative Cover Assessment Project (ACAP) – ORD's multi-site work on the alternative cover assessment project (ACAP) has locations in Regions 4, 5, 7, 8, 9, 10. This work is to determine infiltration rates at landfills and evaluate alternative cover options. (NRMRL)

SITE Demonstrations – One ORD goal is to identify, demonstrate, assess and disseminate information about innovative and alternative environmental monitoring, measurement and characterization technologies, and innovative and alternative remediation technologies. This information is passed along to developers, remediation site managers and regulators. It fosters the development of lower cost characterization and monitoring technologies and remediation technologies for soil, soil gas, sediment, surface water and groundwater. The current list of Regional needs for characterization and monitoring includes biosensors for chlorinated solvents, geophysical techniques for the non-invasive determination of dense non-aqueous phase liquids (DNAPLs) in the subsurface, technologies to determine water quality parameters such as dissolved oxygen, ecological sampling devices, and field toxicity

tests. A reassessment of EPA Regional needs is planned in FY03 and selected technologies/needs will be given high priority in the selection of future SITE demonstrations. Current priorities for remediation technologies, which are revised annually by a broad stakeholder group, focus on sites that have contaminated sediments, DNAPLs, acid mine drainage, manufactured gas plants and pesticides sites. Priority contaminants include chlorinated solvents, PCBs, PAHs and metals. For Region 9, the SITE Program completed one field demonstration for Lead-contaminated soils and is currently selecting technologies for an in-situ biological treatment of PCB-contaminated sediment in Pearl Harbor, HI. Another demonstration of three different technologies is currently being conducted for acid mine drainage in California, and a DNAPL recovery project has been initiated at the F&B Site in Phoenix, AZ. (NERL and NRMRL)

Contaminated Sediment Mass Fate and Transport Models Evaluation – This effort will describe the currently available sediment/contaminant fate and transport models. The highest ranked models will be evaluated for multiple classes of receiving waters. Where weaknesses are identified during the model evaluation, modules will be enhanced or created for the top-ranked contaminated sediment fate and transport models for major water resource classes. Possibilities include simulations for groundwater advective flow under and through a cap, compressive effects of adding additional mass to the underlying sediments from a cap, natural gas escaping from the organic compounds in the sediments, and cap scour and displacement. (NERL)

Support Via Technical Review Workgroup – ORD provides support to all Regions through the Technical Review Workgroup. This group assists Regional risk assessors in the application of the Integrated Exposure Uptake Biokinetic model for lead in children and to the Combustion Technical Assistance Center. (NCEA)

Superfund Site Support

Other Region 9 Site Support:

- Provided information on risk assessment for Superfund site on the Palos Verdes shelf in Southern California. (NHEERL)
- Monitoring performance and closure criteria of several soil venting projects at the Tucson International Airport Site, Tucson, AZ. (NRMRL)
- Assisted in audit of GC and GC/MS laboratory data and provided analytical protocol assessments at Aerojet General Corporation in Rancho Cordora, CA. (NERL)
- Estimating volume of LNAPL, natural attenuation and electron acceptor mass balance at Williams AFB Superfund Site, Phoenix, AZ. (NRMRL)
- Provided guidance on the problems of pseudoreplication. (NHEERL)
- Continuing to provide active support for Edwards Air Force Base. (NRMRL)
- Conducted field evaluations on in-situ and ex situ treatment technologies for treatment of MTBE at the source and the wellhead. (NRMRL)
- Provided information on the use of equilibrium partitioning theory in establishing sediment clean-up levels in Superfund sites in San Francisco Bay. (NHEERL)
- Conducted "Introduction to Phytoremediation" course in San Diego, CA. (NRMRL)
- Determined flow paths of contaminated groundwater on and near the Casmalia Disposal Site in Santa Barbara, CA. (NERL)
- Worked with Regional and State personnel on approval criteria for ET covers in Southern California. (NRMRL)
- Coordinated work with Region, State and University of Hawaii in response to heptachlor accumulation in garden and crop plants. (NRMRL)
- Coordinating a team of ORD and Region 9 scientists to measure indoor air quality of residential housing located within 50 feet of BKK, a former landfill near Los Angeles. (NRMRL)
- Developing approach to incorporate bioavailability in site-specific risk assessments and treatment performance. (NRMRL)
- Will soon be conducting field evaluations at appropriate sites, and developing design, operation and monitoring approaches for landfill bioreactors. (NRMRL)

Superfund Site Support

Region Ten

ORD works closely with each Region to support the cleanup of contaminated Superfund sites. Specifically, it provides site-specific technical support for characterization, modeling, monitoring, assessment and remediation of contaminated sites under Superfund, and in some cases, under RCRA Corrective Actions. Information on Region-specific support is detailed below, followed by a detailed overview of those specific elements under the "Contaminated Site – Site-Specific Technical Support" umbrella.

Region 10 Superfund Support:

Wyckoff/Eagle Harbor – A steam injection treatability study was recently completed for the Wyckoff/Eagle Harbor Superfund site. This former wood treatment facility has an estimated 1 million gallons of creosote and other wood treating wastes in the subsurface, which were flowing into Puget Sound and Eagle Harbor. The treatability study showed that steam injection can effectively recover 70 to 99 percent of the creosote contaminants, depending on the composition of the creosote and the texture of the soil. In addition, it was shown that oxidation of creosote components can occur at the temperatures achieved during steam injection remediation. Specifically, the ORD study evaluated microbial diversity and activity prior to and after steaming. Soil samples, from both the vadose zone and the saturated zone of five site areas as well as one saturated sample from the mudline, were collected. Microcosms were constructed and operated for 9 weeks, and then samples were taken from them at times of 0, 2, 5, and 8 or 9 weeks. Samples were analyzed for 19 PAH compounds and prepared for phospholipid fatty acid (PLFA) analysis, which assesses microbial diversity, biomass, and metabolic activity. Data interpretation is in process for preparation of a draft report. (NRMRL)

Bunker Hill Superfund Site – ORD provides ongoing support to Region 10 with the evaluation of remediation at the Bunker Hill Superfund site. In FY 2000, a Symposium on Remediation Effectiveness was held at Coeur d'Alene, ID. The proceedings will appear in the October 2002 issue of the Science of the Total Environment. (NCEA)

Wide Area Assessment – ORD has been in recent discussions with Region 10 regarding a wide area assessment being conducted in and around Trail, BC. The area of concern extends below the border to Lake Roosevelt on the Columbia River. Region 10 currently is in the initial site investigation stage to determine whether or not the U.S. zone should be placed on the NPL. (NHEERL)

Hazardous Substance Research Center – The Western Region Hazardous Substance Research Center for Developing In-situ Processes for VOC Remediation in Groundwater and Soils will focus on subsurface contamination problems associated with volatile organic chemicals (VOC) with an emphasis on chlorinated solvents. VOCs have emerged as a major groundwater contamination problem facing EPA's Regions 9 and 10 and the nation. Research projects have been developed in four focus areas: anaerobic reductive processes, aerobic cometabolism, physical and chemical abiotic processes and site characterization. Mathematical and physical modeling will be key components of each focus area. The Center's research will focus on a variety of projects including: anaerobic reductive processes for the remediation of TCE at high concentrations; experimental and modeling studies related to chemical delivery and product removal during in-situ anaerobic treatment; and, factors that influence sustainability of the aerobic cometabolism of chlorinated with mixed and pure cultures grown on butane (to name a few). The technology transfer and outreach programs have three activities that include: taking new technologies from the laboratory to the field, and technical outreach to communities in Regions 9 and 10 with special emphasis on Brownfields. (NCER)

Grower Discussions – Per Region 10's request, ORD researchers visited with affected Idaho growers, processors, researchers and regulators last July (2001) concerning the movement of OUST from BLM land onto farmland. (NHEERL)

The Remediation Technologies Development Forum – Under the leadership of the Technology Innovation Office, OSWER has sites in Regions 2, 3, 5, 6, 7, 9, 10. Work is progressing to determine hydrocarbon

SUPERFUND SITE SUPPORT

degradation by phytotechnologies using a standard protocol. (NRMRL)

Alternative Cover Assessment Project (ACAP) – ORD's multi-site work on the alternative cover assessment project (ACAP) has locations in Regions 4, 5, 7, 8, 9, 10. This work is to determine infiltration rates at landfills and evaluate alternative cover options. (NRMRL)

SITE Demonstrations – One ORD goal is to identify, demonstrate, assess and disseminate information about innovative and alternative environmental monitoring, measurement and characterization technologies, and innovative and alternative remediation technologies. This information is passed along to developers, remediation site managers and regulators. It fosters the development of lower cost characterization and monitoring technologies and remediation technologies for soil, soil gas, sediment, surface water and groundwater. The current list of Regional needs for characterization and monitoring includes biosensors for chlorinated solvents, geophysical techniques for the non-invasive determination of dense non-aqueous phase liquids (DNAPLs) in the subsurface, technologies to determine water quality parameters such as dissolved oxygen, ecological sampling devices, and field toxicity tests. A reassessment of EPA Regional needs is planned in FY03 and selected technologies/needs will be given high priority in the selection of future SITE demonstrations. Current priorities for remediation technologies, which are revised annually by a broad stakeholder group, focus on sites that have contaminated sediments, DNAPLs, acid mine drainage, manufactured gas plants and pesticides sites. Priority contaminants include chlorinated solvents, PCBs, PAHs and metals. For Region 10, the SITE Program is currently conducting an in-situ steam-enhanced treatment technology demonstration for chlorinated solvents at the Port of Ridgefield, OR. Another field demonstration for in-situ sediment treatment is planned for Whatcom Waterway in Washington during FY03. (NERL and NRMRL)

Contaminated Sediment Mass Fate and Transport Models Evaluation – This effort will describe the currently available sediment/contaminant fate and transport models. The highest ranked models will be evaluated for multiple classes of receiving waters. Where weaknesses are identified during the model evaluation, modules will be enhanced or created for the top-ranked contaminated sediment fate and transport models for major water resource classes. Possibilities include simulations for groundwater advective flow under and through a cap, compressive effects of adding additional mass to the underlying sediments from a cap, natural gas escaping from the organic compounds in the sediments, and cap scour and displacement. (NERL)

Support Via Technical Review Workgroup – ORD provides support to all Regions through the Technical Review Workgroup. This group assists Regional risk assessors in the application of the Integrated Exposure Uptake Biokinetic model for lead in children and to the Combustion Technical Assistance Center. (NCEA)

Other Region 10 Superfund Support:

- Continuing active support for East Gate Disposal Yard, Ft. Lewis Army Reserve. (NRMRL)
- Working at Eagle Harbor site to evaluate capping effectiveness for PAH-contaminated sediments. (NRMRL)
- Developing approach to incorporate bioavailability in site-specific risk assessments and treatment performance. (NRMRL)
- Will soon be conducting field evaluations at appropriate sites, and developing design, operation and monitoring approaches for landfill bioreactors. (NRMRL)

Superfund Technical Support Overview

Laboratory/Center Contacts for General Information:

National Center for Environmental Assessment (NCEA)	Kevin Garrahan	202-564-3336
National Center for Environmental Research (NCER) (Including Hazardous Substance Research Centers)	Mitch Lasat	202-564-6826
National Exposure Research Laboratory (NERL)	Jane Denne	702-798-2655
National Health and Environmental Effects Research Laboratory (NHEERL)	Bill Russo (on detail)	919-541-7869
National Risk Management Research Laboratory (NRMRL)	Trish Erickson	513-569-7406
Office of Science Policy (OSP)/Superfund Technical Liaison Program	Randy Wentsel	202-564-3214

Contaminated Sites – Site Specific Technical Support:

Specific elements included are:

Environmental Photographic Interpretation Center (EPIC) - Contact: Donald Garofalo 703-648-4285. <http://lvord1.las.epa.gov:9876/epic/default.htm> – This center provides site-specific information on the condition and activities occurring at hazardous waste disposal sites at a point in time or over a historical period; documents these conditions and changes; provide guides in the form of reports, maps, and photographs for assisting in the safe cleanup of hazardous waste materials; and assists in emergency response and enforcement efforts when requested by client offices. Remote sensing technical support is provided to all EPA Regional Superfund Offices and OERR, and includes: hazardous waste disposal site characterization and mapping; annotated aerial photo interpretation reports; topographic mapping of waste disposal sites; acquisition of aerial photographs; and enforcement support. FY01 requests by Region (122 total requests): R1=24%, R2=16%, R3=21%, R4=15%, R5=8%, R6=7%, R7=6%, R8=None, R9=4%, R10=1%. FY01 primary request types: historical site analysis; photo support; topographic maps.

Monitoring and Site Characterization Technology Support Center – Contact: Acting Director,

Chris Sibert, 702-798-2270.

<http://www.epa.gov/nerlesd1/tsc/tsc.htm> – This center provides scientific and technical assistance in the characterization of hazardous waste sites and associated site contaminants. State-of-the-science methods and technologies are identified and applied to identify contaminants, determine their levels and concentrations, and identify their geographic extent and distribution for site characterization and remediation. FY01 requests by Region (94 major/259 short-term requests): R1=7%, R2=17%, R3=15%, R4=13%, R5=5%, R6=7%, R7=9%, R8=4%, R9=17%, R10=5%. FY01 primary request types: statistical design; document review; analytical support.

Center for Exposure Assessment Modeling (CEAM) – Contact: Frank Stancil 706-355-8100.

<http://www.epa.gov/ceampubl/ceamhome.htm> – CEAM's goals are to develop, maintain, distribute, and apply state-of-the-science technical tools including multimedia exposure and ecosystem response simulation models, environmental databases, data analysis packages, tool application strategies, and advanced educational materials in the environmental sciences. FY01 requests (162 phone inquiries): FY01 primary request types: distributed 15,560 copies of models.

Superfund Technical Support Overview

Center for Subsurface Modeling Support (CSMoS) –

Contact: David Jewett 580-436-8560.

<http://www.epa.gov/ada/csmos.html> – Provides support for development, testing, application, and distribution of models on fate and transport of contaminants in the subsurface environment. FY01 requests (approximately 400 phone/email requests). FY01 primary request types: distributed 11,000+ copies of models.

Engineering Technical Support Center (ETSC) and

Superfund Technical Assistance Response Team

(START) – Contact: Dave Reisman 513-569-7588. This center provides site-specific assistance on engineering and treatment issues during any phase of a site cleanup. Focus areas include containment, thermal treatments, soil vapor extraction, bioremediation, and solidification/stabilization. Support is provided for incorporating technology-based data needs in the RI/FS phase and conducting/evaluating site-specific remedy options in the RD/RA and post-construction phases. The center publishes Engineering Bulletins on technologies and site types. The center supports Superfund, Brownfields, and RCRA Corrective Action sites. FY01 requests by Region (325 actions at 100 sites): R1=6%, R2=4%, R3=11%, R4=28%, R5=10%, R6=1%, R7=2%, R8=9%, R9=25%, R10=3%. FY01 primary request types: mining sites increasing; monitored natural attenuation and DNAPL questions continue; landfills and phytoremediation; most frequent technology-specific requests on stabilization/solidification and phytoremediation.

Ground Water Technical Support Center (GWTSC) –

Contact: Dave Burden 580-436-8606.

<http://www.epa.gov/ada/tsc.html> – This center provides site-specific assistance on ground water and subsurface contamination problems in site remediation. Focus areas include in-situ water treatment, in-situ thermal treatment, monitored natural attenuation, soil vapor extraction, and permeable reactive barriers. The center also publishes issue papers on subsurface remediation and ground water topics and provides project manager training upon request by the regions. The center supports Superfund, Brownfields, and RCRA Corrective Action sites. FY01 requests by Region (98 actions at 64 sites): R1=17%, R2=10%, R3=15%, R4=21%, R5=5%, R6=3%, R7=3%, R8=4%, R9=19%, R10=1%. FY01 primary request types: see ETSC.

Superfund Health Risk Technical Support Center

(STSC) – Contact: Harlal Choudhury 513/569-7536.

This center supports Regional and headquarters Superfund risk assessors by reviewing and developing exposure and toxicity factors that allow more accurate quantitative estimates of risk to be developed. Much of the activity is focused on developing new and updated externally peer reviewed provisional toxicity values that describe dose-response toxicological relationships. STSC is in the process of upgrading the Health Effects Assessment Summary Tables (HEAST) chemicals to externally peer reviewed provisional toxicity values. The Center also provides user support through the STSC Hotline as well as on-site expertise reviews. All assistance is provided on a rapid turn-around basis. FY01 requests by Region (regions =35% of total requests): R1=16%, R2=21%, R3=11%, R4=10%, R5=19%, R6=5%, R7=6%, R8=6%, R9=2%, R10=4%. FY01 primary request types: carcinogenicity; RfD; RfC; TCE; PERC.

Ecological Risk Assessment Technical Support Center

(ERASC) – Contact: Michael Kravitz 513-569-7740.

This center provides technical information and addresses scientific questions of concern or interest on topics relevant to ecological risk assessment at hazardous waste sites for EPA's Office of Solid Waste and Emergency Response (OSWER) personnel and Regional Superfund/RCRA staff. ERASC accomplishes this by drawing on the expertise of the Agency's laboratories and research centers as well as scientific community experts. For further information, access ERASC's Intranet site:

<http://intranet.epa.gov/ncea/erasc/index.htm>. FY01 requests (7 requests; pilot established FY01): handles requests forwarded by regional ecotoxicologists or ERAF members. FY01 primary request types: dredging; PCBs; soil/sediment TOC analyses; equilibrium partitioning approach; individual measurements versus population effects; EDCs.

Combustion Technical Assistance Center (CTAC) –

Contact: Harlal Choudhury 513/569-7536. This center provides technical assistance to Regional, state, and headquarter risk assessors who must evaluate the risks from more than 200 RCRA combustion facilities. Major issues addressed include evaluating the fate, transport and toxicity of combustor contaminants; and developing procedures to better quantify the risks from these facilities. FY01 requests by Region (27 requests): R1=2%, R2=9%, R3=2%, R4=4%,

SUPERFUND TECHNICAL SUPPORT OVERVIEW

R5=4%, R6=4%, R7=2%, R8=None, R9=7%, R10=40%. FY01 primary request types: toxicity; procedures/methodology; review of biotransfer coefficients (Travis and Arms).

Superfund Program Support/Tech Transfer – Contact: Lab/Center as above. Technical support to the OSWER Superfund Program includes technology transfer, issue papers on topics of concern to the program, workshops, manuals, and other support to program office activities. Support is provided across the risk paradigm.

RCRA Program Support – Contact: Lab/Center as above. Technical support to the OSWER RCRA program includes technical advice on implementation of combustion regulations, tech transfer documents, workshops and P2 to support RCRA programs, scientific advice, input and review in support of regulations and guidance, and support of HWIR.

Hazardous Substance Technical Liaison Program – For more information on this program, please refer to the “Hazardous Substances Technical Liaison Program” section located near the beginning of this tabbed section.

Other Region 1 Site Support

ORD scientists also provide technical support to Regional risk assessments and risk management actions at sites or in geographical areas not identified under the Superfund or RCRA Programs. This support can take many forms, including guidance and training on the use of ORD models and other research products, evaluation of the utility of specific technologies at specific locations, and expert testimony in legal proceedings. The following are some examples of ORD technical assistance in your Region.

