



Big operations mop up after Floyd

For days, U.S. Army Corps of Engineers staff on the East Coast watched the vortex of Hurricane Floyd edge toward the Southeastern U.S. It approached Florida and passed. Then on Sept. 14 Wilmington District people arrived at work to find that Floyd was headed up Hurricane Alley, straight toward the North Carolina/South Carolina border.

Once again, North Carolina was the target of a major hurricane. By Sept. 15, heavy rains were flooding low-lying areas. By the weekend, people were coping with extraordinary floods caused by 18-to-20 or more inches of rainfall in North Carolina's eastern corridor.

In North Carolina, the Tar and Neuse rivers experienced 500-year floods. The Black, Cape Fear, and Northeast Cape Fear rivers were also flooded. More than 600 roads were closed or damaged, including part of Interstates 95 and 40, and Route 17. More than 4,000 homes were destroyed, and more than 17,000 damaged. Forty-eight people died.

In New Jersey, the Hackensack, Raritan, and Passaic river basins flooded. Nine roads were closed, including the Garden State Parkway. About 11,000 homes sustained major damage, 171 were destroyed, and almost 1,500 businesses applied for aid. There were four deaths.

In Virginia, the Chowan River Basin flooded with high water in the Nottoway, Blackwater, and Meherrin rivers. Several thousand people were evacuated and housed in shelters. Power outages affected 225,000 customers, and the water treatment plant in Portsmouth flooded, leaving 100,000 people without water. Numerous roads were flooded or washed out, including I-95 south of Petersburg and I-64 in Newport News.



Larry Zirkle from Seattle District oversees the sandbagging at Grainger Power Plant in Conway, S.C. (Photo by Jonas Jordan)

When disasters strike, the EOC core expands from three people to a larger team for 12- or 24-hour operations. They manage the initial response, find lodging and conduct personnel business for people arriving from other districts, track the storm, arrange communications and emergency power to keep the district functioning, and help compile information on emergency missions.

ERRO

An ERRO can perform all the functions of a Corps district.

"Corps districts maintain an ERRO staffing plan and a cadre of trained people, so we can immediately stand up a basic district structure just for emergency response," said Steve Aiken, Chief of the Hurricane Floyd ERRO. Once in place, the ERRO can receive added personnel from around the Corps to help with its missions.

An ERRO is as big as it needs to be — no bigger. "We're able to keep this ERRO pretty small, and we're watching taxpayer dollars like a hawk," said DeLony. "We receive our missions from FEMA, who directs us to do jobs that the state and local governments have decided are beyond their capacity."

The ERRO held the line at 80 employees, but they moved 600,000 pounds of ice and six million liters of bottled water.

"Some of the ERRO's tasks are not just a full-time job, they're a job-and-a-half," Aiken said. "That's why the Corps deploys Planning and Response Teams (PRTs) and functional teams to help with the missions FEMA assigns us. The Hurricane Floyd ERRO has a water team, an ice team, and has emergency power support and debris management teams standing by."

The water and ice teams worked from five or six in the morning until 10 at night ensuring that contractors maintained obligations, provided liaison

with Logistics Emergency Response Teams at delivery sites, and coordinated with local emergency management offices and state government to ensure those who need emergency ice and water received them.

Water controllers

"There's no control, and there's some control, but there's no such thing as total control," said Terry Brown, Water Control Manager. In consultation with the National Weather Service and the Southeast River Forecast Center in Atlanta, Brown and his colleagues calculate how much water should be released from flood-swollen reservoirs.

"We do our best to provide safety and security for our dams and reservoirs, yet not burden flooded communities with more water than they can handle."

"Hurricane Floyd has been terrible for many people," Brown said. "Yet from where I sit, the situation could have been worse. When the storm hit, our reservoirs were all suffering from drought, so we had a lot of flood storage. In the days following the storm, we had clear weather. We held our releases to almost nothing for more than a week, then moved to a gradual schedule of releases that we intended to last until mid-October. Then we were hit with more rain, as much as eight inches."

District water control managers held back floodwaters again until the Falls Lake level almost touched the dam's spillway. "There's still more than 28 feet of storage left in Falls Lake when the water reaches the spillway, but this was a significant moment," Brown said.

The wet weather abated, and a regular program of releases resumed. "Every event teaches us more about what we can and can't do," Brown said. "This time, we cleared a number of deviations from our

South Atlantic Division

Forty-eight hours after the rains left, three big white vans pulled into Wilmington District's parking lot. The Deployable Temporary Operations Centers (DTOC) housed complete facilities for an Emergency Response and Recovery Organization (ERRO) to bring disaster relief to North Carolina.

In addition, Corps specialists came from Rock Island, Illinois, Kansas City, Los Angeles, and Savannah districts to help get emergency water, ice, and other support to the flood-damaged areas in the Cape Fear, Neuse, and Tar river basins.

"My own district staff is working around the clock in the Emergency Operations Center (EOC)," said Col. Jim DeLony, Wilmington District Commander. "They've been there since three days before the storm. They're doing a super job, as are our Preliminary Damage Assessment and Survey Teams, who are out looking at damage to our communities and waterways. We're working in close coordination with North Carolina and the Federal Emergency Management Agency (FEMA)."

'Round the clock

"You could say we're *too* good at this," said Joel Hendrix, Emergency Operations Manager. After five hurricanes in 38 months, he could be right. The Emergency Operation Center (EOC) is the brain, eyes, ears, and heartbeat of the district 24 hours a day during a crisis.

Insights

Giving thanks in the midst of disaster

By Lt. Col. Tim Carlson
Chaplain, U.S. Army Corps of
Engineers

Not long ago, in the aftermath of Hurricane Floyd, I overheard a colleague say, "More business for the Corps!" One could easily say, "How callous, opportunistic, and unfeeling!" However, that wasn't the intent of his comment, and there's much more to it than meets the ear.

From ground-level in North Carolina, the sight of bloated, drowned livestock must have been most saddening to the area's farmers. The silt and mud which layered the homes must have been annoying and most intrusive. The persons who literally lost it all were surely devastated beyond words.

The misfortune of others creates a need for outside support. Part of our organizational mission is to go and do what we can to clean up, restore order, and help people return to a measure of normal living.

But that mission implies far more than the words say. There are important lessons we can learn in the aftermath of disaster. Strangely enough,

many of them relate to *giving thanks*.

During the last few months we have seen much calamity in our world. The earthquakes in Turkey, Greece, Taiwan, and Mexico; the flooding on our eastern shores; the war in Russia; and the fires on the West Coast are only a sampling of these global trials. While we may not have been directly affected, many on our planet were. They have faced these ordeals and been profoundly impacted, in life or death.

Who is able to assist in many of these global crises? The Corps of Engineers is able. Whether it is a water and ice mission, a clean-up mission, a river analysis and flood control effort, a rescue effort, or you-name-it, we are often capable of being there and helping. Seen from the aspect of the ability to support, "More business for the Corps" really means more *rescues* from the Corps. The emblem of the Engineer Castle on a hard-hat may be as soothing to a victim of a flood as any other image he could see.

Time and again, Corps people who work during disasters say that helping people is what the mission is really all about. And they say that just one person saying, "Thanks for help-

ing us" makes all the effort worthwhile.

Some years ago I had a discussion with someone about a verse of Holy Scripture which states, in one translation, "In everything give thanks." That's a tough directive. To see the spot where one's home stood, or the barn where one's livestock lived, and know that one will *never* see these possessions again is difficult. It is a grief, a sadness, and a loss.

The person I was talking to had a little different perspective on the verse. He said, "I think it really means, 'For everything give thanks.'" That was a stretch too far for my thinking just then but, having been with the Corps of Engineers for awhile, I think I understand now. I can imagine receiving some bottled water and ice, or some blue plastic sheeting to replace the blown-away roof of my home, and saying, "Thank you, Corps of Engineers!"

That's the full meaning behind my colleague's statement, "More business

for the Corps!" He has seen our team perform after disasters for more than 30 years. He knows the Corps's ability to respond, and he knows how much that aid is appreciated by those who receive it.

I think that is the meaning of "In everything give thanks!"

There is a larger lesson in all this. This time of year has a history of giving thanks, and I invite us to take a lesson from those who are grateful for the Corps' help. May we acknowledge the reservoirs of grace that daily lace our lives with health, resources, and well-being. To acknowledge both the gift and the giver makes giving thanks as normal as breathing.

(The views expressed in this article are those of the author and do not reflect the official policy or position of the U.S. Army Corps of Engineers, the Department of the Army, the Department of Defense, or the U.S. Government.)

Commentary

Hurricane showed what's important

By Christina Plunkett
Jacksonville District

When Hurricane Floyd took over my life for several days in mid-September, it reawakened my awareness of what's important.

The media urged Jacksonville residents near the beaches to evacuate. Although I'm a westsider, I began questioning what I would take if I *did* have to evacuate. What I thought would be a weary matter of gathering up survival essentials and important "valuables" became an examination of my values.

My thoughts first went to my pioneer forefathers, who didn't need microwave ovens, cable TV, or electric blankets to survive. It's certainly scary when our existence is reduced to what can fit in a minivan and we're subjected to bedding-down in a high school that's been converted to a makeshift evacuation shelter. But how can we complain when this type of "roughing it" is far better

than everyday life a 100 years ago?

All the junk I've collected became painfully obvious (to my aching back) as I prepared for the worst. I gathered yard "art" (concrete statues, wooden birdhouses, and ceramic planters) and thought about all the stuff I've accumulated during the years, questioning their purpose. I dragged back-porch furniture covered in dust to the garage and wondered why I rarely take the time to sit in them and enjoy nature. I taped and boarded windows and lamented about how I would feel if I lost my Nana's antiques, or my Dreamsicle collection, or the needlepoint and ceramic decorations I've spent a lifetime creating, or my bed, my clothes, my home.

I've never seen myself as materialistic. I wasn't raised that way. I'm proud that my parents, who could afford to move into a more spacious house or a better neighborhood, have lived in the same house all their married lives (50 years). I enjoy reading instead of watch-



ing TV, baking my own bread and cookies and hanging my clothes out to dry in the sunshine.

Still, I was panic-stricken at the thought of losing my possessions. Then it dawned on me that it wasn't the things I was clinging to, but the memories they represent.

That's what natural disasters destroy...memories and dreams.

