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Districts respond to Arkansas storms

Real emergency supercedes planned drill

By Jennifer Patrick
Little Rock District

Instead of conducting a scheduled emergency operations drill, Little Rock District responded to a *real* emergency brought by recent storms in Arkansas.

The storms cut a 260-mile swath across the western edge of the state, sometimes leaving a mile-wide path of splintered buildings, destroyed businesses, broken homes, and snapped trees.

Across the state, 25 people died and 800 were injured. The Salvation Army estimates 946 homes were destroyed and more than 2,000 damaged.

In a few days the Federal Emergency Management Agency (FEMA) had set up Disaster Field Offices operating to help storm victims. Cleanup started immediately, but it didn't take long to realize more help was needed.

"After a presidential declaration has been made, local communities can make a written request to the state Office of Emergency Services for help," said Ed Chapman, chief of Readiness Branch. "OES requests help from FEMA, and FEMA works with other agencies, like the Corps of Engineers, to get the job done."

FEMA called the Corps to help with debris cleanup and disposal, but the effort was too big for one district. Because of the widespread damage, both Little Rock and Vicksburg districts took on the mission.

Vicksburg District handled the cleanup at Arkadelphia, population 10,000. *(See article at right).* Little Rock District took the cleanup mission in south Pulaski County (excluding Little Rock, which did its own cleanup).

Under FEMA, Little Rock District advertised and awarded debris cleanup contracts. Contracts went to Garner's Backhoe Service of Dover and to JESCO Construction Corp. of Gulfport, Miss., to haul debris to disposal sites.

"We pick up non-burnable debris and haul it to the city landfill," said Terry Steuart, disaster area engineer. "The burnable debris goes to our incineration site."

A third contract to burn debris went to J.R. Ramon & Sons Inc. of Balch Springs, Texas. They used an air curtain burn pit. The technique, developed in Florida after Hurricane Andrew, can burn up to 200 cubic yards of wood in one hour.

Large trees, limbs and other burnable debris are dropped into the pit and set on fire. The fire is fueled with high-velocity air blowers that force air across the pit. The air current creates a hotter fire that burns faster and reduces the smoke produced. It also provides a "curtain effect" that traps smoke and small particles.

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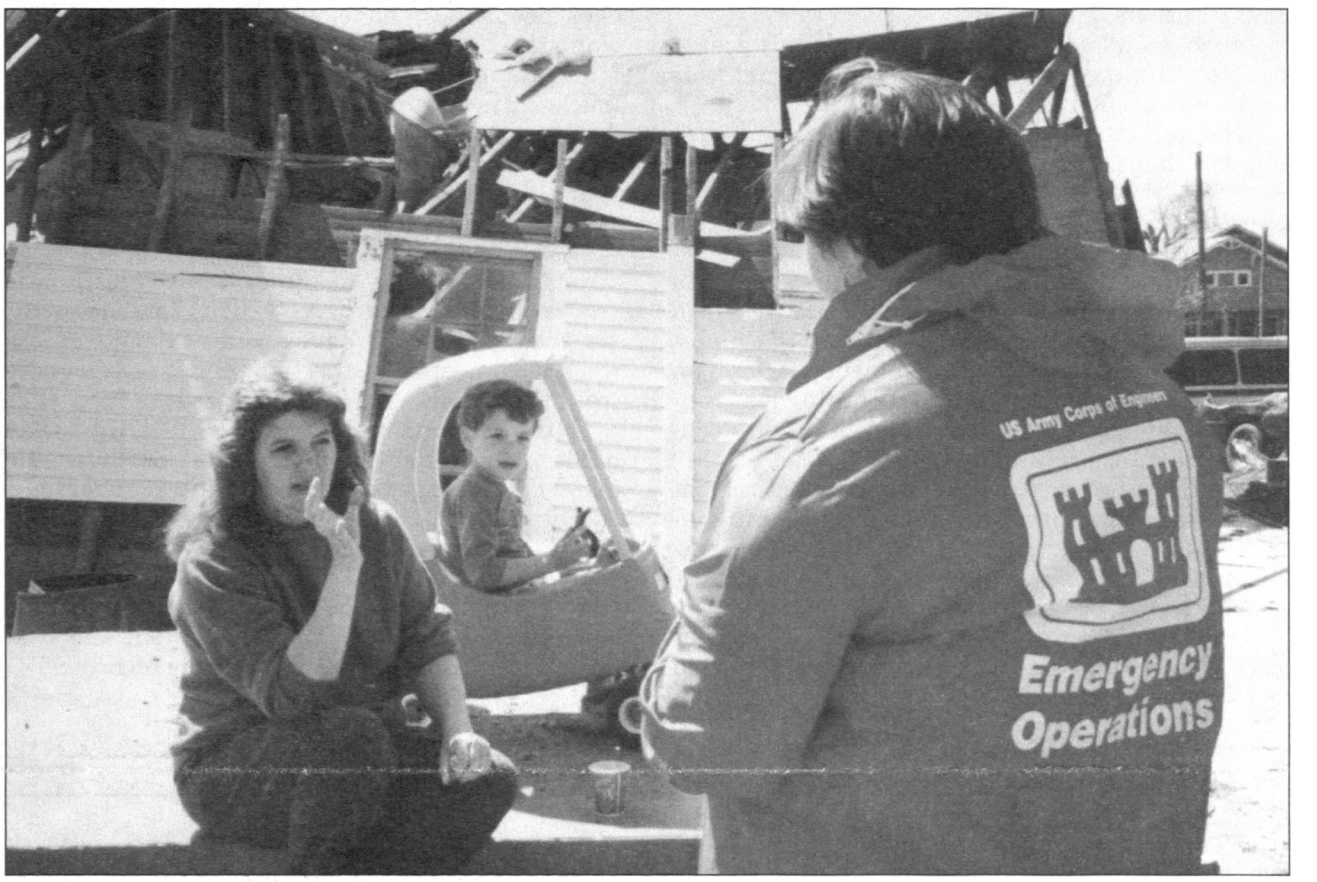

Sherma Peters sits in front of her tornado-damaged home and talks with Brenda Meeks, Arkansas projects manager. Peters' son Randy plays in the background. (Photo by courtesy of Vicksburg District)

Vicksburg takes quick action following storm's passage

By Karen Magruder
Vicksburg District

"The stairs groaned, the howling increased and then darkness closed in," said Sherma Peters. She was describing the tornado that wiped out a section of Arkadelphia, Ark., two blocks wide and nearly a mile long.

"Five of us were huddled under the stairwell when the tornado hit and the whole house collapsed," Peters said. "We began to smell gas and prayed someone would dig us out soon. The Army National Guard or Reserves was drilling that weekend and immediately helped."

Within three hours of the disaster, U.S. Army Corps of Engineers' employees from the nearby DeGray Lake were in Arkadelphia with loaders and chain saws. Other employees who live in town were already helping their neighbors.

The six employees stopped when darkness fell and returned at daybreak with more equipment and operators from Lakes Ouachita and Greeson. A generator from Lake Greeson went to a nursing home to supply emergency power.

By the next afternoon the roads were open, the immediate threat was over and the Corps' initial response mission was complete. Later that week, district commander Col. Gary Wright, the mayor, the board of directors, and the Office of Emergency Operations met with representatives of the Federal Emergency Management Agency (FEMA). That meeting gave the debris removal mission to the Corps.

"We ran the emergency recovery operation out of the DeGray Lake field office, since we already had published phone numbers, computers, and work areas in place," said Brenda Meeks, Arkansas projects manager. "Co-locating with FEMA at Henderson College in Arkadelphia would have entailed moving everything to town. The visitors' center served as the bid opening room and the Corps' contract specialists set up in the auditorium."

The initial mission included curb-side debris cleanup. To accomplish this, contract specialists from Vicksburg District were in Arkadelphia, along with Alan Morris of the Emergency Operations Center in Mobile District.

"Our first challenge was to estimate the amount of debris to write into the contract," said Mac Ross, assistant chief of Contracting Division. "Allen Morris was a great asset in estimating the quantity of debris. He used the corporate knowledge of South Atlantic Division and FEMA damage survey reports to estimate

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Vicksburg cleanup

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70,000 cubic yards of debris."

Getting the contract on the street in one day was a major accomplishment.

"We toured the city on Friday afternoon to get a feel for the layout of the debris and issued a solicitation Saturday afternoon," Ross said. "Once written, a notice was posted at hotels and restaurants, and the local cable television and radio stations."

Ten bids were received by bid opening at 4 p.m. on Sunday afternoon. The contract was awarded at 9:50 p.m. that night.

"The contractor mobilized on Monday morning and began hauling debris to the dump on Tuesday," Ross said. "We also awarded a contract to burn the debris using an air curtain incinerator."

Several elements contributed to the success of the cleanup operation. Realty specialists helped obtain rights of entry to city and county dumps, and a site to stockpile hazardous and toxic waste material. Other operations employees augmented the real estate effort in obtaining documents to enter private property.

Mac Harris, Geotechnical Branch, said the entire Arkadelphia area supported the cleanup effort. A local tire company fixed a flat on Harris' car and refused payment. One morning Harris needed a raincoat and Wal-Mart wasn't open.

"One of the employees went to his car and gave me his raincoat," Harris said. "He just said bring it back later when the store was open and I could buy one."

Several recovery workers commented on the "helping hands" attitude in Arkansas. Shortly after the tornado, church groups, school groups and individuals were helping move trash and debris, and helping victims clean up or demolish what was left of their homes.

