



US Army Corps
of Engineers®

Environment *The Corps*

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New publication embraces all Corps environmental missions

By **LT. GEN. ROBERT B. FLOWERS**
Chief of Engineers

No matter what the mission, the U.S. Army Corps of Engineers strives to make a positive impact.

Nowhere is that more apparent than in the area of environmental stewardship. Safeguarding our nation's environment is an inherent part of every Corps program. It's something we do each and every day at sites across the nation and around the world.

We have environmental engineers, hydrologists, geologists, biologists, oceanographers, atmospheric scientists, researchers, chemists, park rangers, all of whom are dedicated to protecting, preserving and restoring our environment. More than 80 percent of America's citizens view themselves as environmentalists, a sentiment that also is reflected within the Corps. Environmental stewardship is not just a job to us. Like all Americans, we have a vested interest in the nation that we leave for the next generation.

Thus, it's appropriate that two separate Corps of Engineers' publications, *The Restoration Reporter* and the *Ordnance & Explosives Environment*, are combined into a new quarterly journal, *The Corps Environment*, to tell the Corps' environmental story.

As you can see from this first issue of *The Corps Environment*, this new publication embraces all elements of the Corps environmental mission.

Our environmental mission is broad; from brownfields work for more livable cities to the Everglades restoration; from the work on innovative technologies in our laboratories to cleaning up Superfund sites, formerly used Department of Defense sites, and formerly utilized Department of Energy remedial action sites; and from protecting and balancing resources through the Upper Mississippi River System Environmental Management Program to detecting and addressing unexploded ordnance.

Everything the Corps does has a direct impact on the environment.

We want to tell these stories – not only to our customers, but to our regulators, our friends, the Army and the Department of Defense, the folks on Capitol Hill, the general public, and most importantly, the people who work for the U.S. Army Corps of Engineers.



Environmental stewardship is not just a job to us. Like all Americans, we have a vested interest in the nation that we leave for the next generation.

***Lt. Gen. Robert B. Flowers,
Chief of Engineers***

We have a good story to tell, and *The Corps Environment* is one way of telling it. This is a quarterly publication, available in print, e-mail and on the World Wide Web. The articles will focus on our successes, our challenges, our people, and our partners.

Protecting our nation's environment is the responsibility of every American. All of us must work together to take on the environmental challenges of the new millennium. The U.S. Army Corps of Engineers has been called upon to embrace these challenges. The work we do today will reach far into the future. Through *The Corps Environment*, we will share our work with you, and together we will embrace the future.

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Environment
The Corps

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Submissions

The Corps Environment welcomes submissions. Please send your information (article, photos, events, letters to the editor, etc.) or questions via e-mail to:

Kimberley.C.Gillespie@HND01.usace.army.mil

Quarterly publication is subject to these deadlines:
Feb. 15 (JAN - MAR issue)
May 15 (APR - JUN issue)
Aug. 15 (JUL - SEP issue)
Nov. 15 (OCT - DEC issue)
All submissions are subject to editing when necessary.

Submissions to newsletter encouraged

A message from PAT RIVERS
Chief, Environmental Division

As Chief of the Environmental Division, I encourage you to share your stories about environmental successes, challenges, people and partners.

The Corps Environment will be published at the end of each quarter, and your comments and suggestions are welcome.

Information (articles, events, etc.) must be received no later than mid-quarter (or Feb. 15, May 15, Aug. 15, and Nov. 15) for publication at the end of that quarter. Submissions should be made via e-mail to Kimberley.C.Gillespie@HND01.usace.army.mil.

As the Chief of Engineers stated, "All of us must work together to take on the environmental challenges of the new millennium."

Help us to tell the story of how the U.S. Army Corps of Engineers and its partners are doing just that.

Pat Rivers assumed her current position in the Corps in April 1998. She previously held the position of Assistant Deputy Under Secretary of Defense (Environmental Security) for Cleanup. As Chief of the Corps' Environmental Division, her management responsibilities cover a number of strategic programs and activities to include: Army Installation Restoration, Army Base Realignment and Closure, Environmental Restoration, the Formerly Used Defense Sites Program, and the Formerly Utilized Sites Remedial Action Program. She also works at the executive level to plan and oversees environmental support for a number of other non-defense agencies including the U.S. Environmental Protection Agency.



Pat Rivers,
Chief, Environmental
Division

Ohio River Ecosystem Program moves forward

CINCINNATI - The proposed Ohio River Ecosystem Restoration Program could be one of the largest ecosystem restoration programs in the United States, second only to the Florida Everglades restoration.

The U.S. Army Corps of Engineers submitted a final study report for the proposed Ohio River Ecosystem Restoration Program to the Corps of Engineers Headquarters on Oct. 13, 2000. The Corps completed this study with valuable input from the U.S. Fish and Wildlife Service, Environmental Protection Agency, Ohio River Valley Water Sanitation Commission, natural resources agencies from six states, American Rivers and other regional environmental interest groups.

Human activities have influenced the ecological resources of the Ohio River and its floodplain for more than 200 years. Although in recent years much has been accomplished to improve water quality and lessen the impact of human activities, this program is designed to restore and protect the habitats, species diversity and wildlife abundance of the river and its adjacent floodplains.

This study identifies more than 250 potential site-specific projects along the 981 miles of Ohio River corridor stretching from Pittsburgh, Pa., to Cairo, Ill., within the states of Pennsylvania, West Virginia, Ohio, Kentucky, Indiana and Illinois.

These restoration projects would contribute to the restoration of 25,000 acres of bottomland

hardwood forests; 1,250 acres of aquatic habitat embayments; 25,000 acres of wetland and protection of 40 islands, and a hundred miles of shoreline habitat.

The recommendation authorizes a \$307 million long-term program, with maximum federal funding of \$10 million annually for each of the first five years, and \$15 million annually for the remainder of the program. Nonfederal sponsors would fund 35 percent of site-specific projects and all operations, maintenance, repair, rehabilitation and replacement. After final approvals and funding, the corridor-wide ecosystem will start by refining ecosystem goals and prioritizing restoration efforts with a partnership of representatives from government resource agencies, universities, and other environmental concerns.

The public comment period for the report ended in November. The Army's Chief of Engineers and the Assistant Secretary of the Army for Civil Works, with federal and state agencies, are reviewing all information before the report is finalized. The Chief of Engineer's finalized report is expected by the end of 2000.

An initial copy of the report is available in CD-ROM disk or paper copy format at no charge. Multiple copies are available at the reproduction costs of \$5 each for CD-ROMs and \$15 each for paper copies.

For more information, visit the Web site at www.lrd.usace.army.mil.

Japan District helps preserve unique habitat

By MICHAEL D. NOAH
Japan District

In 1997, the 35th Civil Engineering Squadron's Environmental Quality Flight at Misawa Air Base, Japan asked the Japan District to conduct a biodiversity study and assessment of the natural resources on the base and Ripsaw Range in support of the development of the installation's Natural Resource Management Plan. In 1999, Japan District received a similar tasking from the 374th Civil Engineering Squadron's Environmental Flight at Yokota Air Base.

Biodiversity refers to the vast variety of living things in an area: the different plants, animals, insects and microorganisms, etc., plus the ecosystems they form. The Misawa biodiversity study includes more than just an inventory of the flora and wildlife, it also includes the classification of vegetation and landscape analyses.

