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# *Hurricane Andrew*

## Historical Report

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Fort Belvoir, Virginia  
January 1993





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## Hurricane Andrew

Hurricane Andrew began as a tropical disturbance over Senegal, Africa, on 14 August 1992, and developed into a tropical depression two days later. On 22 August, Andrew became the first hurricane of the 1992 season. It was about 700 miles east of Miami, Florida, pushing westward at 15 miles per hour. The next morning, Hurricane Andrew was 380 miles east of Miami and moving west at 16 miles per hour with maximum sustained winds of 120 miles per hour.

A hurricane warning was in effect for the east coast of Florida from Vero Beach southward through the Florida Keys. Florida Governor Lawton Chiles declared a state of emergency in south Florida. He directed that three National Guard battalions be pre-positioned in that area, and 1,500 Florida National Guard soldiers were assembled in Miami. State officials ordered a million residents from Monroe, Dade, and Broward counties to evacuate. By midafternoon roads were clogged as over 700,000 south Florida residents fled north as part of the largest evacuation in U.S. history. At the peak of the evacuation, over 84,000 people sought refuge in 229 shelters.<sup>1</sup>

At 4:00 a.m. Eastern Daylight Time on Monday, 24 August 1992, Hurricane Andrew (now a category IV storm) hit land approximately 25 miles south of Miami with sustained winds of 140 miles per hour and gusts up to 175 miles per hour. The storm propelled westward at 18 miles per hour crashing into Homestead and the south Dade County neighborhoods of Perrine and Cutler Ridge. Three hours later, Governor Chiles asked President George Bush for a disaster declaration.

On 24 August President Bush declared south Florida a national disaster area under the 1988 Robert T. Stafford Disaster Relief and Emergency Assistance Act, Public Law 93-288, as amended by P.L. 100-707. The Stafford Act authorized the federal government to assist state and local governments in disaster preparedness, response, and recovery efforts. The President's disaster declaration designated Broward, Dade, and Monroe counties for individual assistance and public assistance. (A fourth county, Collier, was added on 28 August.) Later that evening President Bush arrived in south Florida to assess the damage.

The hurricane cut a broad path of destruction that stretched 15 miles inland — from Biscayne Bay to the Everglades — and 22 miles from north to south, encompassing about 165 square miles (three times the size of the District of Columbia). It ripped up trees, destroyed public utilities, leveled thousands of structures, and left millions of cubic yards of debris. The hurricane's fierce winds tore down most of south Florida's power lines, leaving 1.4 million customers of Florida Power and Light's 3.3 million customers without power. In Dade County alone, the storm left 400,000 people without power.

Hurricane Andrew was one of the worst natural disasters of the century. Damage from the storm dwarfed that caused by the Hurricane Agnes flood in 1972 and Hurricane Hugo in 1989. Hurricane Hugo had left 85 dead and \$5.9 million in damage as it swept through the Caribbean and into the Carolinas. By contrast, despite the massive evacuation, Hurricane Andrew left over 20 people dead. The storm destroyed 80,000 homes and left 250,000 people homeless, many with only the clothes on their backs. It leveled 90 to 100 percent of the homes in over 100 mobile home parks in south Florida. Seventy percent of the buildings at Homestead had extensive damage. The costs of Hurricane Andrew recovery efforts in Florida and Louisiana would reach \$1.98 billion.<sup>2</sup>

As the first damage assessments began in Florida, Louisiana residents braced for the storm. Evacuations there began on Monday as officials tracked Hurricane Andrew's course. Late on Tuesday, 25 August, the hurricane struck southern Louisiana. The next day President Bush declared a major disaster in Louisiana for the parish of Terrebone. He later added the following parishes to the disaster declaration: LaFourche, St. Martin, Assumption, Iberia, St. John the Baptist, Iberville, and St. Mary.



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## Federal Government Response

The Stafford Act authorized the federal government to respond to disasters and emergencies to save lives and protect public health, safety, and property. The Federal Emergency Management Agency (FEMA) served as the lead federal agency for responding to natural disasters. After the President signed a disaster declaration, FEMA supplemented the efforts and resources of state and local governments and voluntary relief agencies.

Under the Federal Response Plan, which had been adopted by representatives of 27 federal departments and agencies in April 1992, FEMA was responsible for coordinating and administering the activities of all federal agencies involved in the relief operation. The plan encompassed 12 emergency support functions (ESF):

- ▶ Transportation
- ▶ Communications
- ▶ Public Works and Engineering
- ▶ Firefighting
- ▶ Information and Planning
- ▶ Mass Care
- ▶ Resource Support
- ▶ Health and Medical Services
- ▶ Urban Search and Rescue
- ▶ Hazardous Materials
- ▶ Food
- ▶ Energy

The Department of Defense was the primary agency for ESF #3 (Public Works and Engineering) and ESF #9 (Urban Search and Rescue) and a support agency to the other ten ESFs.

Hurricane Andrew would be the first large-scale implementation of the new Federal Response Plan. FEMA opened the Emergency Information and Coordination Center in its Washington, D.C., headquarters on 23 August and convened its Catastrophic Disaster Response Group composed of representatives of the 27 federal agencies. At the same time, within its Emergency Information Coordination Center, FEMA activated its Emergency Support Team — made up of representatives of the ten federal agencies who were assigned as primary agencies in the plan — and asked the agencies to send representatives as quickly as possible. The purpose of Emergency Support Team was to support the Catastrophic Disaster Response Group in establishing policy, to serve as a central source of information at the national level, and to provide inter-agency resource support to the Federal Coordinating Officer.

As FEMA officials prepared their organization in Washington, on 23 August they also activated their Regional Operations Center in Atlanta, Georgia, FEMA Region IV, for 24-hour operations. The Regional Operations Center, staffed by FEMA Region IV personnel and ESF representatives, served as the initial point of contact in the region for the affected state. FEMA also deployed the advance element of its Emergency Response Team to the Florida state Emergency Operations Center in Tallahassee. FEMA Region IV was responsible for Florida, and its director, Major Philip May, became the Federal Coordinating Officer in Florida to direct the response effort.

The federal government did not respond as quickly as south Florida residents had hoped. The response of FEMA and other agencies in the first 24–48 hours was severely hampered by the lack of good information about the nature and extent of the damage. State and local officials, overwhelmed by the crisis, could not provide the kind of information needed. Recognizing this problem, at a Catastrophic Disaster Response Group meeting, Grant C. Peterson, FEMA Associate Director, State and Local Programs & Support Directorate, urged agencies not to wait for requests for assistance but rather to offer assistance and make state and local officials aware of the type of assistance available.<sup>3</sup>



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Another factor hampering the initial response was the cost-sharing requirement. Disaster regulations required that the federal government pay at least 75 percent of the eligible costs for public property repair work, and the state and the affected local jurisdictions pay the remaining 25 percent. In the past, this cost-sharing provision had made state governments hesitant to request federal assistance and thus delayed the response effort.

On the second day after Hurricane Andrew, federal officials decided that a 90/10 percent ratio was more appropriate than 75/25, given the extent of the damage. State officials argued that even this amount was too burdensome. On 1 September, seven days after the initial declaration, during his second visit to south Florida, the President announced that the federal government would pay 100 percent of all approved restoration costs after the state paid a minimum cost of \$10 per capita, which would amount to about \$130 million.

## ***Department of Defense***

The desperate need for assistance in south Florida prompted President Bush to commit federal troops. In the first days after the hurricane, as thousands of south Florida residents searched for food and water, Governor Chiles and other state and local officials severely criticized the federal government for responding too slowly.

Kate Hale, Dade County emergency manager, went before the national media with an emotional plea for assistance. "Where the hell is the cavalry on this one?" she demanded.<sup>4</sup>

Governor Chiles apparently did not realize initially that the President could not commit federal troops without a formal request from the governor. When Governor Chiles submitted that request on Thursday, 27 August, President Bush quickly directed the Department of Defense to supply comprehensive assistance to the disaster area, including mobile tents, food, water, field kitchens, and transportation when necessary. That evening a 30- to 40-person logistics advance party departed for Florida. The next morning, the first Army C-5A landed at Homestead Air Force Base and unloaded Army field kitchens. By midday, troops

from the XVIII Airborne Corps, Fort Bragg, were distributing hot meals and water to south Dade County residents.<sup>5</sup>

A week later, 16,000 Army troops and Marines were on the ground. The Defense Department would ultimately commit approximately 20,000 troops to the relief effort in south Florida.

### ***Presidential Task Force***

President Bush not only ordered large-scale military involvement, he also appointed a Hurricane Andrew Presidential Task Force, headed by Secretary of Transportation Andrew H. Card, Jr. to coordinate all federal response activities (civilian and military) in the disaster area. Secretary Card toured the disaster area on 27 August and later set up his operations at FEMA's Disaster Field Office in Miami close to the Federal Coordinating Officer and Defense Coordinating Officer.

The President had created a presidential task force after the 1992 Los Angeles riots, but the establishment of such a task force to oversee FEMA's efforts was unusual and reflected the high priority that President Bush gave the response. President Bush created the task force in part because of his concern that the scope of the relief operation would overwhelm FEMA, an agency that had been severely criticized for its response to Hurricane Hugo and other previous disasters. Also, with Florida's support so important in the upcoming presidential election, Bush had added incentive for responding vigorously.

### ***U.S. Army Corps of Engineers***

Under the Federal Response Plan, the Department of Defense was responsible for Public Works and Engineering (ESF #3), but the Secretary of the Army had designated the U.S. Army Corps of Engineers as the lead "responsible agent" to manage ESF #3 for the Department of Defense.



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In addition, the Corps had a standing Memorandum of Agreement with FEMA under which FEMA often tasked the Corps for support, in accordance with P.L. 93-288. In anticipation of potential ESF #3 missions and potential damage to its own flood control projects in south Florida, the Corps headquarters activated its Emergency Operations Center for 24-hour operations at 11:00 a.m. on 23 August.

The next day, Brigadier General Stanley Genega, Director of Civil Works, directed Corps Division Engineers to have their emergency management staff identify teams for possible assistance to the South Atlantic Division in —

- ▶ Damage Assessment
- ▶ Structural Inspection
- ▶ Real Estate
- ▶ Communications Support
- ▶ Administration and Logistics
- ▶ Public Affairs
- ▶ Emergency Water Supply<sup>6</sup>

The Corps' South Atlantic Division in Atlanta, Georgia, had already prepared for the storm that threatened its area of responsibility. Division officials activated their Emergency Operations Center at noon on 22 August. On 23 August, the South Atlantic Division sent a representative to FEMA's Regional Operations Center in Atlanta and sent Ron Moore, an experienced emergency manager, to Tallahassee, Florida, as part of FEMA's Emergency Response Team Advance Element Moore arrived in Tallahassee late that Sunday afternoon to find that the team had little good information about the situation in Dade County.<sup>7</sup>

The commander the Corps' Jacksonville District, Colonel Terrence V. Salt, called in his staff on Sunday afternoon, 23 August, to discuss the district's plan to initiate hurricane response operations. That afternoon, Colonel Salt sent the district's deputy commander, Major Hal Alguire, to Orlando with the district's emergency command center vehicle (a van equipped with special communications equipment) and with four staff members (a natural disaster manager, communications technician, and two construction managers), so they would be in position before the storm hit. Colonel Salt sent the communications van down under the authority of P.L. 84-99, Flood Control and Coastal Storm

Emergencies, ostensibly to be in place to assess Corps projects. P.L. 84-99 authorizes the Corps of Engineers to repair federal and nonfederal flood control projects damaged by floods, hurricanes, or coastal storms. Colonel Salt had no authority to take any action other than inspect Corps projects.<sup>8</sup>

Upon arrival in Orlando, Major Alguire's advance team joined George Cooper, the Corps' Atlantic Coast Area Engineer, and two of his staff (construction manager and clerk-typist). Together they left Orlando early Monday morning, 24 August, for Miami. After slowly working its way south through debris littered roads, that afternoon the team set up the emergency vehicle next to the headquarters of Troop "K" of the Florida Highway Patrol in the Snapper Creek Service Plaza along the Florida Turnpike in Kendall, Florida, south of Miami. The team immediately began assessing damage to Corps projects and found it to be minimal. Miami Beach was unscathed, they reported, but residential areas were badly damaged.