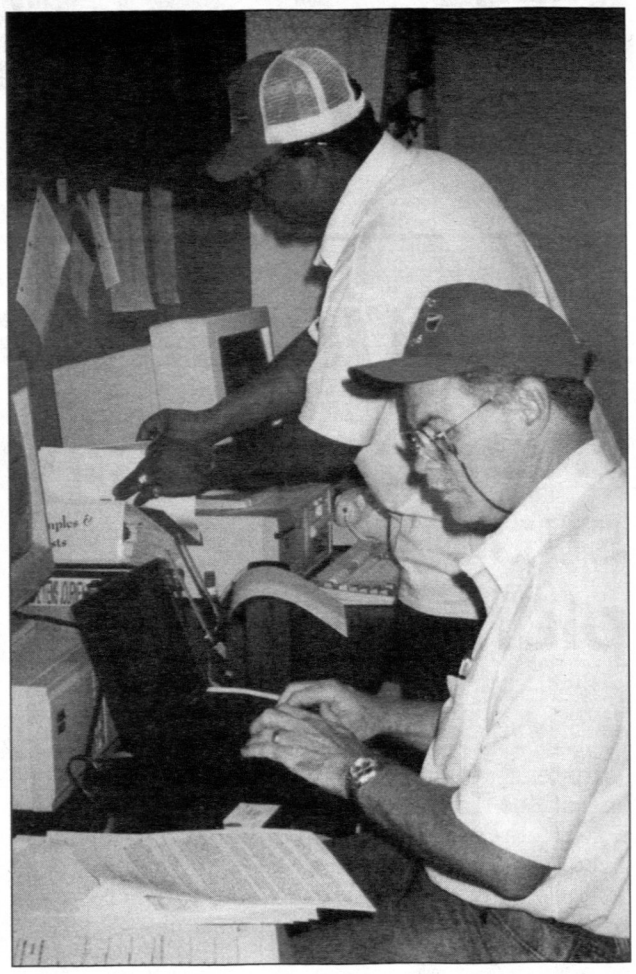
"I'm impressed by the attitude of assistance here," said Donny Weaver, Safety Officer. "However, people here have been hurt enough and we want the cleanup to go safely. We want to see hardhats in equipment areas and make sure the trucks drive safely, under the speed limit, and don't congest local traffic."

Another new dimension to the recovery effort was using rangers for quality control and inspection of the trucking and cleanup work.

"When you are out on a job like this, you need strong people skills to interact with the people you are helping and to work with contractors to get the job done," Weaver said. "Park rangers work with people all the time and it was easy to train them on how to watch the trucks."

Truck-watching included counting loads hauled, making sure burnable and non-burnable material didn't get mixed, and contract oversight operations.

"This is the first time I've done work like this," said Bryon Erickson, Lake Ouachita ranger. "It's just 'other duties as assigned.' I oversee the work, ensure safety regulations are followed, and that the contractor activities are properly recorded."



Mac Ross (foreground) and O.C. Meeks work on contracting issues during the cleanup in Arkadelphia, Ark. (Photo courtesy of Vicksburg District)

Little Rock cleanup

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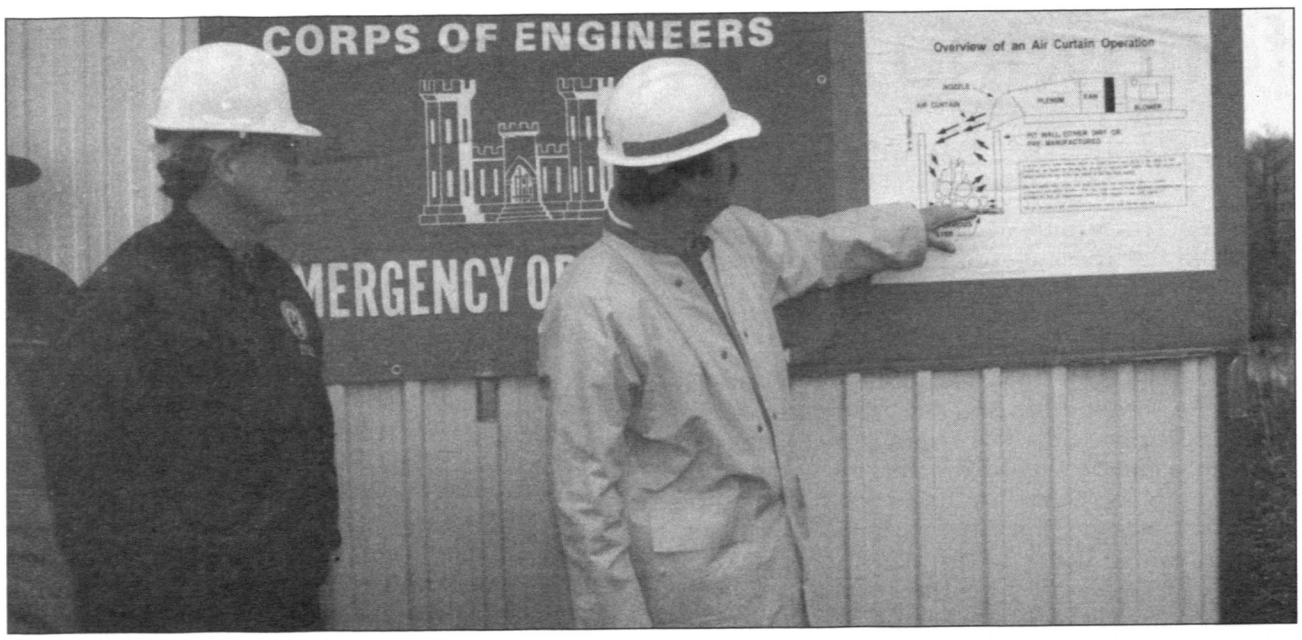
Ash is moved to a second pit, mixed with water, allowed to cool, then hauled to the landfill. The operation reduces the volume of debris by more than 95 percent, leaving only about five percent to dispose.

The district needed that efficiency because the tornado damage was extensive, even in its limited response area.

"We can go down a street and pick up the debris one day, and by the next day there's more," said Bernard Singleton, a debris removal office manager. "It seems like a never-ending job."



Terry Steuart, Little Rock District's field engineer, explains the incinerator process during a press conference. (Photo courtesy of Little Rock District)

That job fell to 20 district employees who volunteered as contracting inspectors during the debris removal work.

"I've been impressed by the response from the district offices," Chapman said. "Even though this is a time when most people are short-staffed, all the offices allowed people to work on the response."

Many times they were in the middle of areas that were hit hardest by the storms. They saw first-hand the damage and the people who survived.

"People come out when we are working, and they want to tell you their story of the storm," Singleton said. "We try to stop and listen to them. It's the least we can do after all they have been through."

"I love the work," said Carol Stuart, a volunteer from the Logistics Office. "I don't think it's depressing because I focus on the fact that we're helping people clean up so they can get back to normal."

Other employees played an important part in the district's quick response. Contracting Division people worked long hours to get contracts awarded and work started. Real Estate Division people found the debris disposal sites and got right-of-way agreements which allow workers to come onto private property to pick up debris.

To date, 79,451 cubic yards of debris have been removed, and 8,300 tons of non-burnable debris have been hauled to the landfills.

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Army recognizes excellent districts

*(**Editor's note:** The wrong article about the Army Community of Excellence results was published in the May "Engineer Update." Due to a computer error, an article from a past issue went to the printer instead.*

The correct article is published below.

We regret the error and apologize for any confusion the mistake may have caused.)

Three Corps of Engineers districts placed in the 1997 Army Community of Excellence (ACoE) awards program. Seattle and Huntington districts both received the Army Chief of Staff Award. The Engineering and Support Center, Huntsville, earned a runner-up.

Winners get a monetary award, which must be spent on projects to benefit employees. Huntington District received $200,000; Huntsville Center received $75,000. The amount of Seattle's award had not be announced at press time.

The ACoE awards are given annually to Army installations for their efforts to support soldiers, civilians, retirees, and their families. Winners are selected based on an entry package written by the agency, and a visit by an ACoE examination team.

Seattle District

Seattle won for innovative decision-making at the lowest level, teachable leadership, information sharing, and partnering. An ACoE assessment team praised the district for several activities.

- The district has a management intern program. Each year, 9-12 people take a management course part-time at Antioch University. The course focuses on leadership and communication. The district's senior executives recognized the course's benefits and have also taken it.
- The district encourages employees to keep mission pamphlets and business plans by holding a drawing during town hall meetings. Numbers drawn match numbers on the plans and brochures. Winners receive a lottery ticket.
- The commander, Col. Donald T. Wynn, established a new office called the Deputy District Engineer for Future Directions. This office facilitates change and looks for new ways to do business.
- Seattle District strives to help people communicate. The effort includes lunch-time brown-bag meetings, town hall meetings, *Flagship* magazine, newsletters, and the daily *Quickread* e-mail bulletin.
- Employee performance is enhanced by alternative work schedules, flexiplace, cross-training, and team building. Team building activities include having a facilitator to work out problems in an encounter-group atmosphere.
- Employees are developing processes for introducing new products and services, and for reviewing, updating, and incorporating customer feedback.
- The district encourages community involvement and outreach. This includes attracting people and groups to district projects, participating in the state fair and buying holiday toys for children.

Huntington District

Installations are judged in seven categories. Feedback from ACoE team indicated that the district excelled in Business Results and Customer Focus and Satisfaction.

Huntington District also garnered praise in several areas from the ACoE team.

- The district's process for developing its strategic business plan is proactive, systematic, and included both customer and employee input. It is based on initiatives and action plans, and distributed throughout the district.
- The district's senior leadership sets priorities based on customer needs. The commander meets with the workforce in town hall meetings and district meetings to discuss mission, values and directions. Leadership skills are enhanced by Army leadership courses. The district has a mid-level manager certified as a LEAD instructor.
- The district offers flexible team shifting, project teams, and process action teams. The monthly newsletter, *Castle Comments,* is used to recognize employee accomplishments and inform them of issues and policies.
- Employees are offered developmental assignments, higher education programs, and on-site courses. The district also has formal mentoring and shadowing programs that allows employees to cross-train with their leaders.
- A quality of worklife committee sets priorities for workplace improvements. New furniture offers greater comfort, health, space, and aesthetics. The district funds a physical examination program for over-40 employees. Flexible work schedules are also available.
- The district promotes good citizenship. It hosts a cultural awareness week with local schools. District volunteer efforts include repairing and restoring local bridges, and clean-up on the Kanawha and Ohio rivers.
- The district is building a system to collect data, manage information, and identify measures linked to key business processes. Project review boards insure interaction among different offices. A systematic process for benchmarking has been outlined.

(Peggy Nolan of Huntington District, Dave Harris of Seattle District, and Bernard Tate of HQUSACE contributed to this article.)

Turbine overhaul

Partnering powers project

By Jennifer Patrick
Little Rock District

At the Dardanelle Powerhouse, a 178-ton turbine unit lies in pieces on the powerhouse floor, the first visible sign that major rehabilitation work on the turbines has begun. But on this project, there's almost as much work done in the conference room as the powerhouse.

The $30 million Dardanelle Rehabilitation project is the first major rehab project authorized and funded under the U.S. Army Corps of Engineers' Major Rehabilitation Program since it was changed in fiscal year 1992.

The work involves replacing four turbines at Dardanelle, which includes designing, building, and installing new turbines. The generators also will be rewound to help increase their efficiency.