Small Business Innovation Research (SBIR)

Solicitation & Workshops – ORD worked with Region 1 to develop a special SBIR solicitation to help meet their specific needs and priorities. The solicitation, "Environmental Solutions for Treatment of Arsenic in Small Drinking Water Systems, Stormwater Runoff, Combined Sewer Overflows (CSOs), Urban River Sediments and Infrastructure Rehabilitation," opened on January 31, 2002, and closed on March 21, 2002. SBIR workshops have also been held to help small businesses convert environmental ideas, inventions, innovations, patents and processes into commercial environmental technologies. (NCER)

Estuary Evaluation – To support Region 1, ORD is assisting in the evaluation of nutrient loading to estuaries. Together, ORD and the Region are modeling the effects of that loading in the context of the National Estuary Program. (NHEERL)

Field Evaluations – ORD is participating in a collaborative effort to set up field evaluations of innovative technologies associated with small mobile packaged treatment systems. The Region is currently searching for potential sites for an upcoming evaluation using an advanced oxidation process to remove contaminants from drinking water sources. (NRMRL)

STAR Grant Workshops – ORD and Region 1 are planning a pilot workshop, tentatively scheduled for November 14, 2002, to bring STAR grantees to the Regional office for presentations and discussions. Region 1 has identified the specific grants in which they are interested. If successful, similar workshops will be planned in each Region. (NCER)

Research Plan Development and Implementation

(Connecticut River) – ORD is currently working through various EPA Programs, Regions and The Connecticut River Airshed-Watershed Consortium to assist in various research regarding the Connecticut River basin. The group will conduct an interdisciplinary research program to define various resource management options for solving long-term degradation and pollution problems in the river. Additionally, ORD is providing support with the development of research plans on nutrient and pathogen non-point sources, rooftop runoff control and street sweeping in the Connecticut River watershed. (NRMRL)

Long Island Sound Study Support – ORD is currently assisting in Long Island Sound's "Site Designation Study." Specific support includes quantifying macrophage aggregate area in the spleens of winter flounder (as a marker of PAH pollution and disease), and reviewing the physical oceanography Quality Assurance Project Plan for this project. (NHEERL)

Technical Information Support – Technical information has been key in developing the protocols for evaluating dredged material in Region 1. Additionally, it has contributed to the measurement of lipids in tissues being tested as part of dredged material assessments. (NHEERL)

Water Treatment Testing and Field Studies – The ETV DWS Center, in partnership with the University of New Hampshire (UNH) Water Treatment Technology Assistance Center, will conduct testing of two Separmatic Fluid Systems DE filter package systems. The systems' goal is to remove cryptosporidium from drinking water at a UNH site. The Center also recently conducted a field study of the Pall Corporation's Microfiltration Microza 4UFD40004-45, LGV3L Package Plant for particulate and microbial control in drinking water at Manchester, NH. (NRMRL)

Technical Equipment and Guidance – Per request from Region 1, ORD provided Hydrolab equipment and technical guidance via an RLA to the Wood Pawcatuck Watershed Association. Work is continuing into FY03. (NHEERL)

OTHER REGION 1 SITE SUPPORT

Modeling Reviews – Region 1 recently submitted a proposal on the multifactorial analysis of time-dependent variables contributing to hypoxia in Western Long Island Sound. Prior to the proposal's submission, ORD was called in to provide a technical review of the modeling portions. (NHEERL)

Macroinvertebrate Index Development – With the state of New Hampshire, ORD is developing a multi-metric index for macroinvertebrates. The index will help monitor the biological condition of state streams. (NERL)

Nonindigenous Species – ORD coordinated the response to the importation of exotic aquarium plants and animals as well as information about Eurasian milfoil. (NHEERL)

Mercury Exposure Research – Working through a cooperative agreement with the University of Vermont, ORD is researching the impacts of atmospheric deposition and lake watershed processes on mercury exposure of fish and piscivorous wildlife in New England lakes. (NERL)

National Coastal Assessment Program (NCAP) – ORD's leadership in the northeast National Coastal Assessment Program, although directed at individual states, has also become of great interest to Regions 1, 2 and 3. Regional managers have been involved in every stage of this effort, from the initial meetings through data assessment and reporting. (NHEERL)

Regional Endocrine Disrupting Chemicals (EDCs) Workshop – This workshop was held May 1-3, 2001, in Atlanta. The objective was to provide an opportunity for Regional scientists to learn the most recent advances in the area of endocrine disruption and how this research could relate to regional issues. The status of current research on the effects of chemicals on thyroid function of amphibians, a high-priority problem in Region 1, was presented. (NHEERL)

National Assessment of Landscape Change by Ecoregion – This ORD effort is a collaborative, multi-year study with the USGS EROS Data Center. It is analyzing landscape changes between the early 1970s and early 2000s, and helping determine the

rates and causes of changes. Pilot studies are complete and results will be available for ecoregions for Regions 1, 2, 3 and 4. National results should be available by 2006 for all Regions. (NERL)

Experimental Program to Stimulate Competitive Research (EPSCoR) – EPSCoR is a joint program with EPA and 20 U.S. states and territories. The program supports the development of the states' science, technology and environmental education resources through partnerships with states' universities, industry, government and federal research and development. ORD funds EPSCoR programs in Alabama, Alaska, Arkansas, Hawaii, Idaho, Kansas, Kentucky, Louisiana, Mississippi, Montana, Nebraska, Nevada, North Dakota, Oklahoma, South Carolina, Vermont, West Virginia, Wyoming and Puerto Rico. (NCER)

First National Environmental Health Survey of Childcare Centers – This ORD effort is a collaborative study with HUD and CPSC. This study will collect and analyze measurements of pesticide residues in childcare centers nationwide. Region-specific concentration, exposure and biomonitoring data will be gathered from across the U.S. during the design of the main study. (NERL)

Air Quality Modeling – ORD assists Regions by communicating new tools and techniques for air quality modeling. These tools are used by states in preparing their implementation plans for the 8-hour ozone program. This information is helpful for Regions as they comply with air quality standards for ozone. (NERL)

Pollution Prevention – In August 2001, ORD published, "An Organizational Guide to Pollution Prevention" (EPA/625/R-01/003). In conjunction with this new document, it is sponsoring a series of interactive Workshops (one per Region) based on the principles and concepts produced in the Guide. ORD works with each Region to customize the workshops, addressing Region-specific concerns and issues. Other Pollution Prevention tools developed by ORD are also on display. (NRMRL)

Other Region 1 Site Support

Technology Transfer Seminars – ORD will sponsor three Regional Technology Transfer Seminars on the intrusion of vapors from soil or groundwater sources into indoor air. The seminars will introduce new EPA guidance and provide state-of-the-science information about important technical issues to regulators and decision-makers. (NRMRL)

Mixing Zone Modeling Technical Support – NPDES permit and 301(h) Secondary Treatment Waiver permit applicants and writers rely heavily on mixing zone models in designing and assessing outfall structures and performance. The EPA Visual Plumes software is designed to help clients meet mixing zone regulatory requirements. Interesting recent applications include: designing new thermal discharge structures (Potrero power plant, San Francisco, Region 9); assessing background tidal pollutant buildup of concentration in a tidal estuary (Salisbury, Maryland, Region 3); establishing Outer Continental Shelf (OCS) produced water guidelines (Region 9); predicting temperature exposure for salmon recovery efforts on the Columbia River (Region 10); developing plans for the safe ultimate disposal of caustic soda from a sunken barge (Florida, Region 4); and establishing the likely origin of bacterial concentration on beaches (Huntington Beach, Orange County, CA, Region 9). Visual Plumes training courses have been given in Alaska, California, Georgia, Oregon and Washington. The models have been distributed to at least 47 states and 55 countries. (NERL)

Other Region 1 Support Activities:

- Technical reviews of several Providence River dredging proposals (NHEERL)
- Providing support to evaluate control technologies for MTBE and PCE (NRMRL)
- Quality Assurance Project Plan reviews for a modeling study of 89 Massachusetts estuaries and a flushing study of Acushnet River Estuary, RI (NHEERL)
- Supporting the Region in its lawsuit against the Mass Water Resources Authority (MWRA) and the filtration issue (NRMRL)
- Technical review of Quonsett Point, RI, dredging proposal (NHEERL)
- Serving as instructors for required drinking water treatment operator course, part of the Region's outreach and monitoring activities for promulgated rules and regulations (NRMRL)
- Review of Charles River water quality monitoring proposal (NHEERL)
- Assistance for Regional personnel in synthesis and interpretation of sediment profile image data from Mount Hope Bay, RI (NHEERL)
- Transferring information management tools and techniques for National Coastal Assessment (NHEERL)
- Providing a Region-based technical advisor to assist in training staff on technical issues, setting up workshops and responding to technical requests (NHEERL)
- Working with Region 1 to develop coastal wetland monitoring program (NHEERL)
- Developing proposal for Regional Methods Initiative, focusing on bioassessment methods for tidal-fresh streams (NHEERL)
- Reviewing a proposal for eutrophication-related research on Long Island Sound (NHEERL)
- Measuring contaminant levels in sediment samples from the Barrington River (NHEERL)
- Providing technical information related to dioxin contamination of the Woonasquatucket River, RI (NHEERL)
- Providing information on standard reference materials for the dibenzodioxins measurement (NHEERL)
- Collecting and providing data and literature information on contaminant levels in winter flounder (NHEERL)

OTHER REGION 1 SITE SUPPORT

- Establishing conduit for technical transfer of latest endocrine disrupting chemical information to Region 1 scientists (NHEERL)
- Supporting model-based TMDL study in Seekonk and Providence Rivers (NHEERL)
- Reviewing implementation manual for lake nutrient criteria (NHEERL)
- Serving on Region 1 Technical Advisory Group for estuaries nutrient criteria development (NHEERL)
- Participating in development of a contaminant-monitoring program for Rhode Island fish. (NHEERL)
- Developing diagnostic tools (NHEERL)
- Developing rapid methods to measure pathogens in seawater samples. (NHEERL)
- Transmitting protocols on the measurement of lipids in marine tissue samples (NHEERL)
- Conducted the transfer of information management tools and techniques and provided survey design support for each of the 10 Regional R-EMAP projects. (NHEERL)
- Conducted hundreds of searches, retrieved data and interpreted results presented in the ECOTOX database. (NHEERL)

Other Region 2 Site Support

ORD scientists also provide technical support to Regional risk assessments and risk management actions at sites or in geographical areas not identified under the Superfund or RCRA Programs. This support can take many forms, including guidance and training on the use of ORD models and other research products, evaluation of the utility of specific technologies at specific locations, and expert testimony in legal proceedings. The following are some examples of ORD technical assistance in your Region.

Hydrological and Thermal Constraints Analyses (Lake Ontario) – ORD scientists followed up field studies performed in collaboration with Region 2 in 1994 and 1997 with additional analyses of benthic communities in Lake Ontario. Objectives were: 1.) to provide indicators of ecological condition; and, 2.) to provide mechanistic knowledge and a conceptual model of how these indicators function. During this analyses the influence of habitat and hydrological events on benthic community structure and function was determined at different depths and locations in Lake Ontario. Seasonal changes of the quality and quantity of phytoplankton as a food source were also determined, including how those seasonal changes affect zooplankton and Diporeia. (NHEERL)

8th Drinking Water/Wastewater Seminar (Dorado, Puerto Rico) – During this seminar, the EPA presented a synopsis of the technical support it provides in Puerto Rico in relation to small drinking water systems, remote monitoring and small community water quality control in Puerto Rico. Project status, programs and specific research projects were discussed. (NRMRL)

Mid-Atlantic Integrated Assessment (MAIA) – ORD, through MAIA, directly supports a large effort focused in Region 3, but extending into Regions 2 and 4. ORD and Region 3 share the responsibility for implementing this program. ORD's leadership in the northeast National Coastal Assessment Program, although directed at individual states, is of great interest to Regions 1, 2, and 3. Regional managers have been involved in every stage of this effort, from the initial meetings through data assessment and reporting. (NHEERL)

New York Harbor TMDL Pathogens Workgroup – ORD participates in this workgroup with key technical advice. For example, it provided indicator die-off data, which supports the development of the Harbor's receiving-water quality model for pathogens. (NRMRL)

Virgin Islands Monitoring Surveys – Working with Region 2, ORD designed and implemented monitoring surveys to examine the effects of effluents from the Virgin Islands Rum Industries. Specifically it reviewed the effects on coral reefs and submerged aquatic vegetation beds in the coastal areas near the St. Croix. (NHEERL)

Landscape Assessment (Catskill/Delaware Watersheds) – This project is a comprehensive assessment of landscape changes on the watersheds where most of New York City's drinking water supply comes from. It contributed to plans to conserve the city's outstanding drinking water quality. (NERL)

American Lobster Mortality Research – ORD is currently assisting in research to investigate the cause of American lobster mortality in Long Island Sound. This research includes examining lobsters from Long Island Sound for histopathological changes. (NHEERL)

Numerical Criteria for Assessing Dredged Material Bioaccumulation Tests – Bioaccumulation testing is required as part of the framework for deciding on appropriate disposal options for material from navigational dredging. In general, the evaluation of this data has been based on statistical comparison to values from "reference" areas rather than being based on actual expected risk. Per Region 2's request, ORD assisted in developing scientifically defensible, risk-based guidelines for evaluating dredged material. This effort was pre-empted by 9/11, but is expected to resume in the future. (NHEERL)

Chlorinated Biphenyls Toxicity Consultation – Responding to Region concerns about potential dioxin-like toxicity, ORD analyzed dust from New York City for a series of chlorinated substances including chlorinated biphenyls. QSAR predictions were conducted, which suggested that the chemicals would have dioxin-like toxicities, but with much less potencies than TCDD. (NHEERL)

Other Region 2 Site Support

TMDLs for Acid Rain and its Effects – ORD is providing technical advice to devise TMDLs for acid rain and its effects on Adirondack Lakes. This is the first time anyone will have tried to apply an aquatic TMDL to an air pollution problem. (NHEERL)

Health Effect Studies of Dioxin – ORD has provided technical assistance for Hyde Park and other sites in and around the Niagara Falls, NY. Its emphasis has been on conducting long-term studies of bioaccumulation and the human health and ecological effects of dioxin-like chemicals in Lake Ontario. (NHEERL)

North American Landscape Characterization Program (NALC) – This is a multi-agency project with USGS EROS Data Center and NASA to assemble Landsat data sets from the early 1970s, mid-1980s and early 1990s to conduct historical landscape change analyses. The data have and continue to be used in landscape change analyses being conducted in EPA Regions 2-10. (NERL)

National Assessment of Landscape Change by Ecoregion – This collaborative, multi-year study with the USGS EROS Data Center is analyzing landscape change between the early 1970s and early 2000s to determine the rates and causes of changes. The pilot studies are complete and results are available for ecoregions within EPA Regions 1, 2, 3 and 4. The national results should be available by 2006 for all EPA Regions. (NERL)

Experimental Program to Stimulate Competitive Research (EPSCoR) – EPSCoR is a joint program with EPA and 20 U.S. states and territories. The program supports the development of the states' science, technology and environmental education resources through partnerships with states' universities, industry, government, and federal research and development. ORD funds EPSCoR programs in Alabama, Alaska, Arkansas, Hawaii, Idaho, Kansas, Kentucky, Louisiana, Mississippi, Montana, Nebraska, Nevada, North Dakota, Oklahoma, South Carolina, Vermont, West Virginia, Wyoming and Puerto Rico. (NCER)

First National Environmental Health Survey of Childcare Centers – This is a collaborative study with HUD and CPSC. Measurements of pesticide residues in childcare centers were taken nationwide, including all Regions. NCS (National Children Study) will collect and analyze available Region-specific concentration, exposure and biomonitoring data across the U.S. during the design of the main study. (NERL)

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Other Region 2 Site Support

new thermal discharge structures (Potrero power plant, San Francisco; Region 9); assessing background tidal pollutant buildup of concentration in a tidal estuary (Salisbury, Maryland; Region 3); establishing Outer Continental Shelf (OCS) produced water guidelines (Region 9); predicting temperature exposure for salmon recovery efforts on the Columbia River (Region 10); developing plans for the safe ultimate disposal of caustic soda from a sunken barge (Florida, Region 4); and establishing the likely origin of bacterial concentration on beaches (Huntington Beach, Orange County, CA; Region 9). Visual Plumes training courses have been given in Alaska, California, Georgia, Oregon and Washington. The models have been distributed to at least 47 states and 55 countries. (NERL)

Other Region 2 Site Support Activities:

- Transferred information on the research and application of land cover/land use, including standards, to serve as a guide for the Mid-Atlantic Region. (NHEERL)
- Served as an active participant in the administrative consent order against NYC regarding the issue of filtering its source water. (NRMRL)
- Supported Regional 305 (b) efforts through National Coastal Assessment monitoring designs and interactions with individual states. (NHEERL)
- Provided support on several Region 2 R-EMAP projects. This included reviewing proposals and coordinating data analysis. (NHEERL)
- Supported development of wetland monitoring approaches and indicators in the Juniata and Nanticoke pilot watersheds. (NHEERL)
- Transferred Central, PA, Spring Creek Watershed Partnership's stream restoration approach to Regions, States and local governments. (NHEERL)
- Provided support in conducting hundreds of searches, retrieving data and interpreting results presented in the ECOTOX database. (NHEERL)

Other Region 3 Site Support

ORD scientists also provide technical support to Regional risk assessments and risk management actions at sites or in geographical areas not identified under the Superfund or RCRA Programs. This support can take many forms, including guidance and training on the use of ORD models and other research products, evaluation of the utility of specific technologies at specific locations, and expert testimony in legal proceedings. The following are some examples of ORD technical assistance in your Region.

Ecosystem Restoration Effects – Working in coordination with Baltimore County's Department of Environmental Protection and Resource Management, researchers are to evaluate the effectiveness and benefits of stream restoration on water quality and nitrate removal. Minebank Run, a small stream in Baltimore, MD, will be restored to improve geomorphic stability. Restoration will include reshaping stream banks to reconnect the stream channel to the flood plain, stream bank reinforcement, reconstructing stream meander features and riffle zones, and re-establishing riparian plant communities. (NRMRL)

Landscape Indicators for Pesticide Study (Mid-Atlantic Coastal Streams) – ORD has completed research into method development for the analyses of sediments for 70 chlorine, nitrogen and phosphorus-containing pesticides and PCBs. Analyses of 200 samples are now in process. Analyses are complete on the same 200 sediment samples for mercury, arsenic, cadmium, chromium, lead and selenium. (NERL)

Water Distribution System Monitoring – EPA implemented corrective action related to Coliform sp. violations in the Washington D.C. Water and Sewer Authority (WASA) water distribution system. As a result, a Web-based remote monitoring system was set up on the system through a collaborative effort with WASA and the Region. (NRMRL)

Region 3 Mid-Atlantic Integrated Assessment (MAIA) STAR Grant Evaluation – The MAIA team evaluated all its Regions' STAR grants (approximately 300) to determine which grant research results could easily

be implemented and used by managers to facilitate decision-making. MAIA took STAR research to 10 groups including Baltimore County, Maryland Department of Environmental Protection and Resource Management; Loudon County, Virginia Planning Commission; Delaware Center for Inland Bays; and others. In one example, Calvert County, MA, used STAR grant results to manage the county's urban sprawl. (NCER)

Landscape Model Development (Mid-Atlantic U.S.) – This ORD project includes empirical studies quantifying the relationships between landscape conditions within riparian zones and across watersheds as well as water quality, stream biota and the quality of breeding bird habitats. The models developed from these studies are then applied to the assessment of historical landscape change to determine how landscape changes have affected water resources and bird habitats. The models are also used to evaluate future landscape change scenarios being formulated by the Regional Vulnerability Assessment Program (ReVA). The work supports the ongoing MAIA Integrated Assessment in Region 3 and parts of Regions 2 and 4. The models will also assist Region 3 in targeting streams most likely to exceed TMDL thresholds for nutrients and sediment. (NERL)

Landscape Indicators for Mid-Atlantic Coastal Streams Pesticides Study – This extensive ORD effort, in collaboration with the USGS, develops models linking spatial landscape data to pesticide loadings into first order streams of Mid-Atlantic Region coastal streams. The project also involves a probably sample of first order streams to estimate their physical, chemical and biological condition. The project fills a significant data gap in stream monitoring in Regions 3 and 4 and provides a way to evaluate streams at risk for pesticides. (NERL)

ORD Scientist Participation – ORD scientists take an active role in Regional science issues. Several scientists are currently serving on an expert panel that oversees the development of the Delaware Estuary PCB Model. This model will be used in TMDL development. Other ORD scientists are technical advisors to the Region

Other Region 3 Site Support

on the sediment transport modeling study performed by EA Engineering, Science and Technology, Inc. as a component of the Washington NPDES permit. (NERL)