While Major Alguire struggled to set up operations in Kendall, Jacksonville District staff spent Monday and Tuesday trying to define the type of organization they would need in south Florida to support the recovery effort. They drafted a plan for a mini-district to be staffed initially with 100 to 120 people. The key constraint in planning the organization was the ability to absorb and support incoming staff in the midst of so much devastation.<sup>9</sup>

On Tuesday night, 25 August, Jacksonville District received its first missions from FEMA. The next day 12 employees from the district's Clewiston Office arrived in Miami with equipment (3 front end loaders, 3 trucks, and 5 chain saws) and began removing debris. The Corps moved its survey vessel, *Sable*, into place to begin emergency surveys of Miami Harbor and adjacent channels.

Some confusion existed initially as to whether FEMA had activated ESF #3. Although a FEMA situation report dated 25 August indicated that ESF #3 had been activated, FEMA had not formally notified the Corps in writing. On Friday, 28 August, at a meeting in FEMA's headquarters, Grant Peterson indicated that FEMA had activated ESF #3 partially, and the Corps' Chief of Construction, Operations, and Readiness, John Elmore, concluded that the Corps had authority to coordinate directly with the state under ESF #3. FEMA, in fact,



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never activated ESF #3 in its total scope but rather gave the Corps specific missions as the need arose.<sup>10</sup>

At a 31 August meeting, FEMA officials confirmed that they had activated ESF #3 partially in Florida for emergency water supply, debris clearance, and emergency restoration of public facilities (water and sewage treatment). Within these areas the Corps was authorized to respond directly to state requests for assistance. FEMA warned the Corps not to accept tasks directly from local interests, but only from authorized state representatives. John Elmore reassured them that the Corps worked closely with local officials to identify requirements but did not execute the missions without taskings from the state.

FEMA officials made clear that they would only reimburse the Corps for missions accomplished within the prescribed state/federal framework. The Department of Defense would have to bear the costs of any of its missions in direct support of local interests without state approval.<sup>11</sup>





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## Concept of Operations

The central focus of the federal response in south Florida was the Disaster Field Office that FEMA established in the Eastern Airlines building at the Miami International Airport on 27 August. FEMA organized the office along lines outlined in the Federal Response Plan, with each ESF represented.

In addition to the standard FEMA organizational structure, there were two unique elements: the Presidential Task Force and the Joint Task Force. The Joint Task Force, established by the Department of Defense to coordinate the military response mission, functioned as part of the Disaster Field Office and reported to the Presidential Task Force.

The Federal Response Plan did not address the creation of either a Joint Task Force or a Presidential Task Force, nor did any military doctrine apply specifically to the creation and function of a Joint Task Force in response to a natural disaster. As a result, the relationships between FEMA's Federal Coordinating Officer, the Defense Coordinating Officer, the Presidential Task Force, and the Joint Task Force were at times confusing (see Figure 1).

Use of a Joint Task Force structure for disaster response, however, was not new. Joint Task Force structures had been used in the cleanup of the *Exxon Valdez* oil spill in 1989, during the reconstruction of Kuwait after the Gulf War, and most recently, during the Los Angeles riots. Also, in recent years the military services had worked together in the aftermath of the Yellowstone forest fires, the Loma Prieta earthquake, and Hurricane Hugo though there was no formal Joint Task Force designation.

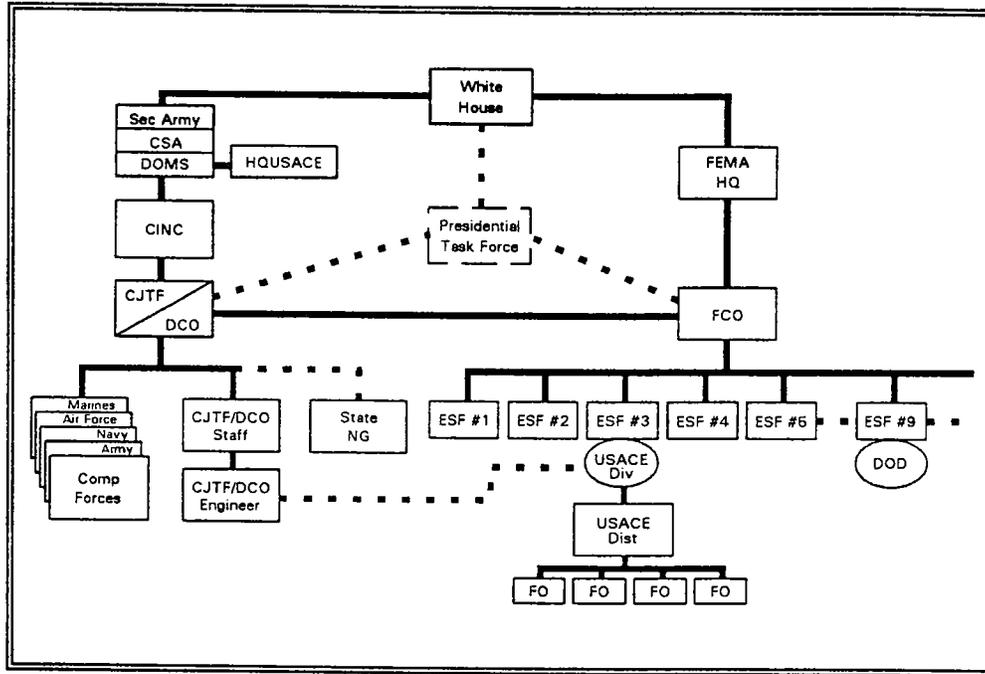


Figure 1. Tasking/Coordination Chain

As normally occurs after natural disasters, the Secretary of Defense appointed the Secretary of the Army as executive agent, and the Director of Military Support in the Pentagon functioned as the Secretary of the Army's action agent. The Assistant Secretary of the Army for Installation, Logistics, and Environment had oversight responsibility for the Director of Military Support. As action agent for the Secretary of the Army, the Director of Military Support appointed an Army commander to be in charge.

Soon after Hurricane Andrew hit south Florida, the Secretary of the Army directed U.S. Army Forces Command (FORSCOM) to provide troop units, equipment, and support to FEMA as required for all ESFs except ESF #3. He also directed FORSCOM to appoint a Defense Coordinating Officer who, as the Federal Response Plan provided, would serve as the Defense Department's liaison with FEMA and coordinate all military support to the relief operations in Florida.



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The Secretary directed CINCTRANS to support FORSCOM and ordered CINCLANT and CINCSOC to provide units, personnel, equipment, and/or support that the FORSCOM commander requested for the disaster response operations.

The Corps would provide personnel, equipment, and support to FEMA as required for ESF #3.

The Defense Coordinating Officer coordinated with FEMA's Federal Coordinating Officer for mission assignments and assigned those missions to the military task force commanders. Each day he reported to the Director of Military Support the support requested, support provided, and on-going activities.<sup>12</sup> If FORSCOM could not provide all that the Defense Coordinating Officer needed, the requests came back to the Director of Military Support.

The commander of Second U.S. Army, Lieutenant General Samuel E. Ebbeson, appointed Colonel Robert S. Lay, Jr. as the Defense Coordinating Officer. Lay was the on-scene representative of the commander of Second U.S. Army and the senior Department of Defense representative in the disaster area. Lay would have operational control of all Department of Defense forces deployed for disaster assistance operations. After General Ebbeson arrived in Miami to command the Joint Task Force, however, he became the de facto Defense Coordinating Officer because he was the senior Department of Defense representative on site. As Joint Task Force commander, General Ebbeson worked directly for the FORSCOM commander and had operational control of all Department of Defense elements in the area of operations that were supporting hurricane disaster relief efforts. General Ebbeson's Joint Task Force included elements of the Navy, Air Force, and Army, as well as some Canadian troops.<sup>13</sup>

### ***Joint Task Force Engineers***

The Joint Task Force included a significant engineer component, one which eventually grew to 2,500 troops, headed by Brigadier General Russell L. Fuhrman, commander of the Corps of Engineers' North Central Division in Chicago. After receiving word of his assignment to the Joint Task Force,

General Fuhrman had asked his senior civilian, John D’Aniello, to organize a team of that could deploy to Miami with him. The team included specialists in construction, mechanical engineering, architecture, and project management. When D’Aniello discovered that the 36th Engineer Group headquarters element was deploying, he realized that General Fuhrman would not need all of the 30 team members that he had recruited. On Monday morning five members of the division staff headed to Miami where General Fuhrman would join them after stopping in Washington to confer with officials at the Pentagon.

Meanwhile, Colonel Philip Anderson, commander of the 36th Engineer Group, planned the organization of the Joint Task Force Engineer staff, using as his model the organization the Corps had established in Kuwait after the Gulf War. The 36th Engineer Group provided much of the needed administrative support. The Joint Task Force Engineer staff ultimately included personnel from North Central Division; 36th Engineer Group headquarters element; Second U.S. Army engineers; and engineer liaisons from the other services and Canadian engineers.

The Joint Task Force Engineer staff consisted of three sections: Operations, Plans, and Support.

- ▶ The Operations Section had two subsections, liaison and project management. The liaison subsection had engineer representatives from the Army, Navy, the Corps of Engineers, and the J3/J4 (operations/logistics). An Air Force captain served as the Joint Task Force Engineer’s liaison to the Canadian Air Force Engineers. The project management subsection included project managers for each major engineer effort.
- ▶ The Plans Section, headed by John D’Aniello, was further subdivided into areas covered by subject matter experts. After the staff in the Plans Section assessed what needed to be done and established the goals, project managers became responsible for implementation. Top project managers or operations officials, or Colonel Anderson himself, made the decisions about whether to assign work to Army, Navy, Corps of Engineers, or Canadian forces.



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- ▶ The Support Section was provided by the 36th Engineer Group headquarters element. This section provided vehicles with drivers, arranged housing and field kitchens, and provided administrative functions.

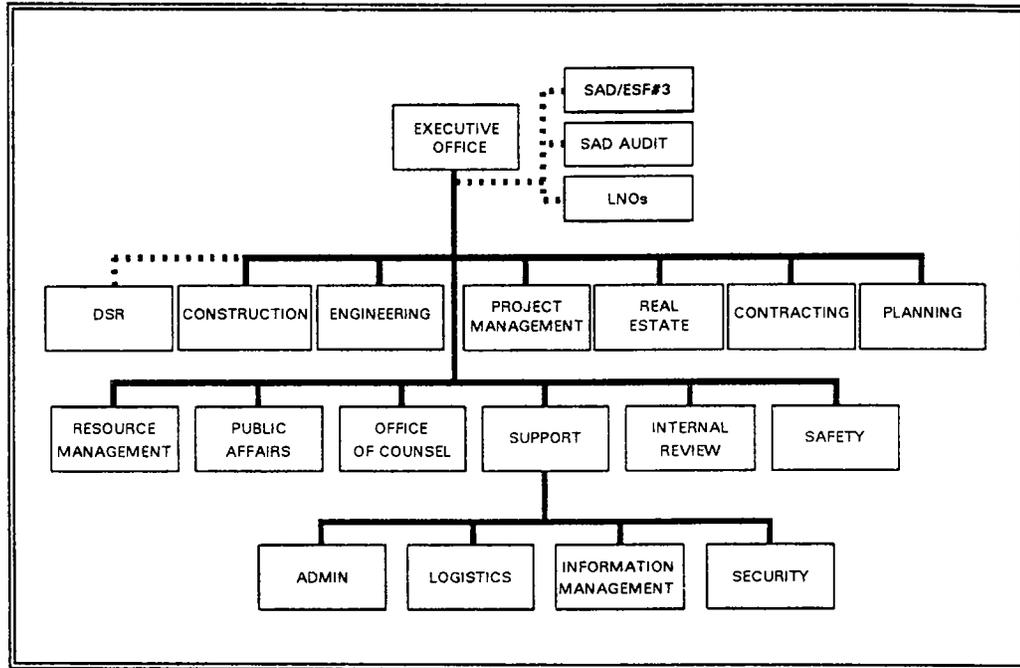
Coordination between civilian staff from North Central Division and the military worked well. The strengths of the North Central Division staff and 36th Engineer Group complimented each other. Division civilians understood FEMA operations and FEMA contacts better than the military, especially after their recent experience with the Chicago tunnel flood. Likewise, the 36th Engineer Group dealt with military more effectively and knew the capabilities of troops in the field. Civilians had experience with project management that the military lacked and initially assisted the military project managers.<sup>14</sup>

### ***Hurricane Andrew Recovery Office***

On 28 August, the Corps established the Hurricane Andrew Recovery Office at the Disaster Field Office in the Eastern Airlines building from which it would direct its field operations. By collocating with the offices of the Joint Task Force, Presidential Task Force, ESF #3, and Federal Coordinating Officer, the Corps fostered better communication and coordination. The Hurricane Andrew Recovery Office was modeled on the mini-district concept outlined in the Response Planning Guide. The office was structured as a scaled-down district with elements for contracting, project management, real estate, logistics, and construction (see Figure 2).

