ARMY CORPS OF ENGINEERS (CIVIL WORKS) ASSISTANCE IN HURRICANE "BETSY" RELIEF AND REHABILITATION

LOUISIANA

Hurricane BETSY came inland from the Gulf of Mexico, in the vicinity of Grand Isle, Louisiana, during the night of 9-10 September 1965. The center passed south and west of New Orleans with winds up to 150 miles per hour and extremely high tides on the northern and eastern sides. The tidal surge reached maximum elevations of 14 feet above sea level in the marshes to the east and north of the Mississipi River below New Orleans and overtopped the main line levees on both sides of the river in the lower parts of St. Bernard and Plaquemines Parishes. Back levees generally paralleling the river and along the Inner Harbor Navigation Canal, built by local agencies for reclamation and protection against tidal flooding, were overtopped and breached in many places. Severe flooding occurred in portions of Orleans, St. Bernard and Plaquemines Parishes. Advance warnings resulted in mass evacuation of these vulnerable areas with an estimated 135,000 persons being affected. However, evacuation was not directed in portions of the City of New Orleans along the east and west sides of the Inner Harbor Navigation Canal and in western St. Bernard Parish when severe flooding occurred and many persons were stranded in these areas.

Early on Friday, 10 September, the Army Corps of Engineers initiated rescue and relief work in critical areas to save life and property

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and to assist other agencies in such activities. Corps of Engineers personnel and boats were sent into the flooded area near the Industrial Canal in New Orleans. These were the first of any Government agency to begin rescue operations in the area. By the night of 10 September, 1,200 persons had been evacuated by the Corps of Engineers. Reconnaissance teams were concurrently dispatched by the Corps of Engineers into the parishes most affected by the hurricane.

On 10 September, the Corps of Engineers was requested by the Office of Emergency Planning to provide disaster assistance under Public Law 875. The request was to make initial inspections for debris clearance and for protective and other work; undertake certain eligible work beyond State and local capabilities; assist the State and public entities in undertaking eligible work; and reimburse them for work done. A total of 35 Corps inspection teams were assigned to the various parishes at the peak of activities. Working with State, Parish and municipal governmental agencies, these teams directed operations of Corps of Engineers contractors in debris removal, emergency drainage, levee repair, and other repair and rehabilitation work. The total cost of the PL 875 mission assigned to the Corps of Engineers is currently estimated at $33,816,000.

To provide emergency power in the stricken areas, the Corps of Engineers obtained twenty-six generator sets of varying sizes, 5 to 60 KW, from Fourth U. S. Army. A total of 42 enlisted men commanded by one officer were dispatched from Fort Sam Houston and Fort Hood, Texas to

operate these generators. Distribution of the generators to local entities was under OEP direction.

The Corps of Engineers called upon the construction industry for mobilization of all possible equipment that could be used in debris removal and other disaster work. Much of the equipment in the immediate affected area was either damaged or temporarily immobilized by effects of the storm. However, immediate response and effort by contractors in the area and from as far away as Florida enabled the Corps of Engineers, within a few days, to contract for a vast array of dump trucks, loaders, cranes, draglines, pumps and related items. A total of 40 Corps of Engineers contracts were let for operating over 1,500 dump trucks and loading equipment for debris removal in thirty-three parishes in Louisiana. Other contracts were let for work such as drainage, levee repair, and other rehabilitation work.

Because of the low elevation of the flooded areas, it was necessary to pump out the floodwaters. The Corps of Engineers mobilized six dredges and one pump barge to aid in this effort. One dredge operated in the Venice, La., area; and five dredges and the pump barge operated in the vicinity of New Orleans. These dredges worked continuously until the area was essentially dry. In addition, the Corps of Engineers furnished and installed pumps at various locations in the flooded areas. The largest installation was at the Citrus Pumping Station in New Orleans where five pumps were used to aid in draining in the City of New Orleans east of the Inner Harbor Navigation Canal and north of the Mississipi River-Gulf Outlet Canal. Three of five pumps required placement on a pile

supported platform. Two pumps were also installed by the Corps in the Venice, La., area. Two Corps of Engineers contract marsh-buggy cranes assisted the locally furnished cranes to facilitate drainage. At the Braithwaite Park area, the Corps installed a pump to assist the parish drainage pumps in removing flood waters.

In the Carolyn Park area in the north and western parts of St. Bernard Parish east of New Orleans, the levee was topped by hurricane tides. This levee was badly eroded on the landside and several crevasses occurred. Local interests, with the help of equipment furnished by the Corps of Engineers, made emergency repairs to the levee. These served to keep out the abnormally high tides immediately following "Betsy" and those caused by the tropical storm "Debbie" which occurred on 28 September 1965. Seepage was noted in the repaired areas. The Corps furnished men, materials and equipment to stop the seepage, prevent overtopping of the repaired areas, and reinforce the entire damaged portions of this levee. Three Corps of Engineers contract marsh-buggy cranes, two draglines, two boats, and 24 personnel assisted in reinforcing the emergency closures.

Levees along Bayou Segnette, south of Westwego, in Jefferson Parish, were also endangered by high tides. Corps of Engineers crews reinforced local levees with sandbags to provide immediate interim protection and constructed a 420-foot levee setback opposite the damaged area.