"This is a large project, and it's fairly visible," said Chuck Stein, project manager. "All of us want it to go smoothly, so the contractors and the district agreed to form a partnership."

Voith Hydro Inc., an internationally-known company, received the contract in 1994. Siemens Power, another well-known company, is Voith's subcontractor in charge of generator work. Since then, Little Rock District, Voith and Siemens have held regular partnering meetings.

"The whole purpose of the partnership is to talk about issues and situations that come up before they develop into problems," Stein said. "By addressing things early, it helps prevent delays due to conflicts."

The partnering sessions are not just done to meet a requirement. Both sides bring concerns where they are addressed by the team and some resolution reached.

"The issue here is finding out how we can do business better," said Bob Steele, project leader for Voith.

Since the contractors mobilized at Dardanelle and work started, all parties have faced unexpected challenges.

When workers began removing the first turbine unit, they found asbestos-coated wire. Ann McClintock, project contracting officer, issued a contract modification and Voith safely removed the wiring.

Then when the unit was removed, workers found lead-based paint on the turbine. Work slowed again until a process for disposing of the paint could be decided by the contractor and approved by the district.

Concerns about removing the lead-based paint were brought up at a recent partnering session, but as the session continued, the real issue began to surface.

"We all knew we weren't communicating well, but the partnering session was the first time the issue was brought out in the open," said Billy Elledge, contracting specialist. "When we got it out, we could resolve it."

"What we found is that a little informal communication could help the situation, " said Judy Bullwinkle, partnering facilitator. "Just picking up the phone and calling with a question instead of writing a formal letter that could get lost could make a world of difference. Trust between all parties is always important in resolving these situations."

After the partnering session, the contractor's proposal for removing the paint was approved by McClintock. A subcontractor will begin the paint removal, allowing work on the project to continue.

While Dardanelle is the first major rehabilitation project to take place since the program changed, it is not the last. Work on the rehabilitation of Bonneville Powerhouse in Portland District is close behind the Dardanelle project.

Since Voith and Siemens will do the Bonneville project, members of the Portland team attended the recent partnering meeting between Little Rock District, Voith, and Siemens.

"We're mainly here to listen and learn," said Sandra Takabayashi, Bonneville project manager. "Any problems or issues you face will probably be problems and issues we will face. If we know they're coming, we can be ready."

"These problems are surfacing as many of these older units are rehabilitated," said Yash Amin, contract administrator for Voith. "Issues like asbestos and lead-based paint will have to be considered and dealt with in the rehabilitation contracts."

The Dardanelle Rehabilitation Project is scheduled to be completed in September 1999. During the work, at least three units will remain operational to enable the powerhouse to meet power generation needs.

Security key at R&D complex

Article by Vince Elias
Photo by Pete Shugert
New York District

Christopher Nastasi, project engineer, and Felix Chevere, BRAC team leader, look over plans for the new research and development facility at Fort Monmouth, N.J.

The Army's Intelligence and Electronic Warfare Directorate (IEWD), a research and development agency at Fort Monmouth, N.J., is getting a new $14 million complex, and New York District is delivering it ahead of schedule and under budget.

Scheduled for completion this summer, the new complex will accommodate several hundred federal employees led by a civilian director. Thanks to effective partnering between the construction contractor and the resident office, project construction will allow a phased, speedy transition of employees into the facility.

"Remarkably, there have been no major delays," said Felix Chevere, BRAC Team Leader at Fort Monmouth.

Official notice to begin construction was received in August 1995. The facility has specifications that call for a limited access administrative area, large loading dock, and many site improvements.

"This is a huge success, from the accelerated design to the timeliness and quality of construction," said Col. Gary Thomas, District Engineer.

The new 80,000-square-foot facility is the most recent construction at the fort, according to Ayed (Eddie) Ireifej, project manager. "Its fast-track design was accomplished through close coordination with the architect engineering (AE) firm of Henningson, Durham and Richardson, Inc., Fort Monmouth & IEWD representatives, the Corps, and the Defense Intelligence Agency (DIA)."

About 35 people on the team met regularly with the AEs to review design plans. The exchange of ideas and information resolved issues on the spot, enabling the Corps to reduce design time and meet a crucial construction award date set by the Army.

"It's a big project," said Christopher Nastasi, project engineer with the Central Resident Office at Fort Monmouth. "We've got a local union contractor who's doing a terrific job and we're ahead of schedule for occupancy."

What makes this project an unusual challenge is that it's three projects in one — a research and development facility, and two individual warehouses. There are different architects and engineers, and three sets of specifications and plans which were not consolidated.

The facility includes a two-story anechoic chamber for experimenting on antennas. The chamber is shielded so that no sound or radio waves can exit or enter.

In the northeast corner of the building, one section appears to be carved out, a modification to save a nearly-symmetrical tree which towers over the building.

"The building doesn't impede the tree's growth," said Jim Mullins, the Corps' Resident Engineer. "It didn't have to be chopped down."

"The DIA was extensively involved in the building design, and representatives attended review meetings with the AE," said Nastasi. "Part of the building is for classified information. Ventilation systems were specially designed for daily inspections. If a power failure occurs, a generator powered by natural gas immediately switches on-line so power isn't interrupted."

The complex is built for compartmentalized access to sensitive military information. The computer labs will have an integrated access program, common and support areas, space for a graphic arts staff, and areas for destroying classified material. Special fire and intruder alarms, and special temperature and humidity controls for sophisticated electronic and computer equipment were installed. New perimeter fencing is part of the stringent security specifications.

Every aspect of the project was completed on time. Ninety-eight percent of the metal roofing is finished, and exterior work continues on the warehouses. The contractor is also installing wall and roof panels for the two warehouses being built near the main building.

"This was an engineering success story because the entire team pulled together," said Ireifej. "We slashed design time from 11 months to six thanks to these sessions. That reduced construction time."

Although scheduled for full occupancy in September, the second floor received furniture in early May, and by June 30 all building furniture could be in place.

"Pre-positioning furniture will facilitate an easy move of personnel into the building," said Chevere. "What makes this project unique is the success of the accelerated work schedule and the quality of work by local contractors. This is the first government contract undertaken by Fitzpatrick and Associates. The contractors are cooperative and produce high-quality work. The project keeps moving even while facing minor obstacles."

Heated floors warm kids, save energy

Article by Vince Elias
Photo by Pete Shugert
New York District

New York District recently completed another successful construction project at Fort Monmouth, N.J. The Child Development Center (CDC) has been operating for just nine months, and has already been nominated for the Department of Defense (DoD) Energy Award.

The center is equipped with a radiant central temperature control system which warms the floors.

The one-story brick structure has been in full operation since the grand opening last September when the first 168 occupants were handed their boxes of crayons. The CDC can accommodate children of ages six weeks to five years, and has a maximum capacity of 244.

The center is available to all those working at Fort Monmouth — active military, Department of Defense (DoD) civilians, National Guard, and contractors. It is accredited by the National Association for the Education of Young Children, and certified by DoD.

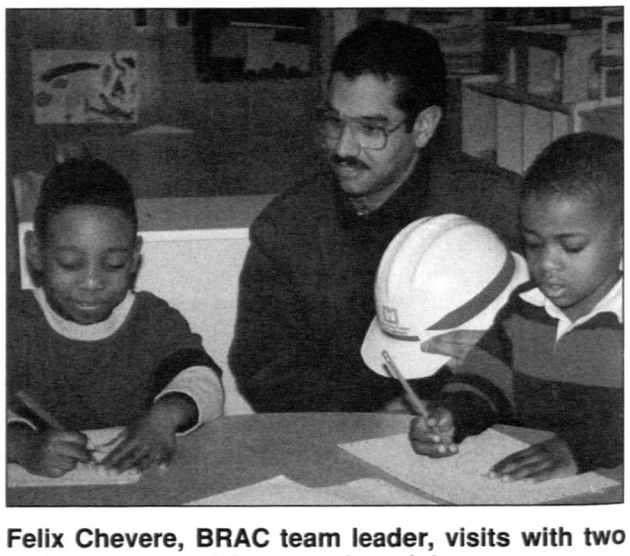
Although heated floors are not new (they have been used in Korea for generations), they are still a novelty here.

"Hot water is circulated through plastic tubing encased in lightweight concrete," said Felix Chevere, the Corps' team leader for all BRAC projects at Fort Monmouth. "Water temperature can be adjusted to 120 degrees. The heat radiates through the concrete, then becomes temperate enough so that the rooms feel comfortable."

Besides the radiant building temperature control system, special features of the center also include a video monitoring system throughout, and computers with touch screen monitors in all preschool and kindergarten rooms. There are also lofts in all preschool and kindergarten rooms, and a state-of-the-art playground.

Chairs, desks, and sinks were installed at kid-level and can be seen in many rooms through glass windows throughout the facility.

The CDC charges an average annual tuition of $300 per family per child, and is based on a sliding scale, determined by total family income. Full day-care is also offered for children six weeks to five years of age, in addition to a part-day preschool, and a before-and-after-school care program for kindergarten children.



Felix Chevere, BRAC team leader, visits with two children in one of the center's activity rooms.

Europe program manager learns to lead

Article by Becki Dobyns
Photo by F.T. Eyre
HQUSACE

Mavericks can be found anywhere, even in a conservative agency like the U.S. Army Corps of Engineers.

Deborah Murray became a maverick of sorts when she joined the handful of Corps people who have attended the 14-month Women's Executive Leadership (WEL) Program.

The program, an intensive, multifaceted training course, prepares career-oriented GS-11s and -12s for leadership roles. It is offered through the U.S. Department of Agriculture Graduate School and attended by people throughout government.

Murray is the Europe Center Program Manager for Installation A-E Support. She is nearing the program's completion and is amazed that less than 30 Corps employees have taken what she calls an outstanding opportunity. "I definitely recommend this course for people who have decided to expand their careers," she said.

Teresa Wright-Johnson, a contract specialist in the office of the Principal Assistant Responsible for Contracting at headquarters, agrees. After completing the program in 1991, Wright-Johnson found her career on the fast track and is a major advocate of the course.

The program

Despite the course name, the WEL Program "is not set up exclusively for women, but the thought was that if they took the 'women' out of the course title, it would be attended by mostly men," Murray said. "They talk a lot about how to deal with diversity in general, particularly how people, men and women, communicate differently."

