US Army Corps of Engineers®

Engineer Update

Vol. 21 • No. 2 • February 1997

Corps battles California flooding

By Bernard W. Tate
HQUSACE

At first, the disaster was a pleasant surprise. Seven to 10 feet of snow fell in the Sierra Nevada Mountains during Christmas week, to the joy of vacationing skiers.

Then the "Pineapple Express" struck.

During New Year's week, satellite photos showed clouds stacked up from Hawaii to the West Coast. It began raining on Dec. 26, and from Dec. 31 to Jan. 3, the "Pineapple Express" hammered Northern California with more than half the rain it would receive in a normal year. The rains tapered off Jan. 5-6.

On top of that, 50 degree temperatures and rain in the High Sierra melted the snow-pack below 6,000 feet.

The San Joaquin Valley is maybe the worst place in the U.S. for that to happen. It's the floor of an ancient inland sea, flat as Kansas, below sea level in places. Eons of annual floods have made it some of the most fertile farmland in the U.S., and more than a century of agriculture and settlement have tamed the floods with an intricate system of levees and dams.

But no one expected the one-two punch of record snowfall and record rain. Millions of tons of water hit that system head-on ... and it sprang leaks.

The Corps of Engineers helped build the emergency levee that protected Meridian, Calif., from the flood. (Photo courtesy of Sacramento District)

Flood-fighters

Sacramento District and many local agencies responded to plug those leaks.

Public Law 84-99 gives the Corps authority to provide assistance during emergencies to protect lives and property, said Capt. Brandon Muncy, Operations Officer. "Local authorities fight the floods. They can turn to the state for help, and federal aid backs up the state if they exhaust their options," Muncy explained.

The Corps usually provides technical advice and emergency contracting. The Corps responds to a request for assistance by sending a team to assess the situation. The group can be tailored to the mission, but will include at least a geotechnical expert, a contract negotiator, and an engineer.

"At the site, the team assesses the situation and defines a scope of work," said Kell Cloward, Chief of Readiness Branch. "Contractors are then notified to attend a site showing, and bids are received at the site. The low bid is selected and the contract is awarded, all in a matter of hours."

There were many flood-fights in the district, but three stand out.

Feather River

"The first thing that happened was a breach on the Feather River, a main tributary of the Sacramento River, said Lt. Col. Dan Perron, Deputy District Engineer for Civil Programs. "The Yuba River flows into the Feather and that caused record water levels, around 300,000 cubic feet per second (cfs) below the confluence."

The local reclamation district was patrolling the levees, and about 8:35 p.m. on Jan. 3 they found a boil (water bubbling out on the land-side of the levee) near Olivehurst, Calif. Ten minutes later, 100 meters of the levee let go.

"The people in that area had a very short time to evacuate," said Perron. "It was primarily agricultural land, but there were quite a few homes and ranches in the flood area, which was about 20 square miles.

"The California Department of Water Resources (DWR) notified us a short time after the reclamation district alerted them," said Perron. "By five in the morning, we had a team up there."

"Our geotech folks did a quick scope of work by floodlights in the early morning," said Clark Stanage, Assistant Chief of Geotechnical Branch. "Then our contracting people got to work, and by daylight a local contractor, Nordic Industries, was at work."

The force of the water eventually eroded the gap to about 1,200 feet. From the air, the breach dwarfed the men and machines working on it. How *do* they close a breached levee with about 95,000 cfs pouring through?

"First the contractor armors the ends of the breach by placing rocks to keep it from eroding further," said John Corrigan, Chief of Construction Branch. "Then he gradually extends the rocks into the breach until he crosses it, which slows down the water considerably."

According to Stanage, a dredge will be placed in the Feather River, and the levee will be rebuilt by layering dredged sandfill over the rock closure section.

But the break itself wasn't the only problem.

"Getting *to* the break was the first problem," said Perron. "The contractor had to drive his heavy equipment down six miles of unstable levee. So he had to stop in places and repair the levee so he could work his way down to the break."

Meridian

Meridian, Calif., looks like a little island in a green sea — a population of about 300, surrounded by great swatches of farmland. Without the help of Sacramento District, the flood would have swallowed Meridian whole.

Continued on page 3

Division restructuring

Sec. Army approves revised plan

Secretary of the Army Togo D. West Jr. approved a revised plan to restructure the U.S. Army Corps of Engineers' divisions in accordance with two provisions in recent legislation.

The plan creates a new division structure of eight divisions, with each division containing at least four subordinate districts. The plan also reassigns some districts to new divisions.

"There was some concern in Congress with our previous plan as to whether we could effectively coordinate the regional issues, and a concern as to whether we would be able to continue to support our military construction mission in the Pacific Rim," said H. Martin Lancaster, Assistant Secretary of the Army (Civil Works).

The major components of the revised plan involve realigning the staffs of four current division offices into two divisions, each under the control of a single commander. The new Great Lakes and Ohio River Division will consist of the staffs currently at the North Central and Ohio River divisions, located in Chicago, Ill., and Cincinnati, Ohio, respectively. The new Northwestern Division will consist of the staffs currently at the North Pacific and Missouri River divisions, located in Portland, Ore., and Omaha, Neb., respectively. Division headquarters will remain open at all four locations to better coordinate and address regional issues.

Additionally, the current New England Division, which is already an operating division similar to a district, will be converted to New England District and will be placed under the control of the North Atlantic Division commander in New York.

The plan also alters the authority line for a number of districts. Two districts managing the Upper Mississippi Valley (St. Paul and Rock Island districts) will be realigned with four districts in the current Lower Mississippi Valley to create a new Mississippi Valley Division and enhance the integrity of the watershed management of

Continued on page 12

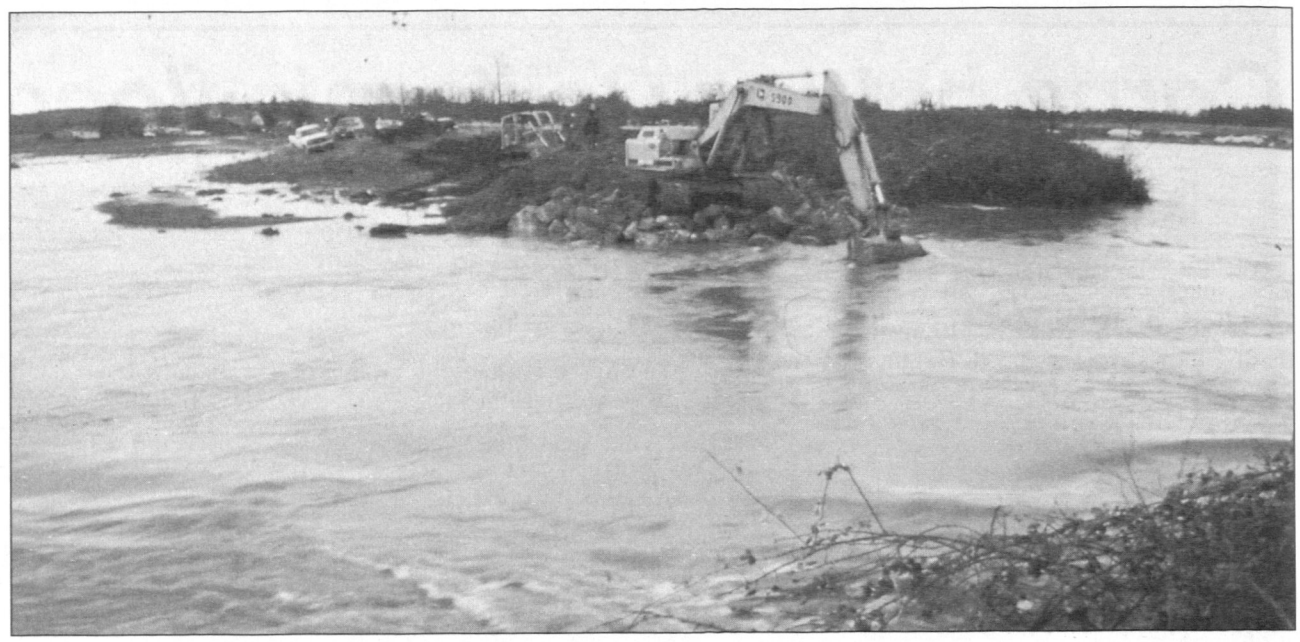
More flood action:

Western districts go all-out in Northwest disaster

December's weather conditions in the Pacific Northwest flip-flopped for weeks. Then, on the day after Christmas, the snow arrived. Lots of it, more than three feet in some areas.

Then came icy rain that weighed down the snow, caving in roofs. A warm front rolled in, and rain melted the snow and saturated the ground. Trees uprooted, small creeks overflowed, drainage systems flooded, and mudslides carried away homes. And the rivers started rising.

Emergency operations flood teams from Portland, Seattle and Walla Walla districts rushed to problem areas to help, most offering technical assistance or sandbags.



A levee on the Noonsack River dwarfs the men and machines working to close it. (Photo courtesy of Seattle District)

Seattle District

Seattle District dispatched a team on New Year's Eve to Washington State's Nooksack River. Flood water blocked access to a nearby peninsula after an ice jam caused a river to overtop its levee.

The team started sandbagging. "As the New Year came, we reached the first overtopping in the levee and patched it with field muck, a sandy silty material from a nearby field," said flood engineer Arill Berg. Farther along, the main break widened to 75 feet before it was closed with rock and gravel on Jan. 3.

Emergency Operations and Water Management offices in Portland were staffed during the holiday to support the field, respond to calls for information, and operate the flood control system.

Through their operation of the district's dams, the reservoir control team prevented more than $400 million in flood damages. Homeowners, public gas and electric utilities, and emergency offices all called the reservoir control centers for river level information and weather forecasts. The district's river flow information page on the Internet got more than 10,000 "hits" during one week at the height of the flooding.

During this year's flood, the snow and runoff from the lower river basins brought widespread minor flooding across Washington, causing 16 flood-related deaths, power outages, closing roads, toppling trees, collapsing structures and roofs, and mudslides. The flood control reservoirs were prepared to fill, but the state got a break when the snow stayed in the mountains.

Further east in Idaho, heavy snow piled up on rooftops, causing safety concerns at schools, hospitals and other county and city buildings. Responding to FEMA (the Federal Emergency Management Agency), district teams evaluated the structural integrity of the buildings and contracted for snow removal, where necessary.

Walla Walla District

The New Year started with a bang for flood fighters in Walla Walla District. Rising waters in southeastern Washington rivers made New Year's Eve a time of watchful concern for area residents. By 1 a.m. New Year's Day, emergency managers received their first call. By 6 a.m., they opened the Emergency Operations Center.

Throughout New Year's Day, district members examined levee systems in areas which had experienced extensive flooding in February 1996. Most levees held fast. Others needed reinforcement to hold back the threatening flows.

On the Boise River system, Corps of Engineers and Bureau of Reclamation projects held back more than 100,000 acre-feet of flood water on Jan. 1, averting about $100 million in damage in the Boise Valley.

The Corps' Lucky Peak Dam and Reclamation's Arrowrock and Anderson Ranch dams minimized flooding as far away as Portland, Ore.

Rural residents in the Weiser and Payette River areas in southwestern Idaho didn't fare as well. Flows on the Weiser River went to its flood stage of 9.5 feet, then kept climbing to an all-time record high of 16 feet. Local officials said there was nothing the Corps could do to help them right away because there simply wasn't enough time to do anything.

Following the formal declaration of an emergency, federal and state agencies activated a Disaster Field Office in Boise, which Walla Walla District helped staff.

Highlighting the federal government's concern for area residents, Vice President Al Gore viewed damage at Seattle and Boise, Idaho. At Boise, Gore met with state, county and local officials of affected areas around the state and responding agencies such as FEMA and the Corps. Civil Works Director Maj. Gen. Russell Fuhrman was part of Gore's team, gathering firsthand information about the extent of the emergency.

At the Boise meeting, Gore announced approval of a $10 million aid package to assist Idaho in recovery. Some of those efforts include levee rehabilitation and road clearing to help southern Idaho begin fixing the damage.

Portland District

Further south, Corps dams in Oregon operated as designed to reduce the effects of flooding.

Eleven dams in the Willamette Valley, two in the Rogue River Basin, plus John Day Dam on the Columbia River, stored water during the peak of the late December-early January rain storms.