When Colonel Salt received word that there would be a large military presence, he decided to take command in Miami. He believed the best role for him would be to represent the Corps of Engineers on General Ebbeson's staff and free up Major Alguire to run the day-to-day operations. Colonel Salt arrived in Miami around midnight on Friday, 28 August.<sup>15</sup>

In addition to the Hurricane Andrew Recovery Office, Jacksonville District established the Hurricane Andrew Area Office in Kendall, Florida, south of Miami, on 6 September. The 35 people working out of the emergency vehicle



*Figure 2. Hurricane Andrew Recovery Office  
Jacksonville District*

were relocated to the Kendall Summit Executive Center. Kendall, on the northern edge of the main disaster area, was closer to the work sites and provided easy access to contractors.

Jacksonville District further subdivided the area office into six regions, each with a resident office. This organization put a resident engineer with contracting officer representative authority in each area to monitor contract performance, resolve issues with contractors, and expedite mission execution. One major contractor was associated with each resident office, and the contract covered the territory assigned to the resident office. If there were too many tasks in one area, however, the resident engineer could use contractors from other areas. The resident engineers reported to the area engineer daily; and the area engineer, in turn, reported to the Chief of Construction at the Hurricane Andrew Recovery Office. Space was at a premium, and the Hurricane Andrew Area Office was so



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small that resident engineers had to work out of their cars for the first few days until they could establish their own offices.

General Genega directed the South Atlantic Division to be aggressive in getting people on the ground in south Florida. Lacking good initial damage assessments, Corps officials were slow to realize how large a staff they would need in south Florida. For the first three or four days, Elmore conceded, the Corps did not push as hard as it could because the magnitude of the disaster was unclear.<sup>16</sup>

Initially, all Corps personnel deploying to south Florida were routed through Jacksonville for processing, but this delayed their arrival in Miami by one day. A week after the hurricane, the Hurricane Andrew Recovery Office logistics staff set up an office in Miami to receive and process these individuals. The initial staff in Miami was quickly overwhelmed, so Colonel Salt decided to double the size of his organization. Between 29 August and 1 September, the Jacksonville District requested 154 people with various skills. General Fuhrman and General Genega encouraged Colonel Salt to bring in even more people.

- ▶ As the scope and importance of the Corps' mission in south Florida became more apparent, Colonel Salt decided to call for more personnel and bring in some of his key staff from Jacksonville District. Between 2 September and 4 September, Jacksonville District requested 239 more people for the south Florida mission.
- ▶ On 3 September General Genega sent out an appeal throughout the Corps for volunteers. In response, Corps activities identified over 400 individuals who could deploy immediately, and most of the positions Colonel Salt requested were filled by midnight the next day.

At peak, the Corps had over 600 personnel and 4,000 contractor personnel working in south Florida in support of the Hurricane Andrew effort.

Jacksonville District began operating a Family Support Center on 1 September. The center was staffed 24 hours a day, seven days a week, with a toll free phone number to provide emergency contact support to Corps personnel working in

support of the hurricane response. The district also organized a support group for the spouses of Corps personnel who had deployed.

In addition to the Hurricane Andrew Recovery Office, the Hurricane Andrew Area Office, and the resident engineer offices, the Corps established an ESF #3 Office, which would report directly to the South Atlantic Division. It was located with all the other ESF offices at the Disaster Field Office (see Figure 3).

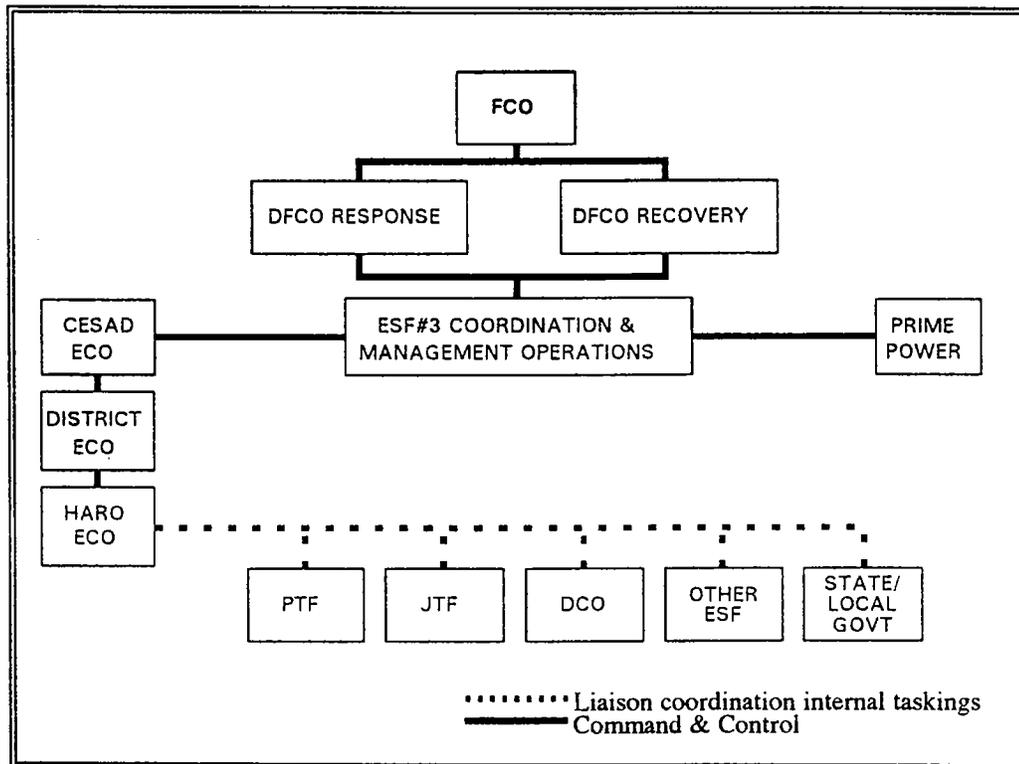


Figure 3. ESF #3 Office  
South Atlantic Division



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Although the Federal Response Plan defined the general functions of ESF #3, Corps planners did not have a good sense of the kind of expertise they would need in south Florida.

Initially, the ESF #3 Office was badly understaffed. Ron Moore, the ESF #3 chief, and Ron Edwards, an emergency manager from the South Atlantic Division, were doing everything themselves. Moore gradually built up his staff with experienced emergency managers whose expertise proved to be very valuable. Moore's function was not only to channel requests from the Federal Coordinating Officer and the Defense Coordinating Officer but to advise FEMA about missions that the Corps should undertake. Moore received advice from the South Atlantic Division and the Jacksonville District but had enough decision-making authority to be responsive to FEMA.<sup>17</sup>

Under the structure set up for the hurricane response, taskings could come to Corps in two ways, either through the Director of Military Support or directly from the Federal Coordinating Officer to the ESF #3 Office. Most taskings went from the Federal Coordinating Officer to the ESF #3 Office rather than from FEMA headquarters through the Director of Military Support to the Corps. The parallel command chains (FEMA/Director of Military Support) caused some confusion. Officials disagree as to how well coordination between the Corps and the Director of Military Support worked.<sup>18</sup>

The Hurricane Andrew Recovery Office's chain of command was at times unclear. The office responded to Corps taskings through the South Atlantic Division, to Joint Task Force taskings through the Joint Task Force Engineer, and to FEMA taskings through the ESF #3 Office. Essentially all funding and authority came through FEMA.

The insertion of a Joint Task Force in the command structure caused confusion. Corps personnel ultimately had to respond to both the Federal Coordinating Officer and the Joint Task Force commander. The Joint Task Force occasionally tried to task the ESF #3 Office although it had no authority to do so and could provide no funding. Technically Colonel Salt had no authority or funding to respond to the Corps headquarters or Joint Task Force missions, so he had to get FEMA to approve and pay for these missions.<sup>19</sup>





## Interagency Coordination

Coordination between the Corps and FEMA occurred on various levels: at the headquarters level in Washington, D.C., at the regional level, and in the disaster area itself. The Corps' representative on the Catastrophic Disaster Response Group, John Elmore, found that the personal relationships forged in the group were helpful.<sup>20</sup>

The Corps also coordinated with FEMA through its Emergency Support Team. Corps representatives on the team spent much of their time responding to questions from FEMA. In responding to these queries, team representative Michael L. Beard, found that he did not have adequate support from the Emergency Operations Center in Corps headquarters. It sometimes took a day or two to get information from the Emergency Operations Center. Corps ESF #3 representatives at FEMA headquarters complained that the Emergency Operations Center was not responsive enough to their requests for information.<sup>21</sup>

During the hurricane response operation, the Corps coordinated not only with FEMA but with other federal agencies as well. Coordination among the various ESF representatives at the Disaster Field Office worked particularly well. The Federal Coordinating Officer, Major Philip May, was pleased. He observed that the various federal agencies understood their roles and willingly accepted missions. There was little interference from their headquarters. The personal relationships that had been established during previous exercises and recovery operations improved this coordination process.

ESF #3 Chief, Ron Moore, observed that the Federal Response Plan provided for better coordination among the federal agencies than previous plans. Agencies acted as a team, supporting each other and advising the Federal Coordinating Officer. Like Major May, Moore found that the personal relationships that had been forged in previous disasters and exercises were very valuable. The bond of trust between ESF representatives was such that verbal requests were sufficient authority. Moore did not have to wait for formal written requests before taking action.<sup>22</sup>

The coordination process, however, was not without some flaws. Although the Federal Response Plan gave primary agencies the authority to task their support agencies, FEMA had to approve all funding actions. As a result, the process of tasking support agencies was slower than anticipated. For example, if the Red Cross tasked the Corps for support, the action had to fall under a FEMA mission assignment. If it did not, FEMA had to create a new mission assignment to set up a funding source. The Corps provided support to the Red Cross (ESF #6) and the Department Health and Human Services (ESF #8).

Other agencies supported the ESF #3 function:

- ▶ The Forest Service provided warehouse space for incoming Corps material.
- ▶ The Soil Conservation Service supported the Corps in evaluating damaged drainage canals.
- ▶ The Department of Transportation provided support in railway and aircraft transportation.
- ▶ The General Services Administration purchased ice for the Corps and helped locate sources for construction supplies such as plywood and plastic sheeting that the Corps could purchase through its contracting process.<sup>23</sup>

Although the coordination between the Corps and its support agencies generally worked well, some Corps officials contended that their agency did not always make the best use of its partners. John Elmore recommended that the Corps work to understand better the capabilities of its partners.<sup>24</sup>

In addition to working with FEMA and other federal agencies, the Corps worked with other elements of the Defense Department. At the headquarters level, this



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coordination occurred through the Director of Military Support, but in the field it occurred primarily through the Defense Coordinating Officer. This was important because the Defense Coordinating Officer needed to be able to control military assets and prioritize them. Although some Army officials contended that the Corps failed to coordinate its activities with the Defense Coordinating Officer as well as it should have, Corps officials disagreed.<sup>25</sup>

As part of the effort to coordinate Corps and Department of Defense efforts in south Florida, the South Atlantic Division assigned John Blake, Chief of the Construction Directorate, to serve as the liaison between the Joint Task Force and the ESF #3 Office. Jacksonville District established liaisons with the Joint Task Force Engineer Section, 18th COSCOM, 10th Mountain Division, and Homestead Air Force Base. Although these liaisons improved communications, the responsibilities and relationships among the various units were not well defined or understood.<sup>26</sup>

Corps personnel worked closely with the Joint Task Force. The Corps provided dumpsters, water, and ice to the Joint Task Force, and the Joint Task Force provided labor when needed. Perhaps the best example of cooperation between Corps contractors and military personnel was the repair of the Dade County public schools. As Navy Seabees cleaned up a school, a Corps contractor put on the roof, Army troops cleared debris in the schoolyard, a Corps contractor hauled away the debris, and Prime Power personnel brought in the electricity. D'Aniello called the coordination a "tremendous success."<sup>27</sup>





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## Information Management

From the beginning of the emergency response operation, the demand for information from Corps personnel in the field was unrelenting. The appointment of Secretary Card heightened the level of interest in the response operation, as did the fact that 1992 was a presidential election year. There was what one Corps official called an “insatiable craving for data,” a powerful concern among senior military leadership with the responsiveness of federal agencies, especially the Department of Defense.<sup>28</sup> High level officials at the Pentagon followed the activities of the Corps and other military units with intense interest, and the Army secretariat was more deeply involved in the management of the Hurricane Andrew effort than it had been in any other recent domestic emergency operation.<sup>29</sup>

In the first days of the response, communications within the disaster area were difficult because the storm had knocked down telephone lines. Some cellular phone service was available, but it was spotty and unreliable. With cells often jammed with post-storm message traffic, radios proved to be the most effective means of communication. Problems with the cellular phones in the emergency vehicle forced Corps personnel to rely heavily on high frequency radio equipment. The South Atlantic Division sent a satellite phone to the Jacksonville District to improve communication capabilities. In another effort to improve communications, a C-12 courier plane made daily trips between Jacksonville and Miami.