In the 55 years since the end of World War II, Japan has emerged from being a mostly agrarian society to become one of the most industrialized nations on earth. However, this metamorphosis has come at the expense of its natural resources, with most of the historical habitats that existed at the turn of the century now either significantly altered or lost entirely. With urban development already severely limited by the nation's rugged terrain, the natural resources that once thrived on developable lands have now all but vanished.

In many cases, some of the last vestiges of these habitats are under U.S. stewardship. For example, one can quickly identify Camp Zama, Sagami-hara, Sagami Depot, Ikego, and other U.S. installations on the Kanto Plain (Tokyo) in aerial photographs, since they comprise the few

"green" areas in a "sea of development."

In other areas, such as Misawa Air Base, some of the largest contiguous expanses of unique natural habitat are found on U.S. installations.

The goal of the biodiversity study is to provide the installation with a baseline about not only its own natural resources, but also those in the larger region in which they exist. Since most wildlife ignore geopolitical boundaries, the study for the Misawa area encompassed most of Aomori Prefecture, which comprises the entire northern tip of the main island of Honshu from the Sea of Japan to the Pacific Ocean. The study's final report will also provide recommendations for natural resource management that conserves and/or enhances the biodiversity of the region. Similarly, the study area for the Yokota biodiversity project focused on the Kanto Plain region.

The District team's first task was to identify the natural resources present on the installation and develop a better understanding of the landscape in which they function.

Ecosystems acquire unique patterns over time due to changes in space, for instance, the loss of habitat or the fragmentation of what were originally large expanses of natural habitat. These spatial patterns usually occur through a gradual conversion to urban, residential or agricultural land use. Landscape ecology is the study of how spatial patterning develops and changes through time, as well as its implications for the ecosystem.

With cooperation from other U.S. and Japanese natural resource agencies, the District's team of Yoshimi Shibata and Michael Noah has incorporated the principles of landscape

ecology into the project.

Extensive field surveys of the various habitats present in Aomori Prefecture were both costly and impractical. So, through cooperative arrangements with several U.S. and Japanese agencies, the District's team had developed an innovative sampling program using state-of-the-science remote sensing technology, thematic maps, and digital elevation data. This sampling allowed the team to classify the vegetation on the air base and throughout Aomori Prefecture.

The team also surveyed the installation for such parameters as the percentage of ground cover and dominant vegetation. Further spatial statistical analysis of the data assisted the team in spotting patterns of habitat loss or change within the region.

The team's end result will enable Misawa Air Base to develop and implement the actions necessary to conserve the natural resources under its stewardship.

For more information, contact the Japan District Public Affairs Office at DSN 325.263.3575.



Mike Noah and Yoshimi Shibata retrieve a "virtual fish" (a semi-permeable membrane device or SPMD) at Misawa Air Base. The SPMD had been integratively "sampling" organic contaminants for 30 days in surface waters on the base.

Cleaning up Lauderick Creek's past

By **DOUG GARMAN**
Baltimore District

Since June, Aberdeen Proving Ground officials, the U.S. Army Corps of Engineers and its contractors have been searching a 452-acre site in a northern portion of Aberdeen Proving Ground, Md., for potentially explosive items. The area was once used for testing and training with chemical-filled munitions.

From 1920 to 1951, the U.S. Army Chemical School used this site to train soldiers in the use and firing of chemical munitions at target areas, handling and maintenance of chemical warfare equipment, and training in decontamination of chemically contaminated materials and personnel.

Today, the ongoing ordnance search is known as the Lauderick Creek Chemical Warfare Materiel Removal Project. The site is a mixture of woodlands and waist-high grassy fields that is bounded on the north by the APG property line, on the west by Maryland Route 755, and on the east by the Bush River.

Priority project

"Because of the history of this site, many believe unexploded munitions containing chemical warfare materiel are likely to still exist here. Given this and the site's close proximity to homes and schools, Congress and the Department of Defense identified the Lauderick Creek Project as a priority project," said Bruce Ware, resident engineer of the project for the Corps' Environmental Remediation Resident Office.

With safety plans and community outreach efforts in place, the Corps conducted a geophysical survey of the

Lauderick Creek site from 1996 to early 1997 and identified 20,000 magnetic anomalies within the project area. Over the years, experts have removed both conventional and chemical-filled ordnance items from the site. Experts add that if chemical-filled munitions are found during this search, the World War I chemical agents of phosgene and mustard are the most likely warfare materiel to be contained in munitions.

"Working closely with our many installation, state and local partners, we have prepared and are following plans that are specifically targeted to meet the risks associated with this type of cleanup effort," said Ware. "So far, our field activities are working as we had planned."

Careful plans

According to Roger Walton, a Corps project engineer with the cleanup, the actual removal work involves a number of carefully planned steps and specially designed pieces of equipment.

Each dig is closely monitored from a remote location using video and air detection equipment. Before each dig, a small, three-sided metal structure designed to stop metal fragments should a munition accidentally detonate is placed over the spot of the dig. Ordnance experts with the contracting firm of Human Factors Applications of Waldorf, Md., working inside the structure, carefully dig with non-sparking hand shovels to a maximum depth of three feet to identify the suspect anomaly.

As an added measure of protection, three tracked

Army personnel carriers equipped with water spraying apparatus circle the spot of the dig. Should an accidental release of chemical agent occur, water would be used to dissipate a plume of agent. Warning sirens are used in conjunction with this system, which would alert the surrounding communities to a potential chemical release and the need to "shelter-in-place."

If an anomaly is identified as a munition, the Army's Technical Escort Unit, headquartered at APG, will be called to the site to complete the assessment of the round. They will decide the best procedure for removing the ordnance item.

"The stability, direction and speed of the wind is an important factor in whether or not we will dig in a particular area on a particular day," said Walton. "It is important that we maintain a safety buffer between the spot of the dig and nearby residences, just in case a problem should occur."

Community outreach

Due to public concerns about the project, the Corps and its contractors launched an intensive community outreach campaign during the early planning stages for the project.

This campaign involved educating businesses and neighborhoods surrounding the site about the potential risks of the cleanup. Through door-to-door visits, block fairs and various presentations in schools, the Corps and its contractors trained the local community on what to do if emergency sirens stationed around the project area should



A transportable blast containment structure, air monitoring devices and a water-spray system mounted on an Army personnel carrier are part of the set up at the dig site.

sound, signaling an accidental release of chemical materiel at the work site.

If such an event should occur, local residents have been instructed on how to "shelter-in-place." This protective measure involves three simple steps. They are: go inside quickly and stay off the phone, close all windows and doors and turn off air conditioning or heating systems, and listen quietly for instructions on the radio. To remind the public of the "shelter-in-place" measure, brochures, posters and bookmarks were distributed to residents, businesses and area schools.

Daily updates

During the remainder of the project, the public will be provided daily updates on activities through the Internet, telephone information line and a mobile community office, which is dispatched daily to key locations within the community.

To date, workers have recovered two liquid-filled 4.2-inch mortar rounds, 125 pounds of ordnance-related scrap and 400 pounds of miscellaneous scrap and construction debris.

For more information, contact Doug Garman at 410.962.2626.

President authorizes Water Resources Development Act 2000

Department of the Army News Release

The Water Resources Development Act of 2000 (WRDA 2000) was enacted by Congress on Nov. 3, 2000, and signed by President Bill Clinton on Dec. 11, 2000. The centerpiece of this historic Act is a comprehensive plan developed by the U.S. Army Corps of Engineers to restore the Everglades.