Corps dams control 27 percent of the Willamette River Basin, 17 percent in the Rogue River Basin and 33 percent of the Columbia River Basin above Bonneville Dam.

Water releases from most of the lakes resumed as soon as river levels fell downstream, to regain the flood control storage space used during the storms.

At Lost Creek Dam on the Rogue River, two women from the community of Shady Cove went to the project office with fresh-baked goodies to show their appreciation. They also brought a poster which about 50 people signed, thanking the Corps for regulating the river.

During the flooding, Portland District sent field personnel to trouble spots throughout Oregon and southwest Washington to assist local officials. However, fewer Corps' resources were required this time because of steps taken before the flood. Members of the district's Readiness Branch toured the state county-by-county late in 1996 to clarify each agency's responsibilities before, during and after a flood.

"Emergency and public works officials appeared to be better prepared to respond to different situations," said Les Miller, Readiness Branch Chief.

A FEMA aid package totaling $42 million has been allotted to the Pacific Northwest, including northern California.

(Gerri Arbios in Seattle District, Dutch Meier in Walla Walla District, Matt Rabe of Portland District, and Jerry Schmunk in North Pacific Division contributed to this article.)

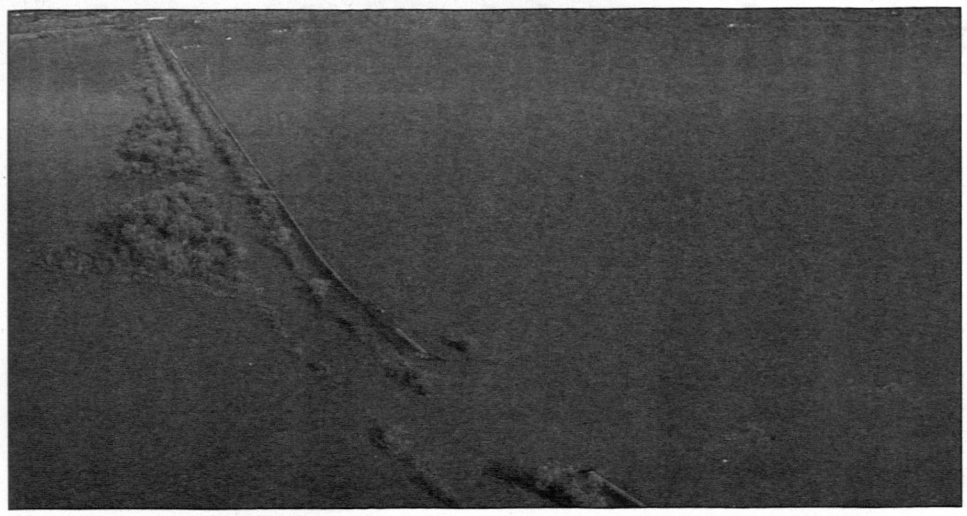
ENGINEER UPDATE is an unofficial publication authorized under the provisions of AR 360-81. It is published monthly by offset for the Headquarters, U.S. Army Corps of Engineers.

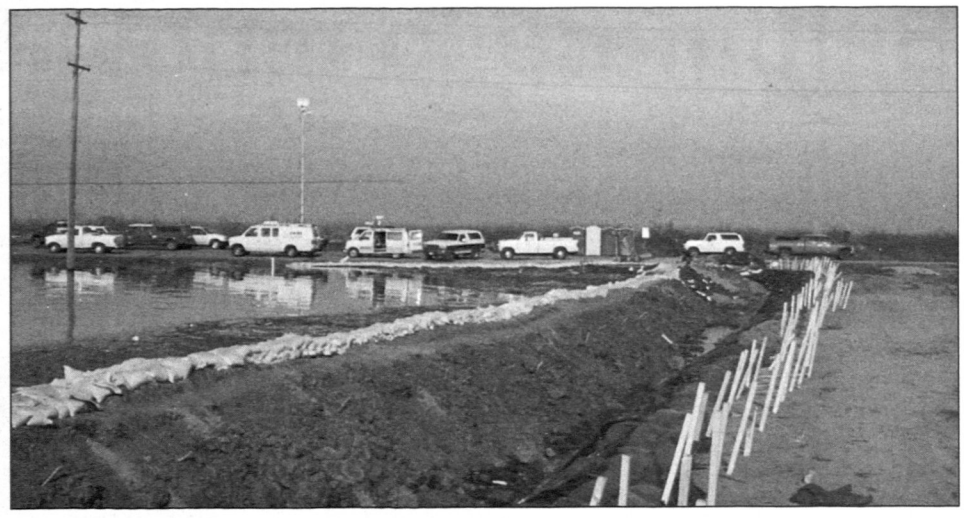
Editorial views and opinions expressed are not necessarily those of the Corps of Engineers or the Department of the Army. Letters to the editor are encouraged.

Deadline for submitting articles is the 15th of the month preceding publication. Subscriptions are available free of charge but must be requested in writing. Circulation: 35,000.

Address mail to: EDITOR, ENGINEER UPDATE, CEPA-C, Washington, D.C. 20314-1000. Telephone (202) 761-0015. Photographs are U.S. Army photos unless otherwise credited. Available on the Internet at http://www.hq.usace.army.mil/cepa/cepa.htm.

Commander, USACE ..... Lt. Gen. Joe N. Ballard
Chief, Public Affairs ..... Col. William L. Mulvey
Chief, Command Information ..... George E. Halford
Editor ..... Bernard W. Tate





The levee break (left) on the Sutter Bypass threatened Meridian, Calif. The crude but effective emergency levee (right) contracted by Sacramento District saved the town. (Photos courtesy of Sacramento District)

California floods

Continued from page 1

The town is located near Sutter Bypass. A bypass is a wide "lane" of agricultural land designed to flood when the river overflows. The farmland absorbs and slows down the flood while levees guide it downstream.

On Jan. 5, the levee on the Sutter Bypass breached and quickly eroded to about 1,000 feet wide. The water ponded against the Tisdale Weir (another water control structure), and backed up toward Meridian.

"We got a team up there and hired a contractor, Jefferies Construction," said Cloward. "He used six or seven bulldozers to push a 10-foot berm around the town. Then workers from California's Civilian Conservation Corps and Department of Forestry came in, spread plastic sheeting over the berm and anchored it with sandbags."

About 300 people were working at the height of the action. The contractor and state workers finished the temporary levee barely 100 feet ahead of the flood.

"It was a cooperative effort among the Corps, the Department of Forestry, DWR, and Sutter County," said Larry Combs, Sutter County Administrative Officer. "From the engineering point of view, the Corps played an important role in saving Meridian."

"I don't even know where to start thanking people," said Barbara Hankins, a Meridian resident whose home is across the street from the berm. "My first reaction was, 'Why would anyone go to all that trouble?' I'm still in awe that they even tried, and that they succeeded in saving our little town. It was an incredible effort."

Sacramento River Bypass

"We did another job on the Sacramento River Bypass that was a real success, but it didn't get much press," said Cloward. "We put down geotextile fabric and covered it with rock to keep the levee from sloughing away, and rocked-in a drain to move water down." The contract ran Jan. 3-6. "If we hadn't done it and the levee failed, it would have caused major damage to West Sacramento."

Cooperative effort

In addition to local flood-fights, Sacramento District used dams and reservoirs to move the massive water-load downstream without further damage to levees or property.

"In the San Joaquin system, more than a million acre-feet have encroached on the flood-space," said Paul Pugner, Chief of Water Management.

An acre-foot is enough water to cover an acre of land one foot deep. All that water was held in 34 flood control projects within the district. Seventeen of those projects are owned and operated by the district. "The rest are owned by the Bureau of Reclamation (BuRec), DWR, and some by large irrigation districts or towns," said Pugner. "Usually, they operate independently. They just follow a flood control plan written by the Corps when the project was authorized."

The Corps has legal authority under the Flood Control Act of 1944 to direct releases at non-Corps flood control projects. "In an event this big, it would be foolish for us to not coordinate with all state and local interests," Pugner said.

Cooperation and sharing information were the keys.

The main source of information was the Hydrological Automatic Data Acquisition system. HADA is a set of radio-based sensors at each project which feeds data to a personal computer. The Water Management Office's computers automatically gleaned that data every hour throughout the flood. Water control engineers throughout the district could then access the data.

"During this event, we also 'bundled-up' that data every hour and sent it to the California Data Exchange Center," said Pugner.

Most other agencies have similar systems and the data is shared by water control engineers throughout California via the Internet.

Pugner was on a conference call at 11:30 each morning with his counterparts in BuRec and DWR to coordinate water releases. "We talked about the whole system and how we could help each other. One project might hold back a few hours so someone who needed help could release without putting strain on the levees downstream."

Long-range cooperation is also needed. Representatives from the district, BuRec and DWR met Jan. 10 at the State Flood Center in Sacramento to set ground rules for releasing flood-water to draw reservoirs down.

"We asked everyone to reduce their reservoirs to a level to protect against a 20-year flood," said Pugner. "The damage caused by this flood will take months to repair, and this is just the beginning of our flood season. So we're asking everyone to share equally in the risk of what might happen while repairs are being made.

More flood action

The peak of the flood-water passed through the San Joaquin Valley on Jan. 10 and people in Sacramento District breathed easier. By Jan. 13, the district had:

- Taken part in 21 flood-fights.
- Sent three million sandbags to Nevada.
- Taken 17 flights (three military and 14 contracted) over the flood area.
- Spent $10,319,940 of the $11,500,000 allotted by HQUSACE.

1986 lessons

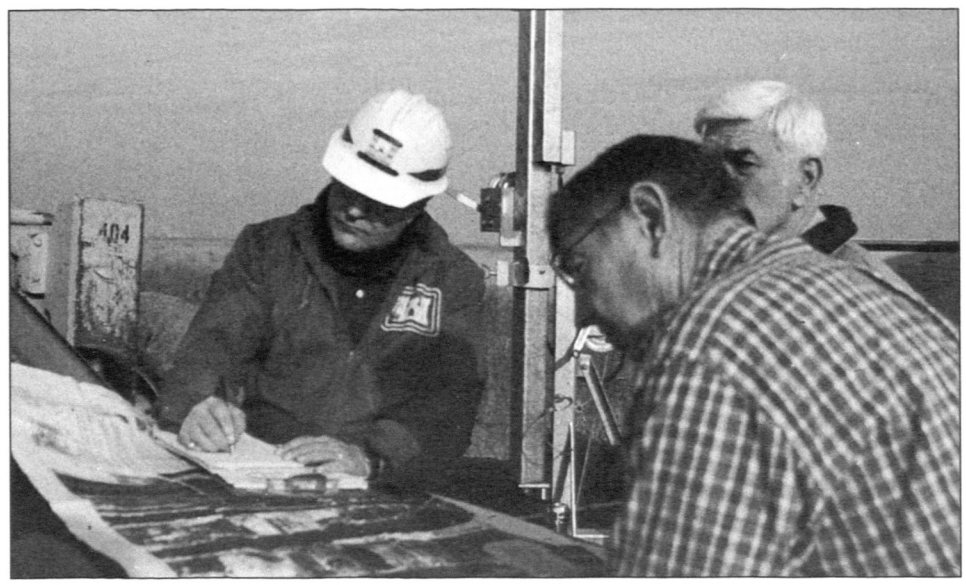
The 1997 flood was a 100-year event, the kind that can be expected about once a century, but Sacramento District fought one nearly as bad in 1986.

"The 1997 flood was worse, but we had similar rain levels in 1986," said Pugner, who was with the district then. "We learned a lot in 1986, and we responded much better in 1997. We started releases earlier, and we made sure Folsom Reservoir (a Corps-built BuRec project that protects Sacramento) was at a much lower level. We had more timely information because we had sensors in place which we didn't have in 1986, and we have better computer systems and the Internet to share information.

"So we responded quicker, we had more space, and we got water out quicker," Pugner said. "That kept 1997 from causing a lot more damage than it did."

The 1997 flood will bring its own lessons.

"You have to respond quickly to the needs of the community, within your rules and regulations," said Col. Dorothy Klasse, District Engineer. "You have to keep the community informed about what you can do for them, and what you *are doing* for them. You need good communications with the community, and with local government."