The Jacksonville District reported through daily situation reports and supplemental “spot reports.” Early requirements from the South Atlantic Division and Corps headquarters for these supplemental (sometimes hourly and routinely throughout

the night) reports posed difficulties for the already overburdened Hurricane Andrew Recovery Office staff.

To further complicate matters, the Recovery Office had numerous reporting channels (Corps, FEMA, Joint Chiefs of Staff), each with different reporting times. As a result, information was sometimes contradictory or inaccurate. The Joint Task Force Engineer and the Recovery Office, for example, reported different figures at different times of the day, and the figures were passed up to higher headquarters with no explanation of the discrepancies.

Initially, the Corps was slow to understand how important the information would be to high level officials at the White House, FEMA, and the Pentagon and to generate the appropriate formats for that information. The Corps did not always provide the Director of Military Support with as much information as some officials would have liked. Many people outside the Corps' chain of command requested information, and these requests sometimes hampered operations. Colonel Salt and the acting commander of the South Atlantic Division, Colonel James H. Simms, complained of being besieged by people asking for information to the point that they were diverted from making necessary leadership decisions. They argued that the level of detail was far greater than that required to manage the operation effectively. Colonel Simms conceded that he and his staff could have responded faster if they had anticipated the problems of communicating information.<sup>30</sup>

The Hurricane Andrew Recovery Office staff did not always have the time to "package" the information in the form that Pentagon officials preferred before submitting it. This led to followup questions requiring more detail, which usually came throughout the night. After responding to information requests all night, the Recovery Office staff had to face a full day of work. The information that they submitted, Colonel Salt conceded, was not as carefully crafted as it could have been because his staff was so busy responding to the suffering they saw around them. Colonel Salt ultimately added more personnel to handle the flow of information.<sup>31</sup> A project management organization, developed at the Hurricane Andrew Recovery Office, worked to eliminate inaccurate or incomplete information, and the quality of information improved.



In response to complaints from Corps field personnel of excessive reporting requirements and micromanagement, General Genega determined that reporting requirements were inevitable and that the field should bring in enough staff to meet these requirements. If the field reported complete and accurate information, higher headquarters would have less tendency to micromanage. In effect, the questions from higher headquarters would be answered before they were asked. General Genega suggested that headquarters standardize the information it wanted so field personnel would not feel the requirements were changing. Too often headquarters staff went directly to the field for information rather than channeling requests through the appropriate emergency operation centers.<sup>32</sup>





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## Corps Missions

The Corps of Engineers responded to taskings from FEMA and the Department of Defense, and also conducted work under its P.L. 84-99 authority.

### *Missions for FEMA*

Through the Hurricane Andrew Recovery Office and the Jacksonville District Office, the Army Corps of Engineers conducted a broad range of missions in support of FEMA in its responsibility for ESF #3. By mid-October, the total value of the Corps' FEMA missions would climb to over \$380 million.<sup>33</sup>

### *Plastic Roofing*

On the day after the hurricane, 25 August, as homeowners began to assess the devastation, FEMA officials gave the Corps its first mission, to install temporary roofing on hurricane damaged buildings. The Corps awarded three contracts on 28 August to install government furnished plastic sheeting for temporary roofing. Two days later, it modified each of these contracts to require the contractor to furnish the plastic roofing material.

While contract specialists prepared contracts for installing plastic sheeting, other Corps personnel began installing coverings themselves to avoid delay. Within days, the Corps workers and two local contractors had roofed 48 homes and distributed 2,000 rolls of plastic. The Corps awarded additional contracts to

supply and install plastic sheeting for temporary roofing and purchased thousands of rolls of plastic to distribute to Army elements, Jacksonville District crews, and private homeowners. The district provided plastic material to Red Cross volunteers who, in turn, worked with county officials or private homeowners for the installation.

Initially, the scope of the roofing mission was unclear. At a meeting in Washington on 3 September, Corps representatives asked FEMA for an estimate of the number of homes they should expect to cover with plastic, but FEMA officials had no good estimate. Their goal was simply to cover as many houses as possible.

The early contractor effort to install the roofing was slowed by rainfall and by occasional confusion over rights-of-entry. Also contractors were training as they worked. Each house presented unique problems.

Corps field personnel quickly discovered that many houses and buildings required two or three rolls of plastic sheeting rather than the single roll (1,000 square feet) they had estimated. In response, Jacksonville District furnished its contractors with plastic sheeting and ordered more plastic. It also modified roofing contracts to allow contractors to use plywood and other materials when plastic was not available.

The initial supply contract for plastic roofing contained material that was unsuitable. It consisted of woven plastic fibers that separated when stressed. Material delivered under another contract proved to be too fragile. The thin 6 mil plastic (polyethylene, reinforced, opaque, UV stabilized) provided under the contract had to be applied double-strength. When the Corps discovered this, it modified contracts to provide for 10 mil plastic.

The Corps established a 19 October deadline for residents to sign up for temporary roof installation and completed the mission in mid-November. It ultimately provided 55 million square feet of roofing material and installed it on 22,000 homes.



## *Debris Removal*

The same day that FEMA gave the Corps the temporary roofing mission it also tasked the Corps to clear debris from the disaster area. The rapid removal of debris was critical to restoring traffic flow and preventing health problems. FEMA made sure that the Corps' debris removal mission was broad enough to cover curb pick-up, trash removal, and trailer park clearing. Over the next two months, the FEMA authorization for this mission would climb from \$1 million to \$225 million. The Corps and its contractors removed millions of cubic yards of debris from the public rights-of-way, provided temporary disposal sites, rehabilitated street signs, and cleared mobile home parks.

The debris removal effort began on 26 August when the Corps' Clewiston Area Office personnel began clearing roadways with their own equipment. The effort intensified the next day when the Corps awarded the first two debris removal contracts. By 31 August, Jacksonville District had awarded four contracts.

The first challenge with debris removal was to determine the scope of the mission and then to determine how to dispose of the debris. Defining the scope of the mission was difficult because Corps officials had no accurate, reliable estimates of the amount of debris. The Corps needed a plan of operations that would not only alleviate suffering, but also clearly define the end point. It also needed performance indicators. To gauge its performance, the Corps would have to look at both the production rate (the number of cubic yards of debris collected) and the extent of the area cleared. The plan that the Corps adopted divided south Florida into distinct areas and required the contractors to make three passes through each part of the disaster area to collect debris.

Early operations focused on removing debris within public rights-of-way. Removal on private property proceeded as county officials completed condemnation surveys of private residences and gave the public proper notification so residents could retrieve any salvageable items.

Debris removal operations were hindered initially by a state requirement that each dump truck be weighed before unloading at the dump site, but this restriction was

quickly lifted. The state of Florida provided a separate access to the dump sites to avoid the weigh-ins.

At peak, the Corps had 2,000 trucks hauling debris every day. Debris removal was a joint civil/military operation. Elements of the 20th Engineer Brigade participated. Army engineers hauled over 43,000 dump truck loads of debris using 220 dump trucks and 55 bucket loaders. They were augmented by over 170 leased dump trucks and 50 leased bucket loaders. The debris clearance effort in south Florida far surpassed any previous effort. After Hurricane Hugo, the Corps had executed debris removal contracts for over \$21 million and removed 4.5 million cubic yards of debris.<sup>34</sup>

In addition to clearing debris from the roads and curbside, at the request of state officials, the Hurricane Andrew Recovery Office assumed responsibility for maintaining 100 dumpsters that the state had placed at nonmilitary relief centers. The office modified the debris contracts to provide for the acquisition and delivery of a large number of dumpsters for support of the military sites.

While the large debris removal contractors mobilized, the Hurricane Andrew Recovery Office issued a request for contract proposals to install temporary street signs. The office awarded the contract to Brown and Root on 6 September. Two days later when contractors began installing the temporary signs, they found that the city employees had already begun installing permanent signs. Hurricane Andrew Recovery Office personnel quickly contacted city officials, and the work resumed two days later as a combined contractor/city effort.

One aspect of the debris removal mission — clearing debris from privately owned mobile home parks — brought its own complications. Dade County officials generally did not seek the removal of debris from private property, but they did ask that 13 trailer parks be cleared to make room for temporary housing. FEMA, in turn, tasked the Hurricane Andrew Recovery Office to clear these mobile home parks. Some local business owners objected to what they viewed as preferential treatment for trailer park owners who would be spared the cost of clearing their own debris.



As part of the trailer park operation, the problem of access and authority had to be resolved. Real estate specialists from the Hurricane Andrew Recovery Office negotiated temporary work easements. The federal government could not clear debris from either public or private property following the declaration of an emergency unless the affected state or local government authorized it to enter the property and remove the debris. On 2 September, the Dade County Board of Commissioners passed an emergency ordinance declaring that mobile homes and mobile home parks devastated by the hurricane were public nuisances. After giving owners 24-hour notice to remove whatever was left of their structures, the ordinance specifically authorized either Dade County or the Corps to enter privately owned trailer parks and remove debris. By 8 October, Corps contractors had cleared eight parks and made available 3,054 trailer pads.<sup>35</sup>

Disposing of the debris collected from the trailer parks, roadways, and other sites was a major challenge. In early September, the Corps, FEMA, the Environmental Protection Agency, and Florida and Dade County environmental officials identified and obtained permits to establish 11 sites where debris could be burned. The Corps assigned safety specialists and industrial hygienists to monitor these sites and worked out procedures with the contractors and the Environmental Protection Agency to handle hazardous materials.

Despite efforts to minimize the impact of the burn-sites, the fires produced a thick yellow-orange fog that stung the eyes and left layers of soot and ash. The smoke generated at the burn-sites made breathing difficult for neighboring residents. Initial tests from mobile Environmental Protection Agency monitoring devices (Dade County's own monitoring devices had been destroyed by the hurricane) showed the pollution level only slightly higher than normal, but in response to problems with polyethylene from homes in Coral Gables, Dade County's Department of Environmental Management persuaded the Corps to shut down a burn site.

The Corps halted burning at a site near Old Cutler Road and Southwest 184th Street because materials that should have been separated out were thrown into the fire pits creating excessive smoke. In response to continued complaints, on 25 September, the Corps cut back the burning of hurricane debris to daylight hours

only at five sites.<sup>36</sup> The Corps increasingly emphasized methods of recycling debris, such as making wood chips rather than burning.

By the end of October the cost of the debris clearance mission approached \$225 million. In November Corps contractors completed the third pass for clearing debris and the total requirements for debris removal were reduced to 13.5 million cubic yards. Dade County prepared to take over the debris removal mission through a contract with Waste Management, Inc.

As part of the original debris clearance mission, the Corps awarded a contract for removal of 97 sunken vessels. By 9 December, it had removed all but five. The Corps also demolished homes in the Homestead area and in Florida City that had been badly damaged by the hurricane.