In addition, the Act authorizes several important policy initiatives, including a new tribal partnership program, changes in cost sharing to help low income communities, a program to restore Puget Sound, and an expanded authority to address problems with the nation's watersheds.

The Comprehensive Everglades Restoration Plan legislation was prepared by the Army and included in the final version of the Water Resources Development Act. The Act authorizes the first phase of the \$7.8 billion Comprehensive Everglades Restoration Plan. It is the largest environmental restoration plan ever proposed.

"I am proud of the Army's leadership in developing the restoration plan," said Assistant Secretary of the Army for Civil Works Dr. Joseph Westphal.

"The professionalism and technical competence of the Army Corps of Engineers were keys to the success of this important effort. The enactment of this piece of legislation is important if we are to begin the restoration of a national treasure—America's Everglades—and to make needed changes to water resources programs.

"On behalf of the Army Corps of Engineers, we welcome the water resources challenges and opportunities presented in WRDA 2000," Westphal said. "We look forward to helping communities throughout the Nation improve their quality of life through economically justified and environmentally sound water resources solutions."

For more information, contact the Corps Headquarters Public Affairs Office at 202.761.1807.

A number of small aquatic ecosystem restoration projects may be carried out under section 206 of the Water Resources Development Act of 1996 (33 U.S.C. 2330). They include:

- ❑ BRAUD BAYOU, LOUISIANA
- ❑ BURAS MARINA, LOUISIANA
- ❑ COMITE RIVER, LOUISIANA
- ❑ DEPARTMENT OF ENERGY 21-INCH PIPELINE CANAL, LOUISIANA
- ❑ LAKE BORGNE, LOUISIANA
- ❑ LAKE MARTIN, LOUISIANA
- ❑ LULING, LOUISIANA
- ❑ MANDEVILLE, LOUISIANA
- ❑ ST. JAMES, LOUISIANA
- ❑ MINES FALLS PARK, NEW HAMPSHIRE
- ❑ NORTH HAMPTON, NEW HAMPSHIRE
- ❑ HIGHLAND COUNTY, OHIO
- ❑ HOCKING COUNTY, OHIO
- ❑ TUSCARAWAS COUNTY, OHIO
- ❑ CENTRAL AMAZON CREEK, OREGON
- ❑ EUGENE MILLRACE, OREGON
- ❑ MEDFORD, OREGON
- ❑ ROSLYN LAKE, OREGON

In addition to Everglades and Puget Sound environmental programs, WRDA 2000 includes a number of small environmental restoration projects that may be carried out under section 1135(A) of the Water Resources Development Act of 1986 (33 U.S.C. 2309a(a)), if deemed appropriate. They include:

- ❑ BAYOU SAUVAGE NATIONAL WILDLIFE REFUGE, LOUISIANA
- ❑ GULF INTRACOASTAL WATERWAY, BAYOU PLAQUEMINE, LOUISIANA
- ❑ GULF INTRACOASTAL WATERWAY, MILES 220 TO 222.5, LOUISIANA
- ❑ GULF INTRACOASTAL WATERWAY, WEEKS BAY, LOUISIANA
- ❑ LAKE FAUSSE POINT, LOUISIANA
- ❑ LAKE PROVIDENCE, LOUISIANA
- ❑ NEW RIVER, LOUISIANA
- ❑ ERIE COUNTY, OHIO
- ❑ MUSKINGUM COUNTY, OHIO

The Secretary may carry out the following projects under section 204 of the Water Resources Development Act of 1992 (33 U.S.C. 2326), which involve the beneficial use of dredge material:

- ❑ HOUMA NAVIGATION CANAL, LOUISIANA
- ❑ MISSISSIPPI RIVER GULF OUTLET, MILE -3 TO MILE -9, LOUISIANA
- ❑ MISSISSIPPI RIVER GULF OUTLET, MILE 11 TO MILE 4, LOUISIANA
- ❑ PLAQUEMINES PARISH, LOUISIANA
- ❑ OTTAWA COUNTY, OHIO

BRAC holds first OE/UXO in-progress review

Property transfers, technology, policy issues discussed among partners

By **CAROL YOUKEY**
Huntsville Center OE CX

The Army's Base Realignment and Closure Office held its first annual Ordnance and Explosives/Unexploded Ordnance in-progress review in Huntsville, Ala., on Oct. 17-18, 2000. Unexploded ordnance is a challenge for all services since policies are still under development. It is an especially difficult challenge for the Army BRAC program because it delays the transfer of approximately one-third of the remaining excess BRAC properties.

Although OE/UXO work has been addressed in combination with other BRAC work in different forums over the past several years, this was the first time OE/UXO response issues have been addressed in an exclusive forum.

The U.S. Army Engineering and Support Center, Huntsville, hosted the OE/UXO in-progress review, which had more than 70 attendees. In addition to Department of the Army BRAC Office personnel, attendees included representatives from Headquarters and district level Corps of Engineers, the Army Environmental Center, several Army major command representatives and 12 BRAC environmental coordinators from installations with UXO.

According to Mark Bellis, of the Army's BRAC Office, the focus of the OE/UXO in-progress review was to move the BRAC UXO program forward by addressing some of the tough issues hampering the UXO program. These issues included selecting appropriate UXO/OE response strategies and developing accurate cost estimates necessary to program necessary financial resources.

During the event, participants exchanged project specific information and shared lessons

learned to reinforce successful practices throughout BRAC installations. Installation and Corps representatives briefed status related to projects at Fort McClellan, Ala., Pueblo Chemical Depot, Colo., Camp Bonneville, Wash., Seneca Army Depot, N.Y., Fort Ritchie, Md., and Jefferson Proving Ground, Ind.

A secondary purpose of the in-progress review was to generate discussions and open dialogue between the field representatives and subject matter experts on relevant ordnance topics. To this end, speakers and participants were invited

from the Corps' HTRW and OE Centers of Expertise, U.S. Army Environmental Center, Defense Ammunition Center, Office of the Director of Environmental Programs, and the Army Environmental



Ordnance and explosives work at BRAC site Fort McClellan, Ala., was among the topics at the first BRAC OE/UXO in-progress review.

Policy Institute. Topics covered both presentations and discussion of OE/UXO technologies and processes, DoD/EPA UXO Management Principles, UXO risk issues, use of statistics during site characterizations, review of Engineering Evaluation/Cost Analyses and decision documents, Range Rule Survey/Inventory, and calculation of OE/UXO project costs-to-complete.

The Army BRAC office will continue to develop their UXO/OE program during FY01 through a series of installation-specific reviews conducted with the assistance of the Army Environmental Center, the U.S. Army Engineering and Support Center, Huntsville, appropriate Army major commands and installation BRAC Environmental Coordinators. The Army BRAC office will continue to explore UXO policy issues, methods and development of innovative technological solutions for clearing UXO from BRAC properties.

For more information, contact Carol Youkey at 256.895.1563.

Institute for Water Resources developing environmental Web site

By **BILL WERICK**

Institute for Water Resources

The Corps' Institute for Water Resources (IWR) is developing a Web site that will help monitor the Corps' environmental performance, track trends in environmental quality, and help do environmental studies faster and better.

The site address is www.pmcl.com/iwred, which provides access to the two main elements, the Atlas and the Encyclopedia. Both are works in progress, but the Encyclopedia is already usable and can help anyone doing environmental studies.

