AGENDA

SOUTHEAST FLORIDA CORAL REEF INITIATIVE (SEFCRI)

Maritime Industry and Coastal Construction Impacts (MICCI)

Study to identify innovative technologies, construction practices and procedures that minimize or eliminate coral reef impacts.

Objectives of Workshop

- Identify activities or actions, which have the potential to have minimal/maximal effectiveness toward the protection of coral reefs, hard/live bottoms and associated coral reef resources.
- Identify innovative technologies that minimize or eliminate impacts to reef communities
- Identify and recommend for cost incorporation of advanced and/or emerging technologies into regional beach nourishment, erosion control, inlet management and infrastructure placement programs.
- Identify and recommend study designs to monitor projects and mitigation associated with associated with coastal construction activities, infrastructure installation, beach renourishment, dredging and groundings.
- Review and recommend criteria for coral reef mitigation (associated with coastal construction activities, infrastructure installation, beach renourishment, dredging, blasting and groundings)
- Address and recommend process for potential rule changes and or 'standard' permit conditions that could advance utilization of emerging technologies for coastal and marine construction activities while maintaining protection of coral reefs, hard/live bottoms and associated coral reef resources.

May 24, 2006, Wednesday

7:30-8:30 Registration

8:30-8:50 Welcome & Introductions

- Sharon Niemczyk, Tetra Tech EC
- Chantal Collier, Florida Department of Environmental Protection
  Introduction of SEFCRI and the MICCI focus team

Morning Presentations

8:50-9:05 Billy Causey, Superintendent, Florida Keys National Marine Sanctuary
Topic: The Importance of Florida's Resources

9:05-9:15 Q&A

9:15-9:30 Paden Woodruff, Florida Department of Environmental Protection
Topic: Proceedings from February 2006 Innovative Shore Protection Workshop

9:30-9:40 Q&A

9:40-9:55 Stephen Higgins, Broward County
Topic: Sand Bypassing at Stabilized Inlets: Sustaining Broward County's Restored Beaches

9:55-10:05 Q&A

10:05-10:15 Break

10:15-10:30 Phil Bates, Dredge Disposal Site Manager, U.S. Army Corps of Engineers
Topic: Silent Inspector Monitoring of Dredging Equipment

10:30-10:40 Q&A

10:40-12:00 Breakout Sessions (focus questions and information to be provided to participants)

Group 1: Identify existing practices that are known to impact coral reef systems, including coral reefs, hard and/or live bottoms and associated coral reef resources:

- Physical activities (i.e. dredging, blasting, beach renourishment)
- Process based activities and secondary responses (i.e. turbidity, shoreline erosion)
- Review extent and components of regional beach erosion control programs and infrastructure placement for purpose, method and effectiveness.
- Lessons learned from past beach nourishment and renourishment projects in Southeast Florida
- Prioritize practices and impacts

Group 2: Review recent applications of advanced technologies and/or methodologies associated with coastal and marine construction activities that minimize or eliminate resource impacts, including but not limited to:

- Shoreline stabilization
- Erosion/beach stabilization
- Beach renourishment
- Infrastructure placement

Group 3: Review emerging technologies for shoreline stabilization, erosion/beach stabilization, beach renourishment:

- Coastal engineering solutions
- Dredging and industry solutions

Identify opportunities for incorporation/implementation of advanced/innovative technologies in coastal and marine construction activities and infrastructure placement programs.

- Recommend criteria and components for appropriate/acceptable "pilot" renourishment projects designed to minimize impacts to coral reef resources (corals, hard/live bottom, reef resources).

Group 4: For the purpose of protection of coral reefs, hard/live bottoms and associated reef resources, review:

- Discuss and propose reasonable or 'standard' permit condition modifications that could advance utilization of emerging technologies for coastal and marine construction activities
- Criteria for mitigation associated with coastal construction activities, infrastructure installation, beach renourishment, dredging and groundings
- Identify/recommend study designs to monitor projects and mitigation associated with innovative/advanced coastal activities