### *Emergency Generators and Pumps*

In addition to the temporary roofing and debris removal missions, on 25 August, FEMA directed the Corps to provide emergency generators. The Corps turned first to the Army Engineer Battalion (Prime Power). The Army Prime Power units, assigned to the Chief of Engineers, install, maintain, and operate power generation equipment to support military contingency plans worldwide and provide technical advice when needed. They also provide peacetime disaster assistance. The battalion primarily provides commercial grade electrical power from its standard 750-kw generators and also leases larger units to various Department of Defense agencies.

On 26 August a three-man Prime Power team, headed by Major Robert Grubbs flew to Florida to assess the damage and power needs. Then Army officials began arrangements to bring Prime Power teams from Fort Bragg and Fort Benning. There were ultimately three Prime Power teams in south Florida with twelve 750-kw generators.

In addition to operating their own generators, as was the initial plan, Prime Power teams inherited the mission of installing small generators because they were the only people on the ground with enough expertise. The teams prepared



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and installed leased commercial generators that were funded by FEMA and procured by the Corps and repaired generators belonging to other agencies.

Rather than splitting the generator mission between the military generators that belonged to Prime Power and the commercial generators, the Prime Power command combined the two. The Prime Power units worked under and reported through the ESF #3 Office. Although the Defense Coordinating Officer could task the Prime Power units directly, more often, if FEMA approved a mission that involved Prime Power personnel or equipment, the Defense Coordinating Officer tasked the ESF #3 Office. That office then tasked Prime Power, which made the decision to execute the mission with either commercial or military generators.

By the end of August, 183 generators had arrived in the field and, after inspection by Corps crews and Prime Power specialists, were ready for use. Corps personnel purchased power cables, electrical hookup materials, spare batteries, and larger fuel tanks. The Corps procured 272 electrical generators and 38 pumps for public schools, polling places, and other agencies.

Prime Power specialists assessed the electrical condition of public works facilities and installed their own generators or leased generators to make facilities operational until permanent repairs could be made. They restored utilities, such as the Dade County telephone system and its water treatment and waste water plants, days or weeks earlier than if the local utilities had to repair them with their own resources. Prime Power specialists coordinated with Florida Power & Light officials, though those officials were not always forthcoming with information.

Prime Power personnel used the large military generators in Northwest Wellfield, the primary source of Miami's water. Once they put their plant on line, the state of Florida lifted the order to boil water for 800,000 residents of Miami. This vital project affected large numbers of people. The twelve 750-kw units were divided among the following sites: four at Northwest Wellfield, one at a Southern Bell site, three at the Richmond school, two at the South Dade High School, and two at the Redland School.<sup>37</sup>

Although the power generation mission was very successful, there were occasional delays because the Prime Power specialists had little experience with Disaster Field Office operations and were unfamiliar with the approval process in FEMA and the ESF #3 Office.<sup>38</sup>

In September the Corps advertised a generator service contract covering labor, equipment, and supplies to install, recover, and perform minor maintenance and service on FEMA, Corps, and Army Materiel Command generator assets. By mid-October contractors were in place and the Prime Power Battalion was no longer involved in generator installation, service, and recovery.

### *Water Supply and Distribution*

Hurricane Andrew not only damaged power lines and facilities, it also left south Florida residents without a safe water supply. FEMA asked the Corps to provide 6 million gallons of potable water to areas without municipal service. Within days, the Corps let contracts to provide 100,000 gallons of water a day and 26 storage tanks. It distributed 475,000 gallons. The Corps also asked Army headquarters to send ten 20,000-gallon bladders and five 1,000-gallon tankers for water distribution. The Corps delivered water and ice to Red Cross sites and military field kitchens for distribution.

In mid-September, the demand for potable water began to decline as various food distribution and other assistance centers were disbanded or combined. The Corps cut its daily bottled water deliveries back to every other day and curtailed its bulk water deliveries. The bottled water contract was complete on 7 October. The Hurricane Andrew Recovery Office continued to supply bulk water to the life support centers that the federal government had established for the hurricane victims and to the military when requested. Gradually Homestead City and Florida City assumed responsibility for supplying water to the life support centers.



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## *Sanitation and Water*

FEMA tasked the Corps to assess the water supply and sanitation systems in south Florida, with \$500,000 authority for each. As part of the technical assistance mission, Corps personnel investigated three major wastewater treatment plants — the North District, Central District (Virginia-Key), and the South District (Black Point). By 2 September, both the North District and Central District plants were operating normally and the South District plant, which had been the most seriously damaged, was partially operational. Only 3 of its 18 injection pumps were in service, not enough to handle the flow. The Hurricane Andrew Recovery Office personnel drafted plans and specifications for rehabilitating some of the Florida City water treatment plant facilities. The Corps submitted a special report entitled “Operational Status of Public Water Systems in Collier and Monroe Counties” to Environmental Protection Agency Region IV and Florida Department of Environmental Regulation, thus completing its mission.

## *Portable Toilets*

The Corps received a \$6-million mission from FEMA to supply and service 5,400 portable toilets in the disaster area. On 29 August, the Corps issued a \$5 million contract with Waste Management, Inc. to provide these toilets. Distributing and maintaining these portable toilets was at times difficult. As troop units departed, the demand for portable toilets diminished. By early October the Hurricane Andrew Recovery Office was removing unneeded portable toilets and was negotiating to definitize the letter contract.

## *Damage Survey Reports*

Another FEMA mission was to prepare damage survey reports for public and private nonprofit property, to include the location and a description of the property as well as estimates of the work required and the costs of repairs. The first damage survey team began work on 4 September. The scope of the mission

had increased from \$700,000 to \$2,100,000; and the Corps placed 28 teams in the field. The Corps had completed 2,700 surveys on 23 November when FEMA increased its requirement from 7,000 to 7,500 surveys.

### *School Survey and Repair*

One of the most significant FEMA taskings involved work for the Dade County public school system. The school system was the fourth largest in the nation, following New York, Los Angeles, and Chicago. It encompassed over 270 schools and over 30 other administrative facilities. It served 300,000 kindergarten through 12th grade students and 200,000 adult/continuing education students. The facilities, which had been badly damaged by the hurricane, required urgent repair before the beginning of the school year on 14 September.

The Stafford Act authorized the President to direct any federal agency to assist state and local government in the performance of "essential community services." In effect, it authorized the President to take actions to provide for temporary facilities and emergency assistance to open public schools in Dade County that had been damaged by Hurricane Andrew.

On the evening of 31 August, FEMA headquarters informed Major General John Sobke, the Assistant Chief of Engineers, that the next day it would task the Army to remove debris at the public schools in Dade County, make temporary repairs to buildings and utilities, and provide temporary facilities. After discussing the scope of the problem with the Dade County superintendent of schools, Octavio Viciado, General Sobke recommended to Secretary of the Army Michael P.W. Stone that he respond to this mission immediately in order to restore this "essential community service" as soon as possible."<sup>39</sup>

After discussing school restoration with Secretary of Defense Dick Cheney, Secretary Stone submitted his plan on 1 September. Of the estimated 270 schools in Dade County, he noted, roughly 40 would require temporary facilities (such as trailers) in order to start operations on 14 September. In order to have all of



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the schools ready by that date, Secretary Stone explained, the Department of Defense would have to do the following: repair roofs at approximately 60 schools; procure and install rented trailers at the 40 schools requiring temporary facilities; remove debris at all schools; repair utilities for at least 100 schools; and make other repairs as required. Based on information from Vicedo's office, the estimated repair cost would be \$35 million for Dade County schools alone and \$50 million if Broward County schools were included.

Secretary Stone noted that the Corps was already conducting damage surveys at the schools at FEMA's request. The Corps had already issued debris removal contracts to four private firms; and as soon as they had finished removing all debris that created safety hazards and life threatening situations, the contractors could be directed to concentrate on the schools. The Army could supplement the contractor effort with troop labor. Stone assured Cheney that he could advise the President that the Department of Defense would accept the mission and that the Department of the Army would accomplish it.<sup>40</sup>

While discussions went on at the Pentagon, on the evening of 1 September, Dade County officials met with representatives from FEMA and the Joint Task Force. Dade County agreed to provide a school list and damage assessment reports prepared by Dade County volunteers the next day. On 2 September, the Hurricane Andrew Recovery Office personnel met with school officials to receive the reports and better define their requirements. School officials asked the Corps to conduct a structural analysis of 54 schools to verify their initial assessment. The Corps assessed nine of the most severely damaged schools and agreed with the Dade County public school system's conclusion that the facilities would not be available for the coming school year.

Based on this conclusion, school officials asked the Corps to provide temporary portable classrooms, and Corps personnel quickly issued five work orders to five of its six comprehensive debris removal/emergency repairs contractors for 600 portable classrooms. They directed the contractors to put these units in place as rapidly as they could be constructed, but no later than 31 December 1992. After school officials had more time to assess their needs, they reduced the request to 294 portable classrooms. By 2 December Corps contracts had delivered 81 units and installed 6 of them.

School officials also asked the Corps to repair the roofs of 11 schools, and the Corps issued a work order to one of its comprehensive debris removal/emergency repairs contractors on 5 September. On 12 September, only five roofs remained to be completed by the start of school on September 14. When the school year opened on September 14, four of these five were complete and the fifth (A. L. Lewis Elementary School) was nearly complete. A. L. Lewis Elementary School opened on schedule with a small section beneath the roof repair closed off.

From the beginning, the plan was to rehabilitate the schools using both contractors and military units. Commercial contractors would conduct major school repairs and portable unit construction, while military engineers handled minor repairs (such as painting, plastering, and rough carpentry), school ground renovations, and other manual labor. Using military engineers would enable the Corps to meet unanticipated requirements without modifying the original contracts and provide the flexibility to respond rapidly to possible contractor shortfalls in work scheduling.

The Corps coordinated with Navy Seabees and other military units to complete the work on the schools. Seabees performed the initial evaluation of the scope of work. They also removed debris from the interior of schools selected by the county, while Corps contractors and Army engineer units removed debris from the exterior. The Seabees repaired Pine Lake Elementary, Perrine Elementary, and Chapman Elementary schools. The Canadian detachment of military engineers and sailors continued the repairs on Mays Middle and Pine Villa Elementary schools. Four schools required emergency auxiliary power to open. Personnel from the Prime Power Battalion, the Navy, and Canadian forces were on site 24 hours a day until Florida Power and Light and HP&L restored commercial power.

Through the remarkable combined efforts of the Army, Navy, Marine Corps, Corps of Engineers, Canadian armed forces, Dade County School District, and contractors, Dade County opened 268 of its 278 schools as scheduled on 14 September. The remaining 10 schools were still being rehabilitated. Teams from the Canadian Air Force were working on two of the ten schools. Colonel Salt commended the Seabees in particular for their "outstanding performance," and noted that it had been "a team effort in every respect."<sup>41</sup>



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## *Garbage Removal*

FEMA tasked the Corps to collect and dispose of garbage during the response phase. FEMA authorization for this mission ultimately expanded to \$10 million. In response, the Corps provided roughly 600 dumpsters. In late September, FEMA coordinated the transfer of control of the garbage collection operations from the Corps to Dade County. The Hurricane Andrew Recovery Office developed an inventory of sanitation units by quantity and location within Homestead City, Florida City, and Dade County. If the cities or county could not verify the need at a given site, the office removed the units.

## *Portable Showers*

On 2 September FEMA gave the Corps a mission to provide all showers (approximately 300 heads) and washers and dryers (approximately 100 sets) required during the response phase of the disaster.

The shower facilities were provided for individuals whose homes had been destroyed or condemned. FEMA gave the Corps the shower mission on 4 September with an authorization of \$10 million. As with other missions, defining the scope of work proved difficult and caused some delays. For example, the Corps had to wait for a decision about whether the government would build a few large life support centers or provide many small neighborhood centers.

After the decision was made to build life support centers, the Hurricane Andrew Recovery Office assessed the potential needs. The office supplied shower trailers and military tent showers, and it constructed showers. It established rudimentary showers at four life support centers and a Red Cross shelter. The Corps contracted for three trailers for Dade County's Neighborhood Family Support Centers, procured 20 24-head shower sets from the Navy, and contracted materials for 200 3-head shower sets to be built by troops and volunteers.

As part of the shower mission, the Hurricane Andrew Recovery Office purchased and installed 82 washers/dryer units. It installed the last units in mid-October.