Atlas

How much has the Corps invested in wetlands creation in the Midwest, and how many acres were produced? How do the costs per acre of wetland created in Nebraska compare to the costs in New York or North Dakota? Do the locations of projects built in support of the North American Waterfowl Management Plan fall along

known migratory paths?

The Atlas is designed to answer these sorts of questions about the results the Corps is getting from its environmental investments. The user can use the online interactive map to specify the geographic or political boundaries for the analysis, and pull down menus to pick the resource output type and programs to include in the question. The prototype version of the Atlas is password protected.

Encyclopedia

The Encyclopedia will be useful in and outside the Corps. It is similar in design to environmental gateway sites that organize hyperlinks to a variety of information, but with two important differences. First of all, Encyclopedia links are made to data sites, not to the home pages

of organizations that house the data. These "deep" links make it easier and faster to find information. Second, the researchers who designed the Encyclopedia reviewed the deep linked sites and rated them on the quality of the data and the convenience of the



Atlas and Encyclopedia are available at www.pmcl.com/iwred.

Web site. A search from the Encyclopedia returns a list of hyperlinks to the site addresses, a summary of each referenced site, and a rating of

the data and ease of use of the site.

The encyclopedia contains more than just data sites, though. It also provides informed access to:

- ten environmental journals;
- Web sites with information about measur-

ing environmental performance;

- environmental gateways;
- environmental laws and policy; and
- maps, statistics and documents.

There is a thumb-nail sketch describing each peer reviewed journal, access to articles or abstracts from the journals, and a table showing a measure of each journal's relevance and influence in the profession.

In the future, the Atlas map interface may be used for things such as letting Encyclopedia users pick the region for which they want environmental data. The Encyclopedia may also be used to track environmental trends using technology that automatically and regularly samples other databases.

For more information on the Atlas or Encyclopedia, contact Bill Werick at william.j.werick@usace.army.mil.

Tucson restoration project groundbreaking draws visitors

LOS ANGELES - A small environmental restoration project recently drew some high-powered visitors. From Washington, D.C., San Francisco and Los Angeles, Calif., they came to Tucson, Ariz. Arizona Congressman Ed Pastor, Assistant Secretary of the Army for Civil Works Dr. Joseph Westphal, and the Corps of Engineers' South Pacific Division Commander Brig. Gen. Peter T. Madsen and Los Angeles District Engineer Col. John P. Carroll, along with Pima County officials, were on hand Oct. 20, 2000 for the groundbreaking of the environmental restoration project.

Officially named the Tucson (Ajo) Detention Basin Wetlands Development/Wildlife Habitat Enhancement Project, a title almost as long as the 50-acre site to be restored, it will see the construction of wetlands in the basin to restore portions of the ecosystem. This in turn will enhance wildlife resources.

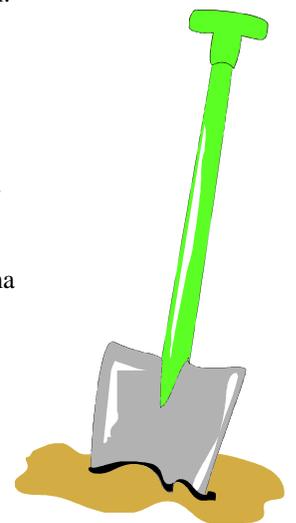
About 12 of the approximately 50 acres will be a wildlife-and-marsh pond area and other wetlands with freshwater marsh, riparian habitat and open-water

areas, which are important to a variety of waterfowl. The remaining 38 acres will also have freshwater marsh and riparian habitat, along with mesquite bosque and ephemeral grassland. Upland habitat also will be created to provide diversity and buffer zones, offering additional habitat for reptiles, amphibians, small mammals, fish and invertebrates.

The modifications will not affect the degree of flood-control protection provided by the basin, according to the Army Corps of Engineers and Pima County, the project's local sponsor. The work is also consistent with an existing pedestrian and bicycle trail system.

The restoration effort is supported by the Arizona Department of Game and Fish and the Audubon Society, and the U.S. Fish and Wildlife Service concurs with the project's potential for increased habitat values.

For more information about the project, contact the Los Angeles District Public Affairs Office at 213.452.3921.



Remediation system evaluation process reduces operating costs for cleanups

By DAVE BECKER and LINDSEY LIEN
HTRW CX

The remediation system evaluation process developed by the Corps of Engineers recommends cost-saving changes in system operations or technologies applied at a cleanup site, verifies a reasonable closure strategy, and assesses maintenance of government-owned equipment.

By identifying potential cost savings, the process can help substantially reduce operating costs for long-term cleanups, help identify performance problems, and serve as an extension of the Comprehensive Environmental Response Compliance, and Liability Act five-year review process.

Remedial system evaluation addresses protectiveness issues such as system performance relative to remedial action objectives, monitoring or operational deficiencies that may jeopardize a remedy's protectiveness, and changes in surrounding land use or risk-based/regulatory cleanup standards.

The Corps' Hazardous, Toxic, and Radioactive Waste Center of Expertise (HTRW-CX), with assistance from Corps district staff and other agency personnel, have applied the remedial system evaluation process at six sites. The process identified potential protectiveness issues; applicable, relevant, appropriate requirements conflicts, and the need for added studies; as well as potential cost savings of \$80,000 to more than \$300,000 per year in operations and maintenance at each site. On average, each evaluation costs approximately \$20,000 to conduct, including associated travel for a site visit and final report generation. Costs that may be incurred in addressing protectiveness issues or new studies are not reflected in the described cost savings.

In FY 2000, the Environmental Protection Agency Technology Innovation Office enlisted the HTRW-CX and one of TIO's contractors, GeoTrans, to demonstrate the remedial system evaluation process at four Superfund pump and treat sites; two in EPA Region 4 and two in EPA Region 5. Based on the success of this pilot program, the TIO has expanded the study in FY 2001 to include two sites from each of the remaining eight Regions.

The HTRW-CX has changed its focus for this FY 2001 pilot to a quality assurance role and acting as a substitute technical evaluator. The primary Corps evaluation duties will be accomplished by a senior chemical engineer from the Kansas City District and the current TIO contractor GeoTrans.

In order to assist Corps district personnel and contractors in performing the FY 2001 evaluations, a

In FY 2000, the Environmental Protection Agency Technology Innovation Office enlisted its contractor GeoTrans and the Corps' HTRW-CX to demonstrate the remedial system evaluation process at four Superfund pump and treat sites.

suite of checklists has been developed. The checklists are intended for use by experienced technical staff when conducting the process on a variety of long-term remedies, including pump and treat, soil vapor extraction, bioventing, and air sparging. Twenty-two remedial system evaluation checklists are available. The checklists address overall system goals and assist in assessment of subsurface system performance, above ground treatment plant effectiveness, monitoring programs, and alternatives for treatment water discharge.

Remedial system evaluation checklists can evaluate specific equipment such as air strippers, carbon adsorption systems, metals precipitation units, piping, pumps, blowers, control systems, solids handling systems, thermal treatment units, advanced oxidation processes, chemical feed systems, oil/water separators, and extraction/injection wells.

During site visits, the checklists are useful as mental prompts and a means to record observations.

The remedial system evaluation checklists, a sample report, a sample scope of work, and an instruction guide are available on the Internet at www.environmental.usace.army.mil/library/guide/rsechk/rsechk.html, or at www.frtr.gov/optimization/general.

A sample contract clause for operations and maintenance contracts for pump and treat systems that identifies data to be collected and documented to support a remedial system evaluation is also available on the web.