12:00-12:50	**Lunch (brought into IGFA)**
1:00-1:15	Dr. Pete Peterson, University of North Carolina, Chapel Hill Topic: Dredging Assessing the Environmental Impacts of Beach Nourishment
1:15-1:25	Q&A
1:25-1:40	Dr. Donald McNeill, University of Miami (Presenting on behalf of Dr. Hal Wanles) Topic: Economically Wasteful and Environmentally Damaging Beach "Renourishment"
1:40-1:50	Q&A
1:50-3:00	Continue Breakout Sessions
3:00-3:15	**Break**
3:15-4:00	Breakout Group Session Brief (brief update by group on information from session)
4:00-4:20	Facilitated Group Discussion on Consensus Items (All workshop participants)
4:20-4:30	**Closing Comments and Adjourn**

May 25, 2006, Thursday

8:00-8:30	Registration
8:30-8:45	Welcome & Day 1 Recap • Sharon Niemczyk, Tetra Tech EC Introduction and Purpose of Workshop (Proceedings), Recap of Day 1

Morning Presentations

8:45-9:00	Georgia Vince, Program Administrator, Regulatory Division, Florida Department of Environmental Protection Topic: Means of Avoidance and Minimization of Coral Reef Impacts During Offshore Coastal Construction Projects
9:00-9:10	Q&A
9:10-9:25	Bill Hanson, Great Lakes Dredge and Dock Topic: Dredging Techniques to Minimize Environmental Impacts of Operations
9:25-9:35	Q&A
9:35-9:50	Dr. Kerry Black, ASR Limited, New Zealand Topic: Coastal Protection in a World of Sophisticated Stakeholders
9:50-10:00	Q&A

Agenda

10:00-10:15	**Break**
10:15-10:30	Dr. Bill Dally, Surf Break Engineering, Melbourne, FL Topic: A Pilot Study: Hypothetical Application of Reef Mitigation Garden Concepts
10:30-10:40	Q&A
10:40-11:40	Breakout Sessions (focus questions and information to be provided to participants)
	Group 1: Identify existing practices that are known to impact coral reef systems, including coral reefs, hard and/or live bottoms and associated coral reef resources
	Group 2: Review recent applications of advanced technologies and/or methodologies associated with coastal and marine construction activities that minimize or eliminate resource impacts
	Group 3: Review emerging technologies for shoreline stabilization, erosion/beach stabilization, beach renourishment; Identify opportunities for incorporation/implementation of advanced/innovative technologies in coastal and marine construction activities and infrastructure placement programs.
	Group 4: For the purpose of protection of coral reefs, hard/live bottoms and associated reef resources, review permit conditions, study designs and criteria for mitigation for innovative/advanced coastal activities
11:40-12:00	Breakout Group Recap of AM Sessions (brief update by group on information from session)
12:00-1:30	**Lunch (on your own, list of eateries provided)**
1:30-2:30	Continue Breakout Sessions (Focus on AM session non-consensus items)
2:30-4:15	Final Group Presentations and Facilitated Discussion
4:15	**Final Comments and Adjourn**

Billy Causey — Key Note Speaker

Superintendent, Florida Keys National Marine Sanctuary
P.O. Box 500368, Marathon, FL 33050
305.743.2437

Billy Causey has managed National Marine Sanctuaries in the Florida Keys since 1983, when he became the Manager of the Looe Key National Marine Sanctuary. He is currently the Superintendent of the Florida Keys National Marine Sanctuary and has headed up this 2900 square nautical mile Sanctuary since 1990. Mr. Causey has been the lead National Oceanic and Atmospheric Administration (NOAA) official in the development of the management plan for the Keys Sanctuary, which is the second largest marine protected area in the United States. He serves as the liaison with local, state and other federal agencies responsible for management of natural resources in the Florida Keys. Mr. Causey received a Bachelor of Arts degree from the University of Corpus Christi in 1967, and a Master of Science degree from Texas A&I University in 1969. Three years of postgraduate work at the University of South Florida introduced him to the Florida Keys coral reef ecosystem. Causey has served with the National Park Service as a Park Ranger and has also worked as a commercial diver and research assistant. From 1972 until 1983 Mr. Causey owned and managed Aplysia Aquarium Collecting and Research Center in partnership with his wife Laura.

Mr. Causey has recently just received an honorary PhD in Science from the University of South Florida.