Like the surreal images in a Salvador Dali painting, the media captured Floyd's flooding in the Carolinas. Floating livestock and the roofs of submerged cars and houses dotted a never-ending sea that used to be farmland and neighborhoods. Sitting in a rowboat, rowing over what used to be his farm, a Carolina farmer who raised pigs for a living talked about how Floyd had not only taken his worldly goods but his dream as well. I watched these images in numbed horror, reminding myself that it could have been me, if Hurricane Floyd had hit Florida broadside.

I suppose it's time to heed that inner voice calling me to slow down and spend more quiet-time and family-time. I can't help but notice that today's self-help book craze has evolved from finding/accepting yourself to saying no; from accounts on how to get ahead and accomplish more to getting back to a simpler way of life.

Maybe Hurricane Floyd tested more than our preparedness for a disaster. Maybe it got us thinking about what's *really* important — family, friends, memories, and toilet paper. It wouldn't hurt to take time to mentally "evacuate" from time-to-time to appreciate life, and to think about what you *really* need to feel content, safe, and happy.

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Official Corps of Engineers Prayer

(Editor's note — In its entire 224-year history, the U.S. Army Corps of Engineers has never had an official prayer. At the direction of Lt. Gen. Joe Ballard, Chief of Engineers, Lt. Col. Tim Carlson, the Chaplain of the Corps, wrote the following prayer, which was officially adopted on Sept. 1, 1999.)

Almighty God, creator of the universe:

We praise You for spanning heaven and Earth and holding the plumb line of the cosmos in Your gracious hand.

Thank You for past engineers who have served with dedication, gallantry, patriotism, and skill — sometimes at the cost of their mortal lives. Bless today all men and women of the United States Army Corps of Engineers wherever they are stationed around the globe.

As we perform our varied tasks, guide us in making rough places smooth, crooked places straight, and our environment safer. May our minds be keen, our calculations accurate, our myriad projects successful, and our faith in You unending. Enable our to-

pographers to be precise, and our stewards of resources to be steadfast. May our works reflect a degree of Your perfection and bring delight to everyone who benefits from them.

Give audacity and courage to our combat elements. May our lead on the battlefield enjoy Your guard as we prepare the way for others who are committed to freedom and justice throughout the world.

Open our inner lives to know You better and receive Your gift of deliverance through salvation. Grant us wisdom in our efforts to improve, maintain, protect, and restore Your creation. Inspire us to also treat fairly all You entrust to our care.

Help us to conform to Your will and be faithful in all our pursuits. Then may we mirror Your divine order, with leadership in engineering that builds a lasting legacy for every generation.

Essayons!

In Your name we pray, almighty God, engineer of all eternity.

Amen.

Engineer efforts aid small town response

By Karin Martinez
Savannah District

Conway, S.C., was one town impacted by Hurricane Floyd, and Savannah District and the South Carolina National Guard were there to help.

"The sun was shining, but the fight hadn't even started in Conway," said Maj. Mike Clarke, district operations officer at Fort Bragg, N.C. Clarke knows disasters -- he worked during both the Los Angeles earthquake and Hurricane Georges. So Charleston District, lead district in post-Floyd operations for South Atlantic Division (SAD), called him to run the emergency operations center (EOC) in Conway.

The fight Clarke refers to was the worst flood Conway has ever seen. While other municipalities were open for business after Floyd, Conway residents were trying to save their town.

Corps-wide response

Since Charleston District had severe damage to the roof of their building and worked out of temporary facilities, other districts helped in the fight. Besides Charleston and Savannah, people came from Jacksonville, Louisville, Mobile, Seattle, and Sacramento districts. By the time it was over, Corps members worked with city, county, state, and federal officials, plus National Guard soldiers of the 122nd Engineer Battalion from Batesburg, S.C.

According to Paul Whitten, Horry County emergency operations director, 16-24 inches of rain in one day caused the Waccamaw River to flood.

Three concerns

"Horry County had three areas of concern — wind, flash flooding, and flooding," Whitten said. "There wasn't much damage from wind or flash flooding; the problem came from the watershed in North Carolina. Water spread laterally for hundreds of miles."

The 26-member EOC team had three missions — mission support, technical assistance, and debris removal.



South Carolina National Guardsmen sandbag the Trinity Methodist Church in Conway, S.C.

"We put in many 16-hour days," Clarke said. "We had several issues to contend with, such as maintaining Conway fortifications, sandbag distribution, regulatory and real estate rights of entry, and debris removal."

The team did a community assessment to find the best way to maintain fortifications. They determined certain public buildings needed to be saved, including city hall, Social Security, deeds and registry, and public safety (where the EOC was located).

Sandbags

"We knew that we had to think of this as a 'point-target' fight," Whitten said. "We doubted we could save each home, so we had to protect our community interests."

Protection meant sandbags. Whitten, Clarke, and the EOC staff figured the river would crest at about 17 feet. The EOC centralized the sandbag operation and claimed priority on 25 vehicles filled with sandbags coming to Conway.

During the operation, flood fighters filled 475,000 sandbags. To protect he

environment, the Grainger Power Station and Grand Strand Water and Sewer Authority were sandbagged, plus 13 sewage lift stations in Conway and 15 in Socastee, S.C. The river crested at 13 feet, 2.9 inches, and the sandbags made all the difference.

"We were remarkably successful in keeping any hazardous material from getting into the river," said Maj. James Neal, deputy commander of Charleston District. "The sandbags enabled us to protect the sewage system."

Save the bridge

Clarke said the success had to do with preparation.

"We started thinking about this early," he said. "We were ready on Saturday morning for a Tuesday crest. It wasn't predictable; it could've come any time, so we wanted to be sure we were ready. The real work came after the river crested."

Part of the work was the Oak Street Bridge.

"It was clear that we were about to lose access east and west, which meant losing access to the hospital, and to

Highway 501 which many people take to work," Whitten said. "We don't have many roads that run east-west, so it was vital to save the bridge. The Corps of Engineers stepped in and took care of everything."

"We started talking about the Oak Street Bridge about 11 o'clock one morning, and by 8 p.m. the contract was cut," Clarke said. "By 9 p.m., the contract was signed, and 20 hours later, the bridge was taken care of with a berm and sandbags. It was a fast, efficient operation."

Good decision

The unsung heroes of the flood fight were the contracting professionals from Charleston District, Clarke said. "Those guys were awesome. They cut contracts left and right, in record time. Charleston District was fully committed to this operation."

"A lot of us didn't know how to conduct a flood fight, and it was a great decision to bring the Corps in," Whitten said. "They knew exactly what to do, and everything worked well. We have a much better idea of what to do now."

The work isn't quite finished. On Oct. 1 the project transitioned from emergency to recovery operations. The emergency operations team dwindled from 26 people to about nine, and the debris removal mission is in full force.

Debris clean-up

Debris is being picked up in the entire county except for incorporated city limits. Everything will go to the county landfill, and pickup will take place as three events — burnable, non-burnable, and toxic waste.

Sandbags are also being taken down. "Our next big step is getting people back into their houses," Clarke said. As of early October, more than 1,700 houses were still under water. The Federal Emergency Management Agency has set Nov. 15 as the end date, although that deadline may be extended if Conway still needs help.

Home sweet SEAhut

Army engineers build two complete towns in Kosovo

Article and Photo
By Dana Finney
USACE PAO Kosovo

U.S. forces in Kosovo are celebrating a victory in pulling off an engineering feat. Starting from a wheat field and a bombed Serb barracks, engineers have created two bustling towns that include nearly 200 temporary wooden housing units called SEAhuts. The SEAhuts, which stand for Southeast Asia huts, will bring U.S. troops in from the cold this winter.

"The base camps in Kosovo represent America's commitment to the NATO peacekeeping mission," said Col. Robert McClure, commander of the 1st Infantry Division Engineer Brigade. "In building the SEAhuts, the Army also made a commitment to our soldiers — that they would not have to suffer through the miserable Balkan winter living in tents."

Camp Bondsteel, near Urosevac, serves as Task Force Falcon headquarters for the Multi-National Brigade (East) and can house up to 5,000 personnel when at full strength. The 1,000-acre camp was built from the ground up on a former field. Camp Monteith, located in Gnjilane, uses some structures remaining from a Serb post and can accommodate about 2,000 persons.

Building the Kosovo base camps in-



Four soldiers in Kosovo relax outside their new SEAhut.

involved some 1,700 military engineers (Army, Navy, and Air Force) augmented by employees of Brown and Root Services (BRS) and local labor. BRS is under a sustainment services contract to the U.S. Army Corps of Engineers. The Corps also deployed a team of civilians who managed the engineering activities at both base camps.

The engineering feat in Kosovo has taken only three months from the time the Engineer Regiment organized the effort on the ground. Besides building the SEAhuts, the team set up a supporting infrastructure at Camp Bondsteel — roads, motor pools, aircraft landing zone, a lagoon system to handle sewage, water wells, waste incinerators, and other life support and

morale facilities. They also helped engineer force protection structures for the base camps.

SEAhuts were first designed during the Vietnam years and have since been modified for use in the Balkans climate, which ranges from very hot in the mid-summer months to bitterly cold in the winter. The housing meets minimum standards for sheltering soldiers from the elements, providing facilities for personal hygiene, and affording some protection against threat.

Each SEAhut is 92 feet long by 32 feet wide and includes five sleeping rooms plus a combination shower/latrines. The temporary units are made of plywood with metal roofs. Rooms have wall-mounted heating/cooling systems, electricity, lighting, and a dry-wall finish. Currently soldiers are sleeping on cots moved out of the tents they previously occupied.

Camp Bondsteel will have some 30 additional SEAhuts built in the next few weeks. Many soldiers have already moved indoors, with the first units occupying SEAhuts since late August. Future facilities will include an improved Tactical Operations Center, new hospital and chapel, and more morale, welfare and recreation centers. All facilities are temporary construction, designed to pack up and leave with the soldiers when the U.S. mission ends.

HQ, Sacramento lawyers swap jobs, coasts

By Cynthia Neff
Sacramento District

People who entered Lisa Clay's office in Sacramento District Headquarters during the past three months were surprised to see a man sitting in her chair. He was Phil Steffen from Corps Headquarters.

The two attorneys took the chance to expand their horizons by swapping jobs. At the beginning of July they each left the security and comfort of their habitual duties and struck out for different responsibilities in different states. Clay drove to Headquarters in Washington, D.C., and Steffen came to Sacramento District. They traded apartments and workloads, except for a few important projects. Both held these jobs for 90 days before returning home.

Clay and Steffen both wanted to gain experience by lawyering in different parts of the organization. Clay wanted to acquire some Headquarters experience to bring back to the district, and Steffen wanted to take some of the district flavor to Washington. They both say they enjoyed the challenge of moving to a new area, tackling fresh projects and meeting new goals. The fact that it gives them promotional clout is an added bonus.