Riverine Biological Integrity Research – ORD has funded a grant with the University of Tennessee to determine the economic value of riverine biological integrity in the Clinch Valley of southwest Virginia and northeast Tennessee. Researchers have completed a set of surveys in which valley residents indicated the kinds of Regional economic trade-offs they would be willing to make to improve stream biological quality. Results are being analyzed. (NCEA)

Assessment of 305B Reporting Segments of the Ohio River – ORD and the Ohio River Sanitation Commission are working together to compare assessments of the condition of fish and macroinvertebrate assemblages. This information was obtained from a variety of areas, from sites selected with the EMAP probability design to those from a long-term intensive monitoring survey at four navigational pools located in the upper Ohio River. (NERL)

Nonindigenous Species (NIS) – Per Region request, ORD coordinated a response from the NIS Working Group regarding the ecological risks associated with the exotic Suminoe oyster's introduction into Chesapeake Bay. A number of Regional NIS issues have been addressed regarding the Superfund program. One example includes whether project managers should put native species requirements into decision records. (NHEERL)

Aquatic Impacts Study of Mountaintop Mining and Valley Fill Practices (West Virginia) – ORD assisted Region 3 in the analysis and interpretation of fish, macroinvertebrate, water chemistry and habitat data. This work assisted in evaluating the potential impacts of mountaintop mining and valley fill practices on the biological integrity of streams in West Virginia. (NERL)

Endangered Species Location and Biological Data Tracking – This effort focuses on securing access to specific location and biological data of threatened and endangered species. Known as the multi-jurisdictional database (MJD), this cooperative effort between EPA

and Region 3 will track the information that currently resides within State Heritage Programs and other sources within each individual state. (NRMRL)

North American Landscape Characterization Program (NALC) – This is a multi-agency project with USGS EROS Data Center and NASA to assemble Landsat data sets from the early 1970s, mid-1980s and early 1990s to conduct historical landscape change analyses. The data have and continue to be used in landscape change analyses being conducted in EPA Regions 2-10. (NERL)

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Canaan Valley Watershed Management – Restoration of riparian zones and acid mine drainage remediation are being applied to stressed watersheds in the Highlands. ORD is applying fate/transport and aquatic community models to provide management input for restoration activities. (NERL)

Cooperative Arsenic Treatment Technology Studies – The Drinking Water Systems Center, with ORD, NSF International and the Pennsylvania Department of Environmental Protection (PA-DEP), have announced cooperative arsenic treatment technology studies. The ETV testing is expected to begin in early FY03. It will include three Pennsylvania community water systems that have arsenic in their source water exceeding the new 10 ppb MCL and that appear to be representative of other small communities. Vendors committed to participating include ADI International, Inc., Tetra Process Technologies, Subsidiary of Severn Trent Services, Water Remediation Technology LLC (WRT) and Kinetico Incorporated with Alcan Chemicals. (NRMRL)

OTHER REGION 3 SITE SUPPORT

Proposed Whole Effluent Toxicity Testing Program Consultation – A state within Region 3 proposed a whole effluent toxicity-testing program for use in NPDES permitting. This approach differed from standard Agency guidance in several respects. ORD staff reviewed the proposal and provided the Region with a written evaluation, which emphasized key points that must be considered in reconciling the proposed approach with Agency guidance. (NHEERL)

Indicators of Ecological Integrity for the Ohio River – ORD, in collaboration with ORSANCO, other State and Federal agencies, and academia are developing basin-scale multi-metric indices to assess the condition of the Ohio River based on characteristics of fish and macroinvertebrate populations. (NERL)

PM Panel Studies (Baltimore) – ORD's University Partnership Program (UPAs) utilizes Region-specific data from California (Region 9), New Jersey (Region 2), Pennsylvania (Region 3), etc. in building modules for SHEDS. It is also used for developing MENTOR source-to-dose exposure models. (NERL)

Regional Vulnerability Assessment Program (ReVA) – Through ORD, the ReVA program assists environmental managers and stakeholders in implementing more effective and timely environmental assessment and management programs by developing and evaluating techniques to integrate data and model estimations from multiple sources. This helps:

- 1.) Assess current vulnerabilities associated with multiple stresses acting on multiple resources;
- 2.) Forecast future vulnerabilities; and, 3.) Enable evaluations of risk management options through alternative scenarios. Current ReVA data and models focus on EPA Region 3 and the Albemarle/Pamlico drainages of Region 4. (NERL)

R-EMAP: Small Watershed Characterization, Classification and Assessment for West Virginia – Utilizing EMAP design tools, ORD provided primary support with experimental design and GIS site selection for an assessment of small watersheds in West Virginia. This study will be used to test the improved National Elevation Dataset Hydrologic Derivatives (NED-HD) products resulting from its collaboration

with the EROS Data Center (USGS). The new NED-HD will provide a better hydrologic basis for stream classification. In addition, an ORD scientist is developing a watershed classification system and watershed-based sampling framework for the state of West Virginia that should support both 305b reports and 303d listings of impaired waters, and ultimately a combined assessment and listing process. In past projects, ORD has also worked with USGS and the Region to delineate the 12-digit HUCs for their state, which they will receive along with watershed classes and characteristics. (NHEERL)

Washington Aqueduct Permit Renewal Support – The ORD provided significant review and input into the deliberations associated with the renewal of the NPDES permit for the Washington Aqueduct, the major drinking water supplier for the District of Columbia. The results of a Region 3 contractor-prepared study on the potential impacts of the Washington Aqueduct on organisms in the Potomac River were criticized by several external parties. An ORD toxicologist, fisheries biologists and a sediment modeler readily offered their services, responding to the quick turnaround times needed by the Region. Their input proved very valuable in responding to criticisms, providing a range of suggestions for improving the permit, and making it potentially more acceptable to the concerned parties. (NERL)

National Assessment of Landscape Change by Ecoregion – This collaborative, multi-year study with the USGS EROS Data Center is analyzing landscape change between the early 1970s and early 2000s to determine the rates and causes of changes. The pilot studies are complete and results are available for ecoregions within EPA Regions 1, 2, 3 and 4. The national results should be available by 2006 for all EPA Regions. (NERL)

Experimental Program to Stimulate Competitive Research (EPSCoR) – EPSCoR is a joint program with EPA and 20 U.S. states and territories. The program supports the development of the states' science, technology and environmental education resources through partnerships with states' universities, industry, government and federal research and

OTHER REGION 3 SITE SUPPORT

development. ORD funds EPSCoR programs in Alabama, Alaska, Arkansas, Hawaii, Idaho, Kansas, Kentucky, Louisiana, Mississippi, Montana, Nebraska, Nevada, North Dakota, Oklahoma, South Carolina, Vermont, West Virginia, Wyoming and Puerto Rico. (NCER)

First National Environmental Health Survey of Childcare Centers – This is a collaborative study with HUD and CPSC. Measurements of pesticide residues in childcare centers were taken nationwide, including all Regions. NCS (National Children Study) will collect and analyze available Region-specific concentration, exposure and biomonitoring data across the U.S. during the design of the main study. (NERL)

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Pollution Prevention Guide – In August 2001, ORD published, “An Organizational Guide to Pollution Prevention” (EPA/625/R-01/003). In conjunction with this new document, ORD is sponsoring a series of interactive Workshops (one per Region) based on the principles and concepts produced in the Guide. ORD customizes the Workshops to address Region-specific items of interest. Other ORD Pollution Prevention tools are also on display. (NRMRL)

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Mixing Zone Modeling Technical Support to the EPA Regions – NPDES permit and 301(h) Secondary Treatment Waiver permit applicants and writers rely

heavily on mixing zone models in designing and assessing outfall structures and performance. The EPA Visual Plumes software is designed to help clients meet mixing zone regulatory requirements. Interesting recent applications include: designing new thermal discharge structures (Potrero power plant, San Francisco; Region 9); assessing background tidal pollutant buildup of concentration in a tidal estuary (Salisbury, Maryland; Region 3); establishing Outer Continental Shelf (OCS) produced water guidelines (Region 9); predicting temperature exposure for salmon recovery efforts on the Columbia River (Region 10); developing plans for the safe ultimate disposal of caustic soda from a sunken barge (Florida, Region 4); and establishing the likely origin of bacterial concentration on beaches (Huntington Beach, Orange County, CA; Region 9). Visual Plumes training courses have been given in Alaska, California, Georgia, Oregon and Washington. The models have been distributed to at least 47 states and 55 countries. (NERL)

Other Region 3 Support Activities:

- Aided in evaluating a Metro DC microbial contamination problem and helped to initiate a remote telemetry project. (NRMRL)
- Conducted Small Business Innovation Research (SBIR) Workshops to help small businesses convert environmental ideas, inventions, innovations, patents and processes into commercial, environmental technologies. (NCER)
- Provide ongoing EMAP support for MAIA stream analysis and interaction with five states on survey design and indicator interpretation. (NHEERL)
- Providing training to Region 3 on the use of common multivariate ordination methods used in interpreting biological data. (NERL)
- Currently working with Regional personnel to design “state-of-the-environment” reports based on data collected through the National Coastal Assessment. (NHEERL)
- Transferred key messages from the Mid-Atlantic Regional Assessment of Global Climate Change to the Region and States. (NHEERL)
- Transferred key messages, information management tools and techniques from five years of MAIA assessments to Region and States. (NHEERL)

OTHER REGION 3 SITE SUPPORT

- Developing an HPLC method to distinguish the nonylphenol isomers of greatest concern for endocrine disruption (EDC) activity. (NERL)
- Transferred application of GIS approach to Regions, States and local governments regarding pesticide use reduction at Ruggles Golf Course in Aberdeen Proving Ground, MA. (NHEERL)
- Updated State BioAssessment Programs in Mid-Atlantic Region. (NHEERL)
- Transferred state-of-science MAIA activities to graduate students via MAIA Case Studies Course at UMBC (2002-present) and Penn (beginning in 2003). (NHEERL)
- Transferred state-of-science integrative indicator of ecosystem condition through existing long-term monitoring program. Information was related to expansion of bird community index to Coastal Plain and Piedmont. (NHEERL)
- Working with West Virginia to develop a multi-metric index for fish to monitor the biological condition of state streams. (NERL)
- Initiated MAIA/STAR pilot to transfer state-of-science knowledge and products from STAR grant program to support Program mission. (NHEERL)
- Transferred state-of science knowledge of landscape ecology in U.S. Mid-Atlantic Region (Landscape Atlas) to support Program mission. (NHEERL)
- Transferred results of Mid-Atlantic Estuaries Assessment to Region and States. (NHEERL)
- Transferred results of Maryland Stream Assessment to Region and States. (NHEERL)
- Transferred state-of-science landscape-level biological indicator noting how birds indicate the ecological condition of the Mid-Atlantic highlands. (NHEERL)
- Transferred results of the Mid-Atlantic Highlands Streams Assessment to Region and States. (NHEERL)
- Transferred state-of-the-science statistical methods regarding "Maryland Agriculture and Your Watershed." (NHEERL)
- Provided assistance on global change research papers. (NHEERL)
- Provided support in conducting hundreds of searches, retrieving data and interpreting results presented in the ECOTOX database. (NHEERL)

Other Region 4 Site Support

ORD scientists also provide technical support to Regional risk assessments and risk management actions at sites or in geographical areas not identified under the Superfund or RCRA Programs. This support can take many forms, including guidance and training on the use of ORD models and other research products, evaluation of the utility of specific technologies at specific locations, and expert testimony in legal proceedings. The following are some examples of ORD technical assistance in your Region.

Technical Review of Grass Shrimp Toxicity Final Report – In Nov/Dec 2001, Region 4 requested a review of a Final Report entitled, "Toxicity, Ovary Formation, Embryo Production and Embryo Development Tests in Grass Shrimp (*Palaemonetes pugio*) Exposed to Sediments from Columbia Nitrogen and pH Tests on Grass Shrimp and Fish (*Fundulus heteroclitus*).” This report serves as the basis for chronic sublethal toxicity tests for grass shrimp used at several Superfund sites in the southeastern U.S. The technical review, encompassing eight pages of comments, was completed in Jan 2002 and submitted to the Region for its consideration. (NHEERL)

Large River Bioassessment and Monitoring Methods Comparison and Development – This project will compare the results derived from using several large river sampling methods that reflect those in common use for collecting assessment information on algae, benthic macroinvertebrate and fish assemblages as well as physical habitat features. The primary goal has been to provide information that will enable government agencies or individuals charged with the bioassessment and monitoring of large rivers to make informed decisions on the selection of scientifically robust, yet efficient methods that meet assessment endpoints. (NERL)

Coral Reef Joint Monitoring Activities (Florida Keys) – In 2001 and 2002, joint monitoring and research activities were conducted in the Upper and Lower Florida Keys as well as the Dry Tortugas. Aspects of the surveys have addressed disease condition and the relationship of disease occurrence with changes in water quality. (NHEERL)

Mercury Model Development – Several watersheds in Georgia have been sampled for TMDL development by the Region. These data will be used to extend and test the Mercury Model, which was developed by ORD and Region 4 for watershed fate and transformation of mercury species. (NERL)

Technical Consultation Evaluation of Causes of Major Bird Kill (Lake Apopka, FL) – ORD reviewed a technical assessment of the possible causes of a major bird kill where pesticides such as toxaphene and other chlorinated hydrocarbons from historical usages were suspected. The incident occurred when former agricultural fields were flooded, attracting large numbers of white pelicans and other aquatic-dependent birds. (NHEERL)

Impervious Cover Research – ORD is developing and testing an impervious cover indicator by watershed and then applying the methodology to 12-digit HUCs (Hydrologic Unit Codes) in Region 4. An "at-risk from development" watershed coverage is also being produced for the Region. (NERL)

Finalizing Wetland Restoration Synoptic Assessment – ORD continues its work with Region 4 to finalize its synoptic assessment in prioritizing wetland restoration for sediment yield reduction. An article was also co-authored with Region 7 on synoptic assessment to prioritize wetland protection for biodiversity, which was published in Biodiversity and Conservation. (NHEERL)

Exposure Assessment Support for Wasp6 – ORD is working with the Region on the testing, refinement, training and support of Wasp6, the Windows-based version of EPA's standard Water Quality Analysis Simulation Program. Region/ORD scientists have given four Wasp6 courses over the past 1+ year at different Regional offices (Seattle, Philadelphia and two in Atlanta). ORD is also working on the sensitivity analysis on a three-dimensional application of Wasp6 and EFDC to the Neuse River estuary. (NERL)

Evaluating the Fate of Contaminants in Sediments and Biota of Wetlands Constructed for Wastewater Treatment – The focus of this study is to evaluate the assimilative capacity of wetlands constructed for

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dual role wastewater treatment/restored wetland habitat to chemical stressors entering the system. The data from this study will be utilized by managers and stakeholders to evaluate where these dual role systems are appropriate to use and where these systems are currently working with no problems. It will also help evaluate where systems currently in place are developing potentially long-term contaminant problems that will negatively impact their suitability to provide high-quality wetland habitat and effective wastewater treatment. This study is being conducted in three regions: North Carolina (Region 4), Missouri (Region 7), Wyoming (Region 8). (NRMRL)

Watershed Field Research – A cooperative field data collection project is ongoing in the South Fork Broad River Watershed in the Savannah River Basin. The project consists of intensive storm event stream sampling ORD and Region 4's Science and Ecosystem Support and Water Management Divisions in Athens and Atlanta, GA. It will: 1.) develop sampling protocols to measure the Total Maximum Daily Load (TMDL) of bedload and suspended sediment, nutrients (nitrate, ammonia, ortho and total phosphorus) and pathogens (fecal coliforms, E. coli and enterococci); and, 2.) create a comprehensive database to develop, field test and apply mathematical models and protocols for calculating the TMDL in this watershed and its tributaries. In 1998, the State of Georgia listed the South Fork Broad River Watershed as biologically impaired (i.e. 303(d) list), but the source of contamination was unknown. Six stream sites have been instrumented with specialized monitoring equipment (three sites with cableway systems) for collecting data before, during and after storm events. (NERL)

ORD Liaison with the Gulf of Mexico Program – An ORD scientist serves as the liaison to the Gulf of Mexico Program. In that capacity, he provides support activities in Region 4 by:

- Serving as Project Officer for the Gulf of Mexico program for offshore hydrodynamic and water quality model development.
- Representing the Gulf program at State and Federal task forces meetings.
- Participating with U.S. Navy Oceanographic and Meteorologic operational support unit located at the Stennis Space Center on joint cooperative work for model development.

- Serving as lead for nitrogen modeling for the Gulf Nutrient Task force which has members from Regions 3, 4 and 6.
- Participating in Gulf comprehensive meetings which has members from Region 4 and 5.
- Representing the Gulf program for environmental security issues.
- Representing the Gulf program as member of NASA's remote imaging environmental program located at Stennis Space Center. (NERL)

Collaborative Efforts Supporting Hypoxia Action Plan Goals – On Oct. 3-4, 2002, ORD will host a meeting with Regions 4, 5, 6 and 7, OW, and GMPO to discuss development of a consensus modeling framework and other collaborative efforts targeting Hypoxia Action Plan goals. These goals include: 1.) reducing the Gulf of Mexico hypoxic zone to <5000 square kilometers by year 2015; 2.) restoring and protecting the waters of the 31 States and Tribal lands within the Mississippi River Basin; and 3.) improving the communities and economic conditions across the Basin. The Hypoxia Action Plan was developed by an Interagency Task Force based on findings of the CENR Integrated Assessment of Hypoxia in the Northern Gulf of Mexico as mandated by Public Law 105-383. OWOW serves as the Chair of the Federal Task Force charged with implementation of the Hypoxia Action Plan. (NHEERL)

Mainstem Green River Monitoring of the Conservation Reserve Enhancement Program – ORD, with the Kentucky Department of Environmental Protection, is working to develop, test and implement practical field methods to collect data on algae, invertebrates, fish and physical habitat. The field methods will be used in a statewide biomonitoring program and to determine restoration activity benefits in the upper Green River basin. (NERL)

Land Cover Methods Development Research – ORD has established a "Virtual Field Reference Database (VFRDB)" for the Neuse River Basin (NRB), which extends from south-central Virginia (Region 3) to the Pamlico Sound in North Carolina (Region 4). This consists of detailed satellite imagery-based land cover data combined with long-term intensive field measurement sites. The VFRDB will be used to: 1.) Develop new phenology-based satellite image analysis methods for the rapid characterization of land-cover

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condition and change from Regional to National scales; 2.) Evaluate the relative accuracy of the new NASA-EOS MODIS Leaf Area Index (LAI) measurements for Regional scale application with landscape process models (e.g., biogenic emissions); and, 3.) Advance the development of the next generation of spatially explicit landscape process-based models to provide a predictive modeling capability for important ecosystem processes (e.g., nutrients, sedimentation, pathogens, etc.). (NERL)

Mid-Atlantic Integrated Assessment (MAIA) – ORD, through MAIA, directly supports a large effort focused in Region 3, but extending into Regions 2 and 4. ORD and Region 3 share the responsibility for implementing this program. ORD's leadership in the northeast National Coastal Assessment Program, although directed at individual states, is of great interest to Regions 1, 2 and 3. Regional managers have been involved in every stage of this effort, from the initial meetings through data assessment and reporting. (NHEERL)

South Carolina TMDL Case Study – This project involved development of a first-of-its-kind model and assessment methodology that produces a map with probabilities of small watersheds having streams that exceed TMDL threshold values for Fecal Coliforms. The result is a powerful statistical approach that can be used to evaluate probabilities of exceeding TMDL thresholds across an entire State. It can also be used to estimate exceedence in unsampled areas. The study was tested in South Carolina and supports Region 4's TMDL program. (NERL)

Analytical Tools Interface for Landscape Assessments (ATtILA) – Per Region 4's request, ORD has been developing a user-friendly GIS interface that permits the Regions and other EPA Offices to calculate a range of landscape metrics and simple models whose outputs relate to water and terrestrial resource conditions. The tool allows the user to conduct these assessments at multiple scales for many different type of natural (e.g., ecoregion) and political (e.g., counties) units. Although developed to support Region 4 activities, the tools are being widely used by EPA Regions, other Federal Agencies, States and Universities (in support of academic studies). ATtILA is continually being upgraded to include new metrics and simple models. (NERL)