Phillip C. Bates — Speaker

Project Manager, Operations Branch CESAJ-CO-OM - U.S. Army Corps of Engineers
Jacksonville District, P.O. Box 4970, Jacksonville, FL 32232-0019
Phone no. 904-232-1196, Fax no. 904-232-3696

Mr. Bates has worked with the Waterways Experimental Station (WES) in Vicksburg, MS for the past 19 years developing, implementing and inspecting Sea Turtle Deflector devices used on hopper dredges to preclude and limit takes of endangered sea turtles during dredging operations. He published a Technical Paper in 1994; "ENDANGERED SEA TURTLES: METHODS TO MINIMIZE THEIR ADVERSE IMPACT UPON HOPPER DREDGING OPERATIONS".

Mr. Bates currently works in the Construction Operations Division of the U.S. Army Corps of Engineers, Jacksonville District. He wears two hats, one as the Dredge Disposal Site Manager, managing upland and ocean disposal of dredge material. He is also responsible for performing Sea Turtle Compliance Inspections and conducts training on hopper dredges performing Civil Works O&M Dredging and Department of the Army Permitted dredging projects to assure dredging contractors and Permittees comply with Regional Biological Opinions conditions.

Topic

Silent Inspector Monitoring Of Dredging Equipment

The Jacksonville District of the U.S. Army Corps of Engineers is responsible for construction and maintenance dredging of harbors, entrance channels and storm protection (beach renourishment) projects throughout Florida, Puerto Rico and the U.S. Virgin Islands. Among the factors affecting the Jacksonville District's ability to perform dredging operations is the presence of coral reefs, hardbottoms, and endangered species in a channel, harbor or borrow site area.

This presentation will describe the Silent Inspector (SI) system, a tool the Corps uses to monitor dredging operations. SI assist in assuring compliance with Local, State, and Federal Regulations and Permits. Also addressed will be the different types of dredging equipment and their strengths and limitations.

Dr Kerry Black — Speaker

ASR Ltd - Marine Consulting and Research
PO Box 67, Raglan, New Zealand
Tel: +64 7 825 6502
Fax: +64 7 825 0386
Mob: +64 (0) 21 267 377
e-mail: k.black@asrltd.co.nz, web: www.asrltd.co.nz; www.heavenontheplanet.co.nz

Dr. Black's scientific credentials are substantially confirmed by his appointments as Director of an Australian research institute, Professor at Waikato University, and a top research scientist in the esteemed National Institute of Water and Atmosphere in New Zealand. His professional status is confirmed by his leadership of 3 large aid projects in Indonesia and India (on behalf of NZAID) and his successful management of his worldwide companies and the many company projects he leads.

Scientifically, he has been uniquely supported by the Australian Research Council in continuous research grants over a decade and subsequently by the NZ Foundation of Research Science and Technology. He has published over 400 scientific documents and written or been the subject of hundreds of popular articles, television interviews, radio interviews and newspaper articles. He edited the world's first scientific journal issue on offshore reefs for coastal protection and recreation ("surfing reefs"), and has been convener of the international conference on reefs. Dr Black is highly regarded internationally for his expertise in shallow and inner shelf physical processes, with high international status for sediment transport and beach dynamics, and his work on plumes, numerical models of physical processes, larval dispersal, wave transformation and estuarine, river and shelf hydrodynamics. He is also developing an eco-focused tourist resort in Lombok, Indonesia (www.heavenontheplanet.co.nz).

Topic

Coastal Protection in a World of Sophisticated Stakeholders

Decisions about coastal protection are a stakeholder minefield. Complex options are presented to communities, government planners and the myriad of interest groups concerned about the coastal environment. Many options have both positive and negative outcomes. Others simply won't work in some locations, while some are just too costly and unsustainable. With the pressure to take "city-type" concrete construction off the beach and to nurture the coastal environment, multi-purpose reefs provide a multi-functional alternative to traditional coastal protection schemes. The presentation will consider various coastal protection options and identify the benefits of multi-purpose reefs. A series of case studies, where the talk has been put into action, provide insight into methodologies, costs and outcomes.

William R. Dally, Ph.D., P.E. — Speaker

Surfbreak Engineering Sciences, Inc., 207 Surf Road; Melbourne Beach, FL 32951
wdally@surfbreakengineering.com

Dr. Dally received a Ph.D. in 1987 from the University of Florida in Coastal/Ocean Engineering with the dissertation: "Wave Transformation in the Surf Zone." Earlier degrees include a MCE in Coastal/Ocean Engineering and BCE in Civil Engineering.