"I was told that as part of my career development it would be a good idea to get out into the field," Steffen said. "The whole purpose is to come down here and learn something new."

Steffen and Clay engineered the swap themselves. Steffen called Clay and together they formed a proposal to pitch to their individual supervisors. "Lisa and I found ways to cut costs," Steffen said. "We even saved money by trading apartments to make the switch work."



Lisa Clay (left) and Phil Steffen temporarily swapped jobs to gain experience. Clay, a lawyer in Sacramento District, worked at Headquarters. Steffen took Clay's job in Sacramento. (Photos courtesy of Sacramento District)

Mike Adams, Executive Assistant in Sacramento District, said that cross-training within the Corps for a short period of time is beneficial to those wishing to increase their knowledge and make them more eligible for future promotional opportunities. "It's an opportunity everyone gains from. It opens that person up to new ways of thinking, of doing business, and brings those skills back to Sacramento District."

Both Clay and Steffen agree that they would be willing to make another short-term trade in the fu-



ture. "It's a unique and convenient opportunity to cross-train at no risk," Clay said. "It didn't involve taking a new job and relocating."

"It's something an individual should definitely take upon themselves to make happen," Steffen agreed.

The switch wasn't quite seamless; Clay and Steffen frequently called each other to ask questions about the assignments they took over. "We *did* spend some time on the phone," Steffen said, and laughed. "But the experience was worth it. I'd definitely be open to doing something like this again."

New barracks is star attraction

Article by Anita Horky
Photos by Mark Valentino
Fort Worth District

If you're taking the VIP tour of Fort Bliss in El Paso, Texas, one of the first stops is the new barracks complex. The recently completed \$44.8 million complex (three barracks, three administrative buildings, a 1,300-person dining facility, and a central energy plant) is the star attraction on post.

"It's quite impressive to tell someone you've got 672 1+1 barracks," said Col. Rayford Shaw, Director of Public Works and Logistics (DPWL) during construction of the complex. "I think everybody who's had a chance to tour the facility agrees that the soldiers are well represented and taken care of."

Soldier quality of life

It's easy to see what the fuss is about. The three-story red brick and beige stucco barracks, designed by Fort Worth District's in-house staff, look like an apartment complex or college dorm. Inside are 336 suites, all built to the new barracks standard called the One Plus One module. Each module has two private bedrooms with a shared kitchenette and bathroom. The bedrooms give each soldier a 110-square-foot room with a walk-in closet. The shared space includes a refrigerator, microwave, and bathtub.

"It feels like real apartments," said PFC Bryan Theckston from the 978th Military Police Company. "I have my own space so I don't have any problems of roommates getting into my stuff."

Down the hall in the common area are a big-screen TV, foosball and pool tables, electronic darts, full-size kitchens, laundry facilities, vending machines, and sitting areas. Downstairs in the basement is a storage area for the soldiers. Outside in the courtyard are covered pavilions with picnic tables and grills, and basketball and sand volleyball courts.

Pfc. Nathan Kinney, also with the 978th MP Company, said he enjoys his new home.

"The rooms are smaller, but the trade-off is that I don't have to worry how clean my roommate is," he said. "Privacy is definitely a bonus. The laundry facilities are excellent, and the courtyards are better for when we have parties."

Next door to the barracks is the dining facility, and across the street are the administrative buildings that house six company headquarters.

Early move-in

Soldiers began moving into the barracks in June, although the complex was not originally scheduled for occupancy until August. The final building completed, the dining facility, began serving troops in July. Turning over the facilities to the customer ahead of schedule is quite an accomplishment, said David Wise, resident engineer for Fort Worth District's Fort Bliss Resident Office, which managed construction.

During construction, 54 modifications were made to the contract. Wise said time growth for the project (how much longer it took for completion than originally estimated) was 4.2 percent, when 20 percent is typical. Cost growth (how much more the project cost than originally calculated) was 1.1 percent, when the average is two percent. Out of more than 1 million man-hours worked, there was only one lost-time accident on the job site.

"We're very proud of our time and cost growth and safety record," Wise said. "This project, the largest ever built at Fort Bliss, is indeed a success story."

"I've been very pleased from the customer perspective about where we're at and where we're going," Shaw said just before the dining facility was finished. "This has been a first-class contract process, with a



The barracks surround a courtyard with covered pavilions, picnic tables, grills, and volleyball and basketball courts.



The new barracks are the 1+1 design, where two soldiers share a suite that has two private bedrooms and a shared kitchenette and bathroom.

first-class team of people following it all the way through."

Formal partnership

Shaw said the partnership agreement between Fort Worth District and the general contractor was key to the successful construction. In November 1996, a month before construction began, representatives

from the district, Fort Bliss DPWL and the general contractor, The Austin Company, met in Galveston, Texas, for a formal partnering meeting.

The partners wrote a charter and agreed to hold monthly partnering meetings and quarterly executive-level partnering meetings at the job site to resolve differences and handle modifications smoothly.

"This partnering meeting paid more dividends than any of us anticipated," Wise said. "We resolved problems in a timely manner before they festered and became claims against the government. Another thing that helped was a transition meeting we had with the in-house design team before construction started. They were familiar with the intricacies of the design, and they gave us a heads-up on things the customer specifically asked for. It was an effective meeting."

Working together

Teamwork and open communication are a big part of how the Fort Bliss Resident Office works. Southwestern Division's (SWD) project management forward is Steve Zediak. He works out of the post DPWL as the Installation Support Coordinator to facilitate interaction between SWD and the DPWL.

"Steve's on the payroll of the Corps, but he resides within the building with the DPWL, so he's really kind of like an interface between the two different agencies," Shaw explained. "The good part is that we are able to identify shortfalls and issues on the DPWL side of the house, as well as shortfalls on the Corps side. Steve can bring the right parties together and get solutions quickly."

Zediak has been in the position for a year. In that time, Shaw said, "business has improved. The work relationship and our ability to get the end results have definitely improved."

Those end results can be seen in the new barracks complex, a new child care center, two new housing areas, the remodeled Military Entrance Processing Station, and numerous other projects scattered throughout Fort Bliss.



The Greenbelt Corridor is built to accommodate a wide variety of activities. (Photo courtesy of Fort Worth District)

A good idea's time finally comes

By Anita Horky
Fort Worth District

Some ideas are so good, so right, that they appear before their time. Sometimes they are accepted, sometimes not. The new Greenbelt Corridor in Fort Worth District was one of the lucky ones.

The 10-mile multi-use trail system in North Texas begins at Ray Roberts Lake and ends at the headwaters of Lewisville Lake. The Fort Worth District project, co-sponsored by Dallas and Denton, Texas, is the product of more than 16 years of work.

When district planners originally looked at building Ray Roberts Lake and raising the pool of Lewisville Lake in 1975, they knew recreation areas would be inundated and have to be replaced. At that time, they recommended replacing the flooded parks with more of the same — traditional lakeside facilities with concrete picnic tables, camping facilities and boat ramps. However, because of plentiful water in the area, Dallas and Denton shelved their plans for sponsoring the lake and associated facilities.

Time passed and times changed.

Because of extremely dry conditions during 1980, Dallas and Denton decided to again pursue the project. Because passage of the Clean Water Act in the interim changed the requirements of the 1975 Environmental Impact Statement, the district's planners took a closer look at the previous recommendations for recreation development at Lewisville.

They also looked at the Texas Outdoor Recreation Plan, which noted the need for more stream-oriented recreation. Ultimately, the cities made new recommendations — acquire the land along the river corridor between the two lakes and create linear, stream-side recreation facilities.

"We did an environmental assessment and sent it out for public input,"



Land activities are not the only recreation opportunities offered in the Greenbelt Corridor. Boaters haul their canoe from the water at a convenient access point. (Photo courtesy of Fort Worth District)

remembered Marty Hathorn, who was an environmental planner in the district during that time. "We received favorable input from all the resource agencies and a lot of the public. There was some opposition from private landowners in that area but, for the most part, it was overwhelmingly thought that a 'Greenbelt Corridor' would be a good idea."

Fort Worth District wrote the necessary reports and, in the 1986 Water Resources Development Act, Congress authorized acquisition and development of the Greenbelt Corridor.

"At that time we hadn't had a WRDA in 12 years, which was a transition time for American society in water resource development," Hathorn said. "Before that time, all Corps development had been navigation features,

dams, reservoirs, and concrete-lined trapezoidal channels. But during that 12-year period between WRDAs, the grassroots philosophy on water resource development moved towards a softer, greener approach.

"Since then, there's been an act passed nearly every two years, and every one gets us more and more into non-structural flood damage reduction projects and into multi-objective projects," Hathorn continued. "Now we're into open space, water quality, ecosystem restoration, wetland restoration. The Greenbelt was the forerunner; it does all those things."

More than 200 birdwatchers, cyclists, hikers, canoeists, anglers, and equestrians celebrated the opening of the Greenbelt Corridor on June 5. The unique trail system includes picnic

and restroom facilities, canoe launches, and soft- and hard-surfaced trails that meander along the heavily wooded banks of the Elm Fork of the Trinity River.

The Greenbelt Corridor provides open space and recreation opportunities, serves as a buffer for water quality by keeping runoff from adjacent lands from flowing into the river, provides an aesthetic buffer between landowners and those enjoying recreation, and helps reduce flood damage because it doesn't allow development at the river's edge.

"It's a win-win-win situation for everybody," Hathorn said.

Another reason Greenbelt was ahead of its time is that it sparked the idea for the Trinity Trails System. It is one segment of the system which, when finished, will be a 250-mile recreation corridor stretching north from Dallas and east from Fort Worth to the Oklahoma border.

"When we saw the opportunity to link two big areas of public land with the Greenbelt, it got us thinking about connecting more areas," recalled Rebecca Griffith, who helped plan the project. "This was the birth of the whole Trinity Trails network. Now, trail networks are everywhere, but they weren't then."

Bill Cotten, who helped plan the Greenbelt's facilities, said the most important achievement of the project was acquisition of the land.

"In an area of Texas that's growing and urbanizing so rapidly, to take land out of development and preserve that corridor with all of the trees and wildlife and keep that as public land is probably the most significant thing about the Greenbelt," Cotten said. "In just a few more years, people would have had houses right up to the back of the river from one end to the other. That area would have become rooftops and residential subdivisions, and a great resource would be lost."