Vertical Atmospheric Profile of Mercury Species over South Florida – Two aircraft sampling campaigns were conducted in January and June of 2000. These campaigns: 1.) Evaluated the potential for long-range transport and deposition of inorganic reactive gaseous mercury species to South Florida; and, 2.) Identified vertical gradients in the marine-free troposphere that would suggest a natural mechanism for the rapid oxidation of elemental gaseous mercury. The data analysis and meteorological modeling is still in process. (NERL)

PM Panel Studies in Raleigh – ORD's University Partnership Program (UPA's) utilizes Region-specific data from California (Region 9), New Jersey (Region 2), Pennsylvania (Region 3), etc. in building modules for SHEDS and for MENTOR source-to-dose exposure models. (NERL)

Organotin Research Support – The State of South Carolina suspected an organotin manufacturing plant was responsible for a major fish kill in one of its streams and the poisoning of a municipal wastewater treatment plant. ORD applied a new analytical approach developed in-house (solid-phase extraction combined with μ -liquid chromatography-electrospray-ion trap mass spectrometry) to detect both dibutyl- and tributyl- tin compounds in water and fish from the affected stream. (NERL)

Assessing Nitrogen Cycling Mechanisms – Through the assessment of the physical, chemical and biological mechanisms that impact the effectiveness of riparian zone restoration practices in southern Appalachia (western North Carolina), researchers can better understand the variety of benefits to water quality and ecosystem health that can be realized. Researchers are investigating the results of multiple restoration technologies and practices as they impact the retention and release of nitrogen in riparian zones. This project incorporates cost benefit analysis to establish the water quality and habitat improvements realized as compared to costs associated with riparian zone restoration activity costs. (NRMRL)

North American Landscape Characterization Program (NALC) – This is a multi-agency project with USGS EROS Data Center and NASA to assemble Landsat data sets from the early 1970s, mid-1980s and early 1990s to conduct historical landscape

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change analyses. The data have and continue to be used in landscape change analyses being conducted in EPA Regions 2-10. (NERL)

Effect of Concentrated Animal Feed Operations (CAFOs) on Groundwater Quality – ORD researchers have been working with Region 4 personnel to evaluate the impact of swine Concentrated Animal Feed Operations (CAFOs) on groundwater quality in Oklahoma. Collaboration on this effort has helped the Region implement specific enforcement actions for one of these facilities. It has also allowed access to information required for assessing environmental impacts to groundwater and adjacent wetlands. (NRMRL)

National Assessment of Landscape Change by Ecoregion – This collaborative, multi-year study with the USGS EROS Data Center is analyzing landscape change between the early 1970s and early 2000s to determine the rates and causes of changes. The pilot studies are complete and results are available for ecoregions within EPA Regions 1, 2, 3 and 4. The national results should be available by 2006 for all EPA Regions. (NERL)

Experimental Program to Stimulate Competitive Research (EPSCoR) – EPSCoR is a joint program with EPA and 20 U.S. states and territories. The program supports the development of the states' science, technology and environmental education resources through partnerships with states' universities, industry, government and federal research and development. ORD funds EPSCoR programs in Alabama, Alaska, Arkansas, Hawaii, Idaho, Kansas, Kentucky, Louisiana, Mississippi, Montana, Nebraska, Nevada, North Dakota, Oklahoma, South Carolina, Vermont, West Virginia, Wyoming and Puerto Rico.

First National Environmental Health Survey of Childcare Centers – This is a collaborative study with HUD and CPSC. Measurements of pesticide residues in childcare centers were taken nationwide, including all Regions. NCS (National Children Study) will collect and analyze available Region-specific concentration, exposure and biomonitoring data across the U.S. during the design of the main study. (NERL)

Air Quality Models Assistance – ORD assists the Regions by indicating how air quality models need to be used to support management decisions for implementing the 8-hour ozone implementation program. This assists Regions as they strive to comply with air quality standards for ozone. ORD, as part of the Air Simulation Workgroup, communicates new tools and techniques for air quality modeling. These tools are used by states in preparing implementation plans. (NERL)

Pollution Prevention Guide – In August 2001, ORD published, "An Organizational Guide to Pollution Prevention" (EPA/625/R-01/003). In conjunction with this new document, ORD is sponsoring a series of interactive Workshops (one per Region) based on the principles and concepts produced in the Guide. ORD customizes the Workshops to address Region-specific items of interest. Other ORD Pollution Prevention tools are also on display. (NRMRL)

Technology Transfer Seminars – ORD will sponsor three regional Technology Transfer Seminars on the intrusion of vapors from soil or groundwater sources into indoor air. The seminars will introduce new EPA guidance and provide state-of-the-science information about important technical issues to regulators and decision-makers. (NRMRL)

Mixing Zone Modeling Technical Support to the EPA Regions – NPDES permit and 301(h) Secondary Treatment Waiver permit applicants and writers rely heavily on mixing zone models in designing and assessing outfall structures and performance. The EPA Visual Plumes software is designed to help clients meet mixing zone regulatory requirements. Interesting recent applications include: designing new thermal discharge structures (Potrero power plant, San Francisco; Region 9); assessing background tidal pollutant buildup of concentration in a tidal estuary (Salisbury, Maryland; Region 3); establishing Outer Continental Shelf (OCS) produced water guidelines (Region 9); predicting temperature exposure for salmon recovery efforts on the Columbia River (Region 10); developing plans for the safe ultimate disposal of caustic soda from a sunken barge (Florida, Region 4); and establishing the likely origin of bacterial concentration on beaches (Huntington

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Beach, Orange County, CA; Region 9). Visual Plumes training courses have been given in Alaska, California, Georgia, Oregon and Washington. The models have been distributed to at least 47 states and 55 countries. (NERL)

Other Region 4 Support Activities:

- Conducted studies in North Carolina homes and childcare centers on "Children's Total Exposure to Persistent Pesticides and Other Persistent Organic Pollutants." (NERL)
- Provided technical assistance in restarting drinking water treatment plants after a hurricane disaster in North Carolina. (NRMRL)
- Conducted a collaborative study with the CDC and Duval County Health Department on "Biological and Environmental Monitoring for Organophosphate and Pyrethroid Pesticide Exposures in Children Living in Jacksonville, FL". (NERL)
- Conducted an agricultural health study securing measurements from a cohort of 90,000 North Carolina farmers and families. Work is ongoing through 2008. (NERL)
- Participated in EMAP workshops, including the technical transfer of probability-based environmental monitoring design and data management systems. (NHEERL)
- Conducted a study of Asthmatic Children in Tampa from September 2002 through December 2002. (NERL)
- Conducted a field study of the Osmonics PS150 Ozone System for microbial control in drinking water at a site in Minneapolis, MN. The study was completed in FY02. (NRMRL)
- Supported development of volunteer monitoring program for amphibians (NAAMP) and stream-side salamander monitoring techniques. (NHEERL)
- Conducted research on the "Environmental Risk and Impact in Communities of Color and Economically Disadvantaged Communities" (Congressional Earmark). (NERL)
- Transferred information on Web-based inventory of ecological restoration projects in the Mid-Atlantic region to Region, States and local governments. (NHEERL)
- Established projects with the Tennessee Valley Authority's Environmental Research Center in Muscle Shoals, AL, to evaluate the ability of TVA's ReCirculating Wetland system to treat CAFO wastewater. (NRMRL)
- Assisting the state of Mississippi in the development of a statewide biomonitoring program for large rivers. (NERL)
- Provided EMAP support via the Region for monitoring in Florida. (NHEERL)
- Provided support for ecoregion development. (NHEERL)
- Provided support in conducting hundreds of searches, retrieving data and interpreting results presented in the ECOTOX database. (NHEERL)

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ORD scientists also provide technical support to Regional risk assessments and risk management actions at sites or in geographical areas not identified under the Superfund or RCRA Programs. This support can take many forms, including guidance and training on the use of ORD models and other research products, evaluation of the utility of specific technologies at specific locations, and expert testimony in legal proceedings. The following are some examples of ORD technical assistance in your Region.

Great Lakes Nearshore Coastal Wetlands Evaluation (Emphasis Watershed Environmental Indicator and Status Development) – This is an Interagency Agreement with the U.S. Department of Interior/Fish and Wildlife Service funded by ORD through its Region 5 R-EMAP Program. The main goals are to: 1.) Develop and test multi-metric indices of biological integrity for wetland plants, invertebrates and fish assemblages; and, 2.) Use a probabilistic sampling approach to assess current condition of biological integrity of Great Lakes coastal wetlands in Region 5. ORD scientists are testing nutrient exposure and response indicators to support the development of Regional effects-based criteria and refinement of indicators, development of diagnostic community-level indicators to support diagnosis of cause of impairment, and testing of watershed classification systems to predict probability of impairment to coastal wetlands. (NHEERL)

Test Protocol/Plan Development – ORD will be developing test protocol/plans for the evaluation of commercial-ready point-of-use drinking water treatment devices. The tests will be conducted at the NSF International Laboratory in Ann Arbor, MI. This effort focuses on homeland security issues and potential terrorist contamination of water supplies. (NRMRL)

Regionalization/Index of Northern Lake and Forests Biotic Integrity Development – The Northern Lakes and Forests (NLF) R-EMAP Project was funded by Region 5 and administered by ORD to develop indicators of ecological condition for streams in the NLF ecoregion based on fish and invertebrate assemblages. Over 100 small- to medium-sized

streams were sampled in northern Michigan, Wisconsin and Minnesota through collaborative efforts with Departments of Natural Resources and universities in those states, as well as the Biological Resource Division of USGS. Streams were selected from watersheds that varied in land-use/land-cover characteristics so the sites spanned a wide gradient of human disturbance. Two of the major accomplishments of this project were to develop indices of biological integrity for streams in the NLF using both fish and invertebrates, and to quantify relationships between watershed character and biological integrity that had been largely unknown for streams in this ecoregion. (NHEERL)

Stream Biological Integrity Research (Central Ohio) – ORD has funded a grant with Miami University to determine the economic value of stream biological integrity in the Big Darby Creek watershed. Researchers have already completed a survey in which Ohio residents indicated a willingness to pay for less-impactful development scenarios. ORD is currently examining the influence of biological integrity on real estate values in the watershed. (NCEA)

Regional Methods Initiative: Diagnostic Indicators of Stream Impairment – The overall goal of this project is to provide information needed by the States to set nutrient criteria at a level appropriately protective of their water bodies' aquatic life uses. ORD will provide research support through analyses of existing biological and chemical data. Nutrient criteria recommendations and diagnostic indicator evaluation will be done in collaboration with the Region. (ORD)

ORD/Regional Briefing (Grosse Ile, MI) – Francis (Frank) X. Lyons, the Region 5 Administrator, visited ORD's facility at Grosse Ile in February 2000. Even though the facility is operated by and under the stewardship of ORD, the facility houses three Regional components which include Superfund, Criminal Investigations Division and Water Division. The purpose of Lyons' visit was to obtain an overview of the projects and activities of the Regional components. ORD briefed him on the history, organization and scientific accomplishments of the facility. Lyons was

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particularly interested in the lower Fox River/Green Bay study and the Lake Michigan Mass Balance Project (as these are problem-driven studies with Region 5), the Great Lakes National Program Office, and states as the primary clients and participants. He expressed appreciation for past Great Lakes Regional studies conducted by ORD, such as the Upper Great Lakes Channel Study/ Detroit River Study with respect to the Detroit River Remedial Action Plan and the Assessment and Remediation of Contaminated Sediments (ARCS) Study, among others. (NHEERL)

Great Lakes Basin Vegetation Change Analysis – This project includes historical land cover and change detection methods development and a comprehensive assessment of landscape changes across the Great Lakes Basin. This is a “first-of-its-kind” study incorporating the U.S. and Canadian portions of the Basin and is a collaborative effort with the Canadian Center for Remote Sensing. In a Region 5 survey, the project was the highest priority regarding landscape analysis. The results will help the Region and the Great Lakes Program Office evaluate the magnitude and direction of landscape change going on across the Basin and help interpret risks of observed change on water resource conditions. (NERL)

Great Lakes Regional Fact-Finding Visit – Per request from Region 5 and the Great Lakes National Program Office, ORD participated in a Great Lakes briefing for U.S. Senator Debbie Stabenow (D-Mich) in August 2001. Several local, Federal, State and private groups were involved including the Coast Guard, Army Corps, Fish and Wildlife Service, Sea Grant, Great Lakes Commission and the Detroit River American Heritage Navigator. The briefing took place on a Coast Guard vessel tour of the upper Detroit River and Lake St. Clair. General summary statements of missions were provided from four EPA groups at Grosse Ile along with an overview of the expertise and experience with the Detroit River and/or Lake St. Clair. Also included was an update of progress on PCBs, atrazine and mercury modeling for the Lake Michigan Mass Balance Study. (NHEERL)

State of the St. Joseph’s Watershed Conference – The St. Joseph’s River is the largest tributary contributor of atrazine to Lake Michigan. ORD presented results of its Lake Michigan Mass Balance Study for suspended solids, phosphorus, nitrate, PCBs, mercury and atrazine. The presentation focused on atrazine data, atrazine modeling, modeling forecasts and ramifications based upon EPA effects thresholds. Results suggest that atrazine will continue to increase in Lake Michigan and reach steady-state in approximately 200 years. Present and forecasted conditions fall considerably below present EPA draft criteria and effects thresholds. (NHEERL)

Lake Michigan Lakewide Management Plan (LaMP) – ORD has been working with Region 5; the Great Lakes National Program Office; the States of Michigan, Wisconsin, Illinois and Indiana; the First Nations, other Federal groups and the public and private sectors to complete the Lake Michigan LaMP. The LaMP for each of the five Great Lakes are updated every two years. These documents serve as an update of status, tracking, progress and new initiatives in the Lake Michigan ecosystem. The Executive Summary (approx. 100 pp.) is being published and further discussion and text is being provided in appendices, which will be posted on the Region 5 Web site. Contributions to the Executive Summary and Appendices by ORD include the mass balance of atrazine and PCBs and forecasts of future conditions under differing remedial/regulatory scenarios. (NHEERL)

Great Lakes Coastal Wetlands – This project’s aim is to develop remote sensing and spatial analysis methods using new remote sensing imagery to detect the presence and potential impact of invasive exotic species in ecologically sensitive Great Lakes Coastal Wetlands. This project directly supports Region 5’s needs. (NERL)

Lake Michigan Regional Case Study – This study is being coordinated with the Lake Michigan Lakewide Area Management Plan (LAMP) process and Lake Michigan Monitoring Coordination Council, both of which also have strong input from Region 5. Under

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the Aquatic Stressors Framework, this study will provide a classification and monitoring framework for the basin to support consolidated assessment and listing (Section 305b and 303d reports) and the TMDL process. (NHEERL)

Mercury Air Emissions from the Olin Chlor-Alkali Plant – This project was coordinated by Region 5 and included ORD researchers. ORD measured inorganic reactive gaseous mercury species being emitted from the cell building, monitored ambient mercury species at "upwind" and "downwind" locations, and modeled the near-field atmospheric mercury deposition contribution from the plant. (NERL)

Collaborative Efforts Supporting Hypoxia Action Plan Goals – On Oct. 3-4, 2002, ORD will host a meeting with Regions 4, 5, 6 and 7, OW, and GMPO to discuss development of a consensus modeling framework and other collaborative efforts targeting Hypoxia Action Plan goals. These goals include: 1.) reducing the Gulf of Mexico hypoxic zone to <5000 square kilometers by year 2015; 2.) restoring and protecting the waters of the 31 States and Tribal lands within the Mississippi River Basin; and 3.) improving the communities and economic conditions across the Basin. The Hypoxia Action Plan was developed by an Interagency Task Force based on findings of the CENR Integrated Assessment of Hypoxia in the Northern Gulf of Mexico as mandated by Public Law 105-383. OWOW serves as the Chair of the Federal Task Force charged with implementation of the Hypoxia Action Plan. (NHEERL)

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Experimental Program to Stimulate Competitive Research (EPSCoR) – EPSCoR is a joint program with EPA and 20 U.S. states and territories. The program supports the development of the states' science,

technology and environmental education resources through partnerships with states' universities, industry, government and federal research and development. ORD funds EPSCoR programs in Alabama, Alaska, Arkansas, Hawaii, Idaho, Kansas, Kentucky, Louisiana, Mississippi, Montana, Nebraska, Nevada, North Dakota, Oklahoma, South Carolina, Vermont, West Virginia, Wyoming and Puerto Rico. (NCER)

First National Environmental Health Survey of Childcare Centers – This is a collaborative study with HUD and CPSC. Measurements of pesticide residues in childcare centers were taken nationwide, including all Regions. NCS (National Children Study) will collect and analyze available Region-specific concentration, exposure and biomonitoring data across the U.S. during the design of the main study. (NERL)

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Other Region 5 Site Support

Mixing Zone Modeling Technical Support to the EPA Regions – NPDES permit and 301(h) Secondary Treatment Waiver permit applicants and writers rely heavily on mixing zone models in designing and assessing outfall structures and performance. The EPA Visual Plumes software is designed to help clients meet mixing zone regulatory requirements. Interesting recent applications include: designing new thermal discharge structures (Potrero power plant, San Francisco; Region 9); assessing background tidal pollutant buildup of concentration in a tidal estuary (Salisbury, Maryland; Region 3); establishing Outer Continental Shelf (OCS) produced water guidelines (Region 9); predicting temperature exposure for salmon recovery efforts on the Columbia River (Region 10); developing plans for the safe ultimate disposal of caustic soda from a sunken barge (Florida, Region 4); and establishing the likely origin of bacterial concentration on beaches (Huntington Beach, Orange County, CA; Region 9). Visual Plumes training courses have been given in Alaska, California, Georgia, Oregon and Washington. The models have been distributed to at least 47 states and 55 countries. (NERL)

Other Region 5 Support Activities:

- Provided a briefing to Regional staff involved in implementing the new arsenic MCL. Also participated in the certification of treatment plant operators by providing expertise at recent training courses. (NRMRL)
- Conducted a study on "Children's Total Exposure to Persistent Pesticides and Other Persistent Organic Pollutants" in homes and childcare centers in Ohio. (NERL)
- Working with Region to assemble Regional ecosystem data and develop a classification system. This also includes development of community-level diagnostic indicators related to nutrient impairments in streams to support the creation of Regional nutrient criteria. (NHEERL)
- Currently participating in a joint project with the Northeast Ohio Regional Sewer District (NEORS) pertaining to Progress Indicators and End Points to Guide Urban Stream Restoration Efforts. The NEORS is leveraging ORD funding with 319 funding from Ohio EPA to develop guidelines. (NRMRL)
- Reviewed and provided technical guidance on a field study measuring a bioaccumulation factor for benzo[a]pyrene submitted by a regulated party for a site-specific NPDES permit. (NHEERL)
- Coordinating efforts with Region and the Indiana Department of Environmental Monitoring (IDEM) to conduct package plant technology evaluations on various water supplies contaminated with low concentrations of MTBE. A possible demonstration site (Elementary School) has been identified in Southwestern Indiana. (NRMRL)
- Provided technical guidance on how to perform TIE to determine the cause of the White River fish kill. Reviewed analytical results and data provided by the State to the Region for the Region's staff. (NHEERL)
- Interpreted historical AVS and metals data, conducted chemical analysis, reported and interpreted AVS/SEM concentrations in Tuscarawas River sediment samples collected by the PPG Barberton Ohio facility. (NHEERL)
- Conducting a field evaluation of the Polymem UF 120 S2 Ultrafiltration Membrane Module for particulate and microbial control in drinking water at a site in Green Bay, WI. Completion expected in mid FY03. (NRMRL)
- Provided support in conducting hundreds of searches, retrieving data and interpreting results presented in the ECOTOX database. (NHEERL)

OTHER REGION 6 SITE SUPPORT

ORD scientists also provide technical support to Regional risk assessments and risk management actions at sites or in geographical areas not identified under the Superfund or RCRA Programs. This support can take many forms, including guidance and training on the use of ORD models and other research products, evaluation of the utility of specific technologies at specific locations, and expert testimony in legal proceedings. The following are some examples of ORD technical assistance in your Region.