Dr. Dally is currently the Founder & Principal Engineer for Surfbreak Engineering Sciences, Inc. He conducts research and provides consulting services in coastal sciences and engineering with clients encompassing a variety of Federal, State, and Local agencies, as well as private interests. An Associate Professor from 1992 to 1998 at the Florida Institute of Technology, Division of Marine and Environmental Systems, Dr. Dally's sponsored work included basic research and applied modeling of wave breaking, surf zone currents, nearshore sediment transport and beach evolution, tidal inlet dynamics, long-term wave climate, the development of remotely operated vehicles for the surf zone, and surfbreak engineering. Dr. Dally was a Hydraulic Engineer at the U.S. Army Coastal Engineering Research Center from 1987 to 1992 and a Civil Engineer for the U.S. Army Corps of Engineers, Wilmington District from 1979 to 1981.

Topic

Reef Mitigation 'Gardens'

Background Until now the practice engaged in major beach nourishment projects requiring reef-burial mitigation has been to mitigate by placing piles of limestone rock, or other artificial substrate, on the sea floor in locations previously devoid of reef. This can be very expensive, with costs approaching that of placing the nourishment sand (several millions of dollars typically). In addition, there has been a recent shift towards requiring 'exact-in-kind' mitigation. That is, the mitigation reef must be of a similar substance & relief, located nearby, and in a similar depth of water, as the reef impacted by the project. This greatly limits the technical and financial feasibility of constructing artificial mitigation reefs.

The Reef-Garden Concept Most regions in which needed beach nourishment conflicts with naturally exposed nearshore rock also contain areas in which rock is naturally covered by only a thin veneer of sand (e.g. 2-3 ft). In addition, many areas close to the beach are ephemerally covered and uncovered naturally. The idea is to create a reef mitigation 'garden' by 1) selecting one or more of these areas using aerial photography and sub-bottom investigation, and 2) vacuuming off the overlying veneer using a 'benign' dredge that will not damage the underlying rock substrate, and 3) maintaining the garden to allow colonization by biota. Subsequent natural reburial of the garden can be prevented by either constructing a low sill wall around it using sand tubes, concrete, or other suitable material, or by dredging a sacrificial band around the garden proper. Although project/site-specific, the cost savings as compared to constructing artificial reefs from terrestrial rock is expected to be substantial.

Pilot Project The immediate objective is to develop a thoroughly documented, well-studied pilot/demonstration protect for the mitigation garden concept. A test garden could be constructed anywhere in the State, where feasible and needed. The anticipated scope of work includes:

1. Sub-bottom investigation.
2. Selection of a suitable site based upon location & water depth, veneer thickness, likelihood of successful biological colonization, and an engineering assessment of sill-wall (or over-dredging) requirements.
3. Engineering design of the sill structure.
4. Development of dredging & construction methods.
5. Pre-condition biological assessment.
6. State & Federal Permitting of the project.
7. Construction of the garden.
8. Comprehensive biological monitoring of the garden.
9. Site monitoring and limited maintenance.

Bill Hanson — Speaker

Manager of U.S. Business Development
Great Lakes Dredge & Dock
2122 York Road, Oak Brook, IL 60523
630-574-3000

Bill Hanson is currently the Manager of US Business Development for Great Lakes Dredge & Dock (GLDD). He has worked for the Corps of Engineers (Galveston and Los Angeles), Connolly- Pacific Co. (Long Beach, California), and with GLDD for the last 17 years with stops in New York, Jacksonville and Chicago. He handled business in Latin America and the Caribbean for 12 years for GLDD prior to assuming his current role in 2004. Hanson is a graduate of Texas A&M University with a B.S. in Ocean Engineering.

Topic

Dredging Techniques to Minimize Environmental Impacts of Operations

Dredging companies have worked closely with their clients for many years to develop techniques to avoid secondary impacts to the areas near their marine work sites. Development of these techniques is made easier when the parties involved clearly identify their respective concerns. This presentation provides a brief summary of techniques developed to respond to these concerns.

Stephen Higgins — Speaker

Beach Erosion Administrator
Broward County Environmental Protection Department
1 North University Drive, Suite 301
Plantation, FL 33324
shiggins@broward.org

Stephen Higgins is Broward County, Florida's Beach Erosion Administrator, attached to the Broward County Environmental Protection Department. He has worked for Broward County for twenty-seven years and currently manages the County's beach erosion control and management program. Steve is a graduate of Georgetown University, Washington, D.C., and has completed a number of graduate courses in Coastal Zone Management at Nova Southeastern University's Oceanographic Center in Dania Beach. He is a member of the Board of Directors and past Chairman of the Florida Shore and Beach Preservation Association and a member of the Board of Directors of the American Shore and Beach Preservation Association.