Focus on North Atlantic Division

New England, New York, Philadelphia, Baltimore, Norfolk, Europe

Division has historic past, futuristic outlook and missions

North Atlantic Division (NAD), headquartered at Fort Hamilton, N.Y., and commanded by Brig. Gen. M. Stephen Rhoades, has district offices in Concord, Mass., New York City, Philadelphia, Baltimore, Norfolk, Va., and Wiesbaden, Germany.

NAD was the birthplace of the Corps and built its first civil works project in 1791, the Cape Henry lighthouse at the entrance to Chesapeake Bay. The division built coastal defenses to protect the nation, including Fort McHenry in Baltimore, and Fort Wood in New York City, now the base of the Statue of Liberty.

In the nation's early years NAD cleared land and built roads so pioneers could move west. The division built ports and maintained harbors, helped build the capital, and played a role in making the U.S. a world power by keeping its key eastern ports clean and navigable, allowing commercial trade and military traffic.

In modern national defense, the division built the Ballistic Missile Early Warning System in Greenland for the Air Force, and two air bases in Israel under the historic Camp David Mid-East Peace Accord in 1979. NAD built ports, bridges, roads, assembly plants, and military installations in Saudi Arabia that proved valuable during the Persian Gulf War. Today they are renovating and modernizing the Pentagon.

NAD headquarters, through its Regional Management Board, markets the division and the talents and expertise of its districts as the "One Door to the Corps" for the northeast region. Besides heading the NAD team, the headquarters office provides supervisory oversight and supports its districts in any way necessary. It also serves as the bridge between them and the Chief's office.

The division's 180,000-square-mile boundaries covers the Northeast, the nation's most densely populated area. NAD headquarters and its six districts employ more than 4,100 people and serves 14 state governors and more than 62 million citizens.

The division designs, builds, and maintains a wide variety of projects for them. NAD's boundaries include five of the nation's top ports — Boston Harbor, New York Harbor, Philadelphia Harbor, Baltimore Harbor, and Norfolk Harbor. Under its jurisdiction are four canals, four navigation locks, 12 major bridges, and the Atlantic Intracoastal Waterway. The Charles, Connecticut, Blackstone, Thames, Merrimack, Hudson, Passaic, Delaware, Susquehanna, Potomac, James and Chohan rivers are in NAD, as are the Delaware and Chesapeake bays.

NAD covers nearly 1,700 miles of shoreline. They widen, deepen, and remove debris from about 3,165 miles of federal navigation channels to insure smooth, safe sailing, and other waterborne activities. They own and operate 53 Corps dams, and operate six others belonging to states. NAD's flood protection measures have saved countless lives and prevented billions in damages during the years. When problems



Throng of people lined the shore in 1885 to watch the Corps blast nine acres of rocks out of Hells Gate at the East River and Long Island Sound in New York Harbor. (Photo courtesy of New York District)

arise from floods and storms like Hurricane Floyd, the division assists communities under emergency authorities.

The division issues thousands of permits each year for work in waterways and wetlands to protect them and insure the safety of the work. The New York, Baltimore, and Norfolk district commanders serve as supervisors of their major harbors. NAD also supplies water to the nation's capital through the Washington Aqueduct.

NAD processes applications to insure present and future work will not harm the environment, and works to restore it from past carelessness. For example, NAD manages the cleanup of hazardous, toxic and radiological waste at military sites within their boundaries under the Defense Environmental Restoration Program.

NAD also oversees the Environmental Protection Agency's (EPA) wastewater treatment plant construction program and manages engineering and construction of EPA Superfund projects. They have the Corps' largest Superfund program, nearly 70 percent of the total.

The division also handles the Formerly Utilized Sites Remedial Action Program, which belonged to the Department of Energy until October 1997. Under this program they remediate low-level radioactive waste at nine sites.

NAD offers engineering and construction manage-

ment expertise to other federal, state, and local customers and agencies. NAD renovated several Washington, D.C., schools which opened on time for the first time in three years. NAD is restoring the Kennedy Center for the Performing Arts, more than \$95 million of work. They oversee the design and construction of national monuments like the Korean War Memorial.

In the international arena, the Chief of Engineers asked NAD to maintain and sustain military programs, introduce our civil works capability in Europe, and maintain general officer and SES contact with Europe Command and Asia Command. Currently, NAD's most visible mission in this arena is supporting U.S. forces in the Balkans. They will also soon begin a new project in Israel.

New England District

New England District is one of the Corps' birthplaces. On June 16, 1775, Gen. George Washington appointed Col. Richard Gridley to design fortifications for the Battle of Bunker Hill, which was fought the next day. Gridley was the first Chief Engineer, serving while Washington was headquartered in Boston.

Headquartered in Concord, Mass., New England District (NED) manages an annual program of more

Continued on page eight

Focus on North Atlantic Division

Continued from page seven

than \$150 million. It has more than 530 employees including three military officers, representing 15 percent of NAD's staff and 7.3 percent of its workload.

NED covers 66,000 square miles, including 6,100 miles of coastline and thousands of miles of navigable rivers and streams. It has 13 major river basins, 36 dams, 99 local protection projects, and five hurricane protection barriers. These facilities cost \$538 million to build and have prevented damages of nearly \$2.8 billion, a more than five-to-one return. With a total storage capacity of 357 trillion gallons, the 36 dams alone have prevented damages of \$1.5 billion. They also attract more than four million recreation visitors annually.

NED has improved and now maintains 11 deep-water commercial ports and 102 recreation and small commercial harbors along the region's coastline.

The Cape Cod Canal is a unique resource to New England. It's the widest sea-level canal in the world, 17.5 miles long, with a seven-mile cut across the isthmus of upper Cape Cod. It was privately built early this century as a toll waterway. The U.S. commanded it during World War I, with the government assuming full ownership in 1928. Today the canal is a modern, toll-free waterway, managed by a sophisticated system of closed circuit television, radar, and radio. Besides the waterway itself, NED also maintains the two highway bridges and one vertical lift railroad bridge which span it and provide the only land link between Cape Cod and the rest of Massachusetts.

NED has been at the forefront of a number of initiatives during the years.

It has led the way in remote sensing, first with the Automatic Hydrological Remote Reporting Network, then with the LANDSAT satellite, and more recently with the Geostationary Orbiting Environmental Satellite, to collect data for the timely operation of flood control structures.

NED pioneered the development of a unique style of flood control, the hurricane protection barrier, and five such structures of varying designs now operate in the region.

Nonstructural flood control is another venue where NED led. The unique Charles River Natural Valley Storage (NVS) Project, with more than 8,000 acres of property, assures that natural "sponges" slow down flows in the highly urban lower basin. The NVS project, along with its companion Charles River Dam in downtown Boston, has been awarded several times, including a Presidential Design Award. Another unique nonstructural project in Warwick, R.I., included razing or relocating dozens of homes from lower elevations and adding first floor utility room additions to others.

In the environmental arena, NED has identified nearly 700 Formerly Used Defense sites in the six-state region and spent \$120.3 million to clean them up. NED's Superfund Program has managed more than \$415 million in work.

NED's emergency management work includes traditional activities, and such nontraditional events as the Chelsea Fire and the Blizzard of '78. After the fire, the Corps razed 18 city blocks of fire-gutted structures. After the blizzard, more than 5,000 miles of roads were plowed.

New York District

New York District also figures prominently in the birth of the Corps. In 1776, Washington appointed Col. Rufus Putnam Chief Engineer of the defenses of New York. Putnam replaced Gridley after Washington's move from Boston to New York City. Putnam's first task was to salvage something from the incomplete, poorly-situated fortifications built around the highlands at West Point in 1775. Fort Putnam still stands at the U.S. Military Academy



The state-of-the-art Mobility/Passenger Processing Center at Dover Air Force Base, Del., is one of Philadelphia District's modern military construction projects. (Photo courtesy of Philadelphia District)



Keeping New York Harbor clear is a vital mission in New York District. (Photo courtesy of New York District)

at West Point.

In 1820, when the Corps received the water resources mission, the district's first project was removing obstructions in the Hudson River. Four years later, the Corps assumed a role in navigation with passage of the Rivers and Harbors Act of 1824.

In 1885, the district undertook the Hell Gate project to improve navigation at the junction of the East River and Long Island Sound where the tides never coincide. About 1,000 ships per year were either damaged or sunk in Hell Gate. Using 280,000 pounds of explosives, the Corps blew out nine acres of riverbed. Hell Gate today continues to have dangerous currents, but minus the rockbeds that caused so many shipwrecks.

In the early 1900s, the New York Corps (as it was known then) was formally organized into New York Districts I, II, and III. In 1938, they merged into the current New York District, which has military construction responsibilities in eight states, Greenland, the Azores, and civil works boundaries that reach into five states.

New York District covers the most densely populated region of any district. They are located in the media capital of the world, which means their work is routinely reported by national publications, television, and radio.

Navigation — The district continues to play a pivotal role in the Port of New York and New Jersey. Of the 561 miles of federal navigation channels maintained by the district, 240 miles are in the port, which is the largest petroleum importing port and cocoa port in the nation, generating \$20 billion in revenue and 166,500 jobs.

The largest harbor dredging project in Corps history is underway in the port. The \$733 million Kill van Kull dredging project will deepen the main shipping artery from 40 to 45 feet from New York Har-

bor to Ports Elizabeth and Newark. It is scheduled to be complete by 2004, using nine contracts to remove nine million cubic yards of material.

Shoreline — New York District has 750 miles of shoreline, and they are pushing ahead with the Sandy Hook to Manasquan Inlet Shore Protection Project in New Jersey. About 71 million cubic yards of sand will be pumped during the 50-year project. Begun in 1996, the project covers 21 miles of shoreline.

Another shore protection initiative is planned for the future, this one four times the size of the New Jersey project. It will protect nearly 200,000 people along an 83-mile-long coastal system from Fire Island to Montauk Point, Long Island. It must deal with large, complex environmental and political concerns, and should be complete in 2002. In the meantime, several innovative interim protective measures have been set in motion to provide relief until the district completes its study.

Flood control — The district is ready to begin the first element of the \$331 million Green Brook, N.J., Flood Control Project, and the \$76.2 million Joseph G. Minish Waterfront Park in Newark, N.J. Three lives were lost in Green Brook Basin during Hurricane Floyd, plus hundreds of millions of dollars in property losses, which could have been prevented if the project were in place.

Environment — The environmental mission is expanding into the brownfields arena and surging ahead to support the Environmental Protection Agency's Superfund program. New York District is also branching out with Hudson River and Jamaica Bay environmental restoration projects. Its regulatory program receives a lot of media attention and includes a Special Area Management Plan to regulate development of wetlands in New Jersey's Meadowslands.