Stacy Wiebold, a Corps site construction representative, discusses plans to close a 1,500-foot break on the Yuba River with two representatives of Reclamation District 1001 in Yuba County, Calif. (Photo courtesy of Sacramento District)

Baltimore to renovate national landmark

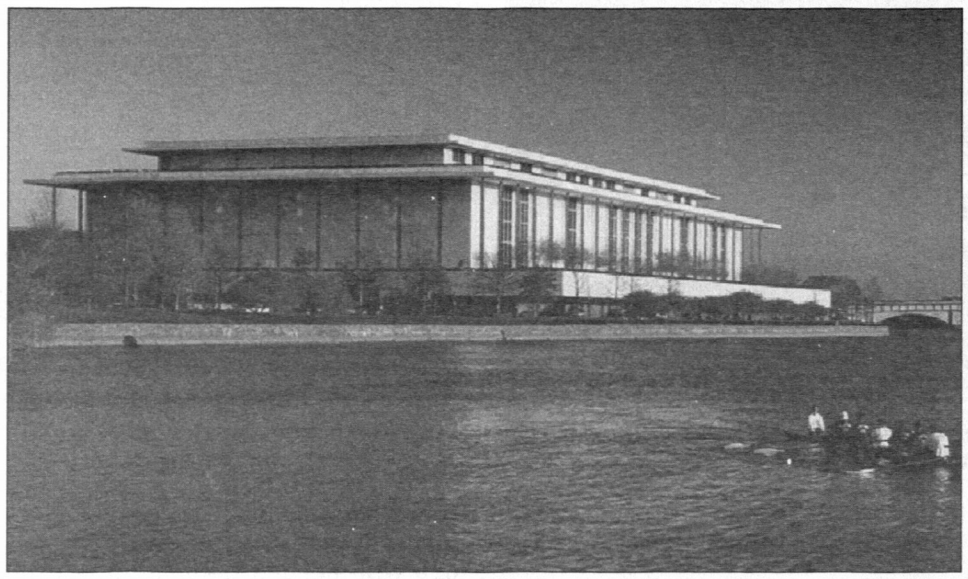
By Denise Tann
Baltimore District

The Corps of Engineers has faced some daunting challenges. Rebuild Kuwait. Clean up after Hurricane Andrew. But this was a different kind of tough. Renovate a mecca of the arts that had more than 2,800 performances and welcomed more than four million visitors last year, without disrupting the program schedule.

Baltimore District took up that challenge when it partnered with the John F. Kennedy Center for the Performing Arts to give the 25-year old living memorial a facelift.

"On its silver anniversary, the Kennedy Center is undergoing major capital repairs to bring it in compliance with modern building codes and standards," said Capt. Mark Coats, the Programs and Project Management Division project manager. "The center is truly a living memorial with performing artists practicing constantly, a full schedule of programs, and frequent visits from high-level foreign officials. We have to be sensitive to the Kennedy Center tenants and its neighboring buildings while doing our work."

The Kennedy Center was established by an act of Congress as a living memorial to Kennedy. The 1.5 million-square-foot facility overlooks the Potomac River in Washington, D.C., and houses four major theaters. It also contains smaller theaters and educational facilities, a parking garage, and a restaurant. It first opened to the public in Sept., 1971.



The Kennedy Center for the Performing Arts in Washington, D.C., opened in 1971 as a living memorial to the late President Kennedy. Baltimore District is renovating the building. (Photo courtesy of Baltimore District)

Engineering Division's William Taylor understands the sensitivities surrounding this project because, since November 1995, he has been detailed to the Kennedy Center as the district's liaison for the project. He has met with the Kennedy Center staff to discuss performance schedules and to plan alternative times for work crews, while simultaneously juggling performers' concerns and continuing the interior work. Taylor is on loan to the Kennedy Center for the Corps, but also works as the point of contact for private contractors hired by the center.

"The project is definitely challenging in some ways, since we're working on a memorial that's occupied during construction," said Taylor. "It's a high visibility facility, and we don't want to disrupt any of the patrons while we renovate."

The district provides design review, contract administration, and construction management services to the Kennedy Center Board of Trustees through a memorandum of agreement.

The repairs are part of the Kennedy Center's 15-year comprehensive building plan, which has been separated into three phases.

The first and second phases cover life, safety, and security issues, handicap accessibility, exterior building, interior spaces, building systems, and memorial interpretation.

The third phase will be a future on-going program for preserving the integrity of the building and its systems.

A memorandum of agreement allows the district to work with the Kennedy Center on separate portions of the work. Some projects currently under way include upgrading the security system, roof and roof terrace repairs, interior lighting upgrades, automated systems, and marble cleaning.

The Kennedy Center work continues to expand. Recently the center staff asked the district to oversee renovation of the Concert Hall. According to Harvey Johnson, Engineering Division's design manager for the project, the Concert Hall work includes renovating the stage and rear walls to include a chorus section and onstage seating, adding an acoustic canopy, installing new carpet, refurbishing the seats, creating handicapped accessibility, and reconfiguring the crystal chandeliers.

The schedule is tight for the Concert Hall upgrades, said Johnson. All the work being done by Quinn Evans/Architects, in association with Hartman-Cox Architects, must be completed by September 1997 when the National Symphony Orchestra returns from abroad.

The district anticipates more work from the Kennedy Center, which is being done under a reimbursable contract.

"I think the Kennedy Center sees the value in our design management and review process," said Johnson. "The next big project will be the Opera House renovations."

Waste products to be used to rebuild land

By Steve Wright
Huntington District

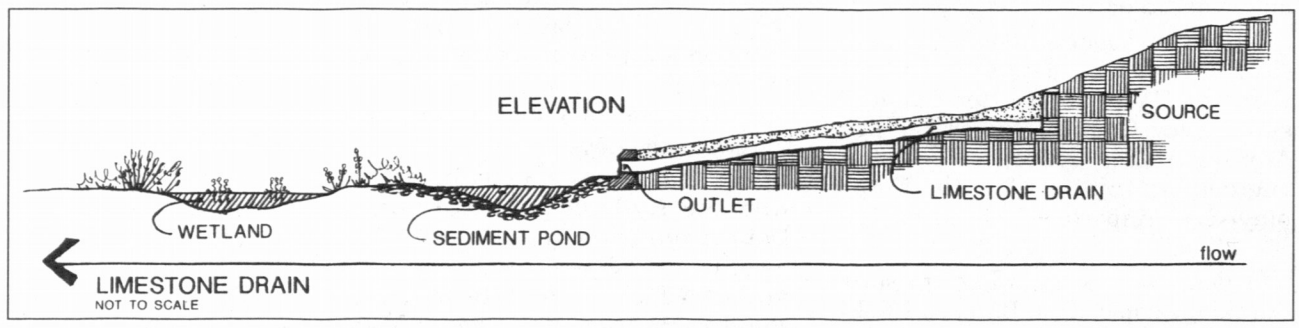
Environmental partnering with industry is paying dividends in Huntington District.

In June 1995, Col. Richard Jemiola, District Engineer, signed an environmental partnering agreement with Marty Mearhoff, American Electric Power's (AEP) Division Manager for Environmental Engineering. The district and AEP agreed to:

- Use flue gas desulfurization by-products from AEP's coal-fired electrical power plants to neutralize acid mine drainage.
- Share zebra mussel monitoring and control experience.
- Share wetland information and expertise.
- Assist in the annual Kanawha River Sweep to help clean up the Kanawha River Valley.
- Foster professional development through information exchange and shared training programs, where applicable.

To date, the most technically challenging projects are developing plans to use flue gas byproducts to neutralize acid mine drainage, reclaim lands damaged by mining, and develop wetlands to treat acid mine drainage.

At Wills Creek Lake in central Ohio, AEP, Huntington District and the Ohio Division of Natural Resources plan to neutralize acid mine drainage that flows from an abandoned coal mine into Wills Creek Lake. They also plan to restore a five-acre "gob pile" (coal refuse area).



Water flowing from the mine into the lake is orange from oxygen in the air combining with iron in the water. This reaction is eliminated when the drainage water flows through underground limestone beds without exposure to oxygen. Limestone removes metals and neutralizes acid in the drainage water.

After flowing through limestone beds, water then flows into constructed wetlands, which also remove contaminates. When the treatment is complete, clear water will flow into Wills Creek Lake.

Depending on the topography and contamination, the final design may have as many as three sets of limestone beds and wetlands.

Restoring the five-acre gob pile area will involve placing flue gas by-products on the area.

AEP is looking for beneficial uses of by-products from its coal-fired Conesville Power Plant in Ohio. AEP uses scrubbers to capture 95 percent of the sulfer dioxide generated by burning coal. The scrubbers spray a slurry of lime and water into the hot flue gases to remove sulfer dioxide before it is discharged into the air through the stacks.

The by-products are calcium sulfite and calcium sulfate, which is landfilled after being mixed with fly ash and additional lime.

AEP and Huntington District plan to use these flue gas by-products at Wills Creek. The by-products, which are impervious to water, will be placed on the gob pile and shaped to match the topography of the area. They will then be covered by a layer of clay and a layer of topsoil, which will be planted with native grasses.

Bob and Pat Knollenberg pose in their home with the members of the Tamagawagakuen University English Speaking Society. (Photos courtesy of Japan Engineer District)

East meets west in JED couple's home

By Doug Makitten
Japan Engineer District

Led by Bob and Pat Knollenberg, Japan Engineer District (JED) volunteers are improving understanding between Americans and Japanese. The Knollenberg's work earned them Japan's prestigious Good Deeds Commendation Award in a Nov. 29 ceremony at the Meiji Shrine in Tokyo.

The Knollenbergs have been assigned to JED since 1992. For more than two years, they have welcomed the Tamagawagakuen University English Speaking Society (ESS) to their home in the Sagamihara Family Housing Area for weekly meetings. The ESS is sponsored by the Zama Officers and Civilian Spouses Association.

Every week, except during the July and August summer vacation, 25-30 Tamagawagakuen students literally fill the Knollenberg home for an hour-and-a-half.

"When Bob and I agreed to take over the group two years ago, we decided to move it from the Camp Zama Recreation Center to our home and feed them a simple American-style meal instead of a snack," said Pat. "We wanted them to see how Americans live and enable us to get to know each other in a more relaxed atmosphere."

In recent months Capt. Kris Hurst, of JED's Kanagawa Resident Office, and his wife Carolina, and JED Safety Chief Karl Anderson, and his wife Dina, have also taken part. JED's Civilian Welfare Council has contributed hot dog buns for preparing the students' meal.

"We talk about anything and everything from everyday topics like hobbies and interests to cultural and political differences between America and Japan," said Pat. "That includes both the good and the bad, like the awful Okinawa rape incident."

Bob and Pat Knollenberg received their Good Deeds Commendation Award at Tokyo's Meiji Shrine. (Photo courtesy of Japan Engineer District)

Each week at the Knollenberg's, the students break up into groups to discuss the evening's topic. Then they come back together to express each group's viewpoint. While this is going on, the Knollenbergs circulate among the groups, guiding the discussion and providing an American perspective.

The Knollenbergs also escort the students to and from the housing area gate and prepare food for each week — American favorites like hot dogs, spaghetti, and macaroni and cheese.

Besides the weekly meetings, the Knollenbergs host two events each year, a summer picnic and a Christmas party.

"We had our own mini-Olympics at the summer picnic and the students really enjoyed it," said Bob. "Kris, Karl, Dr. Joris Wiggers of MEDDAC, and I were team captains. We had relay races, volleyball and badminton tournaments with prizes for everyone, and presented Olympic 'medals' made of construction paper."

Both Bob and Pat feel that the ESS is worth the effort they put into it. Both say they have learned a lot about Japan and Japanese culture and made lasting friendships.

"I believe that it's a privilege to live in Japan and that each of us should reach out to our hosts, share our differences and delight in our similarities," said Pat. "We're all American ambassadors and it's up to us to show the Japanese that Americans are good, decent people who are worth knowing, and who want to know them.

"It's wonderful to see how the students grow during our meetings," Pat continued. "Many are shy at first, and I think of them as closed flower buds. Then, as they start participating and feel more comfortable, those buds open and they become beautiful flowers."