The course is organized into several components:

- Four residential sessions including an orientation session, two training sessions (called Core I and Core II), and a close-out session which includes a Congressional briefing.
- An individual needs assessment.
- A Myers-Briggs evaluation.
- Preparing an individual development plan.
- Leadership development team work (involving a three-hour presentation).
- At least two developmental work assignments.
- A shadowing assignment.
- Executive interviews.
- Reading and reporting on several management books.
- Writing a program impact paper.

Core I and II are held at Hagerstown, Md., and include sessions and seminars on leadership, communication skills, diversity training, and management skills. Most of the other requirements are performed where needed.

Deborah Murray of Europe District came to Corps headquarters for a 60-day developmental assignment, just one of many requirements for the Women's Executive Leadership Program.

Murray and Wright-Johnson agree that the course's biggest drawback is its cost, with a tuition of $3,650 for the 1997-1998 program, plus travel and per diem costs for both the formal training sessions and developmental assignments. Murray is developing plans to lower costs of developmental assignments, including possible job sharing between districts.

Thought provoking

One of the first things Murray learned was the difference between a manager and a leader. "You manage things and lead people," she said. Both are critical to the Corps, according to Murray. A good manager must understand the mission and schedule work to meet that mission. A good leader will help employees understand the mission and "buy into" getting it accomplished.

Murray admits being skeptical about certain aspects of the course, but she later changed her mind. For instance, the course uses the Leadership Effectiveness Inventory and the Myers-Briggs Type Indicator. Murray said she went into the process ready to discount any system aimed at defining her into a box. "But I was absolutely astounded," she said. "I was floored at how accurate it was, and it has certainly helped me to understand how people interact with each other."

She was also skeptical about interviewing executives, but said it was one of the most interesting, educational aspects of the course. Though required to interview only three executives, Murray interviewed many more, from grades 13 to Senior Executive Service (SES), at the district, division, and headquarters levels.

"I've been finding a lot of differences in how people at different levels think," she said. "The GS-13s I interviewed at the district level were task-oriented. At headquarters, people tend to have a broad view of the Corps of Engineers."

For the shadowing assignment, Murray spent a week in Omaha District with Kristine Allaman, the first female engineer SES in the Corps. "It was an incredible week," Murray said.

Allaman is Director of Engineering and Technical Services in the Missouri River Region of the Northwest Division. She was working on restructuring issues, flooding problems on the Missouri River, and a quarterly partnering session with all of the regions' customers.

"It gave me an idea of the depth and breadth required at that level," Murray said. "Kris was also helpful with career planning and gave me guidance on how to proceed."

Murray has completed all requirements of the program, except the final residential session and writing her program impact paper, due this summer.

The next step

The training's momentum will continue beyond the classwork, Murray said. She is working to identify all Corps employees who have participated in the program and develop a network and support system for others.

The program has shown her some specific areas to work on to make herself more effective. Communications is a critical area. Having been an instructor for many years, Murray is comfortable with public speaking, but feels she needs to work on one-on-one communications and networking, which is contrary to her nature.

She will also continue her management book readings and executive interviews. She hopes to share her experiences and mentor others interested in professional development.

Murray feels ready to be a supervisor. In fact, that's what brought her to the program in the first place. "Ultimately, I wanted to improve the organization by improving myself."

Dramatic changes in Europe District helped shape Murray's idea of herself. "I was getting angry and frustrated," she said. "I knew I had to make some changes, but I didn't know how. So I tried to change the organization. I got people together and said, 'What can we do? How can we do it?' And nothing seemed to work. It finally dawned on me as I was getting ready to enter this program that it wasn't the organization I had to change, it was me."

Murray came to view her role in the Corps' future differently. "I may never get into management. I'm confident I will, because I feel I'd be good at it. But I can always be a leader, no matter what my job is."

*(**Editor's note:** If you've attended the Women's Executive Leadership Program and wish to contact Murray, her phone number is 011-49-611-816-2552, ext. 2500. There are several Deborah Murrays on the LAN; she is listed as Deborah E. Murray.)*

Corps professionals mentor tomorrow's engineers

Engineer helps team build robot

Article by Marie Darling
Photo by Bob Demars
CRREL

Reality is catching up with science fiction, fast.

In the past, the fictional Tom Swift was the only teenager who could build a robot in high school. Now whole teams of teens are doing it. Not only are they building robots, they are matching them in head-on competitions.

In midwinter, a robotics organization called FIRST approached CRREL mechanical engineer Jim Lever and asked him to head a local robotics team to compete in March. In no time, Lever had called local engineering firms for technical volunteers to help organize the team.

FIRST means "For Inspiration and Recognition of Science and Technology." It is part of a national, non-profit program founded in 1989 by inventor and entrepreneur Dean Kamen. Kamen's goal was to develop a program to create excitement among teens about science and technology, based on the idea that engineering can be fun and rewarding.

For the past six years, FIRST has sponsored a national tournament which pits homemade radio-controlled, programmable "robo-athletes" in two-minute matches. Starting with a high-tech kit of parts provided by FIRST, a team has six weeks to design, build, and test their robot. This was the first year an Upper Connecticut River Valley high school has participated.

Fifteen students were on the team. Their interests ranged from computer simulation to hands-on engineering. The team named their robot Isaac, in honor of Isaac Asimov, the late science fiction writer.

Isaac was built for rough, tough competition. It stood four feet tall, three feet wide, and weighed 117 pounds. Its structure included arms that were arc-machined from aluminum and copper tubing and reached eight vertical feet. The robot was powered by two 12-volt battery packs, and propelled by two electric drill motors.

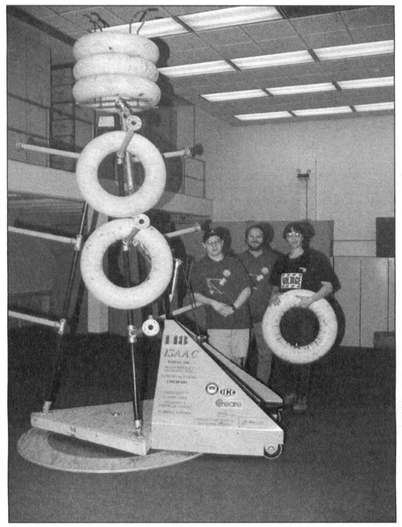
The competition's challenge changes each year. The challenge of *The Competition 1997* was to place inflated inner-tubes on a freely-rotating eight-foot-tall goal. The playing field was a 30-foot hexagon with the goal in the center and the human competitors around the perimeter.

All inner-tubes on the goal at the end of the two-minute match scored points, and various combinations were worth bonus points. Robots could also play defense against other robots.

From the beginning, money was a big obstacle. The students raised $3,000 to cover the entry fee, mainly by the old marketing strategy of door-to-door sales. The students composed a list of possible contributors and hit the streets.

Other tasks to complete before competition included a 30-second animated clip using AutoCAD, submitted for an Autodesk Award, and a 10-minute video and booklet describing the "Birth of Isaac," submitted for the Chairman's Award.

Then it was on to New Hampshire College in Manchester, N.H., for the New England regional tournament.



Jim Lever poses with Steve Athenas (left) and Conrad Barnes (right), two members of the robotics team. Beside them are Isaac, their robot, and the goal that the robot had to hang inner-tubes on.

On the first day of the "seeding" matches, Isaac won three matches, lost three, and placed second once. During the double-elimination tournament, Isaac won his first match and an award for Best Play of the Day. This left the team one win from making the final eight!

"We were experiencing marvelous stunning defeats until a robot came up and tipped us over," said Stacey Dodd, one of the mentors. "Overnight we created a new strategy — we decided to anchor ourselves against the goal."

By doing that, the other teams could not tip over Isaac, a maneuver that was tried by every robot to put them out of competition. Once a robot tipped over it was useless, unable to right itself.

Unfortunately, in the second match a competitor's slam left Isaac unable to pick up inner-tubes. "We couldn't do aluminum welding on-site, so we were out of the competition," said Lever.

So Isaac didn't win, but that doesn't mean the robot or the team were failures. The volunteer mentors passed on working knowledge of planning an event and problem-solving through engineering. The team is passing on knowledge to other students through presentations. Isaac itself has been on a non-stop tour of Scout organizations and grade schools since returning from the competition.

"I never considered engineering for college; I always looked to computer science as a major," said Steve Athenas, a student who headed up the AutoCad animation work. "But now I'll strongly consider computer engineering. My whole way of thought has changed. I used to look at a problem and think that can't be done. Now I think how it *can* be done!"

The team is already gearing up for next year. "Since the objective or task changes every year, play will be much more aggressive next year and so will our strategies," said Lever.

Philly District engineer teaches bridge design to gifted students

Article by Ed Voight
Photo by Tony Bley
Philadelphia District

"The simpler, the better — that's one of the most important things to remember when designing a bridge." Jennifer Carrigan Laning of Civil and Structural Section, Philadelphia District, shared this and other advice with two sixth-grade classes at the Bayard School in Wilmington, Del.

Both classes are part of the Christina School District's Excel program for gifted students. Facilitator Evelyn DeJohn, who works with Excel classes at Bayard and two other schools, invited Laning to share her expertise with the students for their bridge design project.

Laning covered bridges from every angle — types, foundations, design principles, traffic modeling, safety inspections, construction and operating cost. She drew most examples from the district's C&D Canal bridges.

The project involved seven teams competing for the best bridge proposal. DeJohn said, "Each team was responsible for everything — schedule, cost, and construction. The team that built the best working model with the least quantity of toothpicks and Elmer's glue was the winner."

"I wanted to give them a good feel for the issues we grapple with in designing and building a bridge," said Laning, who also gave each student an information packet on bridge design. "Even more important, I wanted to let them know this is something they could do, too, and could have fun in the process."

Armed with fresh insight and ideas after Laning's visit, the teams resumed the project. After weeks of planning, designing, building, testing, and modifying, the bridges were ready for the ultimate test — loading each with pennies until it broke, then weighing the loads.