## *Ice*

On 29 August FEMA provided the Corps with a \$6-million authorization to supply, store, and distribute 100,000 pounds of bagged ice a day (for 14 to 30 days) at established water and food centers. The Corps let contracts for up to 270 tons of ice a day to 11 locations, mostly military field kitchens, and 50 tons every other day to two Red Cross sites. The General Services Administration supported the Corps in this mission.

In mid-September the demand for ice rapidly declined as food distribution and other assistance sites were closed or combined. The life support centers were supplied through a contract to the military. The contract was reduced to providing 120,000 pounds every other day until 14 October when the contract was terminated. The Hurricane Andrew Recovery Office worked with the military to ensure that the needs would be met after the military withdrew.

## *Hurricane Evacuation Study*

On 10 September FEMA directed the Corps to conduct a study of the situation in south Florida, assess current hurricane evacuation procedures, and make recommendations for updating those procedures. A Corps team conducted initial meeting with FEMA and state and county emergency management officials on 13 September. The team met with Dade County, FEMA, and state officials on 23 September to clarify the scope of the mission. The Corps delivered the final report to FEMA and Dade County officials on 25 September, thus completing the mission.

## *Temporary Housing*

The hurricane had left thousands of south Florida residents homeless. The life support centers were not suitable for long-term habitation. Recognizing the need for better temporary housing, on 13 September FEMA tasked the Corps to



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provide all debris removal, rights-of-entry, necessary utilities, and support facilities for temporary housing for displaced persons. The mission reached \$20 million. The Corps was to assess the feasibility and cost of preparing sites to receive travel trailers and mobile homes. FEMA also asked the Corps to acquire leasehold interest on various locations and to purchase the travel trailers and mobile homes. The Corps would also provide engineering and construction management to rehabilitate damaged water lines, sewer lines, electrical services, and other requirements necessary for the mobile homes and travel trailers.

FEMA tasked the Hurricane Andrew Recovery Office to purchase 250 travel trailers for use as temporary housing. The office directed the firm of Brown and Root to install the travel trailers at Goulds Park. The contract included transporting the trailers, setting them up, connecting the utilities, providing individual personal property storage, and providing management services for the units. When the first 50 travel trailers began to arrive at Goulds Park on 17 September, Brown and Root employees were onsite to install them. One hundred more travel trailers arrived at Goulds Park by the end of the month. By early October the contractor was completing fencing work for the parking area at Goulds Park and roughly 130 families had moved in.

FEMA later directed the Hurricane Andrew Recovery Office to construct another travel trailer park similar to Goulds Park, called Modello Park, to consist of 110 travel trailers with underground utilities. At Modello Park, the contractor continued to place travel trailers and install utilities. FEMA also directed the Corps to remove debris from 13 parks, and by early October the Corps contractors had cleared debris from 8 of them. Contractors continued to repair and replace utilities at 14 mobile home parks. On 19 October the Corps turned over the management and operation of Gould Park and Modello Park to Housing and Urban Development.

### *Public Affairs Officer*

At FEMA's request, the Corps provided a public affairs officer to work at FEMA's Joint Information Center to help deal with the news media.

## *Distribution of Donated Goods*

In addition to the FEMA missions discussed above, the Corps had other tasks, such as hazard mitigation. The Corps also distributed donated construction materials to volunteer groups. Initially the Joint Task Force planned to have soldiers assist local residents in making temporary repairs to their homes, so task force officials directed the Corps to purchase plastic, plywood, and other materials for the anticipated soldier effort. The Joint Task Force also asked the Corps to accept 45 railroad carloads of building materials from military surplus in California. Later the task force withdrew the mission, and the Corps decided to donate all the materials to private organizations who did temporary repairs or supplied materials to needy residents. The process worked well.

By early January the Corps had completed most of the FEMA missions (potable water, public affairs, technical assistance, temporary roofing, hurricane evacuation study, garbage removal, portable showers, generators and pumps, portable toilets, and ice).

Over 220 Corps personnel and 1,500 contract personnel were at work in south Florida to complete the remaining missions (debris removal, damage survey reports, temporary housing support, and school repair).<sup>42</sup>

## *Missions for the Department of Defense*

In addition to responding to taskings from FEMA, the Corps also responded to Defense Department missions. Hurricane Andrew had severely damaged Homestead Air Force Base. Although the Department of Defense had planned to close this based before the hurricane hit, President Bush promised the people of Homestead that the federal government would repair the facility. On 24 August the Air Combat Command Engineer, Brigadier General McAuliffe, tasked the Corps' Mobile District to provide support in emergency contracting, damage assessments, cost estimating, and programming.<sup>43</sup> At the time of the hurricane, Mobile District (one of the two districts in South Atlantic Division that handled



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military construction) had five active contracts with Homestead Air Force Base, and was the logical choice for the work.

On 25 August two Mobile District personnel traveled to Homestead Air Force Base to assess the damage. Upon arrival, they met with the Air Combat Command advance team that identified specific missions to include debris removal, demolition, repair and rehabilitation, fencing, electrical distribution, and water and sanitary system repairs. A preliminary tour of Homestead revealed that most buildings on the base were badly damaged and some had been totally destroyed. The Mobile District team, which was supplemented with additional personnel, would be responsible for preparing the scopes of work, government estimates, and invitations for bids; advertising the project; and awarding the contracts.

Mobile District awarded the first contract on 28 August for the rehabilitation and repair of the base conference center. A few days later, Air Combat Command headquarters formally asked the Corps to initiate contracts for removal of debris, demolition of unsafe buildings, temporary protection for buildings, repair of buildings with minimal damage, repair of airfield lighting, restoration of the water distribution system, and for other work.<sup>44</sup> Other Corps efforts involved the demolition and removal of unsafe buildings which posed the problem of asbestos.

By the end of September, the Mobile District team had awarded 20 contracts totalling over \$9.1 million and 23 purchase orders totalling over \$129,000.<sup>45</sup> The headquarters of the Air Combat Command supplied funds to the district through a MIPR totalling over \$11 million. Yet, the recovery mission at the Air Force base was far from complete. A six-member Mobile District team arrived on 5 November to prepare damage assessments, scopes of work, and cost estimates for the repair or replacement of 135 buildings and essential base facilities.

In addition to the Homestead Air Force Base work, the Defense Department gave the Corps a \$3-million mission for real estate support to establish humanitarian depots for the collection, storage, and distribution of supplies to disaster victims. For example, Jacksonville District obtained real estate for the creation of Opa Locka Humanitarian Assistance Center. Also at the Department of Defense's

request, the Corps repaired damage to the U.S. Army Reserve Center in Perrine at a cost of roughly \$2 million.

Another Department of Defense mission developed during a visit to south Florida by the Army Chief of Staff, General Gordon Sullivan, the week after the hurricane. While touring the disaster area, General Sullivan noted the lack of communication of information about the relief effort because of the absence of working televisions, telephones, and local radio stations. The Army distributed 6,500 radios so hurricane victims in a 20-mile radius could listen to "Radio Recovery" relief broadcasts in English, Spanish, and Creole.

### ***Missions for Flood Control***

The Corps also conducted work under its P.L. 84-99, Flood Control and Coastal Storm Emergencies, authority. Jacksonville District's beach and hurricane protection projects in south Florida held up well because of good design features. In particular the beach and hurricane dune on Miami Beach contained the hurricane surge with no evidence of water damage to Miami Beach. The hurricane passed near the structures of the Central and Southern Flood Control Project but caused little damage. The Corps' shore protection projects in the Miami area prevented an estimated \$24.6 million in damage.

Not all projects escaped damage. The Jacksonville District planned nine reports addressing rehabilitation of flood control works in south Florida that were damaged by Hurricane Andrew. Emergency repair of flood control projects and federally authorized shore protection works in south Florida cost over \$500,000. The South Florida Water Management Division requested assistance with nine projects including C-111 Basin, Taylor Slough Basin, and C-31 Basin.



## Key Functional Areas

As the Corps carried out its hurricane response and recovery missions, certain functions and issues became particularly significant or controversial. There were lessons to be learned in each of these functional areas.

### *Contracting*

During the first days of the hurricane response, the Jacksonville District routinely used emergency off-the-shelf contracts (developed out of lessons learned following Hurricane Hugo recovery efforts) to expedite contract actions. District contracting officials had developed an “emergency response kit” which included forms, letter contracts, off-the-shelf contracts, and contract clauses that the contracting team took when they deployed. The district had even pre-identified certain contracting specialists to deploy on short notice.

The South Atlantic Division quickly asked Corps headquarters to delegate letter contracting authority for six \$40-million contracts, to authorize up to twenty letter contracts for \$10 million, and grant \$100,000 small purchase authority for use by the Mobile and Jacksonville districts.

The largest and most controversial Corps’ contracts were six comprehensive cost-plus letter contracts for debris removal and repairs to public and private buildings and utilities in Dade County. Initially Jacksonville District used small debris contracts, but when Colonel Salt arrived in Miami and flew over the disaster area, he realized that the Corps could never accomplish the debris removal

mission without using large contracts. He knew that the district needed a broader, more effective contracting approach, such as the large letter contracts that the Corps had used in Kuwait after the Gulf War.<sup>46</sup>

Corps leaders decided to use a list of prequalified firms and large letter contracts because they wanted firms large enough to handle the mission and capable of mobilizing quickly. The Corps' priority was to get contractors working as quickly as possible to alleviate human suffering. It could not risk hiring contractors who could or would not perform. Nor could the Corps wait for the detailed information it would need to draft good fixed price contracts. The magnitude of the damage was so great that no one could quantify it accurately. The cost-plus comprehensive contracting approach, officials argued, would provide the flexibility necessary to allow volunteer, military, city, and county resources to coordinate better.<sup>47</sup>

Once the decision was made to use large contracts, the South Atlantic Division and Corps headquarters staff reviewed a list of top construction firms that had been pre-qualified and identified six national construction firms that they believed were best able to respond to emergency taskings in Florida. Jacksonville District opened negotiations with each of the firms: Phillip & Jordan; Gilbert Southern Corporation (a unit of Peter Kiewit & Sons); The Hardaway Company; Hubbard Construction Company; Brown & Root USA, Inc.; and Metric Constructors, Inc.

Corps officials met with representatives of the six firms on 2 September to discuss their mobilization plans. They gave the contractors a detailed briefing along with the formal request for proposals. The firms had until 4 p.m. the next day to prepare their proposals. The next afternoon, each firm submitted its proposal and gave a formal oral presentation. The Corps awarded the contracts on 3 September, and within 48 hours the contractors were at work. Later Corps contracting specialists would "definitize" the letter contracts. A cost-plus-fixed-fee instrument would be executed between the parties within 30 to 45 days. The Jacksonville District had contract audit personnel on-site from the beginning to make the definitization process more efficient.

While the large contracts were expedient, critics charged that they unfairly excluded local laborers and minorities. Most Dade County residents had lost



their jobs, and there was a strong sentiment that they should be given preference in the recovery work. Secretary Card and Major May, the Federal Coordinating Officer, maintained that employing local labor and small businesses should be important factors in contracting even in an emergency response.<sup>48</sup>

Corps officials responded that, in fact, one of the selection factors in the six contracts had been the willingness and ability to use subcontractors. Like most Corps' disaster response contracts, the six letter contracts included local labor preference clauses. The Corps directed the contractors to include in their proposals a plan to involve local labor. On 4 September the Corps' contracting officer, Colonel Salt, met with Major May and local business leaders to reiterate that hiring local labor was a high priority. Salt also met with Secretary Card and representatives of four of the firms.<sup>49</sup>

Along with the employment of local labor, the Corps encouraged the employment of small and small disadvantaged businesses. Any construction contract over \$1 million required a formal subcontracting plan that addressed small and small disadvantaged business utilization goals. Contractors had to submit these plans within 14 days of the award of contract.

Initially critics attacked the Corps for not doing enough to utilize small and small disadvantaged businesses. Black business representatives met with Corps representatives often to discuss ways to get contracts. Hispanics, a more significant political and economic force in Dade County than blacks, complained loudly to President Bush after the first six contracts went to nonlocal firms owned by non-Hispanic whites. Hispanics made up half Dade County's population and blacks made up one fifth.