Cumulative Risk Workshop – ORD's Cumulative Risk Team has been working with Regional staff to develop an agenda and plan for an ORD/Regions Cumulative Risk Workshop. The workshop will take place in the Region 6 office in Dallas, TX, November 4-8, 2002. Highlights will include technical talks, the identification of cumulative risk assessment research needs, and the establishment of ORD-Region workgroups to continue interactions beyond November. It will also document the Regions' perspectives on the toxicity of chemical mixtures and cumulative risk. (NCEA)

Protocols and Decision Support Tool Development for Assessing Watershed System Assimilative Capacity (SAC) – The focus of this effort, which supports risk-based ecosystem management/restoration practices, is to evaluate the assimilative capacity of a large reservoir system to an array of commonly encountered stressors potentially impacting the system. The data will be utilized in the development of a Decision Support System that may be used as a model for managing large reservoir type systems. This would allow managers and stakeholders to balance the desired goods and services from these systems with the potentially increasing stresses impacting the system. (NRMRL)

Small Water System Modular Plant Concept – ORD initiated communications with a small utility in South Texas and Region 6 to discuss a proposed small water system modular (SWSM) plant concept. This innovative approach can improve performance and reliability while reducing the cost of operating small water systems. The SWSM approach will be demonstrated in the Region. (NRMRL)

Sediment Toxicity Test Methods Using Bivalve *Mulinia lateralis* – Technical refinements of the *Mulinia* 10-day acute sediment toxicity test, previously developed by Region 6, are underway in support of Region 6 requests to address shortcomings in the practical application of this method. In addition, ORD is developing SOPs for the laboratory culture of *Mulinia* and standardized brood stock sources that will lead to Region 6-sponsored round-robin test method evaluations. The Biological Advisory Committee has provided additional support for this activity. This project was requested directly by Region 6 as part of the BAC process. (NHEERL)

ORD Liaison with the Gulf of Mexico Program – An ORD scientist serves as the ORD Liaison to the Gulf of Mexico Program. In that capacity, he provides support activities in Regions 6 by:

- Representing the Gulf program at State and Federal task forces meetings
- Representing the Gulf program on Louisiana Coastal Assessment
- Serving on the University of Alabama's technical advisory board for national estuary program (Mobile Bay)
- Participating with U.S. Navy Oceanographic and Meteorologic operational support unit located at the Stennis Space Center on joint cooperative work for model development
- Serving as lead for nitrogen modeling for the Gulf Nutrient Task force which has members from Regions 3, 4 and 6
- Interacting with Corps of Engineers New Orleans district on model development
- Representing the Gulf program for environmental security issues
- Serving as panel member for NOAA on hypoxia reduction – Region 6
- Representing the Gulf program as member of NASA's remote imaging environmental program located at Stennis Space Center. (NERL)

EMAP Tech Transfer Workshop – In June 2002, Region 6 hosted an EMAP Tech Transfer Workshop in Dallas, which was attended by State environmental protection agency representatives from TX, LA, OK, AR and Region 6 staff. ORD led the tech transfer discussions, bridging the gap between the conceptual

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design of State monitoring programs and the practical implementation and use of the data collected to:

1.) Improve 305(b) reporting on the condition of coastal waters; 2.) Assess the condition of coastal waters over time to examine the success of environmental management; and, 3.) Identify waters at risk and stressors of concern. Region 6 continues to support EMAP efforts to help States improve 305(b) reporting. (NHEERL)

Tensas River Basin Landscape Assessment – A landscape assessment of ecological condition was applied to the Tensas River Basin located in Louisiana. This study used landscape metrics through GIS and remote sensing data to evaluate ecological conditions and to locate areas of bottomland hardwood forest for restoration. (NERL)

White River Basin Ecological and Habitat Vulnerability Assessment – Landscape metrics are being applied to the White River Basin with a special emphasis on reviewing landscape changes and how those changes could affect wildlife habitat. Changes could include man-made conversions to the riverbed. (NERL)

Collaborative Efforts Supporting Hypoxia Action Plan Goals – On Oct. 3-4, 2002, ORD will host a meeting with Regions 4, 5, 6 and 7, OW, and GMPO to discuss development of a consensus modeling framework and other collaborative efforts targeting Hypoxia Action Plan goals. These goals include: 1.) reducing the Gulf of Mexico hypoxic zone to <5000 square kilometers by year 2015; 2.) restoring and protecting the waters of the 31 States and Tribal lands within the Mississippi River Basin; and 3.) improving the communities and economic conditions across the Basin. The Hypoxia Action Plan was developed by an Interagency Task Force based on findings of the CENR Integrated Assessment of Hypoxia in the Northern Gulf of Mexico as mandated by Public Law 105-383. OWOW serves as the Chair of the Federal Task Force charged with implementation of the Hypoxia Action Plan. (NHEERL)

North American Landscape Characterization Program (NALC) – This is a multi-agency project with USGS EROS Data Center and NASA to assemble Landsat data sets from the early 1970s, mid-1980s, and early 1990s to conduct historical landscape change analyses. The data have and continue to be used in landscape change analyses being conducted in EPA Regions 2-10. (NERL)

National Assessment of Landscape Change by Ecoregion – This collaborative, multi-year study with the USGS EROS Data Center is analyzing landscape change between the early 1970s and early 2000s to determine the rates and causes of changes. The pilot studies are complete and results are available for ecoregions within EPA Regions 1, 2, 3 and 4. The national results should be available by 2006 for all EPA Regions. (NERL)

Experimental Program to Stimulate Competitive Research (EPSCoR) – EPSCoR is a joint program with EPA and 20 U.S. states and territories. The program supports the development of the states' science, technology and environmental education resources through partnerships with states' universities, industry, government, and federal research and development. ORD funds EPSCoR programs in Alabama, Alaska, Arkansas, Hawaii, Idaho, Kansas, Kentucky, Louisiana, Mississippi, Montana, Nebraska, Nevada, North Dakota, Oklahoma, South Carolina, Vermont, West Virginia, Wyoming and Puerto Rico.

First National Environmental Health Survey of Childcare Centers – This is a collaborative study with HUD and CPSC. Measurements of pesticide residues in childcare centers were taken nationwide, including all Regions. NCS (National Children Study) will collect and analyze available Region-specific concentration, exposure and biomonitoring data across the U.S. during the design of the main study. (NERL)

Air Quality Models Assistance – ORD assists the Regions by indicating how air quality models need to be used to support management decisions for

OTHER REGION 6 SITE SUPPORT

implementing the 8-hour ozone implementation program. This assists Regions as they strive to comply with air quality standards for ozone. ORD, as part of the Air Simulation Workgroup, communicates new tools and techniques for air quality modeling. These tools are used by states in preparing implementation plans. (NERL)

Pollution Prevention Guide – In August 2001, ORD published, “An Organizational Guide to Pollution Prevention” (EPA/625/R-01/003). In conjunction with this new document, ORD is sponsoring a series of interactive Workshops (one per Region) based on the principles and concepts produced in the Guide. ORD customizes the Workshops to address Region-specific items of interest. Other ORD Pollution Prevention tools are also on display. (NRMRL)

Technology Transfer Seminars – ORD will sponsor three regional Technology Transfer Seminars on the intrusion of vapors from soil or groundwater sources into indoor air. The seminars will introduce new EPA guidance and provide state-of-the-science information about important technical issues to regulators and decision-makers. (NRMRL)

Mixing Zone Modeling Technical Support to the EPA Regions – NPDES permit and 301(h) Secondary Treatment Waiver permit applicants and writers rely heavily on mixing zone models in designing and assessing outfall structures and performance. The EPA Visual Plumes software is designed to help

clients meet mixing zone regulatory requirements. Interesting recent applications include: designing new thermal discharge structures (Potrero power plant, San Francisco; Region 9); assessing background tidal pollutant buildup of concentration in a tidal estuary (Salisbury, Maryland; Region 3); establishing Outer Continental Shelf (OCS) produced water guidelines (Region 9); predicting temperature exposure for salmon recovery efforts on the Columbia River (Region 10); developing plans for the safe ultimate disposal of caustic soda from a sunken barge (Florida, Region 4); and establishing the likely origin of bacterial concentration on beaches (Huntington Beach, Orange County, CA; Region 9). Visual Plumes training courses have been given in Alaska, California, Georgia, Oregon and Washington. The models have been distributed to at least 47 states and 55 countries. (NERL)

Other Region 6 Support Activities:

- Provided assistance in the form of treatment expertise on the control of arsenic and how it would impact the recently revised MCL. (NRMRL)
- Provided EMAP support to Region 6 and States for data analysis workshop for streams and estuaries. (NHEERL)
- Provided support via the Region for ecoregional development in Texas. (NHEERL)
- Provided support in conducting hundreds of searches, retrieving data and interpreting results presented in the ECOTOX database. (NHEERL)

OTHER REGION 7 SITE SUPPORT

ORD scientists also provide technical support to Regional risk assessments and risk management actions at sites or in geographical areas not identified under the Superfund or RCRA Programs. This support can take many forms, including guidance and training on the use of ORD models and other research products, evaluation of the utility of specific technologies at specific locations, and expert testimony in legal proceedings. The following are some examples of ORD technical assistance in your Region.

Measuring Status and Trends of Biologic Resources in Kansas Streams Using EMAP Probability-Based Sampling Design – This was a collaborative effort among Region 7, ORD, Kansas Biological Survey, Central Plains Center for BioAssessment, Kansas Department of Wildlife and Parks, Kansas Department of Health and Environment and Fort Hays State University. Specific objectives were to collect data to measure the status of biologic integrity and riparian and habitat quality of the state's stream resources; measure spatial and temporal changes; determine differences between fish communities; test; and refine the IBI for fish communities in Kansas streams. This project has been completed and the final report was accepted in March 2002. (NHEERL)

Small-Community Wastewater Treatment Systems Projects – ORD established several joint projects pertaining to small-community wastewater treatment systems. "Advanced Monitoring of Constructed Wetlands Performance in Nebraska," was conducted with the University of Nebraska-Lincoln, and "Application of Biological Aerated Filters to Meet NPDES Ammonia Limits for Small Communities," was conducted with Iowa State University. (NRMRL)

Platte River Water Supply Conflict Resolution Strategies – ORD has funded a grant with the University of Nebraska to help determine strategies to resolve conflicts over the supply of water to meet the needs of endangered and other species in the Platte River. Researchers surveyed the public in WY, CO and NE to determine interest group knowledge and preferences. They used game theory to devise policy solutions that would have the greatest likelihood of success. The final report is available. (NCEA)

Review of Proposed Site-Specific Water Quality Criterion for Ammonia – A municipal discharger conducted an extensive laboratory and field study in support of applying for a site-specific adjustment to the applicable water quality criterion for ammonia. ORD reviewed the studies and provided comments and suggestions to the Region. (NHEERL)

Implementing Probability-Based Monitoring Design Within Nebraska's Rotating Basin Assessment Plan – This project was established through a cooperative agreement between Region 7 and the Nebraska Department of Environmental Quality. The purpose is to investigate the applicability of both the EMAP probabilistic sampling design and the Region 7 R-EMAP sampling and analytical methodologies to assess the status and detect changes of various stream resource parameters. The questions to be answered include: what are the status and changes of fish biological integrity; what are the status and changes of water, sediment, and fish tissue contamination in these basins and eco-regions; and, what are the status and changes of the riparian corridor habitats in these corridors? The final report is expected April 2003. (NHEERL)

Evaluating the Fate of Contaminants in Sediments and Biota of Wetlands Constructed for Wastewater Treatment – The focus of this study is to evaluate the assimilative capacity of wetlands constructed for dual role wastewater treatment/restored wetland habitat to chemical stressors entering the system. The data from this study will be utilized by managers and stakeholders to evaluate where these dual role systems are appropriate to use and where these systems are currently working with no problems. It will also help evaluate where systems currently in place are developing potentially long-term contaminant problems that will negatively impact their suitability to provide high-quality wetland habitat and effective wastewater treatment. This study is being conducted in three regions: North Carolina (Region 4), Missouri (Region 7), Wyoming (Region 8). (NRMRL)

Collaborative Efforts Supporting Hypoxia Action Plan Goals – On Oct. 3-4, 2002, ORD will host a meeting with Regions 4, 5, 6 and 7, OW, and GMPO to discuss development of a consensus modeling

Other Region 7 Site Support

framework and other collaborative efforts targeting Hypoxia Action Plan goals. These goals include:

- 1.) reducing the Gulf of Mexico hypoxic zone to <5000 square kilometers by year 2015;
- 2.) restoring and protecting the waters of the 31 States and Tribal lands within the Mississippi River Basin; and
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The Hypoxia Action Plan was developed by an Interagency Task Force based on findings of the CENR Integrated Assessment of Hypoxia in the Northern Gulf of Mexico as mandated by Public Law 105-383. OWOW serves as the Chair of the Federal Task Force charged with implementation of the Hypoxia Action Plan. (NHEERL)

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First National Environmental Health Survey of Childcare Centers – This is a collaborative study with HUD and CPSC. Measurements of pesticide residues in childcare centers were taken nationwide, including all Regions. NCS (National Children Study) will collect and analyze available Region-specific concentration, exposure and biomonitoring data across the U.S. during the design of the main study. (NERL)

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Other Region 7 Site Support

plant, San Francisco; Region 9); assessing back-ground tidal pollutant buildup of concentration in a tidal estuary (Salisbury, Maryland; Region 3); establishing Outer Continental Shelf (OCS) produced water guidelines (Region 9); predicting temperature exposure for salmon recovery efforts on the Columbia River (Region 10); developing plans for the safe ultimate disposal of caustic soda from a sunken barge (Florida, Region 4); and establishing the likely origin of bacterial concentration on beaches (Huntington Beach, Orange County, CA; Region 9). Visual Plumes training courses have been given in Alaska, California, Georgia, Oregon and Washington. The models have been distributed to at least 47 states and 55 countries. (NERL)

Other Region 7 Support Activities:

- Participated in a recent Region workshop on water treatment and distribution system problems. (NRMRL)
- Conducted an agricultural health study collecting measurements from a cohort of 90,000 farmers and families in Iowa. The project is ongoing through 2008. (NERL)
- Provided EMAP support to Region for biocriteria, habitat indicators and analysis of four State survey results. (NHEERL)
- Provided support in conducting hundreds of searches, retrieving data and interpreting results presented in the ECOTOX database. (NHEERL)

Other Region 8 Site Support

ORD scientists also provide technical support to Regional risk assessments and risk management actions at sites or in geographical areas not identified under the Superfund or RCRA Programs. This support can take many forms, including guidance and training on the use of ORD models and other research products, evaluation of the utility of specific technologies at specific locations, and expert testimony in legal proceedings. The following are some examples of ORD technical assistance in your Region.

Aquatic Ecological Analysis – ORD conducted an initial data analysis for its project entitled, "Linkages between aquatic ecological assessments conducted at different levels of biological organization: individual, population, and community." The project utilized a data set from a R-EMAP study conducted in the metal mining belt of the Southern Rockies ecoregion in Colorado. It compared community metrics for macroinvertebrates and fish between sites in the data set that exceeded water or sediment quality criteria for Cd, Cu, Pb or Zn or exhibited toxicity in surface water or sediment bioassays, and sites that did not exceed metals criteria or exhibit toxicity. The analysis found a number of community metrics, which are community-level measurement endpoints, that were significantly reduced at the sites identified as impacted based on criteria or toxicity testing, which are individual-level measurement endpoints. (NCEA)

Western Environmental Monitoring and Assessment Program (EMAP) – ORD, in collaboration with Regions 9, 10 and 8, helped design the EMAP Western Pilot. It supports those Regional offices and States for monitoring design, analysis, indicator evaluation and reference conditions via EMAP-West. It provides support to Regional bioassessment workgroups and co-authored the Field Operations Manual for Streams Environmental Monitoring and Assessment Program Surface Waters: Western Pilot Study Field Operations Manual for Wadeable Streams. It also provided expert assistance in indicators for fish, fish tissue and macroinvertebrates. For the fish tissue contaminant indicator, ORD is analyzing 11 inorganic contaminants, 22 organic contaminants and 22 congeners of PCBs (three toxic coplanar compounds) in two target fish categories and assisting in the assessment of the results. (NERL/NHEERL)

R-EMAP: Biological Integrity Evaluation of Tributary Streams and Floodplain Wetlands (eastern Montana portion of Upper Missouri River Basin) – ORD is providing oversight of this Region 8 study, which addresses the need to determine the condition of prairie streams in eastern Montana which are tributaries to the Missouri and Yellowstone rivers. Working with the USGS division of Biological Resources at the Cooperative Research Unit at Montana State University, Indices of Biological Integrity are being developed and traditional EMAP assessment methods are being applied, which will aid the State of Montana in its 305b and 303d programs. (NHEERL)

Methylmercury Source Characterization and Risk (Cheyenne River Sioux Tribal Lands) – ORD is assisting Region 8 with biological sampling of algae and fishes. It is applying the Mercury Model to evaluate watershed loadings and transformation of mercury responsible for elevated levels (of human health concern) of MeHg in managed ponds and lakes. (NERL)

Upper Missouri River Environmental Monitoring and Assessment Program – This ORD project will provide unbiased, statistically sound and policy-relevant assessments of the ecological condition of the nation's Great Rivers. The project employs a probabilistic design that produces unbiased estimates of resource conditions with a known level of statistical confidence. Goals include: development and testing of sampling designs for monitoring great river resources; and provisioning of data to Region 8 and other stakeholders to help inform decision-making for 404 permitting, 305(b) reporting, NEPA and TMDL development. Beginning in 2000, pilot research identified sample populations in the river, riparian and reservoir; examined sources of sampling variation in indicators; evaluated sampling protocols; and worked on field logistics to eventually produce the first detailed report on the condition of the Upper Missouri's critical natural resources. (NHEERL)

Review of Proposed Water Quality Standard for Manganese – A State within Region 8 had proposed a water quality standard for manganese based on a large toxicity data set. At the Region's request, ORD staff reviewed the derivation on the standard and provided a technical review of the comparability of

Other Region 8 Site Support

the standard with EPA's national approach to developing water quality criteria. (NHEERL)

Indoor Air Methods Development – This task originated as a request from the Regional Administrator for Region 8 in October, 2000, for review of a monitoring method used by the Colorado Department of Public Health and the Environment (CDPHE). ORD reviewed the CDPHE method and is developing EPA guidance on methods to determine the concentration of toxic vapors in buildings near contaminated groundwater. A written guidance is being prepared in response to the request with an emphasis on more sensitive vapor detection. This same guidance will be extended for application to the target compound list for the National Air Toxics Assessment (NATA) program, a trends network of interest to many of the EPA Regions. (NERL)

R-EMAP: Biological Integrity Evaluation of Floodplain Wetlands (North Dakota portion of the Upper Missouri River Basin) – ORD is providing oversight of this Region 8 R-EMAP study. It addresses the need to determine the condition of floodplain wetlands that are hydrologically connected to the Missouri River below the Garrison Dam in North Dakota. Efforts with the North Dakota Department of Health and the USGS Division of Biological Resources at the Cooperative Research Unit at South Dakota State University are focused on developing Indices of Biological Integrity, which will aid the State of North Dakota in its ability to assess the condition of these wetlands and make management decisions. (NHEERL)

Giving Science to the Regions – ORD STAR grantee Charles Hawkins at Utah State University is working directly with Region 8 to establish an extensive network of stream reference sites throughout the country. Region 8 has been collecting data in South Dakota, Colorado, and Montana in support of this effort. The expected outcome of this project will lead to the development of a national aquatic ecosystem classification for stream reference conditions. It will also allow for a more accurate and comparable evaluation of the biological health of aquatic systems across the country. Because of its interest, Region 8 requested ORD hold its upcoming Progress

Review Workshop on Aquatic Ecosystem Classification at its Regional office. Dr. Hawkins will present at this meeting and stay to talk to Regional staff and management about his work using his data to predict the distribution of aquatic insects in southern Rocky Mountain streams. As a result of his extraordinary interaction with Region 8, the Office of Water decided it also needed to get involved with Dr. Hawkins' work. As a result, Region 8, OW and OST decided to fund the Western Regional Bioassessment Center at Utah State University to facilitate and improve interagency coordination with respect to western bioassessments. The Center will conduct research that is relevant to the Regions and offer technical assistance to States and Tribes. (NCER)

Consultation on the Evaluation of Potential Ecological Risk from Coalbed Methane Produced Water – Within Region 8, expanding development of coalbed methane resources required an assessment of the potential ecological effects from surface discharge of co-produced waters. ORD provided consultation on the toxicological effects of exposure to waters with high salt content, aiding the Region and State in developing a scientifically sound assessment of potential ecological risk. (NHEERL)

Environmental Monitoring and Assessment Landscape Assessment of the Western U.S. – Landscape assessments of ecological condition at many scales will be part of a combined study between ORD, EPA Regions, States and Tribes. Landscape metrics will be tested for use as landscape indicators. Indicators will be applied to complete ecological assessments of watersheds, States and Regions concluding with a west-wide assessment of condition (EPA Regions 8, 9 and 10). (NERL/NHEERL)

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Other Region 8 Site Support

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Other Region 8 Site Support

(Huntington Beach, Orange County, CA; Region 9). Visual Plumes training courses have been given in Alaska, California, Georgia, Oregon and Washington. The models have been distributed to at least 47 states and 55 countries. (NERL)

Other Region 8 Support Activities:

- Provided technical assistance on a recent water-borne disease outbreak in Wyoming, as well as consultation on a riverbank filtration project in Casper, WY. (NRMRL)
- Participated in a project to develop guidance on the application of bag and cartridge filtration technologies for small system compliance with the LT1ESWTR. (NRMRL)
- Conducted Small Business Innovation Research (SBIR) Workshops to help small businesses convert environmental ideas, inventions, innovations, patents and processes into commercial, environmental technologies. (NCER)
- Responded to request to evaluate invasive species issues in a BLM Programmatic DEIS notice on vegetative treatment in the Western U.S. (NHEERL)
- Collaborated with Regional staff to develop a handbook entitled, "Small Drinking Water System Handbook – A Guide to "Packaged" Filtration and Disinfection Technologies with Remote Monitoring and Control Tools." (NRMRL)
- Provided support for ecoregion development. (NHEERL)
- Working with Region to develop a special SBIR solicitation, scheduled to open in March 2003, geared toward their needs. (NCER)
- Participated in workshop with Region 8 personnel on managing cumulative impacts to wetlands. (NHEERL)
- Provided support in conducting hundreds of searches, retrieving data and interpreting results presented in the ECOTOX database. (NHEERL)

Other Region 9 Site Support

ORD scientists also provide technical support to Regional risk assessments and risk management actions at sites or in geographical areas not identified under the Superfund or RCRA Programs. This support can take many forms, including guidance and training on the use of ORD models and other research products, evaluation of the utility of specific technologies at specific locations, and expert testimony in legal proceedings. The following are some examples of ORD technical assistance in your Region.