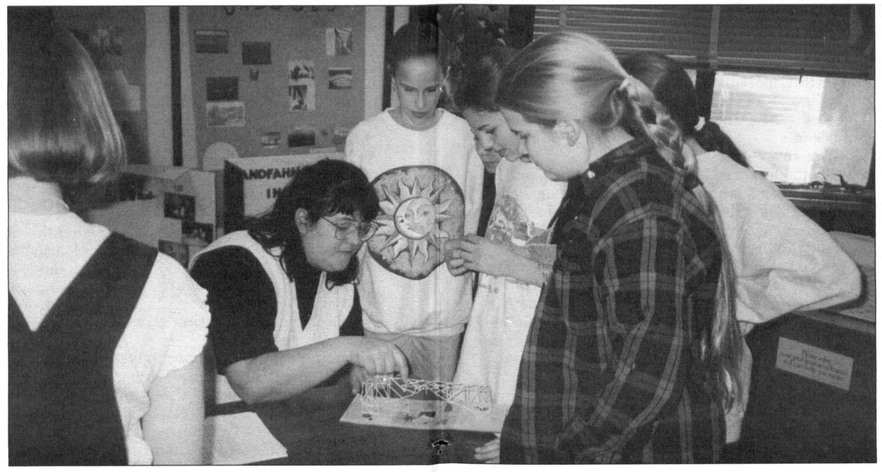
The winning team was Bridges-R-Us, whose bridge held almost six pounds before giving way.

And what did the students gain from this experience? "I learned that if you put the time and work into something, the thing you are doing will turn out better," said Steven DuPlessis of the Bridges-R-Us team.

"I learned that building a bridge takes a lot of work, and that everyone in the corporation has an important part," said Jennifer Luft of Bridges Unlimited. Teammate Kelly Royer added, "I learned that design is just as important as building the bridge, if not more."

Hearing from a real-world engineer made a big difference. "After Jennifer's visit there was a new level of excitement in both classes, and with that a change of perspective," DeJohn said. "Once they understood the forces that hold a bridge together, the fancy and elaborate designs were a thing of the past. The teams went back to the basics."

The students were also impressed that this engineer is a woman. DeJohn said, "I told them someone was coming from the Corps to speak to them about bridges, but without giving them a name. When the three of you arrived, I asked them to guess which one was the engineer. Many of them were surprised by the answer." ***(Editor's note:*** *Laning was accompanied by Tony Bley and Ed Voigt.)*



Jennifer Carrigan Laning inspects a toothpick bridge built by the Excel students around her.

Annette Marion helps measure the placement of support posts while building the Fern Ridge boardwalk.

Students build walkway, gain education, pride

Article and Photo
By Heidi Helwig
Portland District

It's one o'clock in the afternoon and mud is the dress of the day. Squishing and squashing through shin-deep gook around Fern Ridge Lake, four Youth Conservation Corps (YCC) students wear bright yellow rain pants dulled by wet and dry mud. Mud also covers their leather work-gloves, and part of their bare arms and faces.

"It hurts when you pull it off," Annette Marion said with a laugh as she picks at dried mud on her arms. Since January, Marion, 16, and three other students (Kyle DuClos, 16; Nate Shumaker, 17; and Adam DeBoer, 16) have gotten a taste of manual labor and mud while working five hours a day. They are building part of a boardwalk through an area on Fern Ridge Lake's south shoreline at Perkins Peninsula Park.

Carrying 8x8-inch beams, filling and dumping bushel buckets of gravel, and augering holes in the muddy ground are just some of the chores.

"It's hard and tiring, but you see a lot of progress," Marion said. "I've never been so tired after school and work." The three others echoed her words. "It's hard work," Shumaker said. "It's made me strong."

"It's manual labor," DuClos said. "I never appreciated a bath so much before this project." DeBoer, the quietest of the bunch, nodded.

On this day, the group placed the last nine posts to support planks for the boardwalk, a far cry from the single post the group struggled to place on their first day. "The attitudes definitely improved when we got over the learning curve," said Romero Maratea, educational coordinator and interim construction supervisor.

The boardwalk, part of a future lake-wide nature trail system to educate lake visitors about the U.S. Army Corps of Engineers and its Fern Ridge natural areas, is only one product of the students' labors. Another is education, something these students were missing in high school.

"Sitting in a classroom with 25-to-30 kids is not an environment they do well in," said Cheryl Zwillinger, program director of Looking Glass. Looking Glass operates this YCC program to provide an alternative school for high schoolers.

In the job corps program, the peer pressure and large group dynamics are eliminated, Zwillinger said. Instead, Marion, DuClos, Shumaker, and DeBoer are in a class of their own. From 8 to 10:30 each morning, they and two instructors cover English, history, science, and physical education. From 10:30 a.m. to 3:30 p.m., they work.

The classes are tailored to cover information that can be easily associated with the work experience. For instance, when the students worked last year to restore wetlands impacted by construction of a computer chip fabrication plant in Eugene, Ore., the students learned about wetlands and native plants. This semester, science classes focus on natural and cultural resources, such as those found at Fern Ridge Lake.

"The school's *fat,*" said DuClos, a current slang term meaning really good. "The classes are small so it's a lot easier to understand things. Plus, it's a lot harder to skip." In traditional school he skipped at least 40 days in a row.

Some classroom instruction also is provided by the Corps. Rick Hayes, Fern Ridge Park ranger, has presented information about the Corps, its mission, and the natural and cultural resources the agency supports and protects.

"As members of the Corps, we want to teach others about the environment and provide students with a backdrop of a school-to-work program," Hayes said. "This cooperative natural resources project is a great way to do both."

Pride is another by-product of the work.

"They won't be able to go to a park and walk a trail without knowing about all the hard work," said Scott Crowell, a substitute teacher working for Looking Glass. "I think they'll think twice about defacing it."

The Corps supports the Looking Glass Program with projects such as the Fern Ridge boardwalk construction. The Fern Ridge Project Office provides all construction materials, some classroom instruction, and a small financial contribution, said Hayes. The rest of the money for the program is funded by the state, which pays for certified teachers, and the Oregon YCC, which benefits from state-sponsored grants.

Sun Power

Photovoltaic array generates electricity in Arizona

By Mona Lee Goss
Los Angeles District

It's an endless source of free energy. It's efficient, virtually pollution free, and the U.S. Army Corps of Engineers is using it to save energy costs at Yuma Proving Ground (YPG), Ariz.

That energy source is the sun. For almost 360 days a year, it shines brightly on the desert land in and around YPG. The Corps operates a field office on Yuma and has completed a number of projects on base.

One such project is the Photovoltaic Power Station which uses the sun to generate energy. The solar energy panels convert sunlight into electricity, which is then stored in large battery banks in a nearby structure. The power station project recently received a Federal Energy Saver Showcase award. Criteria to receive the award includes demonstrating efficient use of energy and having the potential to be used by other agencies.

There are a number of government agencies working to develop energy-saving technologies for all federal facilities. Technical experts and agencies coordinating with the Corps on the Yuma project were members of the Photovoltaics for Utility Scale Applications (PVUSA) committee in the Department of Defense; a representative of the Construction Engineering Research Laboratory who is also a member of the PVUSA committee; the Naval Air Weapons Station Energy Program Office; and the Department of Energy Sandia Labs PV Systems Design Assistance Center.

The resulting project design is a leap in technology for the photovoltaic industry, according to Alex Azares, one of the Corps engineers who worked on the project. The photovoltaic and battery system, considered the largest in the U.S., can operate in two ways. It is a stand-alone power supply for YPG's Water Treatment Plant, and, when power demands are high, it can add electricity to YPG's grid to reduce the amount of power that YPG pays for.

The project provides power by using solar panels which rotate to follow the sun. The system uses 8,184 individual 55-watt solar modules. There are 11 series-connected solar modules per panel; two panels make a series string or sub-circuit. Overall, there are 372 sub-circuits connected in parallel.

The entire photovoltaic system is rated at 400 kilowatts (kW) direct current which, after conversion to alternating current, yields 375 kW — enough to supply more than 100 average homes. With the battery storage added, the system can provide up to 900 kW during peak demand periods, more than enough to operate YPG's water treatment plant during an emergency power outage.

Before the power station came on-line, YPG received 93 percent of its electrical needs from Western Area Power Administration. During YPG's high demand months, they also provided additional surplus power. However, this service may not be available in the future. The new power station will help offset any loss should YPG have to begin purchasing power from the local utility. It is expected to save at least $400,000 per year in energy costs.

YPG lies within Los Angeles District, and the district shared responsibility for design and construction contracting with Sacramento District. Sacramento produced an initial design and the request for proposal package. Once the proposal was awarded, L.A. District managed the contract and construction. Operation and maintenance of the facility is the responsibility of YPG.

The Photovoltaic Power Station was officially opened and dedicated in March.

(Dave Lehmicke, Utility Power Group; Jack Nixon, YPG Department of Public Works; Jerry Griffin, Corps Roadrunner Office; and Herb Nesmith, Public Affairs Office, contributed to this article.)

New drilling technique protects levees

By Joyce Tsai
New Orleans District

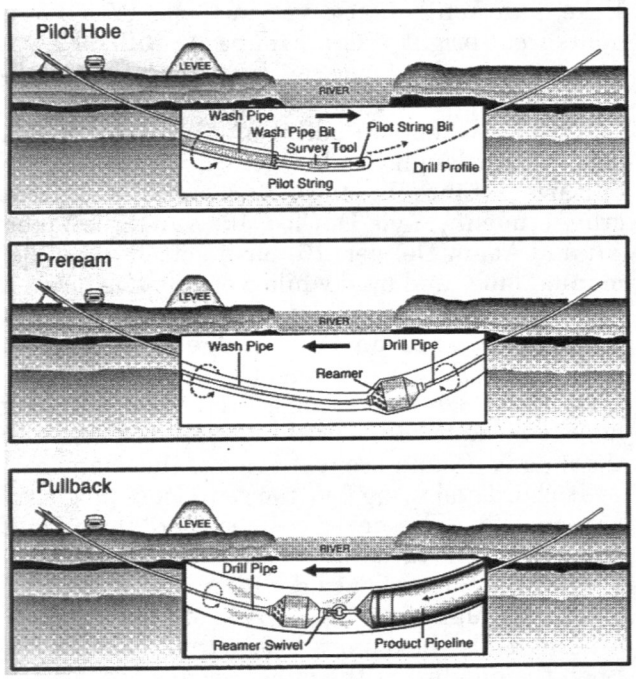
Recent cooperative efforts between Shell Oil Co. and New Orleans District (NOD) have made possible a milestone in pipeline construction — the first-ever pipeline crossing drilled *beneath* mainline Mississippi River levees.

Building a 4,000-foot, 20-inch-diameter pipeline crossing of the Mississippi River at Nairn is part of Shell Oil's Delta Loop Pipeline project. The project, which will transport crude oil to a Shell pump station in Plaquemines Parish, is a significant first in Horizontal Directional Drilling (HDD), the construction method of choice for pipeline crossings beneath waterways.