In response to complaints from blacks and Hispanics that they did not hear about pending contracts in time to submit bids, the Corps began advertising bids in local newspapers. FEMA and the Corps actively searched out minority firms. But finding black-owned firms that could do the work was sometimes difficult. Before the hurricane hit, only about 100 black-owned firms of all kinds were certified to work for the county.

The established governmentwide goal was to award 20 percent of the total value of all prime contract awards to small businesses for each fiscal year. The governmentwide goal for small disadvantaged businesses was 5 percent of the value of all contract and subcontract awards for the fiscal year.<sup>50</sup> By mid-September the Corps had let 225 contracts valued at \$97 million. Of these contracts, 5 percent (worth \$4.9 million) had gone to small firms owned by minorities or women, and 76 percent (worth \$56 million) had gone to Florida-based firms. Colonel Salt argued that the Corps had given preference to Dade County companies and small disadvantaged firms “to the maximum extent possible.”<sup>51</sup>

In response to locals who claimed the contracts had put them at a disadvantage, General Genega responded, “I submit to you that the citizens of south Dade County have not been disadvantaged because we have made a significant contribution towards relieving their human suffering.” John Elmore argued that the Corps exceeded “reasonable” goals in the areas of local preference and providing subcontracting plans.<sup>52</sup>

Corps emergency contracting procedures were generally responsive, but the office of the Assistant Secretary of the Army for Research, Development, and Acquisition was sometimes slow in delegating needed contracting authorities. Although the South Atlantic Division contracting officials were very supportive, the Hurricane Andrew Recovery Office found that the sense of urgency diminished higher up the chain. In October the office had still not received some authorities that it had requested, such as authority for purchase orders to be raised from \$25,000 to \$100,000 and for the Department of the Army to increase SF 44 authority (warrant authority) from \$2,500 to \$25,000.<sup>53</sup>

## ***Funding***

In the aftermath of the hurricane, the federal government had to expend large sums of money in a short time to meet an urgent need. As a result, federal officials established expedited procedures to meet the needs of disaster victims. For FEMA to reimburse other federal agencies for the cost of missions



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undertaken on FEMA's behalf, as provided in the Stafford Act, those agencies had to have an accurate accounting of their costs.

Immediately after the hurricane, Army officials took steps to ensure that FEMA reimbursed its costs in support of the response effort. The Secretary of the Army directed FORSCOM and the Corps to record all costs associated with the relief operations, along with the FEMA contract number, so FEMA could reimburse them. FORSCOM outlined the cost reporting requirements for installations providing Hurricane Andrew relief.

Second U.S. Army would consolidate all bills for Florida and Fifth U.S. Army would consolidate all bills for Louisiana and forward them to FEMA. FORSCOM maintained that all expenses above normal operating expenses were reimbursable and outlined in detail the categories of costs.<sup>54</sup> Although Second U.S. Army was concerned about proper paperwork, it felt also the pressure to respond quickly to the emergency situation in south Florida:

*FEMA is presently concerned with getting support into the area. They are less concerned at this time about keeping up with the paperwork taskings. The Department of Defense has no choice but to support the disaster victims the best we can, so we must move now and fix the paperwork later. It may be some time before FEMA straightens out and documents all their taskings. Complicating this is the probability that the Department of Defense is pushing support that was not specifically requested by FEMA.<sup>55</sup>*

The Corps also took steps to ensure that FEMA reimbursed its expenditures, as stipulated in both the Stafford Act and the Corps' 1988 Memorandum of Agreement with FEMA. On 30 August, John Elmore advised the acting commander of the South Atlantic Division, Colonel Simms, that all ESF #3 missions should be confirmed with state and county officials and should receive funding control numbers from FEMA at the Disaster Field Office, prior to execution. Elmore also asked him to develop a plan for internal financial

management. The plan, Elmore observed, should ensure that all activities and missions were appropriately authorized, that FEMA had approved funding in advance, and that FEMA-directed missions were distinguished from other normal reimbursable taskings from traditional Corps customers such as other services and agencies.<sup>56</sup>

Corps leaders were unclear about the procedures and authorities for funding the indirect costs of conducting FEMA missions. For example, how could and should the Corps pay for personnel in Corps headquarters, South Atlantic Division, and the Jacksonville District who were pulled from their normal duties to work on the response effort? Resource management officials in Corps headquarters determined that it would be appropriate to bill FEMA for the cost of work in the Hurricane Andrew Recovery Office and the Jacksonville District, but not for work in the Corps headquarters and the South Atlantic Division.

Funding of non-FEMA missions, specifically missions assigned by any other Department of Defense command or by the Director of Military Support, was another confusing and challenging issue. The Corps had no military or civil operational funds that it could draw on to support such a response. In Corps districts all the money was allocated to projects. If a military commander requested support without transferring funds to cover that request, the Corps had no way to pay for its actions except by drawing on a special revolving fund. If the revolving fund was not reimbursed, the Corps had to go to Congress for a supplemental appropriation.

### ***Individual Mobilization Augmentees***

During the Hurricane response, the Corps used Army reserve officers to augment its civilian personnel. The Corps had recently established procedures to activate individual mobilization augmentees in support of disaster response and recovery operations. Augmentees could be placed on active duty orders within 24 to 72 hours. Eighty-five augmentees volunteered to support the response and recovery efforts. General Genega encouraged the South Atlantic Division and Lower Mississippi Valley Division commanders to take advantage of this resource.<sup>57</sup>



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The augmentees worked in the Emergency Operations Centers in Corps headquarters and in the field and as project managers for contracts in the disaster area. On 28 August, the South Atlantic Division requested 19 augmentees — 15 to report to the Jacksonville District’s Emergency Operations Center and 4 to the South Atlantic Division’s Emergency Operations Center as soon as possible. Some of these would later go to south Florida to support Corps operations. On 3 September Colonel Simms reported that the augmentees had arrived at the South Atlantic Division and Miami and were “proving their value.” Corps officials reported the program to be “highly successful.” Colonel Salt used the augmentees as project managers at the Hurricane Andrew Recovery Office. They provided project management talent and freed the engineers to do their technical work.<sup>58</sup>

## ***Project Management***

Hurricane Andrew was one of the first major response efforts carried out under a project management system. Project managers played a larger role in south Florida than in any previous domestic emergency. Richard Bonner, Jacksonville District’s Deputy District Engineer for Project Management, created a standard project management organization at the Hurricane Andrew Recovery Office that effectively moved actions through the Emergency Operations Center. Project managers were responsible for controlling project funds and schedules, coordinating through the ESF #3 Office and FEMA with customers (local, state, and federal agencies and military units), and generally solving problems to keep the missions on track.

Upon receiving a tasking from the ESF #3 Office, the Hurricane Andrew Recovery Office’s Project Management Office assigned the task to a project manager. The project manager then became responsible for routing the work, insuring coordination with Engineering (for assessment, design and cost estimates), Counsel, Construction-Operations, and Resource Management before going to the Contracting Division for contract preparation. Project managers were responsible for supervising each of their missions from the time they received the mission until its completion, to include mission funding, scheduling, and preparing the contract scope of work and cost estimates. Meanwhile, the

Hurricane Andrew Recovery Office emergency management specialists were free to focus more on the reporting function, using information provided by the project managers.<sup>59</sup>

The Joint Task Force Engineer Office adopted a similar project management approach. Initially the Joint Task Force Engineer established project managers for three areas: debris removal, life support centers, and schools. Later in the operation, project managers were added for Class IV (construction supplies), and mobile/travel homes. Coordination between the Joint Task Force Engineer project managers and the Hurricane Andrew Recovery Office project managers apparently worked well with one Joint Task Force Engineer project manager acting as a liaison to the office.<sup>60</sup>

Although both the Hurricane Andrew Recovery Office and the Joint Task Force Engineer project management systems worked well, there were occasional problems. Project managers had difficulty identifying their counterparts in other agencies. Duplication of effort occurred when more than one organization was working to accomplish the same mission. This occurred because project managers lacked the experience to know who all the key players were and how they interacted. Officials quickly found that seasoned project managers were needed for work in an emergency and that the emergency environment was not the time to train inexperienced project managers.<sup>61</sup>

Bonner observed that the individual mobilization augmentee captains and majors were experienced managers who knew how to get the job done. They were not trained project managers, but they knew how to manage troops. The operation, he observed, "does not require a project manager out of project management. It just requires an individual who can manage the resources he has to deal with."<sup>62</sup>



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## Observations/Recommendations

The Corps of Engineers did much to alleviate the suffering of south Florida residents and to improve the quality of life in that region. Despite some problems and frustrations, the Corps proved to be very responsive to FEMA and to the needs of south Florida. For example, when FEMA gave the Jacksonville District the water supply mission in the middle of the night, the district personnel immediately began calling contractors, getting them out of bed. Ron Moore, the Corps' ESF #3 representative, did not wait for FEMA to give him a formal written request. He alerted FEMA to the Corps' capabilities and executed missions as soon as he received a verbal request.

Corps personnel worked long hours in sometimes chaotic environments, never losing sight of the urgency and importance of their work. They exercised flexibility in creating organizational structures which allowed them to respond effectively to missions that were not clearly defined.

When the Chief of Engineers, Lieutenant General Arthur Williams, and Colonel Simms visited the disaster area, Secretary Card and Kate Hale praised the Corps for its efforts. Kate Hale observed that the Corps had done a "magnificent job" and commended the Corps for its responsiveness to the community. The Corps received high marks from the Government Accounting Office, Army Audit Agency, FEMA, local officials, and Secretary Card.<sup>63</sup>

The Corps' work in south Florida remains unfinished, and it is premature to draw final conclusions about the Corps' effort. The Hurricane Andrew operations, however, clearly underscored the importance of the Corps' emergency

management function. There is much to be learned to improve the Corps' response operations in the future.

To draw as much as possible from the Andrew experience, a fuller, more analytical history should be written that would describe, compare, and analyze the Corps' Hurricane Andrew operations in Florida and Louisiana and compare those operations to the Hurricane Iniki response in Hawaii. This history should accomplish the following:

1. Evaluate the effectiveness of the Federal Response Plan and compare the implementation of the plan in south Florida to its implementation in Louisiana and in Hawaii.

*One criticism of the Florida operation was that FEMA tended to piecemeal missions rather than give an agency a number of missions at the same time. It also tended to divide up missions rather than issue them to one agency. For example, different federal agencies were responsible for different aspects of getting trailer parks operational. A fuller history should deal with this criticism.*

2. Discuss the transition from the response phase to the recovery phase. When did this transition occur and what impact, if any, did it have on the Corps' organizational structure and contracting and funding procedures?

*Marking the transition was apparently difficult. It was hard for people in the midst of an operation to determine when the transition occurred. Corps personnel noted that the transition from response to recovery seemed to occur at different times for different missions. As a result, the Corps was doing response and recovery work simultaneously. For example, debris removal became a recovery mission as soon as the contractors had cleared debris from the roads. Major Phil May saw the transition in a different way. After canvassing each ESF, he concluded that they had met the*



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*essential needs in south Florida so the operation moved into the recovery phase.*<sup>64</sup>

3. Discuss the Corps' activities in the context of the broader question of how quickly and effectively the federal government mobilizes for emergency response.

*Critics charged that the federal response in south Florida was too slow. Under the Stafford Act, FEMA must defer to local and state officials who are the designated "first responders." FEMA cannot react until requested. "If FEMA is supposed to launch an immediate, comprehensive federal response," observed one FEMA official, "it cannot be predicated on a request for piecemeal federal assistance from state and local governments. It must mobilize beforehand."*<sup>65</sup>

4. Survey and compare the roles of Joint Task Forces in south Florida and Hawaii and assess their effectiveness.
5. Evaluate the role of the military in the Hurricane Andrew and Hurricane Iniki operations and assess the contributions of the military.