Great Basin Ecosystem Management (GBEM) Project for Maintaining and Restoring Riparian Ecosystem Integrity – ORD's GBEM research team is examining the potential use of stream and riparian ecosystem restoration and management practices to slow the rate of channel incision and the loss of the meadow complexes. The development of viable restoration programs requires a sound understanding of the interactions between the geomorphic, hydrologic and biotic processes operating along the riparian corridors. The primary objective of this investigation is to build on existing data to fully define these interactions. Once this objective has been accomplished, the results are to be used to develop management options that can be applied to mitigate the current impacts of channel incision on the riparian ecosystems, particularly those within wet meadow complexes for this site near Austin, NV, as well as other similar areas. (NRMRL)

Water Quality Evaluation – ORD is coordinating with a small community and the Region to evaluate the water treatment disinfectant process to destroy and/or inactivate pathogenic organisms. This study will evaluate subsequent water quality problems associated with chloramination in a distribution system. (NRMRL)

STAR Grant Research – ORD's STAR grantee, Dr. Susan Anderson, at the Western Center for Estuarine Indicator Research, is holding monthly conference calls with Region 9 staff. Region 9 has provided input to this STAR project that has complemented and supplemented the research. According to the Region 9 Regional Scientist, this collaborative approach will result in projects that further the science and directly benefit Region 9. (NCER)

Source Signature Development – ORD is conducting an aircraft engine test to develop a source signature. The source signature will be used by a modeler selected by Region 9 to conduct an analysis of emissions at Los Angeles International airport. (NRMRL)

Survey Design Development – Working with Region 9 (Monitoring and Assessment Office) and State of Hawaii representatives, ORD developed a survey design to assess the condition of Hawaiian coastal waters. The 2001 survey design was completed in March 2001 and a follow-up design for 2002 was completed August 1. (NHEERL)

Gasoline Health and Exposure Studies – ORD is involved in an ongoing evaluation of legally required health and exposure studies on baseline gasoline and oxygenated gasolines (with MTBE, ethanol, ETBE, TAME, DIPE, and TBA). After these studies are completed, a health assessment document will be prepared. (NCEA)

Verification Testing of the US Filter 3M10C – ORD testing of this microfiltration package unit will be conducted at the Aqua 2000 Research Center in San Diego, CA. Additional membrane products may be evaluated at the site later in FY03. (NRMRL)

Incorporating Mysid Two-Generation Bioassay into Monitoring Activities – Discussions are underway between ORD and Region 9's Regional Science Liaison regarding protocols for the marine mysid, *Americamysis bahia*, two-generation bioassay. The development of this bioassay has provided important tools for examining multi-generational effects of endocrine disrupting chemicals (EDCs) on reproductive success in marine invertebrates. Region 9 has received several inquiries from California State agencies concerned about EDCs in their waters. Current discussions focus on the technical feasibility of incorporating this test methodology into existing State monitoring activities. (NHEERL)

Drinking Water Field Studies – ORD conducted field studies on two UV microbial inactivation technologies for drinking water in FY02 at the Aqua 2000 Research Center in San Diego, CA. The systems tested were: 1.) Trojan Technologies, Inc., UVSwift Ultraviolet System Model 4L12; and 2.) Atlantic Ultraviolet Corporation Megatron Unit, Model M250. (NRMRL)

Other Region 9 Site Support

Perchlorate Measurement Development – ORD is developing a portable method to measure perchlorate in water. This method will be used by Tribal governments to detect and measure the levels of perchlorate in sources of potable water. (NERL)

Selenium Toxicity Support – Region 9 is entering into negotiations with the US FWS to set the water quality standard for selenium. It is working diligently to gather background materials and understand the issues, controversies and concerns. ORD has been working on updating the selenium water quality criteria for the past five years. (NHEERL)

Ecoregion Development – Fine scale ecoregion boundaries are being developed for the western states of Nevada, California, Arizona and Hawaii (Region 9). These GIS layers are important for landscape assessment and to help characterize ecosystems. The Omernick approach to ecoregion boundary development is being used for this project. (NERL)

Development of Sediment Quality Guideline Development Consultation – ORD was approached by Region 9 for assistance in the development of sediment quality guidelines for DDT and metabolites. Endpoints of concern were primarily effects on avian species. Staff applied their knowledge of bioaccumulation and effects to aid the Region in developing a scientifically defensible assessment approach. (NHEERL)

Rangeland Assessment for the South Fork Band of the TeMoak Western Shoeshone Tribe – ORD is developing rangeland landscape indicators of ecological condition using indicators developed as part of the Western EMAP Landscapes Group. The Tribe will use this assessment information to develop a rangeland restoration program. This work also includes the continued environmental technical support to the South Fork Band (Region 9). (NERL)

Testing Endocrine-Disrupting Chemicals (EDCs) in Effluents – ORD has participated in a series of Regional consultations concerning methods for monitoring the occurrence of EDCs in municipal effluents. This ongoing effort has focused primarily

on municipalities in California (e.g., Sacramento) that recycle a high percentage of their wastewater for subsequent consumption. (NHEERL)

North American Landscape Characterization Program (NALC) – This is a multi-agency project with USGS EROS Data Center and NASA to assemble Landsat data sets from the early 1970s, mid-1980s and early 1990s to conduct historical landscape change analyses. The data have and continue to be used in landscape change analyses being conducted in EPA Regions 2-10. (NERL)

Risk Assessment to Piscivorous Wildlife from Methyl Mercury (California) – ORD reviewed two technical risk assessments of piscivorous birds from methyl mercury in diets from Clear Lake and Cache Creek watershed in California. Both assessments were developing technical basis for setting mercury criteria values. (NHEERL)

Automated Geospatial Watershed Assessment – A joint effort between ORD and the Agricultural Research Service in Tucson, AZ, this project was initiated to develop a GIS-based, landscape assessment tool to evaluate the consequences of land cover change on stream flow and sedimentation. Although the results of the project will support Region 9's TMDL program, the software tool should prove valuable to a number of EPA Regions conducting TMDL assessments. Additionally, because the tool utilizes the SWAT model, the results may help augment the capabilities of the BASINS3 developed by the EPA Office of Water. (NERL)

PM Panel Studies (Fresno, CA) – ORD's University Partnership Program (UPAs) utilizes Region-specific data from California (Region 9), New Jersey (Region 2), Pennsylvania (Region 3), etc. in building modules for SHEDS and for MENTOR source-to-dose exposure models. (NERL)

Western Environmental Monitoring and Assessment Program (EMAP) – ORD, in collaboration with Regions 9, 10 and 8, helped design the EMAP Western Pilot. It supports those Regional offices and States for monitoring design, analysis, indicator

Other Region 9 Site Support

evaluation and reference conditions via EMAP-West. It provides support to Regional bioassessment workgroups and co-authored the Field Operations Manual for Streams Environmental Monitoring and Assessment Program Surface Waters: Western Pilot Study Field Operations Manual for Wadeable Streams. It also provided expert assistance in indicators for fish, fish tissue and macroinvertebrates. For the fish tissue contaminant indicator, ORD is analyzing 11 inorganic contaminants, 22 organic contaminants and 22 congeners of PCBs (three toxic coplanar compounds) in two target fish categories and assisting in the assessment of the results. (NERL/NHEERL))

Training in the Use of State-of-the-Art Molecular Biology Techniques – Per Region 9 request, ORD prepared and taught a training course to Regional scientists on the use of state-of-the-art molecular biology methods. These methods take advantage of the advances in genome science and provide indicators of cellular changes in relation to exposures of fish to specific contaminants. (NERL)

National Assessment of Landscape Change by Ecoregion – This collaborative, multi-year study with the USGS EROS Data Center is analyzing landscape change between the early 1970s and early 2000s to determine the rates and causes of changes. The pilot studies are complete and results are available for ecoregions within EPA Regions 1, 2, 3 and 4. The national results should be available by 2006 for all EPA Regions. (NERL)

Experimental Program to Stimulate Competitive Research (EPSCoR) – EPSCoR is a joint program with EPA and 20 U.S. states and territories. The program supports the development of the states' science, technology and environmental education resources through partnerships with states' universities, industry, government, and federal research and development. ORD funds EPSCoR programs in Alabama, Alaska, Arkansas, Hawaii, Idaho, Kansas, Kentucky, Louisiana, Mississippi, Montana, Nebraska, Nevada, North Dakota, Oklahoma, South Carolina, Vermont, West Virginia, Wyoming and Puerto Rico.

First National Environmental Health Survey of Childcare Centers – This is a collaborative study with HUD and CPSC. Measurements of pesticide residues in childcare centers were taken nationwide, including all Regions. NCS (National Children Study) will collect and analyze available Region-specific concentration, exposure and biomonitoring data across the U.S. during the design of the main study. (NERL)

Air Quality Models Assistance – ORD assists the Regions by indicating how air quality models need to be used to support management decisions for implementing the 8-hour ozone implementation program. This assists Regions as they strive to comply with air quality standards for ozone. ORD, as part of the Air Simulation Workgroup, communicates new tools and techniques for air quality modeling. These tools are used by states in preparing implementation plans. (NERL)

Pollution Prevention Guide – In August 2001, ORD published, "An Organizational Guide to Pollution Prevention" (EPA/625/R-01/003). In conjunction with this new document, ORD is sponsoring a series of interactive Workshops (one per Region) based on the principles and concepts produced in the Guide. ORD customizes the Workshops to address Region-specific items of interest. Other ORD Pollution Prevention tools are also on display. (NRMRL)

Technology Transfer Seminars – ORD will sponsor three Regional Technology Transfer Seminars on the intrusion of vapors from soil or groundwater sources into indoor air. The seminars will introduce new EPA guidance and provide state-of-the-science information about important technical issues to regulators and decision-makers. (NRMRL)

Mixing Zone Modeling Technical Support to the EPA Regions – NPDES permit and 301(h) Secondary Treatment Waiver permit applicants and writers rely heavily on mixing zone models in designing and assessing outfall structures and performance. The EPA Visual Plumes software is designed to help clients meet mixing zone regulatory requirements. Interesting recent applications include: designing

Other Region 9 Site Support

new thermal discharge structures (Potrero power plant, San Francisco; Region 9); assessing background tidal pollutant buildup of concentration in a tidal estuary (Salisbury, Maryland; Region 3); establishing Outer Continental Shelf (OCS) produced water guidelines (Region 9); predicting temperature exposure for salmon recovery efforts on the Columbia River (Region 10); developing plans for the safe ultimate disposal of caustic soda from a sunken barge (Florida, Region 4); and establishing the likely origin of bacterial concentration on beaches (Huntington Beach, Orange County, CA; Region 9). Visual Plumes training courses have been given in Alaska, California, Georgia, Oregon and Washington. The models have been distributed to at least 47 states and 55 countries. (NERL)

Other Region 9 Support Activities:

- Provided information on the background relative to the arsenic problem in Fallon, NM, prior to enforcement action. (NRMRL)
- Discussed microbial source tracking with staff and provided three training sessions (lecture/discussion) on the use of molecular biology techniques. (NRMRL)
- Reviewed site-specific Copper Water Quality Criteria for San Francisco Bay. (NHEERL)
- Provided technical assistance to Region 9 on small-system technology selection and evaluation for Saipan. In addition, a presentation was given at the Region-sponsored 21st Annual Pacific Islands Environmental Conference. (NRMRL)
- Commented on EIS for the control program for the invasive NIS *Spartina* in San Francisco Bay. Provided sources of information on ballast water treatment along with contacts on exotic amphibians and frog vocalizations. (NHEERL)
- ORD will be conducting a field evaluation of a low-pressure membrane separation system for particulate and microbial removal from drinking water. (NRMRL)
- Developed a rough QA evaluation of the dioxin and co-planar PCBs tissue results from fish from San Francisco Bay. (NHEERL)
- Participated in meeting to identify Region 9 issues/needs. (ORD)
- Communicated with Regions 9 and 10, their States and other Federal agencies about what marine/estuarine species to use in establishing a West Coast dissolved oxygen criterion. (NHEERL)
- Provided support in conducting hundreds of searches, retrieving data and interpreting results presented in the ECOTOX database. (NHEERL)

Other Region 10 Site Support

ORD scientists also provide technical support to Regional risk assessments and risk management actions at sites or in geographical areas not identified under the Superfund or RCRA Programs. This support can take many forms, including guidance and training on the use of ORD models and other research products, evaluation of the utility of specific technologies at specific locations, and expert testimony in legal proceedings. The following are some examples of ORD technical assistance in your Region.

Open-Burning Emissions Examinations – Working with Regions 9 and 10, ORD is examining emissions, particularly of dioxins and furans, from open burning. Sources studied in this effort include agricultural residue open burning (e.g., wheat straw, sugar cane, and rice hulls) and forest fires. In addition, ORD representatives are currently on OSWER's backyard burning workgroup, which is working with Regional, State and Tribal authorities to develop policies and programs to reduce the occurrence of open burning of household waste in barrels. This burning has been shown by ORD research activities to be a major source of dioxins and furans. (NRMRL)

Puget Sound Ambient Monitoring Program Redesign – This ORD program is conducted by the Washington Department of Ecology but has close ties with Region 10. There was also some initial involvement with the Puget Sound Naval Shipyard, the Project XL (with the Navy) and Region 10. (NHEERL)

Atmospheric Ecosystem Stressor Pattern and Trend Analysis – Data collected from the EPA Clean Air Status and Trends Network (CASTNet) is being analyzed to document observable changes in environmental stressors associated with emissions reductions required by the Clean Air Act Amendments of 1990 (CAAA). CASTNet sampling sites are located in every EPA Region except Region 7. Analysis of the data focuses on acid deposition: S and N precursor emissions, concentrations, dry deposition, wet deposition, cloud deposition and total deposition. These data indicate that there has been significant reductions in atmospheric sulfur stressor and no detectable change in nitrogen stressors since the establishment of the CAAA. (NERL)

Technology Transfer Workshops – In 2001, ORD held workshops in Newport, OR, and Moss Landing, CA, at the requests of Regions 10 and 9. They wanted to discuss the approaches used in the Western Pilot and the technology transfer to the Regions and States (Washington, Oregon and California). This technology transfer examined the development of sampling and response designs, analysis approaches and reporting. ORD will sponsor three Regional Technology Transfer Seminars on the intrusion of vapors from soil or groundwater sources into indoor air. The seminars will introduce new EPA guidance and provide state-of-the-science information about important technical issues to regulators and decision-makers. (NRMRL/NHEERL)

Sample Holding Time Reevaluation – Several reports are being prepared to describe results of research to re-evaluate sample holding times. This work is in response to Regional requests and is important for accurate measurement of contaminants. (NERL)

Arsenic Removal Evaluations – ORD and the University of Alaska at Anchorage (UAA), an EPA Technology Technical Assistance Center, have plans for upcoming arsenic removal evaluations. Three sites were identified for possible testing of arsenic small-systems technologies. Testing is expected to begin in early FY03. A request for arsenic treatment technologies remains open for sites in Alaska. (NRMRL)

Effluent Discharge Guidelines Development for Mining Facility – At a large mining complex in Region 10, process water is discharged to a watershed supporting native salmon populations. The effluent is high in total dissolved solids (TDS), and no standards were available to determine appropriate discharge levels for these constituents. ORD provided consultation to the Region and State on the effects of TDS on aquatic organisms, reviewed site-specific toxicity data and conducted limited supplemental toxicity testing to aid the development of NPDES permit limits. (NHEERL)

Consultation on State Water Quality Standards Development – A State within Region 10 had proposed a water quality standard for total dissolved solids (TDS). ORD provided technical consultation to aid

Other Region 10 Site Support

the Region in deciding whether to approve the standard. (NHEERL)

North American Landscape Characterization Program (NALC) – This is a multi-agency project with USGS EROS Data Center and NASA to assemble Landsat data sets from the early 1970s, mid-1980s and early 1990s to conduct historical landscape change analyses. The data have and continue to be used in landscape change analyses being conducted in EPA Regions 2-10. (NERL)

Consultation on Site-Specific Water Quality Criteria Development for Metals – Two dischargers into different rivers within a State wanted to develop Water-Effect Ratios (WER) for metals. ORD assisted the Region, State, discharger and contractor with the design and analysis of the work for one of the WERs and assisted the Region and State in the review and resolution of issues regarding the other. (NHEERL)

Region/ORD Workshop on Aquatic Life Criteria (December 2001, Seattle, WA) – An ORD scientist chaired the plenary session of this workshop that provided an overview of aquatic life criteria and assisted in setting up two technical break out sessions: 1.) biocriteria and nutrients; and 2.) toxic chemicals. Region 10 was the lead in this workshop series. Yearly workshops are held to discuss topics that are important to the Regions and ORD. (NHEERL)

Salmon Research – ORD scientists worked closely with Region 10's Salmon Recovery Coordinator to target specific research to produce products relevant to current Agency priorities. ORD provided reviews of various salmon science documents for Region 10 staff. (NHEERL)

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Other Region 10 Site Support

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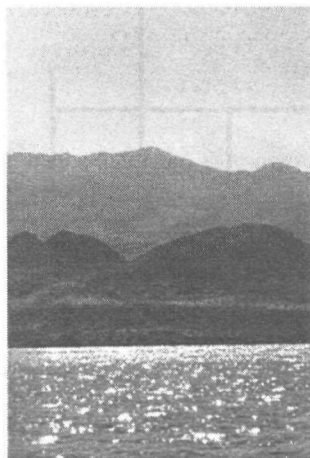
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Other Region 10 Support Activities:

- Presented at a Region 10 workshop entitled, “Best Available Watershed Science Workshop. U.S. EPA Region 10 and the University of Washington, August 26, 2002”. (NHEERL)
- Developing a document for inorganic arsenic concentration in fish in support of Superfund and Office Water guidelines. (NCEA)
- Providing an ORD representative for a Regional methods project on the development of standard protocols for the measurement of PCBs and PBDEs. (NHEERL)
- Provided on-site technical assistance to several communities in Portland, OR, on corrosion-related problems and ways to mitigate the impacts. (NRMRL)
- Providing technical assistance to Regions 9 and 10 (and CA, OR and WA) with the planning, implementation and reporting of the Western Coastal EMAP. (NHEERL)
- Providing an ORD representative to the Western Regional Panel of the Aquatic Nuisance Species Task Force, in place of the R10 representative. (NHEERL)
- Developed a joint Newport-Region 10 Regional Methods Initiative (RMI) proposal on food web modeling in hyporheic zones. (NHEERL)
- Supporting Region 10’s efforts in ORD’s Willamette alternative futures research with application for the Puget Sound area. (NHEERL)
- Provided support in conducting hundreds of searches, retrieving data and interpreting results presented in the ECOTOX database. (NHEERL)



Appendix



Appendix 1

AGENCY SCIENCE ORGANIZATIONS

Available to Address

REGIONAL SCIENCE ISSUES

August 20, 2002

Agency Science Policy Council

The Science Policy Council (SPC) serves as a mechanism for addressing EPA's many significant science policy issues that go beyond regional and program boundaries. The Deputy Administrator chairs the SPC, which is composed of senior managers from EPA programs, regions, and laboratories. The SPC is supported by a Steering Committee of Agency managers and scientific staff, ad hoc working groups formed to study specific topics, EPA's Risk Assessment Forum and the SPC staff. OSP's SPC staff supports the work of the SPC, its Steering Committee and SPC-sponsored ad-hoc work groups.