Because of past failures with this construction method, great care was taken in implementing the construction plans, and NOD worked closely with Shell. "NOD doesn't usually get involved with building such crossings, but because of the sensitive nature of this particular project, the driller would call and give us a report, even on the weekends," said Pete Cali, geotechnical engineer. "This required a strong partnership between all parties involved. We had an agreement — if anything went wrong and there was any danger, they had to stop drilling, pull the pipe, grout the hole, and abandon the whole process. We took every possible precaution."

In this time-saving, state-of-the-art method, a drill rig equipped with a guidance system was used to create a small-diameter pilot hole to map out the location of an underground pipeline. Afterwards, a reamer was pulled through this pathway to create a larger-diameter hole for the pipeline. A pre-assembled pipeline, attached to the reamer, was pulled through the larger hole from one side of the channel until it reached the opposite side.

This method of building pipelines under waterways has its drawbacks and difficulties, however, particularly for deeper and wider channels. Past efforts at using HDD under smaller channels have proved unsuccessful. Two such cases were the 1987 under-the-levee directional drilling of a natural gas pipeline installed beneath the Atchafalaya River, and the 1992 emergency replacement of a ruptured gas pipeline beneath the Gulf Intercoastal Waterway. Drilling operations fractured the foundation beneath the levee, and inadvertent return of drilling fluid and cuttings resurfaced through the ground. As a result, the levees and berms in both cases had to be rebuilt at the permit applicant's expense.



To alleviate these potential problems, the approved plan, which was the result of months of planning and design by district and Shell engineers, called for the initial installation of four piezometers (pressure sensors) to monitor possible excess pore pressure beneath the levee. It also called for the innovative use of five directionally drilled relief wells which would intersect at a point below ground at the service pipeline bores. These relief wells were designed to channel slurry and drill cuttings safely to the surface, preventing a critical pressure buildup beneath the levee during drilling operations.

Drilling the pilot hole and pullback of the service pipe was completed in three weeks, with no major setbacks. According to Cali, the plan was "an unqualified success. The problems in the past were just part of a learning curve. We learned from past difficulties, and we developed a plan which made this drilling possible under the Mississippi River and its levees for the first time."

According to Cali, the HDD method offers a number of advantages. It provides the maximum depth of cover over the completed line, impacts river traffic less, involves fewer relocations, and is often cheaper than other installation methods. "Companies like Shell like it because it saves them time and money, and we like it because there's less possibility of harm to the levees."

Cali said that the success will lead to a lot more requests. So far, research engineers from Waterways Experiment Station and designers from other Corps districts have expressed interest in this innovative method. Also, such companies as Exxon have asked to perform drilling by employing similar techniques.

The partnership led to the success and satisfaction of all parties involved, said Shell's Charles Ralston, chief inspector of the project. "This has never been done to the Corps' satisfaction," Ralston said. "But Corps personnel worked so well with us that it worked out for both parties."

Missiles can run, but they can't hide

By Ed White
Army Space Command

A truck slightly smaller than an 18-wheeler chugs along a deserted road far from the battlefield. At a predetermined location it pulls onto a flat grassy area and the crew jumps out, going about their business. Soon a missile begins a slow rise from its horizontal cradle on the Tactical Erectable Launcher. The crewmen begin their countdown once the missile is pointed at the sky. Fifteen minutes after they stopped, they take cover in nearby woods and wait for the launch. Some 500 kilometers away, the U.S. division attacking an enemy stronghold is unaware they are being targeted.

Once the missile is away, the crew scurries to the launcher and quickly leave on the only road that can handle the launcher's weight and width. They have just a few minutes to escape and hide the launcher before U.S. sensors pinpoint them and artillery puts steel on target.

This scenario could have been part of the Gulf War, or it could happen tomorrow. Theater Ballistic Missile (TBM) technologies and weapons are proliferating rapidly. They are an ideal weapon. They can be a strategic, tactical, or even a terror weapon.

Locating TBM targets on cluttered battlefield or far behind the lines is a tough problem.

Engineers at the U.S. Army Space Command's Army Theater Missile Defense Element (ATMDE), together with the Ballistic Missile Defense Organization (BMDO), the Waterways Experiment Station, and the ARES Corporation have achieved a new level of success in locating TBM and related targets.

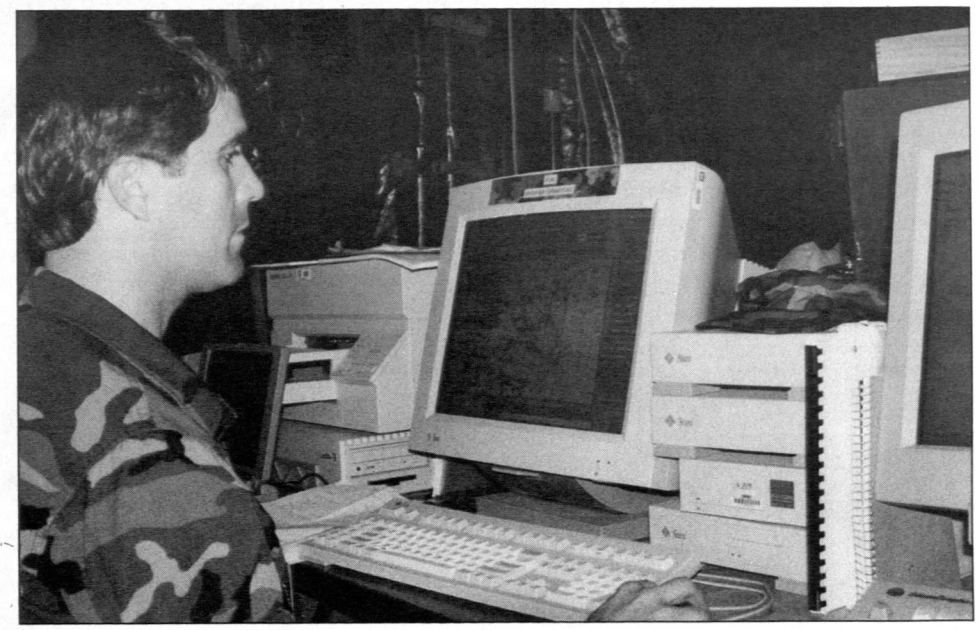
One key to this success is using an engineer mobility model developed at WES. Using this model, they have successfully disrupted an enemy's ability to execute an effective theater missile fire plan.

"If we can get the other guy off his battle rhythm and maintain our own, we control the tempo of the fight," said Lt. Col. Bill Alspach of the Army Space Command. "That's where you want to be."

The ATMDE takes satellite data and gives launch and impact point prediction to establish an area to search for the launcher. Alspach's team of tactical analysts in the ATMDE take the launch point data as a starting point and apply the mobility model to the road system.

Once the analysts determine the most likely avenue of escape for the launcher, they determine which sensors (satellite, airborne, or ground-based) could pick up the launcher as it goes into its hide site. They then decide if they want to destroy the launcher, or follow it back to its reload site and destroy that.

"If we decide to take out the TEL, we can emplace a minefield by aircraft and let nature take its course," Alspach said. "If one of our space-based or airborne sensors pick up its movement out of the hide site, we can call in an air strike.



Alex Baylot, a Waterways Experiment Station research engineer, operates the engineer mobility model. (Photo courtesy of WES)

"On the proactive side, we are able to use an already developed combat engineer software program and evolve a structured approach that develop Tactics, Techniques, and Procedures that identify countermobilty targets associated with enemy TBM operations," Alspach added. "The countermobility approach uses terrain, environmental, and mobility analysis, and current engineer countermobility doctrine to neutralize missiles."

Based on what equipment, tactics, and terrain the enemy has, Alspach's team can look for likely targets and sites for Forward Operating Bases (FOBs), bridges, and critical road intersections. Once identified, they can be targeted for destruction or the emplacement of scatterable minefields. This hampers the enemy's ability to conduct TBM operations.

"I never expected our results to be so good, so quickly," Alspach said. "We knew countermobility would affect TBM operations, but we never thought we'd achieve this high level of success so quickly."

Alspach was also pleased with the support he received from the other team members. "This wouldn't have been possible without the super team support we have received from BMDO, ARES, and WES. We've been able to achieve measurable results quickly. Locating five out of six FOB's in less than 24 hrs and targeting critical nodes of the road and rail networks are results you can measure.

"The Air Force has expressed interest in what we have accomplished," Alspach said. "This is a joint fight, and requires a team approach, thus we have been sharing our lessons learned with whoever needs the information."

Urban range to be built for tankers

By Linda James
Engineering and Support Center, Huntsville

The U.S. Army Corps of Engineers is playing a significant role in designing and building an urban training range that will help soldiers train the way they will likely fight — in the city limits of a town turned war zone.

Two Corps organizations, the Huntsville Engineering and Support Center and Louisville District, are working with several other Army organizations to meet the Army's training needs at Fort Knox, Ky. Fort Knox is home to the Armor Training School and Center.

As the Corps' military design and construction district for Fort Knox, Louisville District handles the day-to-day management of the project. Huntsville Center, through its Range Modernization Center of Expertise, provides oversight to the overall project, including the U.S. Army Missile Command portion. Huntsville's role ensures seamless coordination during design and future development of a new Army range standard.

According to Vern Petty, project manager, the urban range at Fort Knox is the first designed specifically to train soldiers mounted in vehicles such as the MlAl tank or the Bradley Fighting Vehicle. "Other urban training ranges were built to train infantry," said Petty. "Driving a tank, or a column of tanks, through a city presents a different set of problems."

In an urban environment, the tank becomes nothing more than a moving target, explained Petty. If its path is blocked, then it becomes a *sitting* target. Petty said the idea of the Mounted Urban Combat Training Site is to give soldiers the defensive and offensive tactics that may save their lives. "Realism is the name of the game," he said.

And real it is. Most infantry ranges are stripped down to empty stone walls and roofs, he explained, but the Fort Knox range is much more sophisticated. The site will be a 26-acre city equipped with dozens of buildings, parking lots, a power station, a junkyard, even a soccer field and town fountain.

Everything will be wired with computer equipment, laser engagement sensors, and special effects to create war-like obstacles to test soldiers' abilities to respond. To ensure safety and to provide a teaching tool after the exercise, there's a video camera around every corner so that all the action can be monitored. The Corporate Information Center, U. S. Army Missile Command (MICOM), in Huntsville, is responsible for the command and control computer applications for the new range.