"Some of them have never met or talked to an American before they come here," added Bob. "It really is great to see them open up and come to learn and appreciate the good things about the U.S. and Americans."

The Knollenbergs' views are echoed by the Hursts and Andersons.

"At first Carolina and I took part just to help Bob and Pat, but it turned into a way to get to know more about our Japanese neighbors, especially how their culture is changing from the old to the new," said Kris Hurst. "We've hosted the group when Bob and Pat were on leave in the states, and participate at the Knollenbergs' home when possible. It was satisfying to know that we are adding a different perspective to the way Japanese people look at and think about the U.S."

"It's fun to talk to the students and they show great initiative in coming each week," said Karl Anderson. "We benefit from them providing a good source of insights and information on modern Japanese culture."

Despite their hard work, the Knollenbergs were surprised to receive Japan's Good Deeds Commendation Award. About 600 people got it this year, but only 14 were foreigners. The awards were presented by the former Mayor of Tokyo, Shunichi Suzuki, president of the Japan Association of Good Deeds Commendation.

"I was surprised and embarrassed when we learned we would receive the award, because our work with the ESS fills me with such joy and gives me far more than I put into it," said Pat. "This award will remind me of my many happy hours spent with the Japanese youth who attend our meetings."

Metal experts:

Jacksonville has welding, metallurgy support center

By Christina Plunkett
Jacksonville District

The Corps of Engineers has several centers of expertise — concentrations of people who are experts in fields ranging from interior design to treating hazardous, toxic or radioactive waste.

One such concentration is Jacksonville District's Metallurgy and Welding Engineering Support Center, which supports design, inspection and evaluation of steel structures on Corps civil works and military projects nation-wide.

The "center" concept was created because there was significant Corps-wide workload in certain subjects, but insufficient regional work to develop and maintain expertise at each command. The centers of expertise provide consolidated support in those subjects.

John Jaeger, assistant chief of Design Branch, heads the center. Like other task-oriented centers throughout the Corps, it was established by headquarters to operate through June 1999.

According to Jaeger, Jacksonville District was selected because of his team's extensive knowledge in metallurgy, welding, and metal fracture and fatigue. The other team members are Tom Leicht, chief of Structures Section, and structural engineers William Wigner, Dave Dollar and Mike Wolz.

Before being designated experts, they were inspecting, evaluating and repairing hydraulic steel structures throughout the country. They were called on for their experience and research in the best welding sequences for new thick-plate welds and in specialized repairs on existing steel structures.

This team also made a name for itself in the welding world through teaching, publishing and presenting papers at national and international conferences. Some team members participate on national committees such as the American Welding Society and the Computer Aided Structural Engineering Steel Structures task group.

In 1994, the failure of a stoplog on the Tombigbee River had Mobile District asking for Jacksonville's help. This catastrophic failure released 30 feet of water into a dewatered lock chamber just before a contracting crew would have climbed in to begin maintenance work.

Following this failure, HQUSACE required inspection of all stoplogs and bulkheads before use. This led to many districts asking for Jacksonville's support, and resulted in the district being named the Metallurgy and Welding Engineering Support Center in April 1995.

The team knew that honor would increase the number of technical reviews for other districts and consulting trips to sites outside Jacksonville's boundaries.

John Jaeger (foreground), searches for potential defective welds on the needlebeam of St. Lucie Lock, and discusses his findings with a contracted weld inspector. (Photo courtesy of Jacksonville District)

"To date, the response has exceeded our expectations," Jaeger said. "The need for our support focuses on projects that are complex and difficult to design, fabricate and inspect.

"The issues are challenging and have significant impact on the overall project quality, performance and cost," Jaeger said. "A unique aspect is helping people you may never meet with projects you may never see."

While some problems can be solved by phone, the solution to other dilemmas have been so complicated that reaching a solution involved office reviews, consultations, field inspections and laboratory testing.

One such challenge was replacing a vertical lift gate at Ice Harbor for Walla Walla District. This project involved a lift gate about 88 feet wide by 91 feet tall and weighing 675 tons. This project required developing welding procedures and sequences to weld 3.5-inch thick plates in subfreezing temperatures.

A current project involves the Phase II construction of the Composite Medical Facility at Elmendorf Air Force Base, Alaska. This involves special welded framing connections between steel beams and columns to resist loads that develop during earthquakes. The work requires field inspections and material testing to determine the cause for cracking in the connections and making recommendations for correction.

The support center team is also developing engineering guidance for Corps-wide use, including creating an Engineering Technical Letter for identifying fracture-critical members on bridges. As the team reviews structural steel specifications, a new engineering regulation on the responsibility for hydraulic steel structures will be developed.

The team is also teaching short courses and workshops on metal fatigue and fracture on an as-requested or as-needed basis.

Jaeger says the support center's future growth depends on the Corps' workload and the number of welding problems encountered on projects.

Navigation info now on Internet

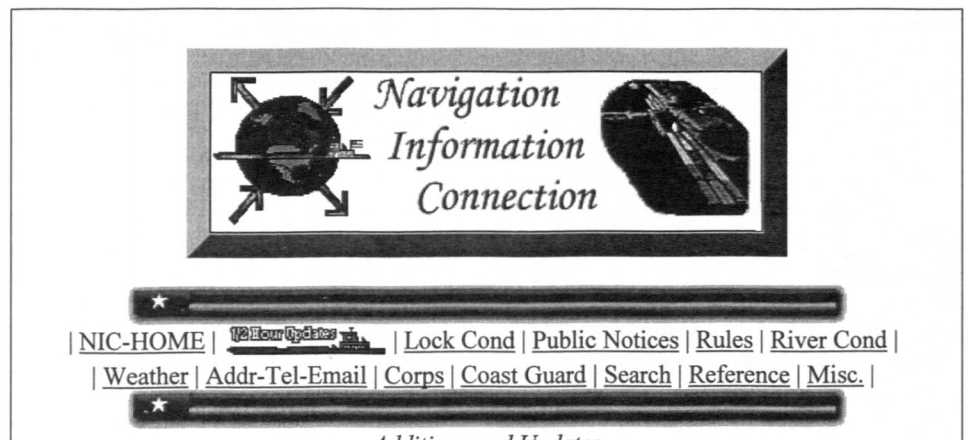
By Denise Tyler
Rock Island District

Like a proud papa, Monte Hines' eyes light up and his voice grows animated when he describes the Navigation Information Connection (NIC). NIC is the new wonder child of the navigation industry, and Hines is one of its "parents."

NIC helps river pilots gain easy access to information on the U.S. inland waterway systems. It helps barge companies keep track of river traffic and assists them as they monitor navigation business needs. And it allows Corps offices to share inland river data.

NIC, a World Wide Web Internet home page, provides a wide selection of information concerning inland river navigation. It makes it easier to locate available data through links, or connections. NIC is free to anyone with an Internet connection.

"In 1994, I was asked to participate on a lock operating team, similar to what we know here in Rock Island District as a process action team," said Hines, acting chief of Mississippi River Project Office. "Ohio River Division (ORD) joined with private industry to sponsor this brainstorm session. We all came away with a common commitment to develop an information clearing house to better serve the navigation industry."



That original meeting included representatives from the Rock Island, St. Louis, Nashville, and Huntington districts, ORD, and the private firms of Ingram Barge Lines, Western Kentucky Navigation, and American Commercial Barge Lines.

"One of the main goals at the 1994 get-together was to work on ORD's navigation notices," Hines said. "North Central Division had experience with Navigation Notice Number One, which consolidated all the notices and rules for the industry. The idea of exchanging information and having one place to go and get it appealed to the industry representatives who were there."

Continued on next page

Reservation system coming for parks

By Chris Moore
Portland District

With a single call to a toll-free number, visitors to federal recreation areas will soon be able to reserve a campsite, book a group table area, or obtain a climbing permit. Plans call for a new, national recreation reservation service to be launched in November, with full implementation a year later.

Jack Ardner of North Pacific Division is the Corps' program manager for this interagency project. Ardner and other Corps employees are working with the Forest Service and Bureau of Land Management to develop an easy-to-use, innovative system that benefits both visitors and field staff at recreation sites across the country.

"This is an exciting project," Ardner said. "It has the potential to make a large impact on customers and raise public awareness of federal recreation areas. Many people aren't aware that we have facilities available for their use and enjoyment."

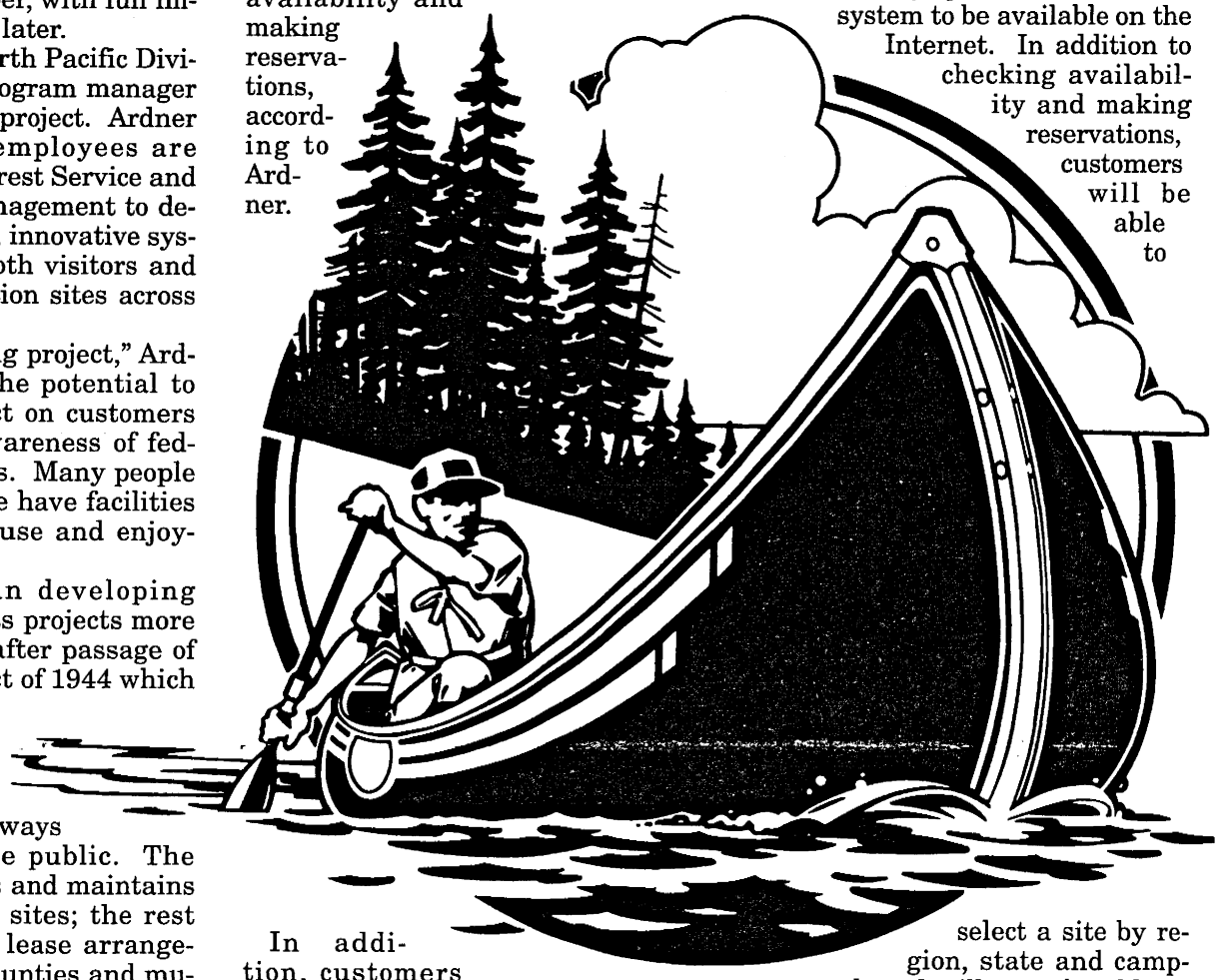
The Corps began developing recreation sites at its projects more than 40 years ago, after passage of the Flood Control Act of 1944 which permitted development. Today, 4,331 Corps-developed recreation areas on 463 lakes and waterways are available to the public. The Corps itself operates and maintains 57 percent of these sites; the rest are operated under lease arrangements with cities, counties and municipalities.