The district has 93 percent of NAD's FUSRAP work, including cleaning up several sites dating back to the Manhattan Project A-bomb research during World War II.

Military construction — New York District has military construction and Base Realignment and Closure (BRAC) responsibilities for 15 installations in two states, plus Thule Air Base in Greenland, and parts of the 77th Army Reserve Support Command.

The district is responsible for a \$130 million program for McGuire Air Force Base, N.J. It was the result of BRAC 93 that transferred 24 KC-10 aircraft and associated personnel to McGuire and established East Coast airlift and tanker support. New York District is also program manager for the Air Force's worldwide Temporary Lodging Facility (TLF) program. Under this \$100 million program, the

Continued on next page

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Corps is building 16 facilities at 14 installations, including projects in Germany and Japan.

New York District is also the only Corps district in charge of military construction at a military academy. Their long-standing association with West Point continues with an annual placement of \$40 million and 13 active projects. Currently, 25 projects are under design with a cumulative value of \$100 million.

And the district also supports Army operations in Europe. Last month the district deployed more than a dozen employees to assist the Army in Kosovo.

Philadelphia District

Philadelphia District manages the water resources of the Delaware River Basin and the Atlantic Coast of Delaware and most of New Jersey, serving more than eight million people in five states.

In 1829 the Corps built its first civil works project in the region, a 1,300-foot stone breakwater near Cape Henlopen, Del., that provided refuge from storms for ships navigating Delaware Bay. In 1866, the Corps established Philadelphia District. In 1908, ice piers were built in the Delaware River to protect ships from ice flows. The first one was built at New Castle, Del. These structures were among the first federally supported public works projects in the nation.

Today, Philadelphia District has more than 500 employees, with offices in the city's historic Wanamaker Building and at field locations throughout the district's 13,000-square-mile area.

Philadelphia is a full-service district, directly supporting Dover Air Force Base, Del., whose massive C-5 transports move people, equipment, and supplies around the world. Recent construction includes an upgraded and expanded passenger terminal, a runway hydrant-type fueling system, a renovated dining facility, and several new enlisted dormitories. Still underway are two C-5 support facilities, a hospital utility upgrade, and visiting officers' quarters.

For Fort Dix, N.J., and McGuire Air Force Base, N.J., the district produced the Corps' first installation-wide regional groundwater model. Demolition of vacated warehouses is well underway to close the Defense Supply Center Philadelphia.

The district maintains more than 550 miles of navigable waterways, notably the 103-mile-long, 40-foot-deep Delaware River federal navigation channel. A \$311 million project to deepen this channel to 45 feet is now ready for construction.

The district operates and maintains the 14-mile-long Chesapeake and Delaware Canal, the nation's busiest, handling almost half of Baltimore's ship traffic. A project to deepen this canal from its current 35 feet is now under design. Ship traffic in the canal is controlled 24 hours a day from the project office in Chesapeake City, Md. The district also owns and maintains four highway bridges crossing the canal.

Philadelphia is home to the *McFarland*, one of only four oceangoing hopper dredges in the Corps' Minimum Dredging Fleet. The vessel and its crew of 60 have two missions — emergency and national defense dredging worldwide, and traditional dredging along the Atlantic and Gulf coasts. In a typical year the *McFarland* removes about seven million cubic yards of dredged material.

After the 1955 floods claimed 90 lives and caused

\$100 million in damage in the Delaware River Basin, Philadelphia District did the nation's first comprehensive basin study. It led to building five flood control dams in eastern Pennsylvania — Beltsville and Blue Marsh Lakes, Francis E. Walter Dam, Prompton Dam, and General Edgar Jadwin Dam.

One project nearing completion, the Molly Ann's Brook Flood Control Project in northern New Jersey, saved millions of dollars in damages that would have occurred during Hurricanes Dennis and Floyd.

The district's engineering expertise has played a key role in protecting its coastal boundaries. New Jersey's Manasquan Inlet saw the nation's first successful use of 16-ton reinforced structures called dolosse, later supplemented with an enhanced version called Core-Locs, to prevent beach erosion and facilitate navigation.

Further south at Barnegat Inlet, once rated by the Coast Guard as the most treacherous on the East Coast, the district improved navigation safety by widening and deepening the channel and replacing the south jetty with a new 4,270-foot structure. The district designed and built a unique sand bypassing plant at Indian River Inlet, Del., that continuously transports sand from the south side of the inlet to the north side for beach replenishment.

Major beachfill projects provide long-term protection at Ocean City and Cape May, N.J., with similar studies and projects in varying stages of progress for the entire Atlantic Ocean and Delaware Bay coastlines of New Jersey and Delaware. One project will provide ecosystem restoration at Lower Cape May Meadows, a key stopover for migratory birds along the Atlantic flyway.

Philadelphia District's regulatory staff processes about 2,500 permit applications annually. The district recently teamed up with Philadelphia and other federal and state agencies to combine a permit action with a navigation project, using Delaware River

dredged material to build a new runway at Philadelphia International Airport.

The district does a lot of work for other agencies. They just completed a one-of-a-kind runway pavement test facility for the Federal Aviation Administration to simulate the heavier impacts of next-generation jet passenger aircraft. And the Federal Emergency Management Agency relies on the district's geographic information systems for flood insurance studies and hurricane evacuation plans. Besides the airport runway partnership, work for Philadelphia has grown to include quality assurance on housing rehabilitation projects and geotechnical investigations of sinking properties.

Baltimore District

Baltimore District's YY99 program was \$730 million, including some unusual projects and programs.

Washington Aqueduct — For nearly 150 years, the district's Washington Aqueduct Division has provided all the water for the District of Columbia, Arlington County, Va., and Falls Church, Va. These local governments distribute the water they purchase from the aqueduct to about one million residents and to federal agencies. All operating and capital funds come from the sale of water to customers.

This mission dates back to 1852 when Montgomery Meigs, a Corps lieutenant, gave Congress a plan to provide Potomac River to the capital city. Since then, the Corps has collected, purified, and pumped potable water for the National Capital Region. We have added new facilities as demand increased and incorporated new processes and technology, but the essential mission remains the same.

Spring Valley — Investigating and cleaning up the nation's first Formerly Used Defense Site is also unique to Baltimore District. In 1993, construction workers installing a utility line to a new home in the Spring Valley neighborhood of northwest Washington, D.C., unearthed chemical munitions. During World War I, soldiers at the American University Experiment Station used portions of the neighborhood for small-scale testing and research of chemical warfare materials.

After the discovery, Baltimore District did an in-

Continued on page 10



The Corps of Engineers has its own fleet of ships, including the dredge *McFarland*, operated by Philadelphia District. (Photo courtesy of Philadelphia District)



Modernizing and upgrading the Pentagon is one of Baltimore District's current missions. (Photo courtesy of Baltimore District)



The transition from tents to SEAhuts is one of the Corps' most important missions in the Balkans. Europe District is playing an important role in this operation. (Photo by Dana Finney)

Continued from page nine

tensive two-year investigation to locate any remnants. This year, a follow-up investigation of one property in the original study area found ordnance-related materials. Work continues as ordnance experts carefully dig to identify and remove the materials.

D.C. proximity — Due to its location near Washington D.C., Baltimore District supports a number of notable customers. They include the Pentagon, the General Accounting Office, Corps Headquarters, the John F. Kennedy Center for the Performing Arts, the District of Columbia public school system, and the U.S. Holocaust Memorial Museum.

The district has worked on several national monuments and memorials. Recently, it managed construction of the Korean War Veterans Memorial and the Arlington National Cemetery Visitor Center.

Kosovo construction — Baltimore District sent 28 people, mostly civilians, to support NATO operations in Kosovo. Some are working on camp construction projects, such as the barracks, fitness centers, recreation facilities, and other structures required by the troops stationed there. Others are assigned to projects to repair, open, and maintain roads, rails, and bridges.

Norfolk District

President Clinton signed the Energy and Water Resources Development Appropriations Act 2000 in September. It funds another \$19.5 million toward one of the largest public works projects in Virginia, the \$103 million Beach Erosion Control and Hurricane Protection Project for Virginia Beach, Va. This

project, designed by Norfolk District in partnership with Virginia Beach, provides added protection to the city during hurricanes and other rough weather.

The system incorporates:

- Beach restoration to break up the waves during bad weather.
- A higher seawall, combined with dune enhancement on the north beaches and beach restoration, to lessen the seawater that overtops the wall or dunes.
- Pump stations and associated storm drain systems throughout the oceanfront to capture and redirect the storm water.

There are several phases of construction — a wider boardwalk and bicycle path, a higher seawall, two storm water pump stations, beach restoration, and dune enhancement. The combined features will protect against a 140-year storm event.

The project's first section, an eight-block section of boardwalk, began in 1996 and was completed in early 1997. Next came construction on the seawall north of the city's resort area in 1997-98. The second section of boardwalk, a 13-block span, was finished last May. Construction of the two pump stations also started in 1998. The boardwalk and pump stations are scheduled for completion next spring.

The new 40-block boardwalk is 10 feet wider than the old one and is integrated into the seawall design. The new seawall is 13 feet above sea level and extends 58 blocks along the oceanfront's residential and resort areas.

The two pump stations will provide added protection against flooding along the oceanfront. Curb and drop inlets throughout the community will direct storm water to the drainage system under the boardwalk. From there it will flow to one of the two pump stations. The two pumps will push the storm water 2,000 feet offshore, one at 135,000 gallons per minute, the other at 180,000 gallons per minute.

The beach will be 280 feet wide when complete. Beach restoration and dune enhancement is designed to work with the seawall, providing increased protection for oceanfront residences and businesses. The

enhanced dune system is a softer alternative to a concrete seawall, but offers the same protection for life and property along the north beaches of Virginia Beach. Dune enhancement, the final phase of the project, is scheduled for completion in early 2001.

Europe District

Europe District provides engineering support to more than 160,000 soldiers, airmen, civilians, and their families in Army and Air Force in Europe. The district is headquartered in Wiesbaden, Germany, with offices in Italy, Turkey, and the Balkans.

The district traces its roots to Europe Division and the Cold War when the Corps designed and built new facilities worth \$5 billion for the Army and Air Force from Scandinavia to Turkey.

After the Berlin Wall fell and the Soviet Union dissolved, the U.S. reduced its Europe forces by two-thirds. Europe Division also downsized and took on new life as Europe District, helping the military re-tool and revitalize its remaining bases.