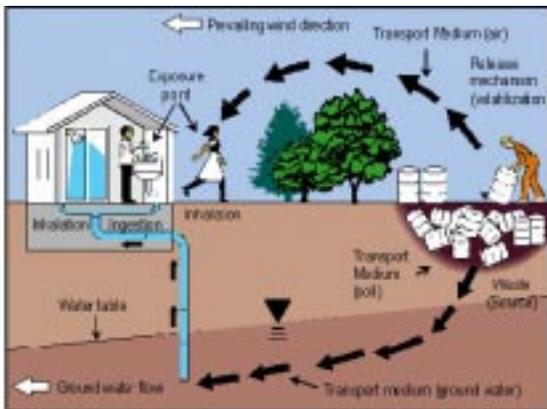
For more information, contact Dave Becker at 402.697.2655, or dave.j.becker@usace.army.mil, or contact Lindsey K. Lien at 402.697.2580 or lindsey.k.lien@usace.army.mil.

Conceptual site model tool assists with cleanup project planning

By **JOHNETTESHOCKLEY**
HTRW CX

The conceptual site model is a valuable tool to assist project teams in the integration of information and decisions. Conceptual site models serve as a planning instrument, a modeling and data interpretation tool, and a communication device among the team, the decision-makers, the stakeholders, and field personnel. Developing a conceptual model is an important step in a project. Initially, the project team integrates all available information to develop the conceptual site model.

The model represents a current understanding of the site, its function, the interaction of its components, and the potential effects of man's inputs to the system (e.g., spills, effluents, excavation) or outputs from the system (e.g., land use, public recreation). The project team uses the conceptual site model to interpret how they think the system operates using pure logic, experience and available data. Very often, a conceptual site model is depicted by a diagrammatic model such as those shown in the figure below and can vary greatly in the amount of detail.



Used appropriately, the conceptual site model is an iterative tool that evolves as site work progresses and data gaps are filled. The model crystallizes the information known about the site and identifies the additional information that must be gathered in order to achieve the project's goals. This process encourages project team members to evaluate the need to collect data and eliminate data collection efforts not necessary to support specific site decisions. (Although this sounds elementary, the one-size-fits-all approach used by many practitioners routinely collects costly data that are ultimately

irrelevant to the project's outcome).

Detailed descriptions of site-specific models differ because conditions can vary greatly from one site to another. For example, on projects that have unexploded ordnance, or UXO, the primary focus of the model is to identify locations where the military has used conventional ordnance, explosives, chemical warfare agents, radioactive materials, or other hazardous items.

Through intensive and extensive research, a detailed history of ordnance and training activity at the site, as well as an up-to-date account of the site's use, geology, soil conditions and land use are evaluated to develop the model. To accomplish this, the project team reviews both installation records and documents and aerial photographs and maps stored at national, regional, state, and local archives and record holding facilities.

Additionally, personal interviews with retired military, employees and others associated with the sites are conducted to gather information that may not be contained in the official written sources. On unexploded ordnance sites where routes of exposure are subject to human intervention, the model does not typically show transport or migration pathways of ordnance items; but includes ballistic information, firing locations and target areas. The end result is a comprehensive conceptual site model used to guide project personnel in their evaluation of the site.

On environmental sites the model focuses on contaminants, sources, and pathways through environmental media and receptors, background conditions, and determination of limits for areas of studies. Many conventional site characterization efforts use the model to effectively guide investigations. Efforts are often overshadowed by the significant amount of time that may lapse between fieldwork and receipt of validated data, and between interpretation of the data and planning for additional work. Many new innovative field-based technologies reduce the amount of time between data collection and data evaluation by providing real-time

Characteristics of a conceptual site model

- An iterative planning instrument
- A modeling and data interpretation tool
- A communication device among the team, the decision-makers, the stakeholders and field personnel

or near real-time data to allow for expedited interpretation and planning. Days or weeks separate phases of conventional site characterizations that were traditionally separated by months. With effective planning, new data can be quickly incorporated into a conceptual site model within only hours or days. Site decisions are supported by systematic planning such as the technical project planning process used by the Corps and available on the web at: www.usace.army.mil/inet/usace-docs/eng-manuals/em200-1-2/toc.htm; EPA's data quality objective, or DQO, process at www.epa.gov/quality/qa_docs.html; and DOE's Streamline Approach for Environmental Restoration (SAFER) process at <http://dgo.pnl.gov>.

Coupled with accelerated approaches to sampling and analysis these new field-based technologies create an environment favorable for the formation of the conceptual site model to manage data effectively.

All conceptual models are simplifications and idealizations; yet we accept these models as useful because they adequately express the most important aspects of the system with regard to the objectives of our characterization, monitoring and remediation plans and the questions being asked and answered.

For more information, contact *Johnette Shockley* at 402.697.2558.

Savannah District uses ORC method for cleanup of Marine Corps Air Station

By **ALICIA GREGORY**
Savannah District

In 1986 the Marine Corps Air Station, Beaufort, S.C., discovered a 1,500 gallon gasoline leak from an underground storage tank at the base gas station. Although the contamination is confined below the service station to an area that is 150 feet long by 100 feet wide, base personnel decided, after approximately 10 years of studies and proposals, that they would move forward with choosing a cleanup method.

Installation personnel considered several options. Vapor extraction turned out to be prohibitively expensive and natural degradation prohibitively slow.

Enter Savannah District in March 1999 with another option—a cleanup method that uses a substance called Oxygen Release Compound (ORC), which eliminates gasoline-related contamination of groundwater.

Regenesis Bioremediation Products manufactures the product, which is a magnesium hydroxide compound stored in powder form that reacts when mixed with water. The compound is injected into the ground to generate a chemical reaction and eventual biodegradation of Benzene. (Benzene is a carcinogenic compound that is found in gasoline.)

“This is an inert material, much like milk of magnesia, with a special coating,” explained Tom Whitacre, district geologist for the project. “We mix the powder in water and make a slurry, then we inject it into the

subsurface. It slowly gives off oxygen over a six month period as it reacts with the contaminants and breaks them down into harmless byproducts.”

Although this is the first time the district or any in-house Corps personnel have used ORC, it has been used on hundreds of petroleum sites commercially. “ORC is safer than other injection products on the market,” said Whitacre. “The other products can be much more chemically reactive and dangerous to use.”

“The base opted to use the ORC method, got a cost estimate, and sent Savannah District the funds,” said Frank Araico, Installation Restoration Program manager.

The initial remedial design cost estimate for the soil vapor extraction system was between \$150,000 and \$250,000, but the district was able to offer the ORC alternative to the customer at a cost of \$80,000. Since the ORC option is a more cost-effective treatment technology, the base was able to save a substantial amount of money.

The actual work—the injection process—took about a week. District personnel injected the ORC slurry 1-10 feet below the surface at 110 locations throughout the contamination site using the Geoprobe. [Geoprobe uses a small diameter tube with a high-pressure pump to inject the compound into the ground.] The most recent ORC injections were performed this past summer.

The district conducts two rounds of performance monitor-

ing—at two months and again at six months after the injection process is completed; then the South Carolina Department of Health and Environmental Control requires periodic monitoring for the next year or so to verify that the contamination levels have dropped.

“We have the original levels of the contamination to use for comparison during the monitoring process,” said Whitacre.