Of those operated by the Corps, 746 areas, with a total of 46,000 campsites, charge a fee for use. Only about 28 percent are reserveable.

"Right now, to reserve a site, you have to know about 100 different telephone numbers," Ardner said. "Under the new system, you'll be able to call one number to reserve a site at any location."

Better customer service

The primary goal of the project is to improve the level of service provided to customers by offering an easy, one-step process for checking availability and making reservations, according to Ardner.



In addition, customers will know what to expect. For example, every one of the Class-A campsites will offer the same features — flush toilets, paved roads and reservations.

With a common reservation system, business practices at Corps lakes will also be standardized. Credit cards will be accepted, allowing field staff to handle less cash and make fewer trips to the bank.

"This should reduce the workload and improve safety for employees in the field," said Ardner. "We're working to develop a mix of services that is attractive to customers and provides good service to our field staff and agencies."

Eventually, plans call for the system to be available on the Internet. In addition to checking availability and making reservations, customers will be able to select a site by region, state and campground, and will even be able to view a photograph of a specific campsite.

Implementation in two phases

Work is underway on specifications for a service contract, which should be awarded on May 1. The new program will be launched Nov. 1 at sites that already offer reservation service. Those sites previously operated on a first-come, first-served basis will be added on Oct. 1, 1998.

Managers throughout the Corps have been asked to identify sites for inclusion in the new system.

"This new reservation system is a valuable option for customers, but we also know we need to continue to respond to the needs of our local, repeat customers who use parks on a more spontaneous basis," said Ardner. "We'll be working to find the best ways to achieve both objectives."

Did you know ???

- The Corps of Engineers recreation program offers camping, hunting, boating, fishing and wildlife viewing. Interpretation and environmental education is also offered at many sites through regional visitor centers, campfire programs and other opportunities.
- The Corps offers 4,400 recreation areas at 463 projects.
- The Corps produces three percent of the electricity generated in the U.S. at 75 hydropower sites. The $400 to $500 million generated annually from hydropower sales is deposited in the U.S. Treasury.
- Recreation visitors typically spend more than $10 billion at Corps lakes each year. The direct and indirect effects of the economic activity result in employee income — about 617,000 full-time and part-time jobs. With a current budget of $170 million, the Corps recreation program expends less than $300 per job.
- The Corps is the nation's leading provider of water-based recreation.
- The Corps offers the second largest federal recreation program, with more than 380 million annual visits, second to the Forest Service and well ahead of the National Park Service.
- Corps recreation sites equal 7 million surface acres of water and 4.5 million acres of land in 43 states.
- More than 25 million people, one-tenth the nation's population, visits a Corps site at least once a year.
- Almost 83,000 Americans volunteered their time at Corps lakes last year helping clean up shores, planting trees, maintaining trails, and performing other worthwhile tasks. If you'd like to help out, call 1-800-VOL-TEER or contact your nearest Corps district or lake manager's officer.

(Chris Moore is a freelance writer in Beaverton, Ore. RecreationFacts courtesy HQUSACE Natural Resources Management Branch.)

Internet

Continued from previous page

The group realized that Corps offices and navigation companies all possess a great deal of information, but the information was isolated and not easily shared.

Hines got the task of exploring a merger of information. He came back to Rock Island District and began working with Tom Lisco and Lee Swanson (now retired) of the Information Management Office. Together they researched ways to electronically link existing data. They briefly investigated a bulletin board system but the Internet emerged as the best forum.

Rock Island District obtained an Internet server to accommodate the large body of existing information. In March 1995, NIC's "birth announcement" was an Internet home page residing on Rock Island District's server. Many pieces of information that were spread throughout the industry could now be retrieved from one location.

Navigation notices, blue book data, and OMNI (Operations and Maintenance Navigation Information) data were part of the first NIC home page. OMNI is a data collection system developed by the district to collect lock performance and other hydrologic data, and has been in place almost 20 years. OMNI provides real-time data, such as vessel queues.

Over time, incremental improvements have been added. Suggestions from users have expanded NIC to hundreds of information links. NIC has links to national weather conditions; visual maps, charts, and photos; library and reference information; newspapers, periodicals, and publications on navigation; and Internet search tools. Information is provided by the Corps, the Coast Guard, federal, state, and local agencies, industry, colleges and universities, and others.

Hines now includes a "Recent Additions and Updates" at the top of the home page. Users can find out by date what's new in NIC. Hines answers questions and implements many suggestions from messages he receives.

Now about 18 months old, NIC is growing and maturing into a popular youngster in the world of inland waterway navigation. To access NIC, the Internet address is http://www.ncr.usace.Army.mil/nic.htm

Huntsville couple adopts three Russian children

By Linda S. James
Huntsville Engineering Support Center

Maj. Alan Cushen and his wife Sara wanted to be parents, and parents they became to three Russian-born children.

Daniel, Lauren and Michael (all under the age of 3) began their lives in a world far from Alabama. Daniel, now age three, was adopted when he was 10 months old from an orphanage in Kahzikstan. Lauren, 18 months, and Michael, 12 months, joined the Cushen family just a few months ago when the Cushens brought them home to Huntsville from an orphanage in Tula.

It wouldn't be easy making a family by adopting three children from another country but, according to the Cushens, the rewards have been tremendous.

"This is the hardest job I've ever done," said Sara. "But watching their eyes get brighter and their development accelerate in just a matter of weeks has been nothing less than incredible."

"Kids don't come with manuals, and being parents of children from a foreign country has its own special challenges," said Alan, project manager for the Ordnance and Explosives Team at Huntsville Center. "But it's been amazing to see how quickly we've become a family."

The joy Daniel, Lauren and Michael have brought to the Cushen's home is evident in their voices and their laughter. But ask them how they came to adopt these lovely children and about the hundreds of children they left behind, and their tone turns sober indeed.

"There were 100 children under three years old in the orphanage where we adopted Lauren and Michael, and another 100 in a second orphanage in the same town," said Sara.

"The Russians do the best they can with what they have, but the children have little they can call their own," said Alan. "And, if they've not been taken into a home by the time they are 16, they are on their own to make a life for themselves."

When so many are in need, how does someone choose just one, or two, or three? The adoption agencies match prospective parents with children based on preferred age and gender. Then they provide videos of the children.

"It's heartbreaking to see them all dressed up," said Sara. "Often the same hair ribbon would be seen over and over on different little girls because they were sharing the nicest things they had for the videos."

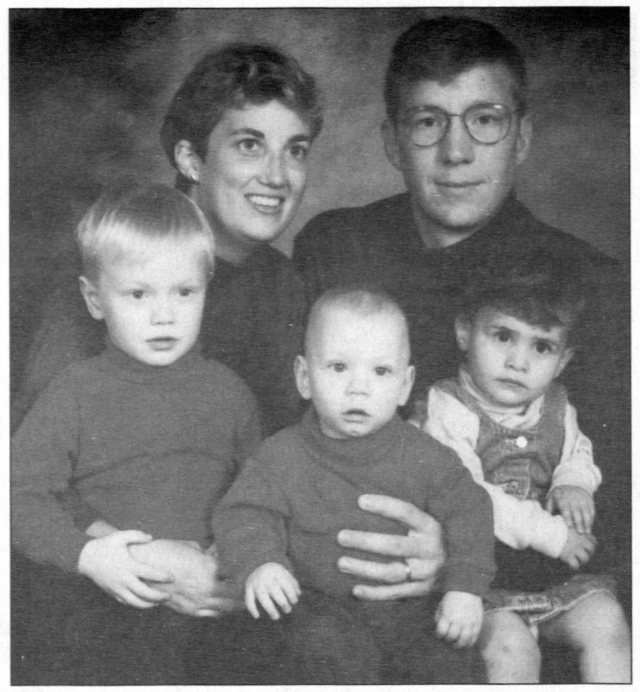
Ask the Cushens about international adoption and you find how committed they were to bringing these children into their lives.

"The paperwork's not hard; it's just time consuming. There's so much of it," said Alan. He explained that they had to write detailed autobiographies and gather letters of recommendation. They also needed an FBI clearance. "The adoption agencies want to make *very sure* that adoptive parents are *very sure* that they want to be parents."

Home visits by a social worker from the adoption agency are typical and, according to Alan, a big help when the parents-to-be are struggling with the process.

"A home study visit isn't a white-glove examination," said Alan. "The social worker is a resource and we relied on her to help us through."

Sara agreed and added that it's important to carefully select an agency. The Cushens called several before deciding on Hand-in-Hand in Colorado Springs, Colo., where they lived when they adopted



Maj. Alan Cushen and his wife, Sara, pose with the Russian children they adopted, (l-r) Daniel, Michael and Lauren. (Photo courtesy of Huntsville District)

Daniel. They were so pleased with the agency, they returned to Hand-in-Hand when they decided to adopt again, even though they had transferred to Huntsville. The only difference was that the home study social worker came from an in-state agency, Villa Hope, in Birmingham.

It took nine months to complete the adoption process for Daniel, the Cushen's first child, and about a year for the two younger children. The time they spent in Russia ranged from a few days to two weeks. Both Sara and Alan agreed that the Russian laws have changed to be more favorable to international adoptions.

"We are registered as the kid's parents on their birth certificates," said Alan. "There's no chance of that changing, ever."

Contest teaches kids about hydropower

By Brenda Henry
St. Louis District

Hydroelectric power is a safe, clean, reliable source of electricity. Managed properly, it poses little threat to the environment. Millions of homes and businesses around the world are supplied with electricity that comes from hydroelectric power plants. Yet many people have little knowledge about how hydroelectricity is generated.

The Clarence Cannon Dam Powerhouse, at Mark Twain Lake near Monroe City, Mo., is one of 71 Corps dams equipped to produce hydroelectric power. In 1990, park rangers at Mark Twain Lake came up with an innovative way to teach this topic. By sponsoring a "Design a Turbine Contest," they could educate hundreds of children.

Schools are introduced to the contest at the Corps' annual "Environmental Education Day." At this event, representatives from local businesses, special interest groups and government agencies discuss how their industry impacts the environment and what steps they are taking to improve environmental quality.

Mark Twain Lake's booth is set up with a demonstration turbine so that the children can better visualize how hydroelectricity is created. Park rangers present a short program to each group on the concepts of electricity.

Anyone in the fourth through seventh grade who decides to participate is challenged to design and build a turbine from local materials. Items such as plastic spoons and bottles, tin cans and rubber bands are all examples of construction materials.

Their model must be powered by falling water. The contestants pour water down a long funnel which turns the turbine and powers a miniature generator supplied by the Corps. Each contestant is allowed one gallon of water and one minute to do the testing.

Once the turbines are built, park rangers travel to the schools and connect the generator to a laptop computer. The computer calculates the voltage each turbine produces, and the one which generates the most electricity is displayed at the Clarence Cannon Dam Powerhouse Exhibit Area for one year.

All participants are recognized for their achievements. Since 1990,

Park ranger Brenda Henry and a group of children test a homemade turbine. (Photo courtesy of St. Louis District)

more than 8,000 students have been educated by the contest.

Environmental education is the theme for the Corps' Interpretative Services and Outreach Program (ISOP). This theme provides a basis for the "Design a Turbine Contest." Park rangers at Mark Twain Lake feel that students gain a better understanding of hydroelectric power and a sense of accomplishment through this hands-on activity.

As a bonus, they exhibit plenty of enthusiasm for their creations. This enthusiasm will hopefully build interest in math and science, or even encourage some students to consider pursuing careers in these fields.

(Brenda Henry is a park ranger at Mark Twain Lake.)

Kids, adults like new child care center

By Judy Marsicano
Fort Worth District

At 5:30 a.m. every morning, Spec. 4 Allen List, a single father, drops off his youngest child at day-care so he can make it to physical training on time. Amber, who is five, isn't quite awake yet, so she is led to a "cozy corner," a soft area with plenty of pillows and blankets where sleepyheads can wake up slowly. Later, she will have breakfast before she goes to kindergarten.

Amber is one of about 170 children who enjoy the new Child Development Services (CDS) Center at White Sands Missile Range (WSMR), N.M. The $3.8 million, 20,000-square-foot center, designed by Little Rock District and built by Fort Worth District, opened in July. It is another example of the quality-of-life services provided by the Corps of Engineers to soldiers and their families.