As Defense Department's primary agent for design and construction, Europe District is building schools, daycare centers, airmen's dormitories, car washes, community clubs, and mission facilities to improve quality of life and readiness. More than 9,775 Army barracks spaces are being renovated to DoD's One Plus One standards. More than 3,000 apartments are being modernized for military families.

The district has also found a host of diverse new ways to support its military customers including:

- Regional Program Managers are collocated with customers to provide responsive support. They prepare DD 1391s help justify major construction projects for Congress.

- Innovative contracting tools like multiple-award task order contracts.

- A regional Force Protection contract to help customers rapidly upgrade security for U.S. operations.

- Centralized environmental program management for assessments, studies, planning, design, prevention, and remediation.

- Maintenance contracts for schools, commissaries, medical clinics, and family housing.

Europe District is also the door to the Corps's technical and contracting capability for military contingencies, NATO enlargement, preventive defense, and peacekeeping operations.

During the past four years, many of the district's 400 civilian employees have deployed to help plan, build, and take down base camps in Hungary, Bosnia, Albania, Macedonia, and Kosovo.

The district also helps NAD tap technical experts from other districts and laboratories to support military missions in the European Command (EUCOM) area of operations.

As 2000 approaches, Europe District is helping NAD seek growth opportunities. The Regional Outreach Office is finding ways to use the Corps' expertise to promote peace and stability in Central and Eastern Europe and in former Soviet Republics. It is currently working on behalf of DoD and EUCOM analyze the infrastructure of new NATO nations to determine their compatibility with NATO standards and equipment.

As part of outreach, the district also sponsors technical engineering information exchanges and civil military emergency planning workshops with Partnership for Peace countries.

(A number of people contributed to this article. Lou Fioto in North Atlantic Division wrote the introduction and coordinated the team that included Sue Douglas in New England District, Peter Shugert in New York District, Ed Voigt in Philadelphia District, Torrie McAllister in Europe District, and Thom Pander in the city of Virginia Beach.)



Focus on North Atlantic Division

New England, New York, Philadelphia, Baltimore, Norfolk, Europe

30 Years Ago

Corps turned Niagara Falls off, on

By Frank Balon
Buffalo District

Niagara Falls, one of the Seven Natural Wonders of the World, attracts millions of tourists each year. But 30 years ago tourists flocked to see an unprecedented sight — the mighty falls reduced to a mere trickle by the engineering skill of Buffalo District.

Niagara Falls is 19 miles downstream from Lake Erie. Goat Island divides the Niagara River into two channels, separating Niagara Falls into American Falls on the American side and Horseshoe Falls on the Canadian side.

Public concern arose in the mid-1960s regarding the talus (rock fragments) accumulation at the base of the American Falls, which many felt detracted from its natural beauty. Three major rockfalls occurred in 1931, 1954, and 1959, depositing about 130,000 cubic yards of rock at the falls' base.

In 1965, Congress authorized the U.S. Army Corps of Engineers to study the measures needed to preserve and enhance the beauty of American Falls. The results of the Corps' study were submitted to the International Joint Commission (IJC) which, at the request of the American and Canadian governments, began an independent inquiry in 1967. The commission established the American Falls Study Board, which included representatives from the Corps, Environment Canada, and eminent landscape architects to consider alternatives for preserving American Falls' future.

The IJC recommended to both countries that American Falls be temporarily dewatered to facilitate a thorough study. The governments agreed, and on June 12, 1969, a rock cofferdam stopped the flow over American Falls. The falls remained dry until November 25, 1969, when a backhoe removed the cofferdam.

Once stripped of its cascading white waters, the 1,100-foot-wide, 200-foot-high precipice revealed sights never before seen. One rock outcrop resembled a human profile. Another giant rock at the fall's base was larger than most houses in the city of Niagara Falls.

Special measures were taken to prevent damage to aquatic life in the American Falls channel. Terrestrial vegetation in the channel's small islands were protected and irrigated. Sprinklers kept Rochester shale wet on the face of the American Falls. In addition, railings at viewing areas were relocated, and



Workers hanging in safety cages lowered by cranes inspected the rock face of the dewatered falls. (Photo courtesy of Buffalo District)

mass rock was stabilized to protect workers and the viewing public from injury.

While American Falls was dewatered, the board conducted a detailed geologic exploration. Forty-six core holes, totaling 4,882 feet, were bored. Dye and water testing on the completed holes identified weak points in the rock mass. Face mapping included topographic, stratigraphic, and structural studies. Additional testing included terrestrial photogrammetry of the falls' face, mapping rock fractures and joints, and measuring both water pressure in rock joints and horizontal movement in the adjacent rock mass.

"It was thrilling to walk on the American Falls riverbed shortly after dewatering and to view closely the huge exposed boulders," said Andrew Piacente, a civil engineering technician in the Water Control Branch. Piacente served as the district engineer's field representative to the American Falls Working Committee and the American Falls Board of Control during the project.

Talus studies involved examining the cobbles and boulders to determine their size, rock type, and condition. The talus blocks were photographed and mapped. Talus depth ranged from 25 to 50 feet.

The board considered three alternative methods for

removing all or part of the talus, and estimated the time and costs associated with each. The rock removal methods involved using either a cableway system between the U.S. and Canada, large cranes on and below the falls' crest, or a large rock crusher together with a portable conveyor. The board determined a cableway with land disposal to be the most practical method.

Data gathered from the geologic exploration was used to build a realistic model of the American Falls 1/50th its actual size. The model, built by Ontario Hydro, included removable talus blocks, which allowed accurate simulation of various talus arrangements. The turbulence, mist, illumination, and volume of water were all closely duplicated.

Far from ruining the falls' tourist appeal, the dewatering significantly increased tourist volume. People traveled thousands of miles to see the Corps unparalleled engineering feat.

"I've seen the falls five or six times before, in winter and in summer," said a tourist quoted in the June 13, 1969 issue of the *Buffalo Courier Express*. "But this is the best time to see it. It's so unique."

Public opinion was considered very important. Public displays describing the falls and the board's undertakings were exhibited in both countries. The dewatering program received intensive national and international media coverage. Public opinion was strongly in favor of maintaining the falls' natural appearance, leaving the accumulated talus intact.

In the end, the board agreed. After exhaustive deliberation, the IJC recommended that the U.S. and Canadian governments leaving the talus totally intact, considering the cost of removal, the irreversible nature of the project, and the resulting accelerated erosion. In addition, the IJC concluded that artificial means should not be employed to prevent further erosion of the falls' crest.

The timeless beauty of Niagara Falls continues to inspire and serve as a symbol of international cooperation between the U.S. and Canada. A 1975 IJC report to both governments stated that "consideration of the preservation and enhancement of the beauty of the American Falls cannot be limited to their physical aspects. The appeal and fascination of the falls mean different things to different people. Their beauty is in the eye, the mind, and the heart of the beholder."



The stark contrast between Niagara Falls with the water flowing and with the water shut off actually increased tourist volume. People traveled thousands of miles to witness the Corps' engineering feat. The water was shut off from June 12 until Nov. 25 in 1969 to inspect rockfall damage. (Photos courtesy of Buffalo District)



When a CH-47 dropped Carol Ohl and her gear off at Camp Bondsteel in Kosovo, the area was little more than an open wheat field. Army engineers and their contractors have completely transformed the site into a military city. (Photo by Susanne Bledsoe)

Corps people face challenge of Kosovo



Burned-out homes and jerry-rigged transportation are common sights in Kosovo. (Photo by Susanne Bledsoe)



Landmine training aids are on permanent display near a dining facility at Camp Bondsteel. (Photo by Dana Finney)



Camp Bondsteel is now a small city of dirt roads and rows of tents and vehicles. You can almost hear the theme music of "MASH" playing in the background. (Photo by Susanne Bledsoe)



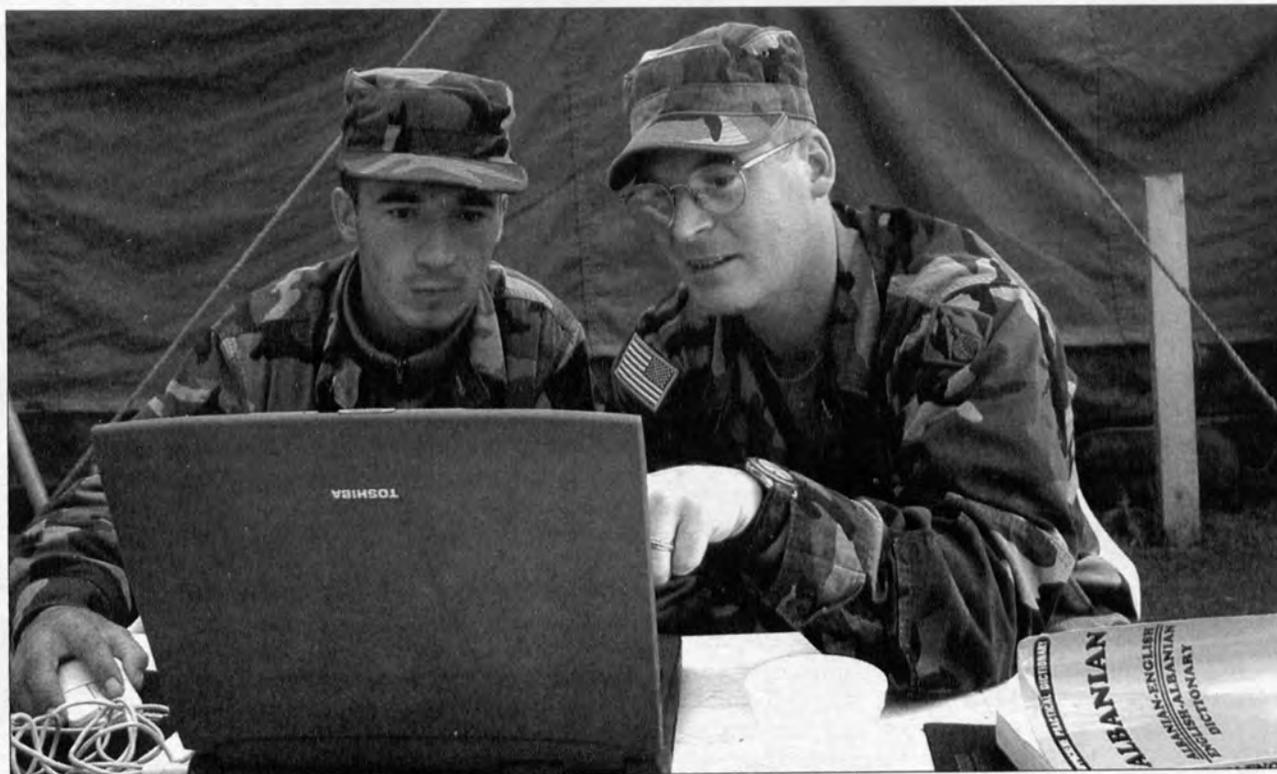
Maria de la Torre and Dan Oswald inventory the weekly supply of bottled water and fresh fruit at Camp Bondsteel. (Photo by Susanne Bledsoe)



A meeting in the mens' tent (the "Bat Cave") at Camp Able Sentry. (Photo by Susanne Bledsoe)



The weather in Kosovo brings either deep mud or clouds of dust. (Photo by Dana Finney)



Contract surveyor Andy Walter (right) and Balkan interpreter Naim Preniqi, work together on a laptop outside the BCCA office tent. (Photo by Dana Finney)

Air Force gets new control towers

By Jennifer Wilson
Little Rock District

Many active-duty air bases still use World War II-era control towers in their daily missions. But some bases under the Air Education and Training Command (AETC) are getting new towers with the help of the U.S. Army Corps of Engineers.