“We don’t have the in-house capabilities to do this type of work, and the district made it easy for us to use their assets,” said Alice Howard, Natural Resources and Environmental officer at MCAS, Beaufort.

Being able to execute some projects in house, such as the Beaufort one, helps Corps personnel maintain their technical capabilities, Whitacre said.

“The project has gone quite well,” said Araico. “They even finished up two days early. The district has done exceptional work.”

For more information, contact *Verdelle Lambert*, Savannah District Public Affairs Office, at 912.652.5758.



Photo by Jonas Jordan

The geoprobe is aligned on the injection site.

RACER takes ordnance projects to cost efficient finish line

Remedial Action Cost Engineering Requirements system provides cost estimating software tool

By JIM PETERSON and KATE PETERSON
HTRW CX

Developing accurate and consistent cost estimates for projects and their associated phases is a critical process for any organization responsible for budget submissions, contract negotiations, and/or financial decision-making. One of the tools available to develop estimates is the Remedial Action Cost Engineering Requirements, or RACER system.

RACER is a parametric, integrated cost estimating software system specifically developed for estimating costs associated with environmental remediation projects. RACER provides a range of cost estimating detail from an order-of-magnitude in a project's preliminary stages to a refined, detailed and definitive estimate at the time of project execution.

With the recent and high visibility of ordnance projects, the U.S. Army Corps of Engineers has developed new RACER Ordnance and Explosives (OE) cost models to enable project and program teams to develop more

reasonable and defensible cost estimates for OE projects. Each of these OE models can be coupled with other existing RACER models to develop an estimate for the total project cost. It is *very important* to note that these models are *not* static and are frequently updated, as new information becomes available. The RACER OE models include:

□ **Archive Search Report Model** - The Archive Search Report model in RACER is used for development of costs in the site inspection phase of many projects. The primary purpose of the Archive Search Report is to provide an overall evaluation at a site to differentiate sites that pose a potential threat to public health, welfare, or the environment. Typically, the Archive Search Report is qualitative in nature and includes information derived from historical research, site inspection, evaluation, and documentation, rather than definition of the nature and extent of explosive ordnance through intensive site investigation. The major cost driver for this model is the complexity of the site, which is based upon the size of the site, the types of ordnance used and the anticipated land use.

□ **OE Engineering Evaluation/Cost Analysis Model** - The OE Engineering Evaluation/Cost Analysis model is used to estimate the cost to characterize the nature, location, and concentration of OE by providing:

- a description of the OE related problems affecting human use of the site;
- identification and analysis of reasonable risk management alternatives;
- recommendations for a proposed alternative;
- a means to seek public comments and participation; and

- documentation of the process for use in final decision making and judicial review.

This model may be used to develop costs for the Engineering Evaluation/Cost Analysis or Remedial Investigation/Feasibility Study project phases. The major cost driver in this model is the area of the site that will be sampled.

□ **Ordnance and Explosive Removal Action Model** - This quantitative model

is designed to estimate the costs of searching for, marking, and removing unexploded ordnance from munitions contaminated property. The major cost drivers are the area to be cleared and the depth of OE clearance. Other factors include site conditions and concentration of munitions to be cleared.

□ **Ordnance and Explosive Institutional Controls Model** - This model combines estimates for options of legal controls on land use and passive controls and engineered solutions to limit potential exposure to OE. Examples of elements in this model

include programs to educate individuals about potential exposure risks, response actions, emergency plans, etc.; the legal options available: including controls related to ownership of the land, easements, zoning and siting restrictions, etc.; and engineering controls that limit the public's access to a site. Engineering controls and site complexity are the major cost drivers in this model.

□ **Ordnance and Explosive Monitoring Model** - This model addresses the cost of site monitoring following the implementation of an OE Removal Action project to assess the effectiveness of the removal. Monitoring is necessary to ensure that public health, safety, and the environment are being protected by the response action that was implemented. Monitoring is performed over periodic intervals. The major cost drivers in this model are number of years and events of monitoring, and site complexity.

The Huntsville Design Center and the Hazardous, Toxic, and Radioactive Waste Center of Expertise (HTRW CX) developed the RACER OE models and will continue to verify the models using historical data and to incorporate user comments. Additionally, research into recently developed innovative technologies and applied engineering solutions may be used to update the models in 2001. These efforts enhance the Corps' ability to continue to prepare defensible budget estimates for OE projects.

For more information, contact Jim Peterson at 402.697.2612, or Kate Peterson at 402.697.2610.

OE Project CTC Estimate

PA, SI, EE/CA, or RI/FS Phase Costs can be developed with the following models:

- ASR Model
- OE EE/CA Model
- Site Investigation
- Remedial Investigation
- Feasibility Study

RD Phase Costs can be developed with these models:

- Remedial Design (Percentage Method)
- Remedial Design (Parametric Model with details)

RA-C Phase Costs can be developed with over 100 models to choose from. Some typical models are listed below:

- OE Removal Action
- OE Institutional Controls
- Cleanup and Landscaping
- Excavation

RACER integrates all models in a project, such as models for an OE project as shown above.

St. Louis District provides environmentally friendly solution for Mississippi River bend

By **TERRIE HATFIELD**

St. Louis District

After 14 years of trial and error, as well as numerous experiments, a tree-screen/riparian corridor developed by the Corps' St. Louis District is proving to be an environmentally beneficial solution to stop erosion along a stretch of the Mississippi River. In fact, U.S. Senator Kit Bond (Mo.) publicly praised the Thompson Bend Riparian Corridor Project and the unprecedented 14-year cooperative effort between the Thompson Bend Landowners Association and the Corps at a tree-planting ceremony.

This buffer strip of trees is planted between the riverbank and the floodplain at Dry Bayou Thompson Bend.

The Dry Bayou-Thompson Bend is a broad sweeping curve in the Mississippi River south of Cape Girardeau, Mo. Over time, the river had begun to scour and cut a new channel across the peninsula. If left alone and allowed to continue this cut-off formation, navigation would have become impossible along this 17-mile reach of river.

An immediate solution was needed to avoid a potentially catastrophic navigation crisis, and serious agricultural and flood control concerns. If this midpoint 17-mile reach were destroyed, it would cause a break in the continuous 2,300 mile navigation channel on the inland waterway system's busiest highway.

Channel development would be extremely costly. The magnitude of the scour would threaten the integrity of the mainline levee system that protects hundreds of thousands of square miles of property.

A new channel, cut across the neck of the peninsula, could not support even a small tow, and the existing channel would be too shallow for navigation most of the time. Velocities would increase many-fold, as the Mighty Mississippi would attempt to regain an equilibrium state.

The district was asked to develop a non-structural, environmentally beneficial project. The result was to use nature to counter nature.

The tree screen erosion control method has been successfully used for a range of overbank and bankline erosion problems throughout the Corps, and adapted by several environmental agencies and foreign countries. Designs are unprecedented, have no established guidelines, and are based solely on engineering expertise and innovative experimentation.

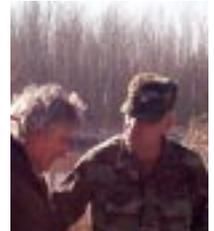
This project uses cottonwood clones and other hardwoods bred for their fast growth and water resistant attributes, and strategic placement of other forms of vegetation. The trees will be selectively harvested, so they don't shade out and prevent undergrowth. (Tree harvesting also provides timber as a cash crop for landowners.) Consistent and continuing application of this technology, including ongoing tree planting, has maintained the river in its natural, original channel, and navigation has been sustained around Thompson Bend.