With a goal of integrating policies that guide Agency decision-makers in their use of scientific and technical information, the SPC works to implement and ensure the success of selected initiatives recommended by external advisory bodies such as the National Research Council and the Science Advisory Board, as well as others such as the Congress, industry and environmental groups, and Agency staff. In this way, the SPC contributes guidance for selected EPA regulatory and enforcement policies and decisions.

Current SPC-sponsored topics of interest include the Web site for the Council of Regulatory Environmental Modeling (CREM), cross-agency science planning and communication efforts, (i.e., Strategic Framework for EPA Science, Science Inventory, Cumulative Risk Assessment and the Handbooks for Peer Review and Risk Characterization).

Currently in development is the Guidance for Development of Science Plans of Cross-Cutting Agency Activities and Contaminated Sediments Science Plan.

Research Coordination Teams (RCTs)

The Research Coordination Teams (RCTs) are workgroups aligned with the Agency's GPRA Goals

whose membership consists of representatives from appropriate EPA Program and Regional Offices and each ORD Laboratory and Center. The RCTs serve as the primary source of consultation and communication on research issues to interested parties within and outside EPA. They assess research needs, plan research programs, recommend programmatic priorities, monitor progress toward meeting commitments to produce research products, facilitate integration of intramural and extramural research activities, and communicate research results.

Regional Science & Technology Organizations

USEPA's Regional Science & Technology (RS&T) Organizations are key to the Agency meeting its mission through performing analytical and other work that:

- practices sound science,
- implements the principles of environmental protection, and
- promotes partnerships with states, Indian Nations, and local governments.

These organizations support the Agency's air, water, waste, and toxic substances programs utilizing applied science technologies. Each organization, at a minimum, is comprised of a Regional Laboratory System, a Field Operations Group, and a Quality Assurance Program. In addition, regions have developed special capabilities and expertise based on unique demographic and geographic issues. Expertise in these areas has led to the establishment of the Centers of Applied Science.

Centers of Applied Science have been designated in the areas of ambient air monitoring, environmental biology, chemistry, microbiology and analytical pollution prevention methodologies. These Centers provide hands-on training, technical assistance and coordination of applied research activities.

ORGANIZATIONS

1. Regional Laboratories. The Regional laboratories generate chemical and biological data enabling the Agency to respond appropriately to environmental issues. The data allow for:

- timely and responsive results; and
- scientifically sound and legally defensible decisions.

2. RS&T Quality Assurance. The Quality Assurance (QA) Programs ensure the integrity of environmental data by:

- overseeing management of monitoring program and policy;
- approving Regional data collection activity plans; and
- evaluating monitoring and laboratory practices.

3. RS&T Field Operations Group. The field operations programs provide on-site capabilities that support:

- collection of environmental data for decision-making purposes;
- determination of compliance with EPA statutes and regulations; and
- assessment of impacts and benefits linked to environmental control strategies.

Regional Science Councils (RSCs)

The Regional Science Councils (or their equivalent functioning Regional organizations) are intra-Regional technical workgroups of scientists who meet on a regular schedule to discuss issues, work on specific projects of Region-wide interest, and make recommendations to management concerning matters dealing with science.

The primary goal of the Regional Science Councils is to strengthen science and enhance its use in the Region. Progress toward achieving this goal is determined by measuring steps taken to meet criteria for success, such as:

- improved quality of regional and national scientific work;
- increased use of sound science in regional decision making;
- more effective planning of scientific work; and
- better communication of ongoing and completed scientific work.

National Regional Science Council (NRSC)

The National Regional Science Council (NRSC) is a group of Regional scientists who meet on a regular schedule to discuss issues, work on specific projects of interest across the Regions, and make recommendations to management concerning matters dealing with science as developed and applied within the Regions.

Vision: The overall vision for science in the Regions is for the Regions to be a place where: (1) a culture of scientific excellence exists; (2) science collaboration and communication activities are highly effective; (3) the right skills and technical expertise are available to respond to environmental challenges; (4) scientists and decision-makers work to make science a key component to Regional priority setting; and (5) scientific and technical capacities are effectively used in achieving Regional priorities. The National Regional Science Council will be instrumental in realizing this vision.

Goals, Criteria for Success, and Approach: The primary goal of the National Regional Science Council is to strengthen science and enhance its use in the Regions. Progress toward achieving this goal will be measured by the following four criteria for success, which are also related to achieving the vision stated above. The general approach the NRSC will take for each criterion is also indicated.

The criteria below should be looked upon as a long-term agenda, and the approaches looked upon as examples of ways the NRSC might choose to proceed.

1. Improved quality of regional and national scientific work.

The NRSC will approach this by providing a forum at NRSC meetings where scientists can discuss scientific issues and exchange ideas by: supporting peer and relevancy review of scientific products; serving as a sounding board to management and staff for science-based decisions; supporting scientific white papers as needed, and by using them to provide input to science policy development; and identifying and addressing barriers to improving quality.

2. Increased use of sound science in regional decision making. The NRSC will approach this by: regularly identifying scientific expertise in the Regional offices and at EPA national laboratories; building Regional scientific knowledge and expertise; placing emphasis on advocating funding for short-term regional research needs through the Regional Applied Research Endeavor (RARE), the Regional Methods Initiative (RMI), and other means; and identifying and addressing barriers to quality, communication, planning and capacity increase.

3. More effective planning of scientific work. The NRSC will approach this by providing input into the national research agenda of the Office of Research and Development and others by: identifying, assessing and prioritizing actionable Regional research issues not on the national research agenda; remaining

aware of the work of individual Regional Science Councils (RSCs); developing and implementing an annual Regional Science Plan; and identifying and addressing barriers to effective planning.

4. Better communication of ongoing and completed scientific work. The NRSC will approach this by ensuring Regional participation at national forums by: serving as a focal point for receiving and disseminating information on ongoing and completed regional, program office and ORD research; providing or sponsoring forums for scientific presentations; updating senior management regularly; providing a unifying voice for the Regions' message/perspective; and identifying and addressing barriers to promoting communication.

Appendix 2

PAUL GILMAN PLENARY MESSAGE TO WTQA Symposium August 12, 2002

As the Agency's new Science Advisor and the Assistant Administrator for Research and Development, it is a pleasure to address a group that is in the forefront of environmental monitoring science. The work that you and your colleagues perform is critical to solving our nation's environmental problems. Without quality data, those of us in federal and state government service who are charged with determining our nation's environmental policies will have an extremely difficult time selecting the correct courses of action. In my message to you, I want to share some of my thoughts and objectives in two areas. These are: (1) accreditation of environmental laboratories and (2) Agency efforts to strengthen science in the environmental arena.

Laboratory Accreditation

EPA is very supportive of the efforts being made to establish a national environmental laboratory accreditation system. I believe that its implementation will have a number of very positive benefits. These benefits include:

Improving the level of staff expertise in the environmental laboratories as a result of having established minimum education, training, and experience standards for laboratory management and staff;

Ensuring that laboratories have suitable quality systems and that the systems are operating;

Reducing the costs of accreditation to the laboratory industry and to the state accreditation programs;

Bringing a degree of consistency and quality to state accreditation programs;

Helping to eliminate the problem of incompetent laboratories; and

Assisting purchasers of laboratory services in finding competent laboratories to do their work.

For these benefits to accrue, however, it is critical that we have a truly national program where accreditations by any member accrediting authority are recognized by all states, the federal government and the tribes.

In this regard, EPA has, and will continue to actively support the National Environmental Laboratory Accreditation Conference (NELAC) effort to establish a national system through both staff participation, and by providing a degree of financial support. In addition, as the Agency's Science Advisor, I will do all I can to generate support across EPA for the program and at senior levels in the states.

However, while the Agency is supportive of the NELAC efforts, EPA would like to see a number of changes made in the program. EPA does not believe that laboratory accreditation is an inherently governmental function. In fact, I believe that the national accreditation system should not be government run. Standards should be developed by groups representing and including all sectors of the environmental community. Here I include the federal government, the states, the commercial and in-house laboratories, the engineering firms who are major users of data generated by the laboratories, as well as all the other parties who are the purchasers or users of laboratory services and data. In this regard, EPA was very pleased to see that the NELAC community adopted a new structure at their recent annual meeting. Under the new structure, accreditation standards will, henceforth, be developed by national consensus standards developing bodies where experts from all sectors of the monitoring community can work together, as equals, to develop the accreditation standards.

I also strongly believe that we still need to look at what mechanism should be used to approve the laboratory accreditation standards; what organization(s) should perform the laboratory auditing function and ensure the competency of the auditors; who should accredit the laboratories; and how to ensure that U.S. accreditation standards comport with international standards in order that U.S. environmental testing

laboratory accreditations are recognized by other nations. I hope that the NELAC community will continue to look at these issues between now and its next annual meeting.

One area where I feel the NELAC program needs to be strengthened is with regard to the personnel performing the laboratory audits. Laboratory auditing needs to be performed by persons who are experienced in laboratory operations. It is critically important that the auditors really understand how laboratory operations are performed and how laboratories operate if they are to effectively identify operations that do not meet the accreditation standards. In addition, auditors can and often do help laboratories improve their operations by identifying areas where improvement is needed and by recommending appropriate courses of action. Such services can only be performed by competent, knowledgeable auditors.

One aspect of a national environmental laboratory accreditation program that I want to take a moment and focus on concerns funding. How to make such a program financially secure. EPA believes that the accreditation program should be self-sufficient and its funding sources broad-based. Examples of funding sources that should be looked at include: membership dues from accrediting authorities; contributions from organizations such as EPA and other large users of laboratory services; and fees charged to laboratories for accreditation.

Finally, I want to reiterate the need for NELAC to adopt a system that focuses on the laboratory needs to meet project-specific, customer-established data quality objectives (the ISO 17025 or Performance Approach) rather than to continue with the required-method approach. As part of this change, the accreditation community needs to take a new look at its approach to "fields of accreditation" since the current methods-based approach acts as a roadblock to implementing the performance approach. Now that EPA is finally beginning to implement the performance-based measurement system and build flexibility into its measurement requirements, this is a critically important change that needs to be made.

Agency Efforts to Strengthen Science

This past April, EPA Administrator Christie Whitman announced that, in order to strengthen the role of science at the Agency, she was creating the position of Science Advisor and was appointing me to that position. As her Science Advisor, I am responsible for working with all parts of the Agency to ensure that high-quality science is fully integrated into the Agency's programs, policies and decisions.

This afternoon, I would like to take a few moments and discuss some areas within the environmental monitoring arena that I plan to focus on in order to ensure that the Agency's decisions are supported by the best available science.

I will increase Agency efforts to implement the performance approach by working with senior management of our Program Offices and Regions to modify the regulations and permitting procedures to not only allow, but to encourage, use of new measurement technologies. While progress has been made in regard to implementing the performance approach, as you will hear about in a few minutes from my colleague Elizabeth Cotsworth, more needs to be done, and I will work to speed up the pace of implementation.

One reason that mistakes are sometimes made when conducting monitoring or data gathering programs is that the people conducting the studies do not always spend enough time to properly plan the work. We need to ensure that all measurements are made under a "plan" that describes the question(s) to be answered and either the required accuracy of the data, or the minimum degree of certainty with regard to the answer to the questions. We need to require that the actual quality of all our data be documented. While current Agency policy requires that before any testing is performed a Quality Assurance Project Plan has to be prepared and approved by the Quality Assurance Officer (QAO), this process needs to be strengthened and the states and the private sector need to be encouraged to adopt a similar approach. If quality assurance project plans were properly prepared and followed, three benefits would ensue.

The appropriateness of all the methodology that is used to collect the data would be assured.

The defensibility of the data that the Agency uses in its decision-making would be strengthened, since the actual quality of the data would be documented.

Management will be more confident of its decisions since we will know the statistical quality of the data and results.

In a number of instances, the Agency has been criticized that the methods that we issue do not always perform as advertised. I believe that for the most part, the criticism is not warranted. However, in order to ensure that all EPA methods can actually achieve the performance that is advertised, I will work to require outside peer review of all new measurement methods issued by the Agency. Such reviews would not be under control of issuing/developing organization whether it be my own Office of Research and Development, a Program Office, or any other EPA organization. As you know, EPA policy is to not issue monitoring requirements unless methodology exists that the regulated community can use to meet the monitoring requirements. By employing outside peer review, I hope that we can eliminate any future situations where EPA-issued or EPA-cited methods do not provide the degree of accuracy or sensitivity that you need to meet Agency monitoring requirements.

The Agency has been working to strengthen its internal procedures to improve its data gathering and information product generation procedures. The effort is termed the Data Quality Strategic Plan, and it is my understanding that you were briefed on this effort at this symposium last year. A number of components of the strategy only affect how EPA conducts its internal activities. However, one aspect of the strategy that may impact you, and that I would like to see the Agency implement as quickly as possible, will be to require the quality of all data generated by, or generated for, the Agency be actually determined and documented. While this would be a significant change in how we do business, this move mirrors the efforts being made by NELAC, ASTM and ISO.

As some of you may be aware of, and have already been following, in 1999 Congress mandated that each federal agency develop and issue guidelines to improve the quality of the information that the Agency generates, uses and disseminates. Under guidance issued by the Office of Management and Budget, EPA is now developing its implementation guidelines which are to be issued by October 1, 2002. Our guidelines build upon numerous established agency policies and procedures for ensuring the quality of information. While you will hear more details about this effort later in the Conference, I want to highlight two areas that we are working on.

First, while the Agency will continue to do its utmost to ensure that the information that we use and disseminate is of high quality, sometimes bad information slips through. As a result of our continuing commitment to take timely action to correct such errors, the Agency will modify its information correction process to make it easier for you to get errors in Agency information corrected.

Second, since the bulk of the Agency data comes from outside sources, EPA is developing a series of assessment factors that the Agency will publish and use to evaluate the credibility and appropriateness of data and information obtained from outside sources. The goal is to minimize the possibility of EPA receiving and using data and information that is not suitable for the use to which it is being put.

As you know, it is often very difficult for someone outside the Agency, and sometimes even for someone inside the Agency, to find appropriate measurement methods that have been developed or issued by the Agency. ORD, each of our Program Offices, the Regions, all develop and publish measurement methods. Some of the methods are available on the Agency's Web site but many are not. In addition, navigating the various Agency Web sites and finding a particular method is very difficult. The Web sites also do not make it easy to determine which of the many seemingly identical methods is appropriate for a particular application. I know that our Region 1 library has, for several years, been issuing an index to EPA's various testing methods. I do not know if this index is complete, but it has helped serve as a roadmap. Also, I understand that the National Water Quality Advisory Board is in the

process of developing a comprehensive index to environmental monitoring methods issued by EPA, other federal agencies and national and international standards-setting bodies. Their effort is called the National Environmental Methods Index, and it looks like it will be a very valuable tool. However, this still leaves the problem of obtaining the cited methods once you have identified which ones are appropriate for your application. As Science Advisor, I will discuss with other Agency senior managers the possibility of establishing a centralized Web-based registry of analytical and other measurement methods that cuts across programs/ORD/regions. Having a central location on the EPA Web site for all Agency methods would be a tremendous service to the public [and to EPA's own staff] and also, hopefully, cut down on unnecessary duplication of effort with regard to methods publication. Such a registry would make it much easier for you to obtain methods that are cited in regulations, guidance and the previously mentioned indices.

Earlier I spoke of my commitment to helping to establish a national accreditation program for environmental laboratories. As the Science Advisor, one of my goals is to promote the acceptance by senior Agency and State management of the program

and the use of accreditation as a means of improving the quality of our nation's environmental testing laboratories. As I mentioned earlier, laboratory accreditation provides a means of ensuring that laboratories are competent to perform the type of tests that they have been accredited to perform. By actively promoting the concept of only using quality laboratories, I hope that the Agency can do its part to eliminate, or at least reduce, the credibility problems facing the environmental laboratory community. I would like to take this opportunity to solicit your ideas and suggestions as to what specific changes can and should be made in the procurement process to ensure that the Agency only contracts with competent laboratories.

Thank you for giving me the opportunity to share some of my ideas and priorities with you. You are a key to quality science. The quality of the data and information that you supply largely determines how well we do our job and how well we can determine whether our efforts are succeeding.

In conclusion, on behalf of the Agency, I want to thank the Independent Laboratories Institute for organizing and hosting this Symposium and especially want to thank Joan Cassedy and Larry Keith.

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Size Characteristics of Re-aerosolized Anthrax Spores

Chris Weis (NEIC), Tony Intrepido (CHPPM), Pat Cowin (CHPPM), Joan Gephardt (NMRC), Robert Bull (US Navy NMRC), Aubrey Miller (USPHS), and Mark Durno (EPA-R5)

Collaborative studies with the Naval Medical Research Center (NMRC), the Army's Center for Health Promotion and Preventative Medicine (CHPPM-Aberdeen Proving Ground), and the U.S. Public Health Service are in progress. Spores collected from a US Senate office and analyzed for size characteristics and propensity for anthrax spores to become re-aerosolized after an initial attack have been submitted for publication. Coupled with this work is an interest in follow-up investigations to measure the electrostatic charge on spores as a possible tool for forensic fingerprinting.

Epidemiological Analyses of Health and Environmental Data from Libby, Montana

Jeffrey Lybarger (ATSDR), Aubrey Miller (USPHS), Chris Weis (NEIC), Brad Venner (NEIC), and Steve Dearwent (ATSDR)

In participation with the U.S. Public Health Service and the Agency for Toxic Substances and Disease Registry (ATSDR) an epidemiological analysis of health and environmental data collected from Libby, Montana is underway. During 2000 and 2001, approximately 7000 individuals thought exposed to high concentrations of amphibole asbestos were screened at the radiology clinic built by EPA and ATSDR. Approximately 2000 of these individuals demonstrate signs of exposure as determined by 2 of 3 board certified asbestos pulmonologists. The data set is important for estimation of asbestos-related exposure and health effects.