Topic

Sand Bypassing at Stabilized Inlets: Sustaining Broward County's Restored Beaches

Sand bypassing is the act of capturing sand from the updrift side of a stabilized inlet and mechanically transporting the material to the beaches on the downdrift side of the inlet. This presentation will offer a look at the various types of sand bypassing systems in operation today, including one at Hillsboro Inlet in Broward County. The presentation will then focus on current and historical efforts to implement sand bypassing at Port Everglades Inlet, downdrift of which are the repeatedly replenished but still erosive beaches of south Broward County. The discussion will examine the recently completed feasibility analysis of bypassing at the Port, including the constraints inherent in establishing such a system and a look at potential alternatives for implementation.

Charles H. Peterson — Speaker

University of North Carolina at Chapel Hill
Institute of Marine Sciences
Morehead City, NC 28557 USA
cpeters@email.unc.edu

Peterson has a split professional personality, pursuing traditional academic goals of research and teaching, while also serving on governmental policy-making boards in environmental and natural resource management. His research interests can perhaps be best described as interdisciplinary marine conservation ecology.

In his academic persona, Peterson has published 160 papers in peer-reviewed journals and book chapters. This work is dominated by experimental assessments of processes in estuaries and the nearshore coastal ocean but also addresses such curiosity-driven exotica as community ecology of deep-sea vents. He is currently focusing on developing a better conceptual basis for environmental restoration and defining and quantifying ecosystem services provided by various habitats. In the management arena, Peterson has worked largely but not solely at the state level. He served two terms (8 years) on the NC Marine Fisheries Commission, three terms (18 years) on the NC Environmental Management Commission, where he remains Vice Chair and Chair of its Water Quality Committee, one term (2 years) on the NC Sedimentation Control Commission, and an open-ended appointment (5 years to date) on the Intercommission Review Committee for the NC Coastal Habitat Protection Plans for fish. Internationally, Peterson served for 6 years as US representative to ICES (International Council for Exploration of the Sea) Shellfish and Mariculture Committees.

Topic

Dredging: Assessing the Environmental Impacts of Beach Nourishment

With sea levels rising and intense storms becoming more frequent under global warming, dredge-and-fill projects are increasingly conducted to protect coastal development from shoreline erosion. Such beach “nourishment” can bury shallow reefs and degrade other beach habitats, depressing nesting in sea turtles and densities of invertebrate prey for shorebirds, surf fishes, and crabs. Despite decades of agency-mandated monitoring at great expense, much uncertainty about biological impacts paradoxically exists. Much of this uncertainty arises from ineffective science done to assess biological impacts. A review of 46 beach monitoring studies shows that: (1) only 11 % controlled for both natural spatial and temporal variation in their statistical analyses; (2) 56 % reached conclusions not adequately supported by the evidence; and (3) 49 % failed to meet publication standards for citation and synthesis of related work. Although monitoring is typically conducted through project promoters, independent peer review is not utilized and permitting agencies exhibit inadequate expertise in assessing biostatistical design. Monitoring results are rarely used to scale mitigation to compensate for injured resources. Funding of experimental studies and of population modeling is almost never included in studies of biological impacts of beach nourishment. Academic scientists have failed to establish interdisciplinary research programs combining physics, sedimentology, and biology to provide the conceptual basis for accurate predictions of impact and recovery trajectories after beach nourishment. Reform of agency practices is needed to improve the scientific foundations of ecological assessments as risk of cumulative impacts grows.

Georgia Vince — Speaker

Program Administrator
Department of Environmental Protection
Southeast District Environmental Resources Program
400 N. Congress Avenue - Suite 200
West Palm Beach, FL 33406

Georgia Vince is currently the Program Administrator for the Southeast District Environmental Resources Program for the Department of Environmental Protection. Georgia returned to the Southeast District in July 2005 after a four-year sabbatical. She previously held the Training Coordinator position in the Office of Submerged Lands and Environmental Resources in Tallahassee and also was responsible for the Deadhead Logging Program. Georgia attended the Florida Institute of Technology and received her B.S. in Biological Oceanography. In her spare time, Georgia volunteers with Florida Boxer Rescue (www.flbr.org) which helps find loving homes for Boxers that have been mistreated, abused or abandoned.