Work is ongoing and more tree screens are being established. The concept is considered to be structurally sound,

environmentally proactive, and economically viable. The project has been described by the president of the local levee district as "an innovative concept, to solve a perennial problem, severely tested by the Great Flood of '93...the new technology works well...very cost effective, and an environmentally friendly solution to an age-old problem."

Although 40 percent of the trees were killed in the Great Flood of 1993, they remained anchored in place through that flood and a flood in 1995. These floods caused setbacks, but provided valuable opportunities to collect data and evaluate the work.

No one expected that a 100-foot tree screen would cut flood velocities in half, but using an acoustic doppler profiler, flows were measured at 8-8 1/2 feet per second going into the screens, and 4-4 1/2 feet per second coming out. This 50 percent reduction in velocity



Top photo shows Lester Goodwin, Thompson Bend Landowners Association, and St. Louis District Commander Col. Michael R. Morrow standing in what could have been the new Mississippi River channel. Below, map shows how the Mississippi River tried to cut a new channel across the neck of the peninsula.

led to far less erosion and scour, increased deposition, and eventually, healing. Tim Searchinger, Senior Attorney for the Environmental Defense Fund, stated that this is a "wonderful project, an ideal project, a credit to everyone involved."

The Corps' Mississippi Valley Division considers the work to be a prototype demonstration for the entire Corps and is changing the way the Corps deals with severe erosion problems along the nation's waterways, while providing benefits to the environment.

The technical paper, "Preventing a Cut-Off of a Mississippi River Bendway with Tree Screens," by Jerry Rapp, was published by PIANC in 1989 and explains how the concept was developed.

For more information about this project or Jerry Rapp's technical paper, contact St. Louis District (Jerry Rapp) at 314.331.8371.

Regulatory program plays major role in use of Alaska wetlands

ANCHORAGE - The U. S. Army Corps of Engineers has been responsible for regulating the use of the nation's wetlands for almost three decades. In Alaska, the Corps' regulatory mission often places the agency in a critical role.

Although most proposals to alter wetlands are approved, a majority of them are modified during the technical and public review process. Replacement of affected wetlands by preserving or creating other wetlands, called mitigation, also is a frequent tool to allow development while protecting the environment.

Approximately 55 percent of the land area of Alaska is classified as wetlands compared to roughly 5 percent of the land in the lower 48 states. "Wetlands" are those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support (and that under normal circumstances do support) a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.

Because Alaska is sparsely populated, proposals to disturb natural wetlands usually occur in relatively small urban or developed areas of the state.

Section 404 of the Clean Water Act's program requires approval, or permitting, of wetlands use by the Corps. The Corps' Alaska Engineer District processes hundreds of requests for these wetlands permits each year.

Congress gave the Corps the responsibility to allow, modify, or decline the discharge of fill material into waters of the United States, including wetlands.

Wetland determinations are made using three parameters — types of plants, soil conditions, and hydrology of the affected land. Wetlands use applications are evaluated according to highly technical standards of the Clean Water Act.

The Corps mitigates wetland impacts whenever possible. Most mitigation in Alaska is achieved by avoiding or minimizing impacts, but on occasion compensatory mitigation is required. Compensatory mitigation, which requires applicants to replace affected wetlands as a condition of

a permit, is required only when the most fragile wetland acres are disturbed. Last year, the Alaska District received requests for using 2,212 acres of wetlands and granted permits for 2,059, of which 638 acres required wetland mitigation.

The Corps issues four different types of permits — Individual, Letter, Nationwide General, and Regional General Permits. Though almost all permit requests are eventually granted, a very large majority are modified, amended, or given conditions based on the Corps' technical analysis and public input.

Approximately 55 percent of the land area of Alaska is considered wetlands, compared to roughly 5 percent of the land in the lower 48 states.

"I think this fact is very important because our goal is to promptly and completely process applications," said Don Kohler, acting Chief of the Alaska District regulatory branch.

"If changes were not made to applications as originally submitted, a substantial portion would be dismissed," he said. "But because we are here to serve the national need we attempt to assist applicants in preparing a permit application that is complete and addresses all the legal requirements of the wetlands program.

"A lot of our permits are issued under 'Nationwide Permit' regulations. These general permits cover activities that occur in all states. Nationwide Permits allow specific wetlands actions such as maintenance of roadways, utilities, very small tracts for residential uses, survey activities, minor discharges and excavations, and other recurring uses," Kohler said.

"We try to streamline the process where we can, but the facts are that wetland resources are a national resource that needs to be preserved for the environment and the greater public good. Thus, the modifica-

tions, and mitigation requirements that sometimes extend the process have to be maintained," Kohler said.

The Alaska District also has about 20 Regional General Permits, used by other government agencies working under strict agreements with the Corps to help regulate use of wetlands.

The Alaska District authorized 469 Nationwide General Permits and 440 Regional General Permits in fiscal year 1999.

In that same fiscal year, the District received 451 applications for individual permits — issuing 218 as individual permits, 40 as Letters of Permission, and denying three. However, 232 of these permits were modified while in process, or modified by conditions inserted by the Corps into the final permit offered to the applicant. The remaining actions were either accomplished by in-house modifications, were modified to fit Regional or National General Permits, or were closed or withdrawn.

The District also offers a free jurisdictional determination of land status to see if proposed activities at the site require a Corps permit. In the last fiscal year the District provided 1,814 determinations.

Permit applications also are coordinated routinely with other federal and state natural resource agencies seeking their comments prior to completing the internal review process by the Alaska District. In high-profile cases, it may be necessary to conduct public information meetings, or hearings. Last year the Alaska District conducted 32 public information meetings and one Public Hearing.

The Corps' expanding outreach program, which included the establishment of regional field offices, has reduced the number of violations from 289 in 1992 to only 75 in 1999.

The regulatory program helps the Corps accomplish its mission of preserving the environment while maintaining the needs of the citizens.

Additional details about the total Alaska District regulatory program are available at www.poa.usace.army.mil/reg.

Innovative technology improves project efficiency

By KIM GILLESPIE
Huntsville Center

The use of two innovative ordnance and explosives technologies, geophysical surveys and a portable blast shelter, at the former Camp Croft's Wedgewood subdivision made the project safer, quicker and less expensive, according to Huntsville Center project manager Karl Blankinship.

"We (Charleston District and Huntsville Center) estimate the savings achieved by using these technologies at more than \$1 million," said Blankinship.

The removal of ordnance from the 50-acre Wedgewood subdivision in Spartanburg was successfully conducted in less than six months. "If we hadn't used these innovative technologies, the project could have extended well over a year and increased costs significantly," said Blankinship. Investigations were performed on 36 acres, with 50 practice grenades, 1,700 pounds of scrap, and 3,000 pieces of ordnance and explosives scrap removed during the six-month project.

The formerly used defense site is located in Spartanburg, S.C., and occupied approximately 19,000 acres during its primary years of operation between 1941-1945. The Department of Defense began returning property to private and public use in 1947, and the land became the 7,000-acre Croft State Park and a mix of residential, farming and business developments. "The Wedgewood area is a subdivision of about 50 homes, which makes ordnance investigations and removals extremely difficult because of safety requirements for work exclusion zones," explained Blankinship.