*Major Phil May contended that the Andrew response was establishing a model for military and civilian coordination in disaster response. Previously, FEMA had not focused on the need for large-scale military involvement, he added, and the Federal Response Plan should include a larger role for the Department of Defense. May, Hale, and others argued that military involvement was appropriate when the infrastructure had been severely damaged because the military had a capability that no other agency had.*<sup>66</sup>

*Clearly the military could mobilize faster than contractors and bring assets to bear that the civilian sector did not have. Perhaps the most important contribution of the military, however, was providing traumatized south Florida residents*

*with a much needed sense of security. Yet, some observers express concern that emergency response activities would detract from the Department of Defense's combat mission.*

6. Evaluate more fully the coordination between the Corps and other federal agencies, particularly the roles of its support agencies under the Federal Response Plan.
7. Describe the ESF #3 relationships with the Hurricane Andrew Recovery Office, the Defense Coordinating Officer, FEMA, and the ESF #3 Office.
8. Document the problem of getting early reliable information about the nature and extent of the hurricane damage and discuss how that affected the Corps' response.
9. Assess the effectiveness and timeliness of the Corps' contracting and funding procedures and the use of small and local businesses. Discuss the role of auditors.
10. Trace the use of project managers and individual mobilization aughtees to evaluate their effectiveness.
11. Discuss problems with acquiring and distributing generators, plastic roofing, and toilets.
12. Describe the role of the Corps' counsel at the Hurricane Andrew Recovery Office and the use of arbitration.
13. Evaluate how effectively the Corps was staffed and organized in its headquarters and in the field. Are there some general principles that should apply?
14. Discuss the Corps' public relations operation. How effectively did the Corps deal with the news media? What contribution did the Corps make to the Joint Information Center?



By addressing these questions and issues and by comparing the Hurricane Andrew and Hurricane Iniki experiences, the historian would not only produce an inherently valuable record of two major events in the Corps' history, but also provide policy makers and planners in the Corps and in other agencies with a valuable tool for improving the federal government's response to emergencies in the future.





## Notes

Unless otherwise noted, the information cited below can be found in the files of the Office of History, U.S. Army Corps of Engineers. The most valuable sources, not cited in the text, are situation reports produced by South Atlantic division and the Jacksonville District. All interviews were conducted by the author, Janet A. McDonnell.

### HURRICANE ANDREW

<sup>1</sup>FEMA Situation Report #3, 25 August 1992.

<sup>2</sup>*The Washington Post*, 3 January 1992, p 3.

<sup>3</sup>Interview with John P. Elmore, HQUSACE, 7 October 1992.

<sup>4</sup>*The Washington Post*, 29 August 1992, p. 1.

<sup>5</sup>Ibid.

<sup>6</sup>COL Milton Hunter, Memorandum for all Divisions, Districts, etc., 24 August 1992, Command and Control File; BG(P) Stanley G. Genega, Memorandum for Division Commanders, 24 August 1992, Edward Hecker Hurricane Andrew Files, Hurricane Andrew Correspondence.

<sup>7</sup>Interview with Ron Moore, ESF #3, Miami, FL, 12 September 1992.

<sup>8</sup>Interview with COL Terrence V. Salt, HARO, Miami, FL, 16 September 1992.

<sup>9</sup>Ibid.

<sup>10</sup>Elmore interview; interview with Robert Fletcher, FEMA Headquarters, 7 October 1992.

<sup>11</sup>John P. Elmore, Memorandum for Chief of Engineers, n.d., Edward Hecker Hurricane Andrew Files, FEMA Coordination.

### **CONCEPT OF OPERATIONS**

<sup>12</sup>Secretary of the Army message to Commander, FORSCOM, 242010Z Aug 92, CEHO File: Command and Control.

<sup>13</sup>COL J. W. Thurman, Deputy Chief of Staff for Operations, Second U.S. Army, Memorandum for COL Robert S. Lay, Jr., 23 August 1992, CEHO File: Command and Control; Commander, FORSCOM, message 201430Z Sep 92, CEHO File: Command and Control.

<sup>14</sup>Interview with John D'Aniello, JTF Engineer Office, Miami, FL, 14 September 1992; interview with BG Russell Fuhrman, JTF Engineer Office, 15 September 1992; interview with COL Philip Anderson, JTF Engineer Office, 14 September 1992.

<sup>15</sup>Salt interview.

<sup>16</sup>Interview with COL James Simms, SAD, Atlanta, GA, 10 September 1992; Elmore interview.

<sup>17</sup>Salt interview; Moore interview.

<sup>18</sup>Interview with COL Michael Thomas, DOMS, 21 October 1992; interview with LTC Joseph Alexander, ASA(ILE) Office, 22 October 1992.

<sup>19</sup>CECW-OE-D, Memorandum for Director of Military Support, n.d., CEHO Files: Afteraction; Moore interview; Salt interview.



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## INTERAGENCY COORDINATION

<sup>20</sup>Elmore interview.

<sup>21</sup>Michael L. Beard, Memorandum for Record, 15 October 1992, CEHO File: Lessons Learned; LTC Donald E. Willhouse, Memorandum for Chief, Readiness Branch, 1 October 1992, "After Action Report — Hurricane Andrew," CEHO File: Lessons Learned.

<sup>22</sup>Moore interview.

<sup>23</sup>"Issue — GSA Support Capability," n.d., Edward Hecker Hurricane Andrew Files: Support Agencies.

<sup>24</sup>Elmore interview.

<sup>25</sup>"ESF #3 Draft Afteraction Report," p. 11.

<sup>26</sup>Jacksonville District, "First Impressions," p. 12.

<sup>27</sup>Interview with Richard Bonner, HARO, Miami, FL, 14 September 1992; D'Aniello interview.

## INFORMATION MANAGEMENT

<sup>28</sup>Elmore interview; Alexander interview; COL Jesse C. Gatlin, Memorandum for Commander, SAD, 30 August 1992.

<sup>29</sup>Interview with BG(P) Stanley Genega, HQUSACE, 15 October 1992; Alexander interview.

<sup>30</sup>Elmore interview; CECW-OE-D, Memorandum for DOMS; Simms interview.

<sup>31</sup>Jacksonville District, "Hurricane Andrew First Impressions Report," 22 October 1992, p. 5; Salt interview.

<sup>32</sup>Genega interview.

## CORPS MISSIONS

<sup>33</sup>“ESF #3 First Impressions Report,” 22 October 1992.

<sup>34</sup>“JTF Engineer After-Action Report,” p. 6; *Hurricane Hugo Afteraction Report*, Charleston District, USACE, April 1990, p. 24.

<sup>35</sup>SAD Counsel, Memorandum for COL Jansen, 11 September 1992, CEHO Files: Debris Removal; BG(P) Stanley G. Genega, “When Nature Strikes Back,” *The Military Engineer*, Vol. 84, no. 553 (November-December 1992), p. 5).

<sup>36</sup>“Dade fumes as debris from Andrew is burned,” *Newark Star-Ledger*, 30 September 1992; “Corps cracking down on smoky burning sites,” *Miami Herald*, 25 September 1992.

<sup>37</sup>Interview with Major Robert Grubbs, ESF #3, 14 September 1991.

<sup>38</sup>“South Atlantic Division Most Significant First Impressions,” CEHO Files: Afteraction.

<sup>39</sup>MG John Sobke, Memorandum for Secretary of the Army, 1 September 1992, CEHO Files: Schools.

<sup>40</sup>Secretary of the Army, Michael P. W. Stone, Memorandum for the Secretary of Defense, 1 September 1992, CEHO Files: Schools.

<sup>41</sup>MG John Sobke, Memorandum for Secretary of the Army (draft), n.d., CEHO Files: Schools; COL Salt, Memorandum for Director of Civil Works, HQUSACE, n.d., CEHO Files: Schools.

<sup>42</sup>HQUSACE, EOC Update, 6 January 1993.

<sup>43</sup>William W. Fuller, Memorandum for Leonard Parish and Leo Hickman, 24 August 1992, CEHO Files: Homestead AFB.

<sup>44</sup>Headquarters, Air Combat Command message to SAD Project Management, 012129Z Sep 1992.

<sup>45</sup>Mobile District, Memorandum for Commander, USAEDSA, 27 October 1992, CEHO Files: Afteraction.



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## KEY FUNCTIONAL AREAS

<sup>46</sup>Salt interview.

<sup>47</sup>Genega interview; Salt interview; interview with Nick Etheridge, HARO, 14 September 1992.

<sup>48</sup>Interview with Major Philip May, DFO, Miami, FL, 15 September 1992; interview with Secretary of Transportation Andrew Card, Jr., DFO, 15 September 1992.

<sup>49</sup>Simms interview; COL Terrence Salt, Memorandum for BG Genega, 8 September 1992, CEHO Files: Contracting.

<sup>50</sup>Allan V. Burman, Administrator, Office of Management and Budget, Policy Letter No. 91-1, 11 March 1991, COL Gatlin Files.

<sup>51</sup>Presidential Task Force, Joint Information Center News Release, 15 September 1992; *Wall Street Journal*, 21 September 1992.

<sup>52</sup>Genega interview; Elmore interview.

<sup>53</sup>Interview with Kay Bauer, SAD, 10 September 1992; Etheridge interview.

<sup>54</sup>Secretary of the Army message to Commander, FORSCOM, 242010Z Aug 1992, CEHO Files: Command and Control; Commander, FORSCOM/FCJ8 message to AIG 7433, 021730Z Sep 1992, CEHO Files: Funding.

<sup>55</sup>Coversheet of Fax message from FORSCOM Engineer to Mel Atterberry, CEHO Files: Funding.

<sup>56</sup>John P. Elmore, Memorandum for Acting Commander, SAD, 30 August 1992, CEHO Files: Funding.

<sup>57</sup>BG(P) Stanley G. Genega, Memorandum for Commander SAD and Commander LMVD, 23 August 1992, CEHO Files: Individual Mobilization Augmentees.

<sup>58</sup>SAD Commander's Report, Hurricane Andrew, #4, 2 September 1992; CECW-OE-D, Memorandum for DOMS, n.d.

<sup>59</sup>Bonner interview.

<sup>60</sup>D'Aniello interview.

<sup>61</sup>"JTF Engineer After Action Report," p. 5; SAJ, "First Impressions Report," p. 15.

<sup>62</sup>Bonner interview.

#### **OBSERVATIONS/RECOMMENDATIONS**

<sup>63</sup>Simms interview; interview with Kate Hale, Miami, FL, 13 September 1992.

<sup>64</sup>Moore interview; May interview.

<sup>65</sup>Fletcher interview.

<sup>66</sup>May interview.



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## Acronyms

AAA	Army Audit Agency
AMC	Army Materiel Command
ASA(ILE)	Assistant Secretary of the Army for Installations, Logistics, and Environment
BG	Brigadier General
CDRG	Catastrophic Disaster Response Group
CEHO	Corps of Engineers, History Office
CINC	Commander in Chief
CINCLANT	Commander in Chief, U.S. Atlantic Command
CINCSOC	Commander in Chief, U.S. Special Operations Command
CINCTRANS	Commander in Chief, U.S. Transportation Command
CJTF	Commander, Joint Task Force
COR	Contracting Officer Representative
CSA	Chief of Staff, Army
DCO	Defense Coordinating Office
DER	Department of Environmental Regulation
DFO	Disaster Field Office
DOD	Department of Defense
DOMS	Director of Military Support
DSR	Disaster Survey Report

ECCV	Emergency Command Center Vehicle
EICC	Emergency Information and Coordination Center
EOC	Emergency Operations Center
EPA	Environmental Protection Agency
ERT-A	Emergency Response Team, Advance Element
ESF	Emergency Support Function
EST	Emergency Support Team
FCO	Federal Coordinating Officer
FEMA	Federal Emergency Management Agency
FO	Field Office
FORSCOM	U.S. Army, Forces Command
HAAO	Hurricane Andrew Area Office
HARO	Hurricane Andrew Recovery Office
HHC	Headquarters, Headquarters Company
HQUSACE	Headquarters, U.S. Army Corps of Engineers
HUD	Housing and Urban Development
IMA	Individual Mobilization Augmentee
J3	(Operations)
J4	(Logistics)
JCS	Joint Chiefs of Staff
JTF	Joint Task Force
LMVD	Lower Mississippi Valley Division
LSC	Life Support Center
LTC	Lieutenant Colonel
LTG	Lieutenant General
MG	Major General
MIPR	Military Interdepartmental Purchase Request
NCD	North Central Division



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NG	National Guard
P.L.	Public Law
ROC	Regional Operations Center
SAD	South Atlantic Division
SADBU	Small and Disadvantaged Business Utilization
SAJ	South Atlantic Division, Jacksonville District
SARDA	Secretary of the Army for Research, Development, and Acquisition
SF	Standard Form
USACE	U.S. Army Corps of Engineers



U.S. Army Corps of Engineers  
Office of History  
Fort Belvoir, VA  
January 1993