There are about 800 military and civilian families at White Sands. The center provides services for children from six weeks to 12 years old, with programs for infants (6 weeks to 12 months old), pre-toddlers (1 to 2), toddlers (2 to 3) and preschoolers (3 to 5). There are also special programs for before-school and after-school care for kindergartners, plus hourly care.

"The Army has always considered child care an important issue to our soldiers," said Denise Rodriguez, CDS coordinator. "The community is growing and our program is, too. If parents can't leave their children in a safe and nurturing environment each day, then how can they be expected to do their jobs well?"

The children were previously crowded into a child care center which was split between a renovated messhall built 50 years ago and a chapel annex, and there was always a waiting list. Now, 160 to 170 children participate each day at the new center, which can accommodate up to 244.

"I don't know how we managed in the old facility, but we provided a high-quality program there, too," Rodriguez said.

The WSMR child care program has been certified for the past five years by the Department of Defense, with commendation on financial management, staff, parent-teacher relationships, and meal program. It recently won the Army Child Development Service of Excellence Award, the highest award given to installations with child development programs.

But nothing speaks more highly of a child care program than the parents' observations.

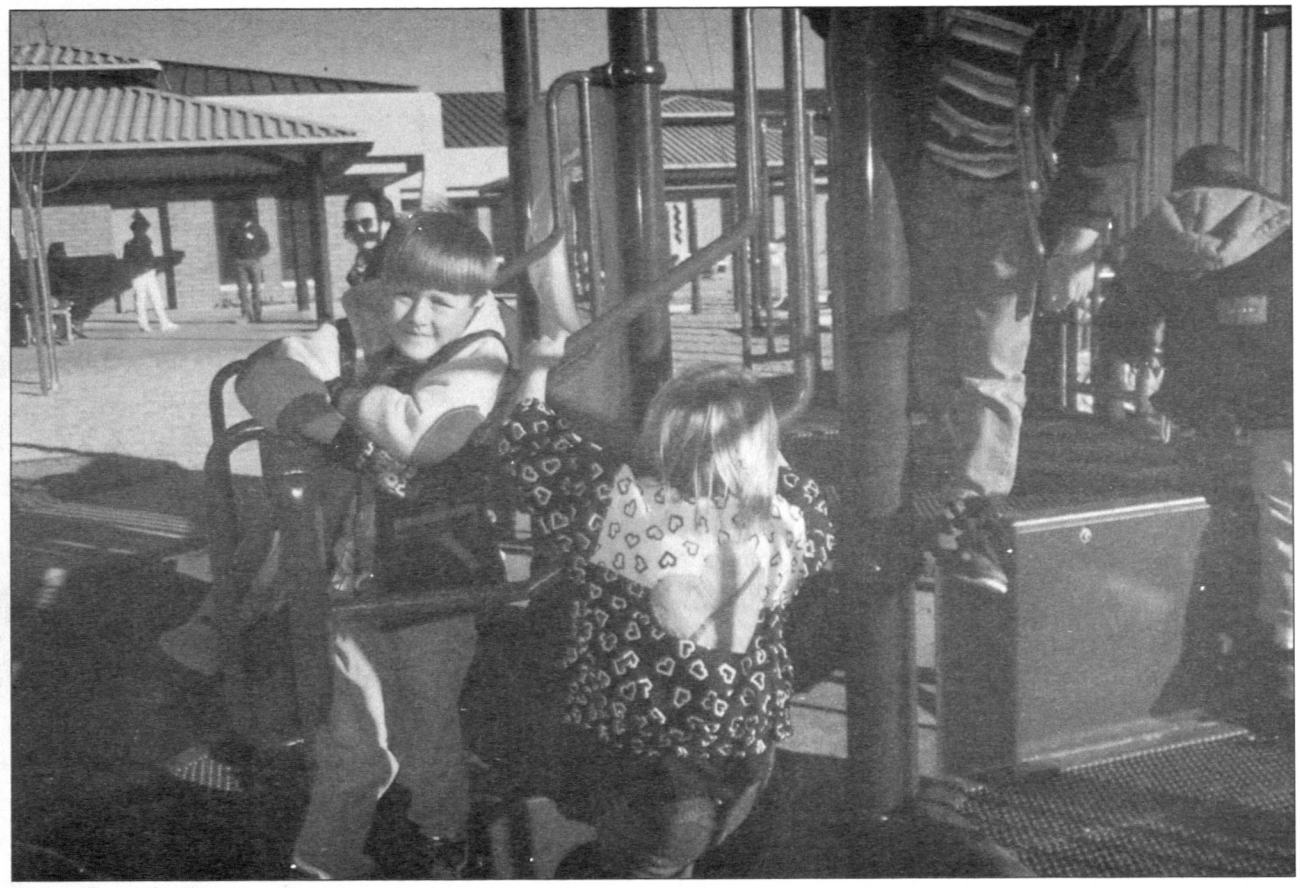
Toy Cartwright, a civilian working at White Sands, has entrusted her two children to CDS for nearly three years. "There's no comparison in the quality of care," Cartwright said. "There's more space and many more activities and the children seem happier when I pick them up."

Cartwright likes having the children nearby so she can be there in minutes if one gets sick. "I also like them close because I go over almost every day at lunch to nurse my baby."

The facility was designed by Little Rock District and has a number of special features. In the reception area, 12 closed-circuit televisions help calm anxious parents who have problems separating from their child. There are viewing windows in each room so parents can come at any time during the day and look in on their children.

Conference and resource rooms are available for parent-teacher use, and a commercial-size kitchen is equipped to prepare more than 600 hot meals per day, if necessary.

Each age group is placed in its own color-coded module which features pint-size furniture and other facilities appropriate for that age. Drinking fountains, toilets, and sinks with no-touch faucets are all adjusted to the right height.



Children enjoy the playground outside of the Child Development Services Center. (Photo courtesy of Fort Worth District)

Each child has his/her own personalized "cubbie" for a change of clothes, sweaters, or coats. The floors throughout the facility are heated for the childrens' comfort during cooler months.

Four playgrounds are designed to trigger the imagination of each age group. The infants have riding toys, safety padding and "bye-bye" buggies which can accommodate up to six babies. The toddlers area has playhouses arranged neighborhood-style. Pre-schoolers have a ball play area and a jungle-gym for climbing. The kindergartners have a basketball court which they share with the preschoolers. There are sand and water areas in each playground, awning-like structures that provide shade, and a tricycle "road" which gets heavy use.

Misters strategically placed around the playgrounds are operated by the children to keep cool during the hot summer months. Care givers don't worry about cleanup problems from wet children playing in the giant sandbox. "Remember that we're in the desert," Rodriguez said. "Just as soon as the child gets wet, he's dry!"

The CDS staff had input from the design phase through construction, which Rodriguez credits for the project's success. "Usually, when you move into a building, all the construction people are gone and it's too late to make any changes," Rodriguez said. "Because we got involved up front, we had a great team effort with the Corps, the contractor and the master planner."

Michael Abraham of Little Rock District was the architect. He took the Southwest flavor of the local area, added it to the design, and the parents loved it. Just before construction started, he flipped the design so the children have a view of the Organ Mountains southwest of the center, and of the elementary school where many would attend their first years of school.

"It's a design that blends with the character of the region," Abraham said. "We tried to develop a project that would appeal to the children and the parents, and would serve as a landmark for the base."

During construction, Rodriguez and other CDS members did weekly walk-throughs of the facility and spoke up when they saw where improvements could be made.

The staff wanted special features like hands-off sensor faucets, rounded corners on the "cubbies," and a place to store the nap cots. They doubled the size of the shade structures on the playgrounds because of the harsh summer temperatures and, knowing how much children like to play outside, they enlarged the sand and water play areas. When they saw during construction that drinking fountains and other facilities were being built at the wrong height, their ideas were incorporated.

"Everyone was so responsive to our suggestions," said Rodriquez. "I think it was important that they listened to the care givers, because they'll be the ones who work here and they know what will best serve the children."

Rafael Acosta of Fort Worth District's Southwestern Area Office monitored the construction, quality and safety aspects of the center, and coordinated with the project architect, the contractor, and the base project engineer.

"This was a high-profile project and everyone was watching it go up," Acosta said. "The contractor struggled to finish the project on schedule, which was important to the customer. But we really focused more on giving the customer a quality product."

It is the users, the children, who are the best judges of the center.

"I like to play soccer and football on the playground because it's my funnest game," said 5-year-old Charles Chronister. "When I'm inside, I like to read books. The best thing I like is to be a team captain because I get to ring the bell."

Six-year-old, blue-eyed Allison Marie Smith, sitting nearby, said she likes to play housekeeping. She dresses up in clothes like a mommie and plays with a pretend baby.

"I'm one of the early morning kids," she said. "I eat breakfast, then I go to kindergarten in a blue and white bus," and she pointed with enthusiasm at the White Sands Elementary School.

Contraption makes ice fly at South Pole

New CRREL digger great success, makes tunneling fast, safe

Article and Photos
By Michael R. Walsh
CRREL

The South Pole has some of the worst weather in the world. Temperatures at the Pole average about 50 degrees below zero Celsius (C)(58 degrees below zero Fahrenheit (F)), and during the austral winter, temperatures can reach 80 below zero C in absolute darkness. Even during "summer," windchills 70 below zero C are not uncommon.

These extreme low temperatures, coupled with drifting snow, make access to utilities difficult. A midwinter failure of a critical system could be disastrous. So how do you run utilities from one structure to another at America's Amundsen-Scott South Pole Station?

A team of CRREL engineers headed by Donald Garfield and myself, working on a project funded by the National Science Foundation, designed a unique system for tunneling through the dense, hard snow at the South Pole.

The system is a modified Bobcat 231 excavator, a series of expandable ducts for chip conveyance, a 50-horsepower centrifugal fan that powers the chip ejection system, a modified SIMCO 2400 drill, and a Caterpillar 205-kilowatt generator in a specially-designed weatherproof enclosure.

The equipment can cut a 2x3-meter (about seven feet wide and 10 feet high) rectangular tunnel at depths of 14 meters (about 45 feet). The system was designed and built at CRREL 1991-92 and later tested at the nearby Dartmouth Skiway before shipment to Antarctica.

Early in 1996, after a two-year delay due to budget limitations, a team of four CRREL engineers and technicians traveled to the South Pole to test the equipment on-site. The original 30-meter (about 100 feet) "proof of concept" tunnel turned into a 120-meter (about 390 feet) utility tunnel when the station's wastewater outfall began to rapidly fill due to expanded activity at the facility.

The station's population is generally not more than 125 persons, but the population has increased to about 175 due to the manpower needed to install the new facilities.

We couldn't use the tunneler at that time due to problems with the equipment and a lack of spare parts. But all was not lost, since we learned many valuable lessons and made or planned improvements to the equipment.