Asbestos Analysis by Reflected Infrared Spectroscopy

Roger Clark (USGS), Greg Meeker (USGS), Sam Vance (EPA R8), Todd Hoefen (USGS), Chris Weis (NEIC), and Mary Goldade, (EPA R8)

Work has started with the USGS in the use of visible reflected infrared light as a tool to measure mass percent concentrations of specific asbestos minerals in solid matrices. This research grew out of USGS work on airborne mounted spectrometers used in mineral prospecting. The technique has evolved to a bench top-method, which may have portable or field applications in some environments. This technique will be tested in a multi-instrumental method of analysis performance evaluation study.

Quantitative Asbestos Determinations by X-ray Diffraction

Douglas Kendall (NEIC), Richard Martinez (NEIC) and Peggy Forney (NEIC)

Recent developments in X-ray instrumentation and sample preparation techniques have made viable a more practical and accurate method for asbestos determination in bulk samples. Developments in the regulatory area and with accreditation have made more accurate methods for asbestos desirable. Existing methods, which may be of unknown uncertainty, will be tested and evaluated. Sample preparation is likely to be very important. If warranted, new methods will be developed and tested. The selected methods will be validated.

Surface Charge Based Length Discriminate Separation of Asbestos Fibers

Vince Castranova, (NIOSH), Steve Wilson (USGS), Greg Meeker (USGS) and Chris Weis (NEIC)

Physiologists at NIOSH in Morgantown, WV have developed a method of separating asbestos fibers as a function of fiber length. The method is dependent upon surface charge characteristics of individual asbestos fibers and, presently is only useful for separation of microgram quantities of fiber. The objective of this work is to scale up the process such that gram quantities of fiber could be obtained for use in cellular or animal toxicity testing.

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Ambient Fiber Concentrations Archived by Sediments

Mary Goldade (EPA-R8), Chris Weis (NEIC) and James Weber (NY Dept Health)

In collaboration with scientists at the New York State Department of Health (Albany) sediment core samples will hopefully be a useful a tool for estimating historical airborne fiber concentrations. Once the core is pulled, layers are dated by measuring traces of radioactive cesium known to be associated in time with past atomic tests. The collocated fiber concentration, coupled with measurements or estimates of deposition rate can (in theory) be used to back-calculate historical ambient fiber concentrations.

Animal Toxicity Studies of Amphibole and Serpentine Asbestos

Chris Weis (NEIC) and Jim Christiansen (EPA-R8)

In collaboration with other Agency scientists a study design is under development to determine the relative toxicity of amphibole vs. serpentine asbestos. Presently, EPA's policy treats all asbestos equally in terms of numerical estimates of toxicity. Recent models suggest possible methods to differentiate the toxicity of asbestos fibers based upon their size and chemical characteristics but these have not been.

Amphibole Asbestos Reference Materials

Chris Weis (NEIC), Mary Goldade (EPA-R8), Sam Vance (EPA R-8), Greg Meeker (USGS), Steve Wilson (USGS) and Steve Sutley (USGS)

In collaboration with USGS and NIST work has been initiated on the development of a set of known amphibole asbestos standards that will be used to quantitatively (qualitatively in some cases) compare existing methods of analysis for bulk asbestos containing materials (performance evaluation study).

Equilibrium Soil/Water Partitioning of Azide and Cyanide

Eric Betterton (Univ. of AZ), John Reschl (NEIC) and Joe Lowry (NEIC)

Azide and cyanide are of environmental concern due to anthropogenic inputs from industrial wastes. An understanding of their behavior in the environment necessitates an assessment of the processes influencing their fate and transport in soils and groundwater. In the pH range relevant to most environmental scenarios, a portion of each can be partially or totally protonated, unionized. This may modify sorption and transport. The equilibrium sorption constant for the partitioning of azide and cyanide between water and soil will be determined using a number of soils (differing pH and organic content) and two different techniques. Breakthrough curves for bromide (control), azide and cyanide will be obtained by collecting column effluent fractions followed by ion chromatography analysis. Partitioning will also be measured by batch mixing followed by filtration and ion chromatography. Azide breakthrough curves for an Arizonian soil and a Floridian peat have been obtained. No partitioning in comparison to bromide was observed with the Arizonian soil while partitioning or reaction was observed for the high organic peat (about 45% carbon).

Solar Photolysis of Gaseous Hydrazoic Acid

Eric Betterton (Univ. of AZ), James Hoban (NEIC) and Robert Bohn (NEIC)

An understanding of the behavior of azide in the environment necessitates an assessment of the processes influencing its fate and transport in the atmosphere. The photodecomposition of hydrazoic acid may be an important sink. The purpose of this work is to determine the rate of solar photolysis of hydrazoic acid in the atmosphere. As means to follow this reaction the literature suggests two techniques - gas chromatography and long-path FTIR. Evaluation of these techniques for said purpose will be the first steps in this work.

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Kinetics of the Redox Reaction of Azide and Hypochlorite

Eric Betterton (Univ. of AZ) and Robin Ingamells (NEIC)

Azide if ingested in sufficient quantity can be poisonous. Recent concern over adulteration of water supplies together with the ready availability of azide because of its widespread use in automobile air bag, begs the question would normal disinfectants detoxify azide. Thermodynamics indicates that the redox couple between azide and hypochlorite is favorable. However, it is expected that kinetics will predominate in the reaction of azide with hypochlorite and hence determine whether detoxification would be achieved in a timely fashion. Initially, use of UV-visible spectroscopy to monitor the reaction kinetics will be evaluated.

Cyanide in Process and Waste Water Samples by Ion Chromatography with Electrochemical Detection

John Reschl (NEIC) and Joe Lowry (NEIC)

Cyanide analytical methodology has been a research interest at NEIC since the early 1980s. Recent study has involved various ion chromatography systems. Experimentation studying pulsed amperometry with a silver electrode for measuring cyanide and sulfide has been conducted. The goal of this work is to develop methodology for use in confirming results from the manual distillation followed by colorimetry methodology. This methodology is prescribed by the Agency for NPDES wastewater and drinking water monitoring, and also appears in an Agency solid waste methods manual. Study has found that less signal drift and significantly improved symmetrical peak shape was achieved with the pulse waveform as opposed to the direct current amperometry. This is because unlike direct current measurement the pulse waveform cleans film from the surface of electrode essentially continuously by use of anodic and cathodic polarizations. Comparison to colorimetry for distillates of an electroplater's wastewater and process tank samples has been conducted. Additionally, ligand exchange experimentation discerning hexacyanoferrate was accomplished.

Reactivity Worksheet for use in lieu of Rescinded OSW SW846 Methods

Ken Rota (EPA-R1) and Joe Lowry (NEIC)

A spreadsheet was developed relating air and water concentrations at the TLV, IDLH and LEL of toxic or flammable gases or vapors based on Henry's Law. Temperature and protonation chemistries affects were modeled. NIST Henry's Law constants, temperature coefficients and protonation constants were relied upon for most chemicals. The spreadsheet can be a useful tool to aid in determining potential reactivity. Another use is to help identify wastewater discharges that may potentially result in the generation of toxic or explosive fumes in the sewer system. A memorandum explaining the use of this spreadsheet for both RCRA and the Water Program has been sent from Region 1 to the New England states as well as to some Agency RCRA enforcement staff. Additionally, some other state and regional staff have received the table.

Design Flaws of the Rescinded SW846 Chapter Seven Methods

Joe Lowry (NEIC)

Volatilization from water to the atmosphere can be a significant exposure pathway for some pollutants. Knowledge of the Henry's law constant is essential in calculating mass transfer from the water to the atmosphere. A mathematical description of volatilization for dynamic stripping systems [such as that used by SW846 Chapter seven] is readily derived and has been published. The predicted recovery of hydrogen cyanide of 2.4% at 25°C and 1.8% at 22°C closely approximate measured recoveries. The fact that the SW846 method is designed to operate at the rapid incline region of the mass transfer recovery curve rather than the plateau region means that small changes in experimental parameters such as temperature, flow, time, and aqueous solution volume can cause large changes in the amount measured. To understand the fate of a volatile weak acid, the degree of dissociation in the aqueous phase must be known. As the pH increases the effective Henry's law constant increases. While the intrinsic Henry's Law constant depends only on temperature, the effective Henry's Law constant depends both on temperature and pH. At higher pH less hydrogen cyanide would be measured. This reveals another design flaw of the

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rescinded methods because pH is not controlled. This document has been used in response to inquiries concerning the rescinded methods and forwarded to companies found still relying on these methods.

EPA Cyanide Methodology: Sulfide Interference Removal Studies

John Reschl (NEIC), Willis Collins (NEIC) and Joe Lowry (NEIC)

The EPA's cyanide methods as well as the regulations prescribe precipitation of sulfide with the intention of preventing the formation of thiocyanate or to eliminate or diminish possible interference on the cyanide measurement chemistry. To the contrary, study has shown that the formation of lead sulfide precipitate under alkaline conditions can lead to ready conversion of cyanide to thiocyanate. Depending on the measurement chemistry this can cause an underestimation of the cyanide in the water or wastewater. Further, these sulfide precipitation measures are not mindful of effects on cyanide species and hence the measured cyanide. In considering dissolved cyanide species, total cyanide is intended to measure hexacyanoferrates while cyanide amendable to chlorination and available cyanide are not. However, hexacyanoferrates are known to precipitate with bismuth, cadmium, and lead. Therefore, if hexacyanoferrates are present and the sulfide precipitation procedures are implemented than total cyanide will be underestimated. Further total cyanide was intended to include both dissolved and particulate cyanide. Since the sulfide precipitation procedures cause the sample to be filtered than particulate cyanide would be removed from the solution analyzed. This work will confirm the hexacyanoferrate precipitation chemistry and measure the kinetics of the thiocyanate conversion under conditions typically encountered.

NIOSH Hydrogen Sulfide in Air Method 6013 Evaluation

Jon Beihoffer (NEIC), Brad Venner (NEIC), and Joe Lowry (NEIC)

NIOSH has approved Method 6013 for the determination of hydrogen sulfide in air. In a study of ammonia and hydrogen sulfide air levels near concentrated animal feeding operations Method 6013 was intended as the hydrogen sulfide reference method for comparison of two other field monitoring devices. The NIOSH method involves filtration through 0.5 um Zeflur to remove particulate sulfide; sorption on a solid sorbent tube containing coconut shell charcoal; desorption with ammonia hydroxide and hydrogen peroxide; dilution; and analysis by ion chromatography with conductance detection. Very poor recoveries (< 30%) of known additions of hydrogen sulfide were measured using the methods desorption procedure with ion chromatography or inductively coupled argon plasma emission spectroscopy. Increasing the desorption time improved recovery and further improvement was measured upon increasing the temperature. Although the objective to discern which continuous field-monitor was more accurate could be achieved because the field measurements differed by a factor ten (because one device was measuring ammonia as hydrogen sulfide), the evaluated NIOSH method and modifications are less than satisfactory. Grinding the charcoal may prove useful in any future study.

NMR Spectroscopic Environmental Analysis Applications

Jimmy Seidel (NEIC) and Jon Beihoffer (NEIC)

NMR spectroscopy has been used for detection, structure elucidation, and conformation analysis of inorganic and organic chemicals. NMR analyses confirmed ion chromatographic analyses for various oxy acid phosphorus anions as well as the detection of a fluoro-phosphorus oxy acid anion in electric arc furnace dust from elemental phosphorus production. NMR analyses identified organic and metallic-organic chemicals whose uniqueness collaborate association

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of PRPs with wastes buried in landfills. Some of the chemicals were sodium nitrophenoxide, triclocarban, chloronitrobenzene, and zinc dialkyl dithiophosphate. Some other applications have been to detect the presence of perfluorinated acids in drinking water near a Teflon plant and glycols in wastewater discharge from an anti-freeze recycler.

Liquid Chromatography/Mass Spectrometry in the Determination of Non-Traditional Contaminants

Larry Strattan (NEIC) and Christine Casey (NEIC)

Liquid Chromatography/Mass Spectrometry (LC/MS) technology combines a compound-specific detection technique with the power of liquid chromatography to separate thermally unstable or highly polar compounds not amenable to gas chromatographic analysis. Two recent applications of LC/MS have been the identification of dimethyldithiocarbamate, a slimicide and metals-removal polishing treatment chemical, responsible for a large fish kill; and the analysis of drinking water supply samples for perfluorinated acids near a Teflon plant. The perfluoro compounds bioaccumulate and are probable carcinogens, and are just being recognized as chemicals of concern in the environment.

Analysis of Congener-Specific PCBs by Tandem Mass Spectrometry

Christine Casey (NEIC) and Larry Strattan (NEIC)

Although the Agency regulates PCBs as total PCBs, the toxicity of individual congeners differs greatly. The PCB congeners having a planar shape with at least two chlorines near each end of the molecule are the most toxic. The quantitation of a particular Arochlor® (commercial PCB mixture) is pertinent to regulation, but it has little to do with a toxicity assessment. The use of a gas chromatograph/tandem mass spectrometer allows the congener-specific analysis of PCBs with minimal cleanup of extracts. This type of analysis provides a better potential of identifying the source of the PCB for enforcement purposes, as well as improving any toxicity assessment.

Ambient Air Monitoring of Ammonia and Hydrogen Sulfide Near Concentrated Animal Feeding Operations

Cary Secrest (EPA ORE), Jon Beihoffer (NEIC) and Brad Venner (NEIC)

One of the main issues in EPA's ongoing investigation into the possible health effects of concentrated animal feeding operations is the effect of low levels of toxic gases such as hydrogen sulfide or ammonia.

Monitoring of outdoor air concentrations using long path UV and IR have revealed elevated levels of ammonia, but the significance of these from the viewpoint of possible health effects are unclear.

Therefore, indoor air concentrations of ammonia were measured concurrently with outdoor air monitoring near a CAFO hog facility in Missouri. The indoor measurements were conducted with a photoacoustic detector and sorbent tubes; the latter were then analyzed in the lab using ion chromatography. The study revealed transient elevations of ammonia but these episodes were too brief to substantially impact indoor air concentrations. Sorbent tubes were also used to measure hydrogen sulfide emissions from Ohio an egg laying facility.

Two Compartment Mass Transfer Model

Brad Venner (NEIC)

The withdrawn reactivity method relies upon a simple scenario of dumping acid into an open pit of cyanide or sulfide wastes to derive the threshold limits in the method. The analysis used in these methods was flawed. Development of a mathematical model based on the widely accepted two-film model of mass transfer to model the air-water partitioning in the reactivity method is underway. This model will help extrapolate the results of the method to the method scenario as well as other scenarios of interest. Confirmatory experimental work is currently being conducted.

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Tin in Soil by Hydride Generation / Plasma Mass Spectrometry

Theresa Hosick (NEIC), Robin Ingamells (NEIC) and Steve Machemer (NEIC)

A paper was published in 2002 in *Analytica Chimica Acta* on method developments associated with the study of contamination in a residential area near a lead-acid battery manufacturer facility. Method development and validation was conducted for the determination of tin in soil by potassium hydroxide fusion followed by hydride generation coupled to plasma mass spectrometry. A method detection limit of 0.5 mg/Kg was achieved. Sample results from this method compared well with results from instrumental neutron activation and analysis of the fusions by plasma emission spectroscopy.

Iron Treatment of Lead-Contaminated Brass Foundry Waste

Douglas Kendall (NEIC)

This work contributed to Agency regulations banning iron addition as a treatment of hazardous waste. The work has been expanded and has been submitted as a paper for publication. Three processes were studied: reduction by iron metal, adsorption of lead, copper and zinc onto iron oxides, and precipitation of hydroxides. Comparison of the chemistry of the TCLP test to the reactions occurring in a landfill was conducted.

Sampling variability and the impact on the TCLP method

Brad Venner (NEIC) and Joe Lowry (NEIC)

The recent revision of the RCRA sampling guidance by OSW proposes the use of the Gy's sampling theory to assess sampling uncertainty for the TCLP. This theory was developed to analyze compositional data, and must be extended to account for non-linear properties such as leachability. A simple model for leachability has been developed that demonstrates that the non-linear effects of TCLP can result in significant magnification of the sampling variability. Furthermore, this non-linearity can result in

non-additivity of the results. This means that an average value of a collection of TCLP results may not give an unbiased estimate of leachability even if the compositional results are unbiased. This work was presented at the recent Waste Testing and Quality Assurance conference in Washington DC and a manuscript is in preparation.

Sampling Particulates – Application of Gy Theory – Subsampling Part 1

Charles Ramsey (Envirostat), Bob Gerlach (Lockheed-LV) and Brad Venner (NEIC)

In collaboration with the Office of Research and Development experiments were performed to gather information to corroborate the sampling theory of Pierre Gy. In particular, these experiments were designed to simulate common laboratory subsampling methods. The experiments used simple combinations of sand, sugar and salt in various proportions and used varying subsampling techniques such as simple grabs and composites as well as rotary and manual splitting. The simulated samples were analyzed using a conductivity meter to assess the amount of sand in each simulated sample. The results of this work have been included in a draft guidance on sampling of soils that is currently in review and is expected to be completed at the end of the fiscal year.

Laboratory Fraud

Andrew Lauterback (EPA OCEFT), Richard Ross (NEIC), Andrew Goldsmith (DOJ ECS), Mark Measer (EPA CID), William Smith (formerly EPA CSEE), Fred Burnside (EPA CID), Herman Griffin (EPA LCRMD), and Mary LaFrance (IG USPS)

The commission of laboratory fraud poses threats to the EPA's regulatory program, i.e., the basis for establishing regulations and their enforcement. A report was prepared indicating the seriousness of the problem, detection, investigation, prosecution, and post prosecution issues. Elements of the report have been presented at a Science for Prosecutor's Course, at NELAC and various other forums

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Reactivity/Ignitability Friction Testing

Richard Ross (NEIC)

Portions of 40CFR part 261 provide a narrative description of certain hazardous properties. One of these properties is directed to substances, which cause fire through friction. Various existing testing procedures were researched and a BAM friction tester was acquired. An advantage of this tester is that a range of pressures can be applied while exerting frictional movement on a test specimen. An evaluation of the tester on various substances is underway.

Automated Ignitability Testing

Theresa Morris (NEIC), Jennifer Suggs (NEIC), and Richard Ross (NEIC)

The 40CFR261 regulations specify the use of certain ASTM Pensky Martens or Setaflash methods for the determination of flashpoint pursuant to the ignitability characterization of liquid wastes. Temperature ramping control for the Setaflash apparatus is tedious. An automated Setaflash tester, which precisely controls the temperature ramping, has been acquired and experimentation has been conducted. Combining manual operator intervention with the automatic temperature control provides successful analyses.

Field Gas Chromatography - Mass Spectrometry Analysis of Ambient Air and Wastewater Samples

Christine Casey (NEIC), Stephanie Volz (NEIC), and Theresa Allen (NEIC)

A portable gas chromatography - mass spectrometer has been used to make real-time measurements of volatile organics in ambient air at a PVC plant and in wastewater at a vinyl chloride monomer plant while on-site. This has enhanced compliance evaluation capabilities. A sample run time is typically about 10 minutes, even for a very aggressive list of compounds. The instrument is capable of measurement in the ppbv range in air and, in conjunction with the equilibrium headspace unit, in water and soil samples.

GIS Application in Environmental Field Investigations

Carrie Middleton (NEIC)

The application of Geographic Information Systems has greatly enhanced the ability to use various imagery products in different phases of environmental field investigations. Each phase in an investigation has specific imagery requirements, which vary depending upon the case objectives. In the targeting and prioritization phase, imagery is utilized to provide information about an area's population, natural systems, and potential environmental impacts. In the planning phase, image analysis incorporating change detection provides insight into process or operational changes at the site, as well as activities impacting a facility's regulatory compliance. Images are used as a form of "virtual field reconnaissance" to help familiarize field personnel with a site. Once the field team arrives on site, imagery provides a base map for geophysical, sampling, ground verification, and analytical activities, thus supporting the field phase. Finally, imagery also supports the evaluation and report development phases of an investigation by providing a crucial visual element in reports, courtroom exhibits, and technical presentations.