A year after Little Rock District broke ground on a new control tower at Little Rock Air Force Base (LRAFB), construction began on another tower in Florida. Contracts should be awarded soon for towers in Oklahoma and Texas, and the district has just begun work on another tower in San Antonio.

The LRAFB tower was the first designed using the new air traffic control tower design guide. AETC, the command responsible for LRAFB and other bases, was pleased with the district's work.

Because of the design team's grasp of the control tower design guide, AETC requested that Little Rock District handle all of their tower replacement work. Each tower is estimated to cost between \$3 million and \$4 million dollars. The total control tower replacement program is about \$40 million.

Work on the \$3.8 million tower at LRAFB is about 20 percent complete. The shaft is about four stories high now. Little Rock District's Construction Resident Office at LRAFB is overseeing construction.

"When the structure is complete, it will be one of the tallest cast-in-place concrete structures constructed in Arkansas in the past two decades," said Jim Pfeifer, program manager.

Work is also progressing on other replacement towers. Construction on the tower at Tyndall Air Force Base in Panama City, Fla. has started. The contracts for towers at Laughlin Air Force Base in Del Rio, Texas, and Altus Air Force Base in Altus, Okla., should be awarded any day. For the tower at Luke Air Force Base in Phoenix, the invitation for bid has been con-



The Corps is replacing World War II-era control towers for the Air Education and Training Command. (Photo courtesy of Little Rock District)

verted to a request for proposal. Little Rock District recently received the go-ahead to start work on the tower at Randolph Air Force Base in San Antonio.

While all the towers are being built using the same design standards, the design team is making some changes to fit.

"We listen to the needs of the customer and work to customize the interior to fit the user's preference," said Gary Young of Design Branch. "The exteriors are very similar. Minor changes to the exposed finish materials have occurred to meet the individual base's architectural computability standards."

For example, the Randolph tower will have a tiled roof like other base buildings. The height of the towers varies based on visual sight line restrictions. To date, Luke AFB has the tallest tower. Little Rock District has kept the same in-house design team for all of the towers. Therefore, lessons learned can easily be applied to the new designs.

It has taken teamwork to make this program work. As program manager for replacing the control towers, LRD works closely with the geographic district's project managers and the users at each base. Little Rock is working with Mobile District on the Tyndall Air Force Base tower, Los Angeles District on the Luke AFB tower, Fort Worth District on the Laughlin AFB and Randolph AFB towers, and Tulsa District on the Altus AFB tower.

"Typically, we are responsible for program management and technical review work, and the geographic district is responsible for geotechnical work, contracting, construction and project management," Pfeifer said. "We couldn't do this without the cooperation of the other districts. They have gone out of their way to support this program."

"Our A-Es have performed great on all of these projects," said Shirley Bruce of Architect-Engineering Contracts Section. "They're staying on schedule and within cost. They're getting the job done right the first time, so we've had few modifications to do."

Bruce said it has helped tremendously to have A-Es working on the project who are close to the district office. "They are easy to get to and close at hand," Bruce said. "They've become part of our team on these projects. They want as good a product as we do."

'The Saint' earns top park ranger award

Article and Photo
By Pat Graesser
Seattle District

Acting as a guardian angel looking after a disoriented senior citizen is one reason why Seattle District park ranger Craig Lykins brought home the U.S. Army Corps of Engineers' 1998 Hiram M. Chittenden Award for Interpretive Excellence.

Those who spend time with Corps park rangers understand how broad their duties are and how deep their character must be to do their jobs well. Lykins, an interpretive specialist at Chittenden Locks, said he was honored to be recognized as the best.

The award is named for Hiram M. Chittenden, a former Corps district commander who championed the 1910 development of the Lake Washington Ship Canal and Locks, which were named for him in 1956. This is the first year an employee at the Chittenden Locks has won the namesake award.

More than 1.4 million visitors stream onto the 49-acre site each year, creating unique opportunities and challenges. Lykins' summer concert series and Saturday Family Fun Days foster a sense of community by including a diverse lineup of cultural and educational programming. Since Lykins came to the locks in 1994 he has worked to make its Regional Visitor Center the Corps' showplace in the Pacific Northwest.

Craig also has a student scholarship named for him. David Wilcox, a retired businessman and frequent visitor to the Summer Concert Series, became a big fan of the Music Center of the Northwest and appreciated Lykin's efforts to present three concerts by the center's Greenwood Summer Band. This year, Wilcox established the "Craig Lykins, Park Ranger, U.S. Army

Corps of Engineers, Honorary Scholarship Fund." This is a \$1,000 scholarship given each year to an amateur musician to continue his or her music education at the Music Center of the Northwest.

In addition, Lykins was selected as Seattle District's Employee of the Year for 1999 and chosen by Headquarters to serve on the Natural Resources Management Career Development Steering Committee.

Yet, even more important than what he has done for the Corps and community is how Lykins has touched the lives of individuals. An example is his friendship with Philip Melody, an older man who visited the Chittenden Lock frequently for several years.

Roger Baenen wrote a letter Oct. 19 praising the service Lykins provided to Melody. In the letter, Baenen referred to Lykins as "The Saint."

"One day The Saint observed Mr. Melody like normal, except Melody wasn't normal," Baenen wrote. "He was very...confused, and his rationalization impaired. So...concerned is The Saint that he shadows him home...After all, to stop him would perhaps confuse him more and betray his trust..."

"I happened to observe The Saint outside my apartment a couple blocks away. Joking, I asked if he was lost or looking to arrest someone. We chatted and he said he was worried about the subject whom he knew from sight only. He knew no name, no actual residence, nothing other than a human being who visited the locks very frequently and today wasn't himself. Therefore, The Saint...followed on foot...20 blocks from the locks. Philip Melody made it home, but didn't know that day he had a guardian angel...Craig Lykins defined what a real public servant is."

Melody, an 89-year-old retired psychology professor, Army colonel, and decorated World War II veteran,



Craig Lykins won the 1998 Hiram M. Chittenden Award for Interpretive Excellence.

died April 16 from complications of Alzheimer's. In a May 4 letter to Lykins, Melody's daughter wrote:

"My father had such high regard for you and always spoke of you with the greatest respect. Thank you for treating him with dignity, thoughtfulness, consideration, and respect."

Around the Corps

General officer news

Brig. Gen. Stephen Rhoades took command of North Atlantic Division during a ceremony at Fort Hamilton, N.Y., on Aug. 3. Rhoades arrived from Fort Leonard Wood, Mo., to take command from Maj. Gen. Jerry Sinn, who commanded NAD for the past two years.

Brig. Gen. Robert Griffin took command of Great Lakes and Ohio River Division on Aug. 5. Col. James Hougnon passed command to Griffin; Hougnon commanded the division since July 8 after Brig. Gen. Hans Van Winkle became Director of Civil Works at Headquarters. Griffin was previously Commander and Division Engineer of Northwestern Division.

SES news

Wilbert Berrios was selected as the Deputy Chief of Staff for Corporate Information at Headquarters. Berrios is currently the Director of Information Management for the U.S. Army Materiel Command. His reporting date is to be determined.

Linda Gavin was selected as the Deputy Chief of Staff for Real Estate. She is currently the Chief of Real Estate and Facilities Engineering with the Defense Information Systems Agency. Her reporting date is to be determined.

Poplar Island

The rebuilding of Poplar Island in the Chesapeake Bay is moving ahead. The first portion of the project, 640 acres of containment dike, is about 80 percent complete, and construction on the remaining 470 acres of diking is scheduled to begin next March.

After the diking construction, up to two million cubic yards of dredged material annually will be placed behind the diking to restore the island to its 1847 size of about 1,110 acres. The rebuilt island will be a valuable habitat and nesting area for wildlife in the upper Chesapeake Bay.

Panama Canal Commission

Five members of the Panama Canal Commission's Capacity Projects Office visited Los Angeles District Sept. 27-28. They were interested in technical project briefings and tours. District personnel conducted tours and briefings of Seven Oaks Dam and the Santa Ana River Mainstem, with a stop on Sept. 27 at the Orange County Water District. On Sept. 28 the group received project briefings focusing on the technical and environmental aspects of Tropicana/Flamingo, Rio Salado, and San Juan Creek. They also toured the Los Angeles County Drainage Area, and Los Angeles Harbor projects.

Soldier housing

New England District (NED), at the request of the U.S. Army Soldier and Biological Chemical Command at the Soldier Systems Center in Natick, Mass., found housing for displaced soldiers while their quarters are renovated.

The soldiers were in quarters built in 1954 and 1978 that were inadequate and do not meet the Army's current "One Plus One" standards. Natick Labs needed temporary housing for 32 soldiers during the rehabilitation. Renovations will include replacing heating, ventilating, electrical switchgear, vinyl asbestos floor tile, ceilings, and lighting. The project could take 12 to 24 months to complete.

Natick Labs asked for NED to find housing for the soldiers until renovations are complete. Real Estate Division found housing for 20 soldiers at Hanscom Air Force Base, the only military installation in the area.

But Hanscom could not accommodate the remain-

ing soldiers, so Real Estate Division had to find non-government lodging. They sent a request for proposals to more than 60 hotels, motels, and apartment buildings to lease at least four and up to 12 furnished bedrooms. The lease terms would be for 12 months with an option to extend from one to eight months. The Inn at Framingham, Mass., signed a lease on Aug. 10. The lease term began Sept. 1.