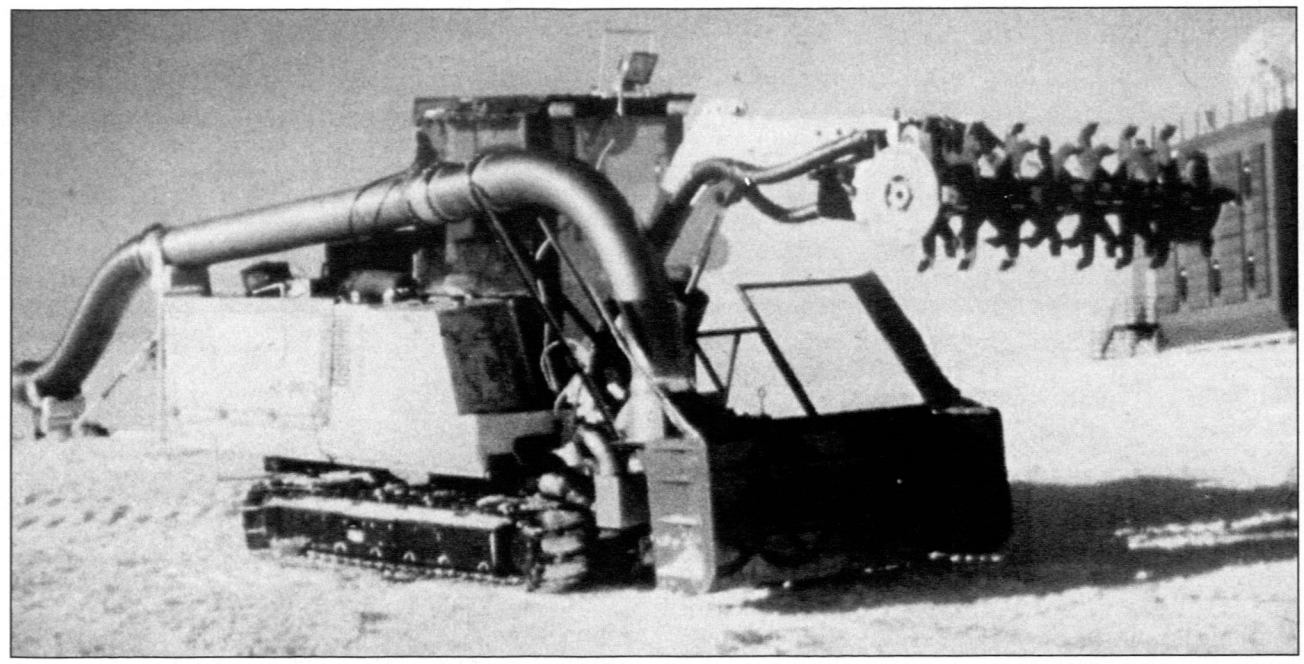
A lot of work had to be done between our return to CRREL and our redeployment last November — spare parts ordered, equipment designed and fabricated, and manuals written.

Then, once again, we traveled 30 hours by air to Christchurch, New Zealand, where we picked up the first of two military flights to the Amundsen-Scott South Pole Station.

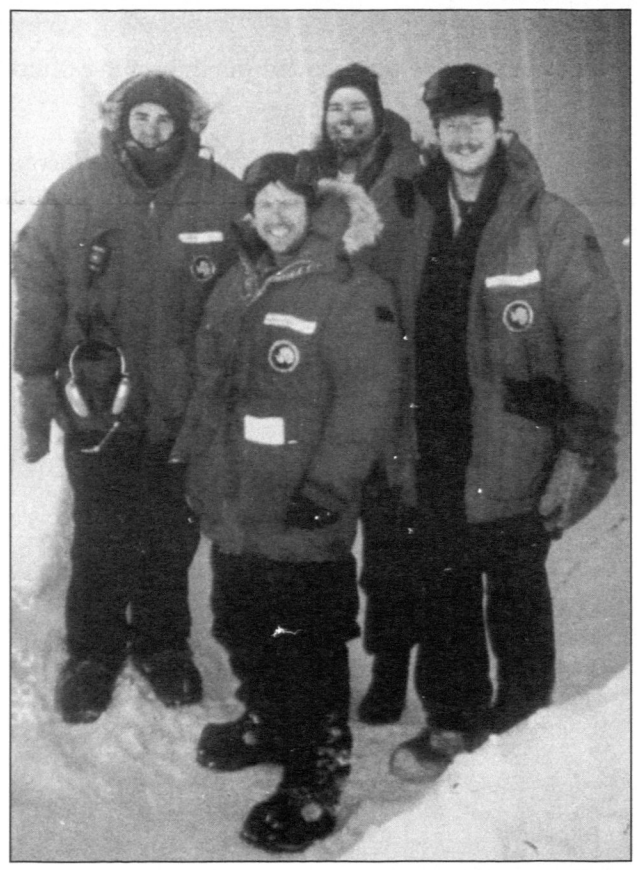
Our arrival was delayed by the worst spring storms in history. When we finally got to the station, it was a hive of activity as personnel dug out from the storm. Re-excavating the 14-meter deep trench for starting the tunnel was delayed a week, but we put the time to good use modifying and testing equipment.

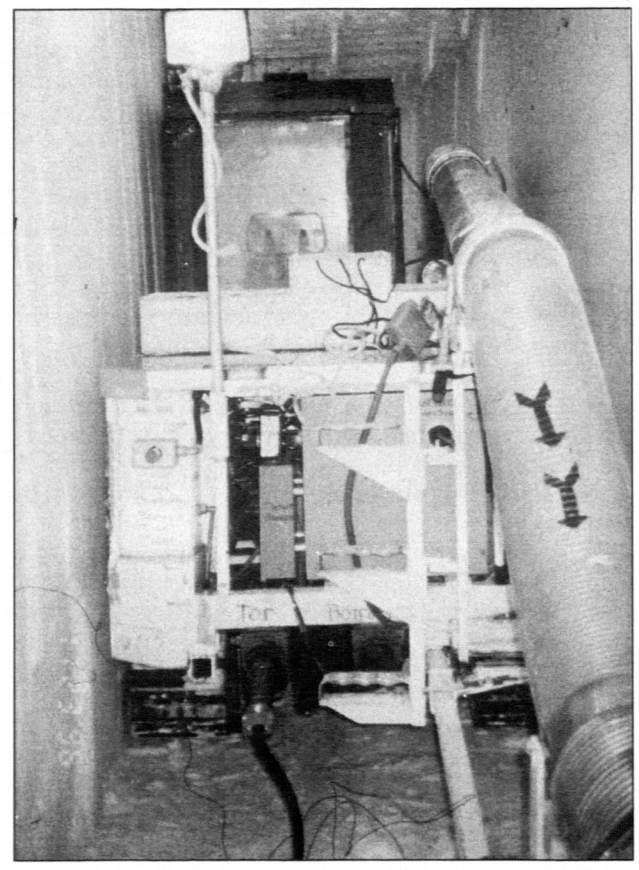
Finally, on November 22, tunneling began and we let the snow fly!

Initially, the blower for the chip ejection system was in the trench with the tunneler. When the tunneler was about 30 meters (about 100 feet) into the tunnel, two vertical holes were drilled from the surface, one for the ejection system's vertical tubing, and one for the power cord from the generator to the tunneler. We placed the centrifugal fan on the surface and snow was ejected to the surrounding terrain.



The tunneler is at home at the South Pole.





(Left) The tunneling team (l-r) Dennis Lambert, Chris Williams, Mike Walsh, and Troy Arnold, stand at the entrance to the new tunnel. (Right) The tunneler at work.

As the tunnel progressed, the expanding ducts reached their maximum spread and another set of vertical holes, about 25 meters (75 feet) further down the tunnel, were drilled. We repeated this process two more times.

Progress was slower than expected, so we decided to increase production by splitting the team into two shifts. The first shift did most of the tunneling. The second shift did maintenance work, moved equipment, drilled the vertical holes, and tunneled. Although exhausting, this arrangement proved efficient, with up to 22 meters (about 65 feet) of tunnel completed a day. A 54-meter (about 165 feet) stretch of tunnel and an equipment redeployment was done in three days.

We completed the tunnel on Dec. 3, and station personnel immediately began installing the outfall system. When complete, the tunnel will be 140 meters (about 450 feet) long. About 20 meters (about 65 feet) will be a covered trench between the main station and the tunnel opening.

The tunnel outfall system should be integrated into the station's wastewater system this month.

CRREL's South Pole Tunneling System is the first of its kind ever successfully deployed. Tunnels have been built in icefields, but none have ever been fully mechanized. The tunneler is a prototype system but it proved that unlined tunnels are both feasible and possible.

Around the Corps

Supercomputing challenge

A team of researchers from the Waterways Experiment Station (WES) won a gold medal at the recent Supercomputing 96 High Performance Computing Challenge competition in Pittsburgh, Penn.

The first place WES entry was "A Distributed Interactive Particle Simulation." All entries had to produce useful scientific or engineering results. The WES winner was a real-time simulation that allows researchers to interactively visualize and steer the computation of the interaction between military vehicles and soil.

The WES team was Alex R. Carillo, John E. West, and C. Stephen Jones of the Information Technology Laboratory, and Dr. John F. Peters and David A. Horner of the Geotechnical Laboratory.

The competition included more than 60 scientists from 15 organizations, including Oak Ridge National Laboratory and Sandia National Laboratories.

New Gulf War book

Supporting the Troops: The U.S. Army Corps of Engineers in the Persian Gulf War is the newest book from the Office of History. It provides an overview of the Corps' missions during Operations Desert Shield and Desert Storm.

During the Gulf War, the Corps provided housing, sanitation facilities, and logistics support. It also maintained supply routes, built helipads and airfields, provided electrical power, and administered contracts for the Department of Defense.

The Corps ultimately performed $298.7 million of construction on base camps, airfields, wash racks, sunshades, and equipment rental. Of this, $219.6 million came from Saudi Arabia under host-nation support agreements, and $37 million from the Gulf Peace Fund on behalf of the Japanese government.

The book, written by Dr. Janet McDonnell, discusses the deployment and mobility of engineer troops and equipment, use of contractors to perform engineer functions, support and funding from other nations, and sending civilians to the Persian Gulf.

Single copies are free to Corps employees. Contact the Publications Depot, (301) 394-0081, and ask for EP 870-1-50, or write:

U.S. Army Corps of Engineers
Publications Depot
2803 52nd Avenue
Hyattsville, MD 20781-1102.
Fax: (301) 394-0084.

Fort Lewis barracks design award

In December, a Design Excellence Award for the Whole Barracks Renewal Project was presented to the Seattle District barracks project team, and Whiteley Jacobsen Associates and HNTB of Bellevue, Wash.

The award, given by the Society of American Military Engineers, is a tribute to the work of the district project team and their consultants in developing the 500-acre site at North Fort Lewis, including designs for more than 30 buildings, supporting roads and infrastructure.

Kirk Bryan Award

Dr. Roger T. Saucier, retired physical scientist with the Waterways Experiment Station (WES), has received the Kirk Bryan Award from the Geological Society of America. Saucier received the award for *Geomorphology and Quaternary Geologic History of the Lower Mississippi Valley.* Publication was sponsored by the Mississippi River Commission (MRC), and Saucier wrote it while employed at WES.

The award is given annually by the Quaternary Geology and Geomorphology Division of the Geological Society of America. It is awarded to the author of a published paper which advances geomorphology or some related field.

Saucier's publication updated and revised the work of Harold Fisk. Fisk's *Geological Investigation of the Alluvial Valley of the Lower Mississippi River* was published by the MRC in 1944. In 1992, senior MRC engineers decided the time had come to revise Fisk's work. It was clear that Saucier was the best qualified because he had spent his career studying, detailing and investigating the engineering geology of the Lower Mississippi Valley. Saucier accepted the task and completed it in two years while working on many other projects.

Army Engineer Memorial Awards

The Army Engineer Officers Wives Club of Washington, D.C., announces the availability of Army Engineer Memorial Awards for qualifying high school seniors. To qualify for an award, an applicant's parent must be a Corps of Engineers officer presently on active duty, or retired, or who died on active duty.

These awards, established in 1973 as a living memorial to engineer officers killed in Vietnam, are given annually to honor all engineer officers who die in the line of duty.

The award is based on academic and extracurricular achievement in high school, and it must be applied toward tuition or scholastic expenses at a college, university, technical or vocation school. Deadline for application is March 1.

For further information, contact Kathleen Moakler, the AEMA treasurer of the Army Engineer Officers Wives Club, at 5992 Norham Drive, Alexandria, Va. 22315. Telephone (703) 719-9632.

Russian chem demil

Huntsville Center recently awarded a contract that will help the Russians begin destroying their chemical weapons.

The requirements contract, worth up to $600 million, was awarded to the Ralph M. Parsons Company of Delaware. The company will provide engineering management support of the Russian chemical weapons destruction facility to be built at Shchurch'ye.

The contractor will operate offices in Moscow and the U.S., but will use predominately Russian firms to do the work. Construction should begin in 2000. Facility completion and subsequent destruction operations are scheduled to begin in 2004.

Award of the contract is the result of the 1992 Cooperative Threat Reduction/Russian Chemical Weapons Destruction Support Program and Chemical Weapons Implementation Agreement signed by former President George Bush and Russian President Boris Yeltsin. It is a commitment between the two nations for the safe, secure and ecologically sound destruction of chemical weapons.