Topic

Means of Avoidance and Minimization of Coral Reef Impacts During Offshore Coastal Construction Projects

The Environmental Resources Program (ERP) regulates construction activities out to three nautical miles in the Atlantic Ocean. Recent advances in technology have initiated several new types of offshore projects including telecommunication lines and pipelines making landfall in Florida. The presentation will review the different construction techniques that have been required by ERP permits in order to minimize impacts to coral reefs and hardbottom communities.

Harold R. Wanless — Speaker

Katherine L. Maier, and Donald F. McNeill — Alternate Speakers

Department of Geological Sciences, University of Miami
Coral Gables, FL 33124
305-284-4253

Harold R. Wanless is professor and chairman of the Department of Geological Sciences at the University of Miami. He and his students have been studying the recent geological history of south Florida and the Bahamas since the early 1970s. Their research has documented the important control of fine-scale sea-level history and hurricanes on tropical wetland, coastal and, shallow marine environments. They are currently using this knowledge to forecast future changes in Florida coastal environments in the face of global warming.

Dr. Wanless has been involved in helping to design the RECOVER research and monitoring program associated with the Everglades Restoration.

Topic

Economically Wasteful and Environmentally Damaging Beach 'Renourishment'

Most sediment chosen for southeast Florida beach renourishment projects displays unsuitable grain size, durability and hydrodynamic behavior for a beach setting. As a result, the coral and hardbottom communities lying on the adjacent narrow shelf are being stressed by increased sediment turbidity, siltation and smothering. Historic and proposed renourishment sands derived from dredging on the adjacent shelf contain excessive amounts of fine sand and silt too small to remain on the beach, resulting in persistent long-term suspension-transport release to nearshore waters. Most shelf-derived renourishment sands contain much less durable carbonate skeletal material than the natural beach sands, when tested in a tumbling barrel designed to reproduce natural beach abrasion. In addition, carbonate skeletal grains display hydrodynamic behavior of grain sizes smaller than their sieve sizes when settled in a vertical accumulation tube. When used for renourishment, a higher percentage of these sands will not remain on the beach. Durability and wet settling analyses must be utilized in evaluating sediment for possible placement on a beach.

Failure to use sand of proper size, behavior, and durability in beach-fill projects results in decreased project life and long-term degradation of the adjacent sandy and hardbottom communities and coral reefs.

Paden E. Woodruff III — Speaker

Environmental Administrator
Bureau of Beaches and Coastal Systems
Department of Environmental Protection
State of Florida
3700 Commonwealth Boulevard, M.S. 300
Tallahassee, FL 32399
850-922-7703

Mr. Woodruff has worked for the State of Florida for over twenty-three years and is the Environmental Administrator of the Beach Management Section within the Bureau of Beaches and Coastal Systems. He directs the Florida Beach Erosion Control Program, a grant-in-aid program established for the purpose of working with local, state and federal government entities to achieve the protection, preservation and restoration of the coastal sandy beach resources of the state.

Prior to becoming the Environmental Administrator, Mr. Woodruff was the Division's special project engineer involved with innovative technologies and beach restoration. He also served as the East Coast Administrator for the Florida Coastal Construction Control Line Regulatory Program.

Topic

Proceedings from the February 2006 Innovative Shore Protection Workshop

The Department has a responsibility to evaluate new and innovative technologies developed to protect and restore the sandy beach resources of the state. The Department also has the authorization to sponsor or cosponsor demonstration projects of technologies which have the potential to reduce project costs, conserve beach quality sand, extend the life of beach nourishment projects, and improve inlet sand bypassing pursuant to section 161.091, Florida Statutes. It is the Department's philosophy to encourage the application of technologies that are based on sound engineering and scientific principles and have been favorable peer reviewed or scientifically documented.

This presentation will provide an historical overview of Innovative Erosion Control Technology in Florida reviewing the performance data of several innovative project installations. In addition to the historical overview, a summary of the innovative technologies presented at an Innovative Technology Workshop held by the Department on February 22 and 23, 2006 will be provided. The presentation will also discuss the need for more scientifically based approaches to investigate innovative technologies such as, numerical and physical modeling, peer review and analysis, and the use of experimental test plans.