The project has been under way for about 2.5 years, construction should begin this summer, and the first soldiers should be training by 2000. According to Petty, the project has been a partnership among the Corps, Fort Knox, and MICOM.

Why Louisville and Huntsville? Louisville is the geographic district for Fort Knox, and typically range construction projects are carried out at the appropriate geographic district.

Huntsville, on the other hand, was designated the Mandatory Center of Expertise for training ranges in 1987 when the Army decided range design and construction needed to be standardized. The mission fell to Huntsville Center. Usually, Corps districts will build only one range every five years, but Huntsville is involved in range design and construction every day.

Part of the Huntsville Center role is to provide two mandatory inspections during the construction of ranges. The first is a target interface inspection done early in the construction process as soon as one of every type of target is in place.

The second is a construction compliance inspection done when construction is almost complete to ensure all electrical connections are target-ready. "If this inspection isn't done, then the procurement office that controls the purchase of all targets will not install the targets, and that will bring the project to a screeching halt," Petty said.

Currently, Huntsville is working on 18 ranges, either under design or under construction, for the Marines, Army, and Army Reserve.

Modern explorers brave the Everglades

Article by Christina Plunkett
Photo by Mark Wolff
Jacksonville District

Thick sawgrass in the Everglades dwarf members of the expedition and their canoes as they get their bearings with the Global Positioning System. Left-to-right are Cyril Zaneski, Winifred Park, David Swetland, and John Ogden.

It was no ordinary canoe trip. Eight adventurers, two from Jacksonville District, travelled through the heart of the Everglades where few have gone before. It was the centennial celebration of Hugh Willoughby's journey — the first non-Indian to cross the 'Glades.

The adventure began when Susan Bullock learned of John Ogden's desire to retrace part of Willoughby's path through the Everglades. Ogden, a senior scientist for South Florida Water Management District, has studied the Everglades for 30 years for the National Park Service. He planned to canoe to a campsite on the 100th anniversary of the day Willoughby camped there. Ogden felt a canoe trip would honor Willoughby, and give an opportunity to see how the ecosystem has changed.

Ogden invited anyone who wanted to experience the real Everglades to join him. Bullock told a fellow veteran canoeist in the district, Mark Wolff, and they both joined the expedition.

Although the Everglades are a fraction of their past size, and it's been fully mapped since Willoughby's time, few people have ever seen the "real" 'Glades. The heart of Everglades National Park is as wild as ever, and special permits are required to go beyond the developed areas, which is all most people ever see.

So Bullock and Wolff were excited about the opportunity to see the Everglades, but for different reasons.

As a hydraulic engineer in the Water Management and Meterology Section, Bullock monitors water levels in the Everglades by operating the flood gates along Tamiami Trail that bring water into the park. "I wanted to see how the different water levels I monitor affect life in the area and how what I do contributes," Bullock said.

As a South Florida native, Wolff knows how urbanization and agriculture have degraded the Everglades, so he wanted to see how much is left. "This was an opportunity to go with scientists who know a lot about the ecosystem," said Wolff, a project manager for Construction Operations Division.

Of course, Bullock and Wolff say the main reason they went was the simple desire to prove they could do it, like Willoughby, who wanted to be the first non-Indian to cross the Everglades. He wrote in his journal, *River of Grass*, "It may seem strange, in our days of Arctic and African exploration, for the general public to learn that in our very midst...we have a tract of land 130 miles long and 70 miles wide that is as much unknown to the white man as the heart of Africa."

The modern explorers began their journey by meeting just off the Tamiami Trail at Levee 67 Extension's gate. First they paddled several miles down the L67 canal, and a few more miles further out on what rangers call the "airboat highway" across Shark River Slough.

Their adventure truly began when they turned west off the airboat highway into the slough, where a special permit is required to enter the dense sawgrass.

Moving their canoes was slow and exhausting. They had to stand and muscle the vessel ahead a few feet at a time with a long pole. When they crossed limestone even poling was impossible, so they had to drag their canoes in knee-deep muck.

It was unlike anything Bullock or Wolff had encountered in past canoe runs. "The environment contradicted what you'd expect," Bullock said. "In the deepest areas of water where you'd count on less sawgrass, it was thick instead. Neither of us had any idea of the effort it would take to move through the 'Glades."

The explorers' original goal was to get to Willoughby's Key, about six miles out from L67 canal, but soon realized their slow pace would not allow them to make it there and back in three days. Instead, they camped both nights at Black Hammock Island.

Getting on the island and setting up camp was a challenge. The canoes could only get within 100 feet due to thick vegetation, so the group had to make many trips carrying equipment. This meant sloshing through knee-deep mud, breaking a trail through dense brush, and trying to make tent-space where there was no open ground.

Even finding a tree island dry enough to camp on was a difficult task. Tree islands (called hammocks or hummocks) form as trees take root, drop their leaves and grow more trees until an island forms.

"The tree islands are phenomena in themselves, providing habitat for many species from panthers to nesting birds," Bullock said.

The effort paid off when they finally settled in for a night under a sky full of stars while birds and insects serenaded them.

"Some of the birds we saw and heard included the wood stork, ivis, and limpkin," Wolff said. "I only wish we could have recognized all the species we saw because there was such a great variety."

The next day's goal was to pole to an island where Willoughby camped 100 years ago. Although the island was close enough to see from Black Hammock, it was a tedious poling and dragging trip. But they made it by mid-day and celebrated with lunch and a champagne toast.

"It gave us all a sense of history and awe to know that Willoughby had walked this same area 100 years earlier," Wolff said.

"And our reverence for this last frontier really brought home the importance of saving what's left of the 'Glades, and of the multibillion dollar restoration of the area," Bullock added.

With bloody shins from scraping against the dense brush and sawgrass, and aching muscles, the group made it back to Black Hammock by sunset with a new appreciation for Willoughby's trip. They knew first-hand what they read in Willoughby's journal about the grass being "so much to be dreaded [because of its] saw-like edge...If you get a blade between your hand and the pole, it will cut you to the bone, with a jagged gash that takes long to heal."

On the trip back, Bullock and Wolff, sharing Wolff's woodstrip canoe, discussed what they'd learned.

"It wasn't more than a generation or two ago when all of South Florida was part of the Everglades," Bullock said. "Back before the Central and Southern Florida Project, the timing and volume of water through the Everglades was determined by the natural cycle of drought and flood. Today, water managers determine the timing and volume by reducing water to avoid floods during wet seasons and delivering water during dry seasons. But because of development pressure in the last 50 years, we've segmented the Everglades and, if we're not careful, we're going to lose it all."

Bullock and Wolff were also stunned by the small amount of pristine 'Glades left and how fragile it was. "As dense and formidable as the sawgrass looks, as I turned to peer aft after traveling through an area, it bothered me that the canoes had left a trail," Bullock said.

"This trip was a reminder of what mankind had before the asphalt highway took over," Wolff said. "It's almost impossible to get far enough away not to hear and see the effects of civilization, but we did it."

Wolff said the only sounds were the occasional call of birds, the rustling of the wind in the sawgrass, and the high-pitched scraping of it against the canoes.

Around the Corps

General officer reassignments

The Chief of Staff of the Army has approved the reassignments of the following general officers:

Brig. Gen. Jerry L. Sinn, from Director for Operations and Support, Office of the Assistant Secretary of the Army (Financial Management), Washington, D.C., to Commanding General, North Atlantic Division, with a reporting date to be determined.

Maj. Gen. Clair F. Gill, from Commanding General, U.S. Army Engineer Center and Fort Leonard Wood, Fort Leonard Wood, Mo., to Director of the Army Budget, Office of the Assistant Secretary of the Army (Financial Management), Washington, D.C., with a report date to be determined.

Maj. Gen. Robert B. Flowers, from Commanding General, Mississippi Valley Division, to Commanding General, U.S. Army Engineer Center and Fort Leonard Wood, Mo., with a report date to be determined.

Maj. Gen. Milton Hunter, from Commanding General, North Atlantic Division, to Director of Military Programs, with a report date to be determined.

Brig. Gen. Phillip R. Anderson, from Director of Military Programs, to Commanding General, Mississippi Valley Division, with a report date to be determined.

Education partnership

The Construction Engineering Research Laboratory (CERL), has entered into an educational partnership with North Carolina A&T State University (NC A&T), a Historically Black College/Minority Institution. Michael O'Connor, CERL's Director and Ernestine Psalmonds, the university's Vice-Chancellor for Research, signed the agreement in a ceremony at NC A&T.

NC A&T is interested in promoting Army technology through advanced studies in engineering design, energy controls, structural design and facility management. O'Connor said that NC A&T offers excellent research capabilities that can support CERL's programs.

The cornerstone of research and development at CERL is built on integrating basic research from academia into its applied research programs. The partnership agreement enhances this by establishing the framework to involve NC A&T faculty and students in research programs.

Correction

Ericca Olsen, a student aide in the public affairs office of Rock Island District, wrote "Foreign students find 'mom' in U.S." in the May *Engineer Update.*

PIANC competition

The Permanent Association of Navigation Congresses (PIANC) is seeking papers for its 1998 International Gustave Willems Award competition.

The award is presented for the most outstanding technical paper on design, construction, improvement, maintenance, or operation in inland or maritime waterways, inland and maritime ports, and coastal areas. The competition is open to engineers, researchers, and other professionals, as well as students.

Applicants must be under the age of 35 and submit an abstract to PIANC by June 15. The technical papers are due by Oct. 15.

For more information, contact the U.S. Section, PIANC, 7701 Telegraph Road, Alexandria, Va. 22315-3868, or call (703) 428-6286.

Michael Maples and Joann Rosenfeld pose with some of the props used in their award-winning video. (Photo courtesy of New Orleans District)

Video award

New Orleans District Visual Information Specialist Michael Maples, and Hydrologic Technician Joann Rosenfeld, flew to Washington D.C. in early May to receive an award from the Department of Treasury for a video they produced to promote 1996's Savings Bonds drive. The video received first place in the department's 28th Annual Savings Bonds Communicators' Competition, Audiovisual Category.

Engineer honored

William Myers, an engineer at the Waterways Experiment Station, has been honored by Southern University in Baton Rouge, La. The university recognized Myers for his contribution to the curriculum of the Safety of Dams Training Program.

Myers, who works in the Geotechnical Laboratory, has been helping Southern University since 1993 to establish studies in dam engineering. The Department of Civil Engineering presented Myers with a plaque during a recent lecture. Myers voluntary sends material and information and has given 12 lectures since 1993.