The first innovative technology used was digital geophysical surveys. Geophysical mapping and analysis were used to identify potential ordnance items, reducing the number of digs (excavations to identify suspect metallic objects) by providing more accurate discrimination capabilities. The use of this technology reduced the number of digs from 1,000 to approximately 150 per grid or area and thus, reduced removal time from about three days per area to one day per area.

"When compared to the time and number of excavations required with the old 'mag and flag' technology, we saved close to a million dollars right there," said Blankinship. The term "mag and flag" technology refers the use of hand-held magnetometers,

or metal detectors configured for ordnance detection.

"Digital geophysical surveys offer a better way of recording data, but they also require the right types of soil and geography. We based our decision to use the digital geophysical survey on our knowledge and experience with various ordnance projects, and the positive results at Croft reinforce our decision and give us additional data to help evaluate its use at other sites," explained Blankinship.

The second innovative technology used in the Wedgewood subdivision removals was a portable blast containment shelter nicknamed the "Bud Lite." Developed by the Corps, and nicknamed after its designer, Huntsville Center engineer Cecil "Bud" Morgan, it is a blast containment shelter (engineering control) that is light enough to be moved by a two-man crew from excavation to excavation site.

Using the "Bud Lite" in the Wedgewood area reduced the exclusion (work) zones from almost 900 feet to 200 feet. This smaller work zone reduced the daily evacuations from as many as 10 per day to typically one per day. The

result meant fewer disruptions to homeowners' lives, and increased protection for the community from any potential blast. "The best thing about the Bud Lite is that it truly does increase safety for members of the public by providing an additional means of protection," said Blankinship.

"Coordination for evacuations was performed through extensive public involvement, and during the project closeout meeting with the residents, no complaints were voiced by the 29 homeowners affected," added Blankinship.

The Corps safely concluded the six-month project at a cost of \$1 million. Using geophysical mapping rather than "mag and flag" reduced the number of excavations needed by up to 75 percent and reduced the project duration by as much as one year.

Using the Bud Lite also reduced the number of evacuations and the inconvenience to property owners. "Most importantly, the large number of ordnance related items removed significantly lowered potential risks at the site," concluded Blankinship.

For more information about the former Camp Croft project, contact Karl Blankinship at 256.895.1548. For more information about the use of innovative technology for ordnance projects, contact Roger Young at 265.895.1629.



One of the innovative technologies used at the former Camp Croft project is a transportable, lighter-weight blast containment shelter nicknamed the "Bud Lite." The structure provides an added measure of protection for the public during excavations for suspected ordnance.

Asbestos and lead management guidelines serve as tools for building and structures requirements

Tech update

From **RODDOLTON**
HTRW CX

The Environmental Safety and Health Branch of the Corps' Hazardous, Toxic, and Radioactive Waste Center of Expertise (HTRW CX) is a participating member of the Army Asbestos and Lead Hazard Management team. Branch industrial hygienists have developed a number of asbestos and lead technical guidance and contract documents, including guide specifications and standard scopes of work.

This guidance serves as "tools" for the Corps and for installation Directorates of Public Works (DPWs) to execute the Commander-led asbestos and lead hazard management programs under AR 420-70, Building and Structures requirements; Public Works Technical Bulletin (PWTB) 420-70-8, Installation Asbestos Management Program; and PWTB 420-70-2, Installation Lead Hazard Management.

Asbestos: The Corps of Engineers Guide Specification (CEGS) 13280 "Asbestos Abatement", and two Engineering Pamphlets (EP) containing standard SOWs for asbestos surveys and air monitoring activities make up the newly published asbestos guidance.

Lead: The Corps of Engineers Guide Specification (CEGS) 13281, "Lead Hazard Control Activities," and four Engineering Pamphlets (EP) containing standard scopes of work for lead activities comprise the newly published lead guidance.

Asbestos and lead guidance can be downloaded in .pdf file format (also in MS-Word, for the EPs) from the Corps' Huntsville Center Web site under TECHINFO, www.hnd.usace.army.mil. Each publication can be linked directly through www.environmental.usace.army.mil/.

For additional information or questions, please contact the HTRW CX technical POCs: 1) For asbestos SOWs/CEGS: Terry Tomasek 402.697.2590; 2) For lead SOWs: Rod Dolton 402.697.2586; and 3) For lead CEGS: Mark Fisher 402.697.2587.

District receives national environmental award

By **MARY BETH THOMPSON**
Baltimore District

The Corps' Baltimore District received the Coast America Partnership Award at a Baltimore, Md., ceremony on Nov. 9, 2000. The award recognized a team of federal, state and local governments, and private organizations for efforts to restore and enhance the tidal wetland near Fort McHenry, Md.

Tom Filip, the District's representative to the team, helped develop the concept for the project, which is officially called the Tidal Wetland Restoration and Field Station at Fort McHenry.

The Fort McHenry project involves 19 federal, state, local, corporate, academic and non-governmental organizations in a partnership for conducting regular cleaning and studying of the marsh.

Coastal America is a multi-agency organization established in 1992 to restore and protect the coastal environment. The projects of its members can be nominated for special awards that recognize outstanding partnership efforts, multi-agency projects and team endeavors that demonstrate the successful collaborative nature of Coastal America.



Federal Environmental Engineer of the Year nominations

The Conference of Federal Environmental Engineers (CFEE) is accepting nominations for its Federal Environmental Engineer of the Year.

Nominations are open to federal civilian and military environmental engineers, and recent retirees.

Additional information and the nomination form are available at www.aec.army.mil/prod/usaec/eq/programs/awards.htm.

THE CHALLENGE TO EXCEL

Professional Development Opportunities

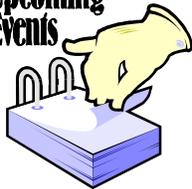
Training spaces available for FY01 Environmental Restoration and Compliance courses

The following FY01 Environmental Restoration and Compliance Training sessions currently have spaces available. If you are interested in more information on these sessions you should contact Joy Rodriguez of the Professional Development Support Center at 256.895.7448, or visit the Web site at <http://pdsc.usace.army.mil> for course descriptions.

#228 TERC	January 9-12, 2001	Huntsville, AL
#443 Clean Air Act	March 6-8, 2001	Seattle, WA
#427 Env Req on Const Projects	March 7-8, 2001	Omaha, NE
#351 Safety & Health for HWS	March 19-23, 2001	Huntsville, AL
#141 HTRW Const Inspection	April 30 -May 4, 2001	Philadelphia, PA
#225 Env Sampling	May 8-11, 2001	Omaha, NE
#222 HTRW Risk Assessment	June 11-15, 2001	Omaha, NE
#255 CWM Workshop	June 12-14, 2001	Huntsville, AL
#223 HW Manifesting	July 16-20, 2001	Norfolk, VA
#399 Exp Ord Res & Safety	August 6-10, 2001	Huntsville, AL

CLOSING NOTES

Upcoming Events



UXO/Countermining Forum

April 9-12, 2001
New Orleans, La.
POC: Charlotte Gaylon,
Phone: 1.888.808.5303
E-mail: TheForum@tva.gov

Environmental Remediation and Ecosystem Restoration Conference

April 16-20, 2001
Portland, Ore.
POC: Mike Klosterman
Phone: 703.428.7337
E-mail: Michael.J.Klosterman@HQ02.usace.army.mil

Tri-Service Environmental Technology Symposium

June 18-20, 2001
San Diego, Calif.
Web Site: www.ets-2001.com
POC: Jean Thomas
Phone: 756.357.4011
FAX: 757.357.5108
E-mail: jattmc@aol.com

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