Eagle Vision II

The National Reconnaissance Office (NRO) formally turned over operation of Eagle Vision II, the world's first mobile ground station that can receive high-resolution commercial satellite imagery, to the Army during a ceremony on Oct. 18 at the Topographic Engineering Center (TEC).

Eagle Vision II is a self-contained imagery downlink and processing station that will give military commanders direct access to multiple commercial imaging satellites. It introduces new capabilities in data timeliness, availability, and accuracy. The system can be loaded onto C-130 or C-141 transport aircraft without special loading equipment for fast deployment.

Eagle Vision II was procured by the NRO with acquisition support from the Army Space Program Office and deployment support from TEC.

Korean War Memorial

The Korean War Veterans Memorial in Washington, D.C., returned to full operation in September after two years of modifications and enhancements by Baltimore District. Portions of the memorial were closed as workers rebuilt the tree grove and improved operation of the Pool of Remembrance. They also installed a new fiber optic lighting system. The improvements cost about \$2.5 million.

"Shortly after the memorial was completed in July 1995, we identified lighting, landscaping, paving stone settlement, and proper operation of the Pool of Remembrance as the issues that required attention," said Jon Sadler, project manager. "We're confident these improvements will fix those features."

Intelligence award

Lt. Gen. Patrick Hughes, Director of the Defense Intelligence Agency (DIA), presented Defense Intelligence Director's Awards to three Mobile District team members and one former employee on July 7 at Redstone Arsenal, Ala. The award is the highest presented to civilians outside the DIA. Tom Clinton, project manager; Aleta Greenspan, interior design; Paul Carr, project engineer; and Steve Arendale, former Redstone Arsenal Resident Engineer, received the awards.

The awards were for performance during design and construction of the Missile and Space Intelligence Center at Redstone Arsenal. Mobile District also received an overall award for superior efforts to deliver the 200,000-square-foot facility, the new home of the Missile and Space Intelligence Center for the DIA. The center produces scientific and technical intelligence analyses on foreign missiles, missile defense systems, beam weapons, space programs and systems, and command, control, communications, and computer systems.

Barracks design

Baltimore District is designing a modern 288-room barracks with a soldier community building for Fort Meade, Md. In the FY00 Military Construction Appropriations Act, Fort Meade officials received \$18 million to build the first phase of the installation's barracks renewal project.

The new barracks will house junior enlisted and

unaccompanied personnel, and replace existing barracks built in the 1950s. Other district in-house design efforts for Fort Meade include a \$1.3 million field operations building for the Criminal Investigation Division Command, and a \$4.5 million military entrance processing station for Recruiting Command.

Historian honored

Lake Superior Magazine awarded Patrick Labadie, Director of the Corps' Lake Superior Maritime Visitors Center, their 1999 Achievement Award. The award is given to a community, organization, or people who have made a lasting contribution to Lake Superior. Labadie has directed the museum since it was built in 1973. He also helped organize the 500-member Lake Superior Marine Museum Association, and has worked as a consultant for a number of state, national, and private organizations.

Sharing technology

Baltimore District has twice participated in the Department of Commerce Special American Business Internship Training Program (SABIT).

Corps personnel from the Washington Aqueduct recently briefed water resource professionals from the Ukraine and former Soviet Union on the Corps' method of water and wastewater treatment. The briefings included a tour of the Dalecarlia Water Treatment Plant.

Earlier this summer, Robyn Colosimo, Planning Division, talked to another group about environmental planning for water supply.

SABIT allows participants to gain a fundamental understanding of the environmental technologies and applications at work in the U.S. Participants use this information to help address needed repairs in their countries.

Crew expedition

Five crewmembers of the dredge *McFarland* challenged the North Maine woods again this year during their annual six-day canoe trip. The group explored the Champlain Lake region of the Allagash Wilderness Waterway by canoe and on foot. Days and nights were clear and the swimming was perfect. This year's sightings included moose, eagles, river otter, whitetail deer, loons, bullfrogs, and a black bear. They also enjoyed a magnificent display of the Northern Lights.

Medical research lab

The new Inouye Laboratory at Walter Reed Army Medical Center was officially dedicated in October. The 474,000-square-foot lab, located at Walter Reed's Forest Glen Annex, was named for Sen. Daniel Inouye of Hawaii, a World War II hero and member of the Senate Appropriations Committee. It will house the Army's Institute of Research and the Naval Medical Research Center.

Baltimore District started design of the \$147.3 million project in 1991. Sitework began in 1994 and building construction in 1996. Final completion, including the turnover of administrative requirements, is scheduled for Dec. 31.

Lab personnel will conduct research in five major areas — infectious diseases, combat casualty care, operational medicine, chemical defense, and biological defense. Researchers and staff from more than 20 Army and Navy facilities scattered throughout Washington, D.C. and southern Maryland are moving to the new facility. The first occupants arrived in March, and about 450 people are now in place. All 950 employees should be in place by January.



Maj. Mike Clarke of Savannah District discusses the debris removal mission with Paul Whitten, Horry County emergency operations director. (Photo by Jonas Jordan)



James Lee Witt, Director of the Federal Emergency Management Agency, talks to Lt. Col. Mark Held, Charleston District Engineer. (Photo by Jonas Jordan)

Floyd

Continued from page one

standard plan with South Atlantic Division headquarters, and I think we did a lot to ease the minds of folks who have already suffered enough."

Waterway surveys

Most people think only of land damage during a hurricane. But Wilmington District's survey fleet knows that ports, harbor channels, inlets, ferry crossings, and navigable waterways can also be severely damaged or clogged by wreckage.

While most people are waiting for the winds to subside, the survey vessel crews get ready to go. As soon as it's safe, they fan out to their assigned areas to begin depth soundings. This is critical, because before a hurricane the Captain of the Port, the Coast Guard's Marine Safety Officer (MSO), closes the waterways. They do not reopen until the district's hydrographic survey team assures the MSO that the channels are clear.

So the Corps deploys its survey vessels and feeds information to the Coast Guard, which notifies port authorities and the public when waterways are safe.

During this season's hurricanes, the Coast Guard located their EOC in Wilmington District headquarters. This allowed immediate access to the large survey files, and to technical integration of the data, which speeded their ability to reopen waterways.

Regulatory Division

Even before the storm, the district's Regulatory Division was preparing to respond. "We devised a system that served well during Hurricane Fran, and has served us well since," said Wayne Wright, Chief of Regulatory Division. "We worked with South Atlantic Division to get permission for rapid permitting that speeds the repair process."

When the water recedes, everyone from state transportation officials to homeowners can get permits for repairs in 48-to-72 hours. "They fax us their repair needs, we fax the appropriate state and federal environmental authorities, who agreed to turn the work around in 24 hours, and we respond with a permit," said Wright. "We've issued more than 200 permits near Wilmington. We may see that number grow into the thousands."

Recording and repairing damage

As soon as floodwaters fall, Corps teams venture forth to assess the damage and record conditions. Everyone from community governments to insur-

ance claims adjusters need scientific observations of what happened. Emergency response organizations also need to know where to start repairing damaged infrastructure. Under Public Law 84-99, the Corps can also repair its own projects damaged in a flood, and also some other publicly owned structures and projects.

"After Hurricane Floyd, we received blanket funding to investigate repairs to nine of our federal structures in North Carolina," said project manager Linwood Rogers. One was the Princeville Dike. Built to withstand a 300-year flood with two feet to spare, the dike was overtopped Sept. 17. As the Tar River receded, Wilmington District sent a team to survey the dike, and within 24 hours after receiving a FEMA mission to dewater some areas in Princeville, the district had signed a contract and had pumps humming.

When renewed rains threatened to send water back through the breach, the Corps supervised an immediate repair project that moved dirt and laid down sandbags so Princeville would not suffer further damage.

North Atlantic Division

Although Hurricane Floyd had lost much of its punch as it rampaged through the Carolinas, it still caused major problems in Virginia, Pennsylvania, Delaware, New Jersey, and New York.

The storm affected all of North Atlantic Division's (NAD) U.S. districts. Some districts, like Philadelphia and New England, experienced minimal problems. Others, like Norfolk and New York, had major problems within their jurisdiction. All districts activated their EOCs and monitored the storm, and all supported storm-stricken areas with personnel and other resources.

Norfolk District

Division team members contracted for ice and water supplies for areas that lost power and had its drinking water contaminated. Norfolk District, with support from New England District, obtained more than 850,000 gallons of potable water for Portsmouth, Va. It also contracted for 200,000 pounds of ice for the area, but that mission was later terminated. Norfolk also assisted in contracting for ice for New Jersey.

Norfolk District developed an infrastructure response plan for Franklin, Va., and for Southampton County in Virginia. The plan will help those areas

restore vital services and recover from Floyd's effects. Norfolk is monitoring Franklin's debris removal contract and providing quality control and quality assurance.

Norfolk is also designing and building a 100-unit mobile home park to serve as temporary housing for Southampton residents who are without shelter. FEMA will procure and install the mobile homes, probably in Courtland, Va., and the Corps will assist in placement.

The Dismal Swamp Canal (DSC) in Virginia was closed with high water and debris after the storm. Once the water level returned to normal, trees were removed and dredging performed under Corps management to reopen the canal to navigation.

New York District

Staffers from New York District, assisted by PRTs from Albuquerque and Kansas City districts, contracted for 400,000 pounds of bagged ice and 3.5 million liters of potable water for hard-hit areas in northern New Jersey, especially the towns of Bound Brook, Lodi, and Manville. These supplies were delivered to Fort Dix and McGuire Air Force Base, Somerset Armory and Teaneck Armory, and the National Guard distributed them where needed.

Baltimore District

Baltimore District staffers mobilized one of the Corps' new Rapid Response Vehicles (RRV) and took it to Richmond, Va., to support recovery efforts. The RRV is one of seven state-of-the-art vehicles owned by the Corps and designed to put a Corps team into action at an emergency site in 18 hours or less.

Philadelphia District

Sandbags and related equipment from Philadelphia District helped protect many areas within that district's boundaries, especially at Repaupo Creek in Gloucester County. Local officials reported these helped tremendously in their efforts.

Philadelphia has two FEMA Region III missions for post-flood technical assistance in New Castle County, Del., and Delaware County, Penn.

After the storm, damage assessments were performed throughout NAD, which indicated that Corps dams and flood protection projects prevented millions of dollars in damages.

(Lou Fioto of North Atlantic Division, and Penny Schmitt of Wilmington District contributed to this article.)