Beach restoration

Galveston District, teamed with the Texas General Land Office, Texas Parks and Wildlife Department, and Galveston County Beach Park Board, placed sand dredged from the Gulf Intracoastal Waterway (GIWW) onto the eroded beaches near Rollover Pass. The Corps completed a similar project at South Padre Island this spring.

About 200,000 cubic yards of sand and silt was pumped onto the beach, extending it 1,000-2,000 feet to the west. Work started after Memorial Day and ended about three weeks later. The contract also called for routine maintenance dredging on the GIWW at Port Bolivar to restore the channel to 12 feet deep and 125 feet wide. About 1.8 miles of channel was restored.

Work was done by the pipeline dredge *Everett Fisher,* pumping about 12,000 feet using 20-inch diameter dredge pipe. The pipe ran under the State Highway 87 bridge at Rollover Pass to avoid disrupting traffic.

Galveston District operates and maintains about 1,000 miles of deep- and shallow-draft waterways on the Texas coast, with waterborne commerce exceeding 350 million tons annually. The GIWW in Texas carries about 78 million tons of cargo annually with a value of about $22 billion, making about 125,000 vessel trips.

Dredge crewman rescues 3

By Ed Voight
Philadelphia District

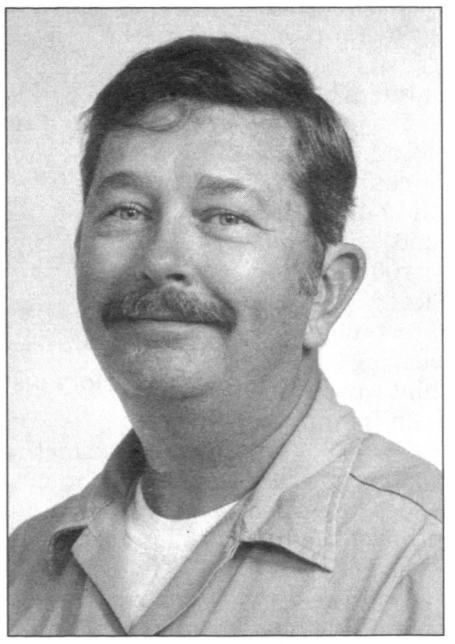
A crewman on Philadelphia District's dredge *McFarland* is credited with saving three lives.

It started as a routine Saturday morning aboard the oceangoing hopper dredge, which was on assignment in the Mississippi River delta. Around 6:45 a.m. on May 10, the *McFarland's* launch *McFarland II* was lowered so that launch operator Billy Birch could deliver mail and take care of other ship-related business.

Almost two hours later the *McFarland II* came upon a 50-foot shrimp boat that was listing hard to its port side with one outrigger overboard and the other stowed away. The boat was crewed by four Vietnamese fishermen.

"It appeared the crew members were trying to bring the boat back to an even keel, but despite their best efforts it still turned over," said Birch, who was 100 yards away when it capsized. One crewman was on top of the overturned hull and two were stranded in the water with nothing to hold onto. Birch immediately called a "Mayday" notifying the Coast Guard station in Venice of the emergency.

But Birch did not stop there. He maneuvered the launch to the nearest man and pulled him out of the river, then ran back to the helm and backed astern to get the second man out. He went to the overturned boat and took the remaining fisherman aboard the *McFarland II.*



Billy Birch, launch operator of the dredge *McFarland,* is a hero for the second time. (Photo courtesy of Philadelphia District)

There was a language barrier, but the fishermen were able to tell Birch through hand gestures that another crewman was trapped inside the capsized vessel. A Coast Guard patrol boat arrived shortly thereafter to pick up the three survivors.

Birch later learned that the fourth crew member had drowned. But without his intervention, the death toll might have been four instead of one. The Coast Guard is still investigating the accident.

"This was a truly heroic and unselfish act, reaching out to a fellow waterman," said Joe Vilord, master of the *McFarland.*

"I just did what I hope someone would do for me," said Birch. This was not Birch's first save. In September 1995 he successfully performed the Heimlich maneuver on a choking fellow crewmember during dinner aboard the *McFarland.*

Birch lives in Chincoteague, Va., and has been with the U.S. Army Corps of Engineers seven years.

Fuel spills cleaned up at Ft. Benning

Article by Alicia Gregory
Photos by Jonas Jordan
Savannah District

In 1988 a fuel leak was discovered at the Main Mall Service Station at Fort Benning, Ga. The leaks (there were several) came from the lines that connect the gas pumps to the underground fuel storage tanks. Concerned about soil and groundwater contamination, Fort Benning asked Savannah District to investigate the leaks and come up with a corrective action plan.

"Once it was determined the soil and groundwater contamination exceeded allowable limits, we submitted the plan to Georgia for approval," said Porter Morgan, a geologist in the Hazardous, Toxic, and Radiological Waste (HTRW) Section. "However, the project was put on hold for four years due to lack of funding."

A year after the leak was found, the Corps established a program to develop innovative technology to improve the efficiency and lower costs of HTRW cleanup. The Innovative Technology Program uses Corps research and development labs and the U.S. Army Environmental Center to develop new technology.

The program's Innovative Technology Action Plan covers eight areas:

- Innovative Technology Advocates (ITAs) at HTRW Design Districts.
- Formal processes in funding and selecting projects for innovative technology.
- Training, education, and sharing lessons learned.
- Standard format to collect cost and performance data.
- Appropriate contracting tools.
- Flexibility through partnering.
- Risk sharing and restitution.
- Incentives to accelerate commercialization of research and development efforts.

The Corps is working now in four areas — the ITA program, research and development, guidance on application and design of innovative technologies, and use of innovative technology by Corps districts to clean up sites.

The Main Mall Service Station is a site where innovative technology is being used. Once funding was available, Savannah District hired an architect-engineer firm to determine if the contaminates had spread. The contamination had doubled during the four years. The area of ground-water contamination was 1,600 feet long and 1,100 feet wide. Soil contamination was 200 square feet.

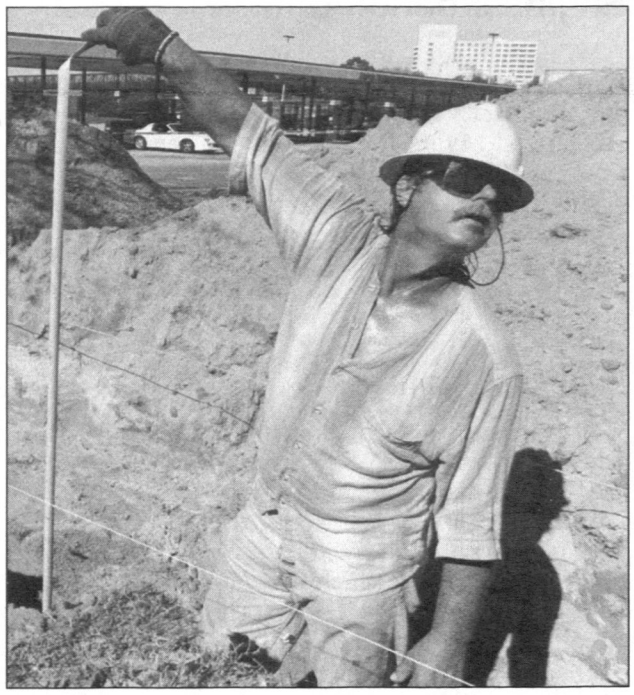
The contractor evaluated several techniques for remediation: removing the soil, bioventing (supplying oxygen through wells to stimulate bacteria), soil vapor extraction, air sparging, and pump and treat.

It's not always easy to persuade customers to use innovative technology. "It's difficult because often we don't have a lot of experience with the technology, and little documentation," said Bob O'Kelley, a supervisory geologist in the Geology/Hydrogeology and HTRW Design Section. "It's important to have a good relationship with your customers. They have to trust your judgment, but also be an equal partner in technology selection. It's often a hard sell, but many customers understand the advantages of using this type of technology and are willing to take the risk."

"The different technologies were evaluated for the cost and efficiency of the operation," said Morgan. "Because this is a high-traffic area (beside the post exchange), remediation also had to be inconspicuous. This area lent itself to processes that could be generated underground and in situ."

Based on the criteria, a combination of soil vapor extraction and air sparging was the best option. "The customer's needs, cost, and state approval were crucial in making the decision," said Morgan.

These 10 old underground storage tanks were replaced with three new tanks.



Contractors install the air sparging system.

"In soil-vapor extraction, a series of wells are drilled, then a vacuum is placed on the collective system to move air through the pores of the soil," said Morgan. "This process also increases any microbes in the soil to assist in breaking down contaminants."

Beneath the vacuum system are air sparge wells that pump air into the ground-water to force contaminates into the soil, which are vacuumed by soil vapor extraction.

"Once the method was determined, a design plan was developed by the A-E firm and service station manager, the Department of Public Works (DPW), and the district's West Area Office," said Morgan.

During the design process, the underground storage tanks (USTs) were removed. "DPW decided to excavate the old storage tanks and replace them with three new ones to decrease the chances of more contamination to the site later," said Morgan.

With the design completed, the contract went out to bid and was awarded to City Environmental of Detroit.

Information gathered in projects like this is shared with federal and state agencies, and with civilian enterprises. HTRW Design Districts encourage using innovative technology in site characterization and cleanup, including tracking innovative technology projects, evaluating innovative technology in HTRW applications, and promoting innovative contracting methods.

In 1994, the Corps established an ITA position at each HTRW Design District with more than 100 HTRW positions. (Corps headquarters provides 50 percent of the funding for each ITA position.) Seven districts — Omaha, Tulsa, Sacramento, Kansas City, Alaska, Baltimore, and New England have designated ITAs.

There are not 100 HTRW positions in Savannah District, so an innovative technology point of contact was appointed. The district's point of contact is O'Kelley, who does this work in addition to his regular duties.

The district uses a team of employees from Engineering, Project Management, and Contracting divisions to promote HTRW innovative technology projects.

"Our goal is to find cheaper and better ways to serve our customers," said O'Kelley. "Once we receive a project, we decide whether to encourage using innovative technology. That depends entirely on the project.

"In most cases, the innovative technology saves the customer time and money, said O'Kelley. "When we pump and treat a site, it's expensive and can take 30 or more years to complete. Using technology like air sparging can reduce the time for remediation by many years. Using SCAPS (laser scanning) technology for site characterization can also save up to 50 percent. Bottom line — innovative technology generally results in cleaner sites at lower costs."