The Russians will use a two-step neutralization process to destroy the weapons. The U.S. has chosen incineration as our preferred technology. Huntsville Center is the Life Cycle Project Manager for the design, facility construction, equipment acquisition and equipment installation for the eight chemical demilitarization facilities in the U.S.

CPR heroes awarded, thanked

By Heidi Helwig
Portland District

On Aug. 23, Don Chambers died.

During a recent award ceremony, he thanked the two people who brought him back from the dead, and they all told their story.

Chambers, Chief of Structures Section, is a veteran of the Hood to Coast relay race. On that hot August afternoon, he and the rest of the Corps' Dam Runners were competing in the race. Four miles into the first of three legs of the race, while stopping for water, Chambers told teammate Jeff Sedey that he didn't feel well. Sedey replied, "you're kidding, right?" Then Chambers collapsed.

When Sedey, a structural engineer in Chambers' section, couldn't find a pulse or any signs of breathing, he called for help. Tina Rea, a visual information specialist with the Defense Printing Office and team masseuse, helped Sedey perform two-person cardiopulmonary resuscitation.

"I didn't even think about it; I just did what I was trained to do through the ski patrol and in my profession as a licensed massage therapist," Rea said. "I told Don, `Damn it, breathe! Take this air!'"

"I'm just grateful Tina was there," Sedey said modestly. "Not as grateful as I was," Chambers added, bringing laughter from other Dam Runners members. They had assembled to honor Sedey and Rea for their life-saving efforts.

Rea and Sedey both received a Civilian Award for Humanitarian Service, the top award presented to any civilian or military employee. Approved by the Secretary of the Army and signed by the Chief of Staff of the Army, it reflects the performance of a "significant human action, deed or achievement."

Don Chambers thanks the people who saved his life, Jeff Sedey and Tina Rea, at their awards ceremony. (Photo courtesy of Portland District)

"This is a time to think not only about presenting awards, but also that we could have lost one of our best friends if it wasn't for those who knew the right thing to do," said Deputy District Commander Maj. Chris Cottrell during the informal ceremony.

Chambers said his doctor explained that he suffered a mild heart attack with minimal damage. But, with no heartbeat and no breathing, Chambers was clinically dead for a minute or two. "I never saw the white light or the tunnel, though," Chambers said.

"That's not a good sign," Cottrell replied. "You better change something before this happens again." And the room erupted in laughter.

Seizure dog warns, protects owner

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

A new member of the Corps headquarters team is winning a lot of respect for his dedication — he's on duty 24-hours a day. Maximilian (just Max will do) is a seven-month old German Shepherd. He is a full-service seizure alert dog, one of only 70 in the U.S.

His owner, Debra Halmon, a secretary in the Formerly Used Defense Sites Branch, in headquarters, has epilepsy. Even though she's had Max only a month, he's already made a monumental difference in her life. Max has enabled her to do more and go more places without feeling as vulnerable as she did before.

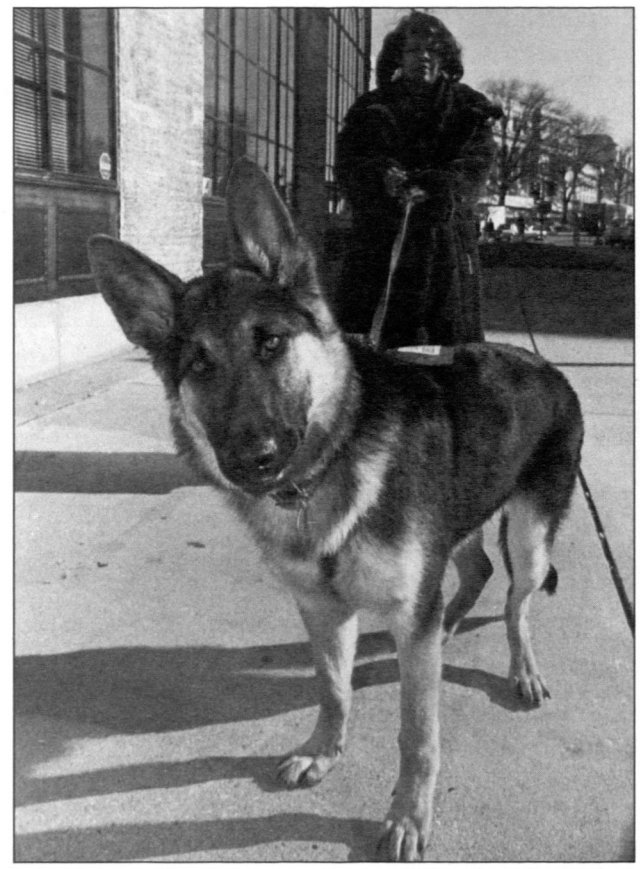
Some dogs are able to sense when someone is having a seizure, or is about to have one. At this point, science cannot explain how they do it.

Most of Halmon's seizures are not obvious to humans. She may "space out" or, like a sleepwalker, may walk and talk unconsciously. Some are even more subtle — brief attacks that last only a few seconds.

Bystanders may not notice the seizure, but they'll notice Max's reaction. That's the point. The dog alerts others so they can get Halmon medical attention.

Max's primary function is not protecting Halmon at work, but to and from work. She doesn't feel vulnerable in the headquarters building because her co-workers know about her condition. But she's been robbed each time she's had a seizure on the subway or street. Once, even a hospital nurse slipped the rings off her fingers while Halmon was powerless to stop her. Another time she was hospitalized as a "Jane Doe" for three days because her identification was stolen, along with her valuables and medication. Max is trained to protect her property as well as her health.

What's more, the dog may *prevent* seizures. Max gives Halmon added confidence and, since her seizures are brought on by stress or fear, he may actually reduce their number. "I'm more willing to do things I was afraid to do before," Halmon said.



Debra Halmon says that Max, her seizure alert dog, has made a monumental difference in her life.

Dog trainer Ruby Joyce of Clarksville, Tenn., says the dogs also reduce stress for parents of epileptic children. "Parents are afraid to go to bed at night for fear they'll sleep through a child's seizure," she said. The dogs solve that problem.

Each dog forms his own alert pattern. Some dogs bark wildly, while others show physical agitation by circling or pacing. Halmon has had only three mild seizures in the month she's owned Max, and those came in the middle of the night. Max nudges her awake. The first time she didn't realize she'd had a seizure and thought he needed to be let out.

Halmon says her biggest challenge isn't getting used to the dog, but getting used to people's reactions. Because her disability isn't visible, and because most people don't know much about epilepsy or seizure alert dogs, Halmon says she gets a lot of strange reactions.

Some people judge from her personal appearance that she suffers no disability. Others don't understand the dog's function, since he mostly just lays under her desk or follows her around.

Some don't realize that Max can remain in the office alone while Halmon performs short errands. She doesn't need him for a trip to the restroom.

Though one co-worker built Max a doghouse, Halmon said some people are afraid of the dog or are uncomfortable in his presence. Others try to pet him or feed him leftovers, which Halmon discourages.

"I know people mean well, but I want them to understand that Max is a working dog, not a pet," Halmon said. She would prefer that people simply ignore him. Human food can be detrimental to the dog's health, so when Halmon forbids scraps and sweets, she's simply protecting an expensive investment.

According to Joyce, who trains service dogs and now specializes in seizure dogs, their ability is just starting to be recognized in the world of alert dogs.

Service dogs for the blind and hearing impaired are well-accepted in society, Joyce said, and dogs who help those confined to wheelchairs are obviously useful. But the seizure alert dog's role is more subtle. He accompanies someone without an obvious disability and serves no function unless there is a crisis.

Seizure dogs have had service dog certification for eight years, yet most people have never heard of them. Only about 70 dogs are fully certified, while another 1,000 are trained, but licensed to work only in the home.

Max doesn't realize he's part of such an elite corps of dogs. Like any other young dog, he can keep fetching a ball until your arm falls off from throwing it. But when it comes to detecting seizures, he's a trained professional on the job.

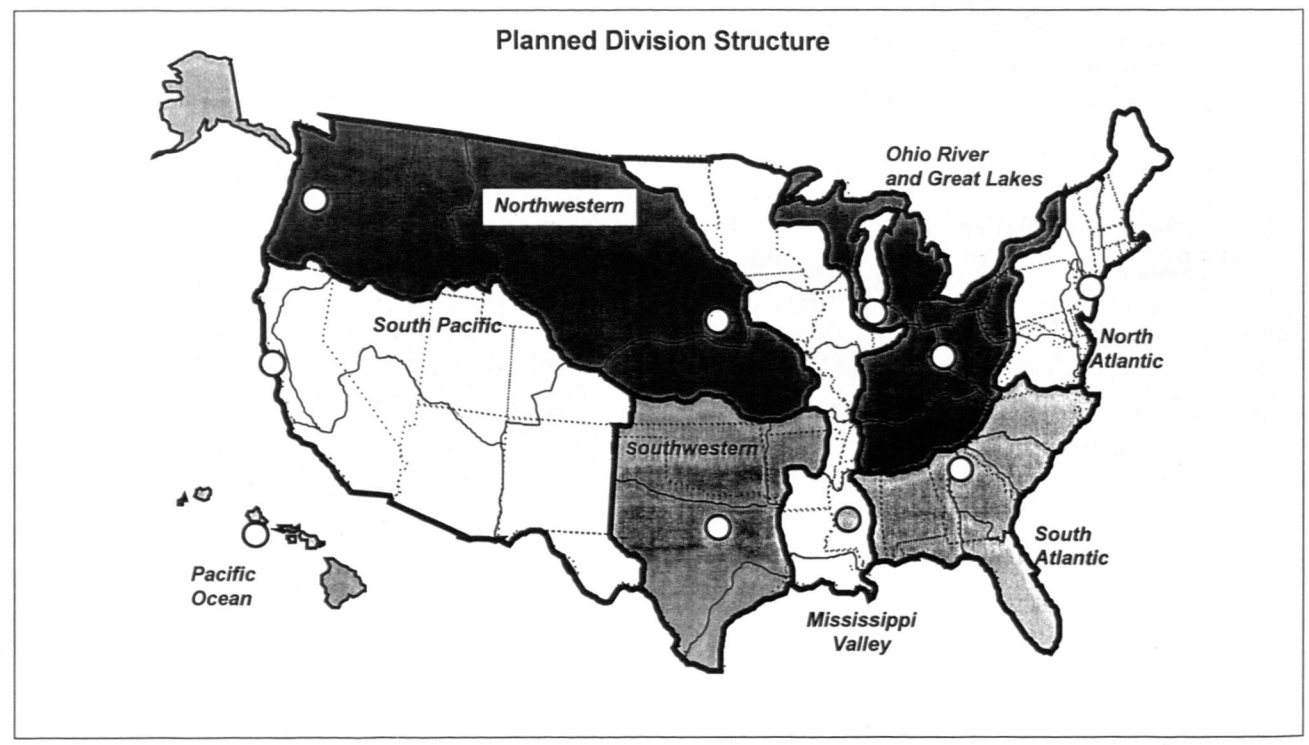
Restructuring

Continued from page 1

the Mississippi River. The plan also calls for Alaska District to report to Pacific Ocean Division, based in Honolulu, and for Albuquerque District to report to South Pacific Division in San Francisco. Alaska and Albuquerque districts currently report to North Pacific Division in Portland, and Southwestern Division in Dallas, respectively.

The revised plan is in response to Public Law 104-206, Energy and the Water Development Appropriations Act, 1997, which directs the Corps to reduce the number of its divisions. A provision in Public Law 104-303, the Water Resources Development Act of 1996, prohibited the reassignment of St. Louis District from the operational control of the Lower Mississippi Valley Division. St. Louis District will continue to be under the control of the newly renamed and realigned Mississippi Valley Division. The plan will now be transmitted to Congress.

"We are eager to move forward on this directive," said Lt. Gen. Joe N. Ballard, Chief of Engineers. Ballard noted that, in addition to meeting the requirement of the law to reduce the number of divisions, the plan also meets other criteria he established: optimizing support to military forces, minimizing district realignments and maintaining geographical balance. The plan also ensures continued customer service, ensures that the management of major watershed basins stays under a single division headquarters, and minimizes work disruptions and personnel turbulence.



Lancaster said that the details of the implementation of restructuring were still being developed and that the Corps would begin the implementation on April 1, as provided by the law.