The Corps of Engineers installed emergency base radio stations at Thibodaux and at Grand Isle, La., to provide those areas with temporary communications until the normal means of communications were restored. The

station at Grand Isle is still in operation and the one at Thibodaux operated for forty-four days, until 13 November 1965.

In Grand Isle, 99 individual trailer sites and one trailer park were cleared and prepared, by the Corps of Engineers, to receive GSA-supplied trailers for those residents who were left homeless by the hurricane and who wished to return to the area.

Under contract, the Corps of Engineers successfully refloated two ferries on the Mississipi River, one at Luling and the other at Belle Chasse. The Corps of Engineers also let contracts for the removal of houses which were blocking streets and highways in Jefferson, Lafourche, Plaquemines and St. Bernard Parishes, and for the demolition of structurally unsafe buildings in the New Orleans area.

Corps of Engineers crews and equipment and contractors are presently working on the rehabilitation of damaged main-line Mississipi River levees below New Orleans. A total of 57 miles of these levees were found to require extensive repair and restoration. This work, and similar work on other flood control components of the Congressionally authorized Mississipi River and Tributaries project of the Corps, is estimated to cost $2,400,000. Also, a program to rehabilitate locally constructed flood control works has been initiated under Corps emergency authority, for which the cost is currently estimated at $3,000,000.

Repairs and restoration of dikes and range and dredging targets by Corps personnel are also in progress at both South and Southwest Passes to restore effectiveness of the structures controlling navigation channels at the Passes of the Mississipi River. Total cost of this navigational work

prosecuted under Corps statutory authority is estimated at $1,250,000. Additional clearing and dredging of channels in southeast Louisiana is estimated at $1,525,000.

Immediately after the hurricane, all navigation channels were surveyed by Corps of Engineers personnel and survey boats for possible obstructions to navigation. Loss to shipping and navigation interests of all categories in south Louisiana was the greatest ever recorded for one disaster. A total of 176 vessels of all types were stranded or wrecked against the Mississipi River levees and along the batture between Baton Rouge and the Gulf of Mexico. These vessels were located by aerial surveys and photographs, investigated and documented by Corps of Engineers personnel. One hundred thirty-four of these have been removed by the owner and follow-up is being maintained to insure removal or satisfactory disposition by the owners. In addition, thirteen sunken vessels have been abandoned to the Government and removal operations are underway on three of these vessels, under Corps statutory authority.

A serious potential threat to public health and safety was posed by the barge MTC-602, laden with 600 tons of liquid chlorine, which tore loose from its moorings on the Mississipi River near Baton Rouge and sank during the height of the hurricane. When reported missing, a massive search effort was immediately begun, using all needed resources of the Department of Defense.

On 12 September, because of the hazard, the Corps of Engineers closed navigation through the 37-mile river stretch within the search area.

River patrol operations were undertaken by the U. S. Coast Guard. On 13 September, the OEP requested the Corps to coordinate search activities and conduct necessary salvage operations. This effort, designated as "Project 602", was later made a PL 875 work item, on 23 September after the barge was found to be no obstruction to navigation.

The Corps dispatched 85 personnel and 16 pieces of major floating plant to aid in the search. Naval assistance in the search included 138 personnel, one destroyer and two search planes. Coast Guard assistance included 31 personnel and three pieces of major floating plant. After 15 sunken objects were located and determined not to be the MTC-602, by Army and Navy divers, the barge was finally located on 16 September 1965 by a Corps of Engineers survey boat. It was found in sixty feet of water, about 200 feet off the east bank of the river, near the Louisiana State University campus in Baton Rouge, La. Navy divers quickly confirmed that it was barge MTC-602, by bringing up three seals bearing the proper identification. The condition and exact location of the barge and tanks were determined through extensive underwater surveys conducted by the Corps of Engineers with contract forces.

A Site Operations Center was established to handle the salvage operation. During the preliminaries, all safety precautions were taken including continuous surveillance to detect possible chlorine leakage. Assistance in such safety measures was provided by representatives of the U. S. Weather Bureau, U. S. Public Health Service, The Chlorine Institute, the Army Materiel Command's Edgewood Arsenal, and the Fourth U. S. Army.

On 9 October 1965, a contract was awarded by the Corps of Engineers for salvage of the barge. A safety and protective plan was drawn up by the

State of Louisiana, for activation during the actual salvage operation. Designated "Operation SAFEGUARD", it included measures for necessary warning protection and evacuation under the direction of the Louisiana State Director of Public Safety. Military support to the State for execution of Operation SAFEGUARD was arranged.

On 12 November 1965, after completion by the State of precautionary measures under Operation SAFEGUARD, the barge MTC-602 was successfully raised and the all-clear signal given. Navigation in the area, suspended during the lifting operation, was resumed and Operation SAFEGUARD was concluded. On the next day, 13 November, the barge was secured at the Wyandotte Chemical Cooperation docks, Geismar,Louisiana.

ARMY CORPS OF ENGINEERS (CIVIL WORKS) ASSISTANCE IN HURRICANE "BETSY" RELIEF AND REHABILITATION

MISSISSIPI

As Hurricane BETSY approached Mississipi on 9 September 1965, standing operating procedures for a flood or hurricane emergency were activated by the responsible field officer of the Corps of Engineers. After it passed, inspection teams were sent into the areas affected by the hurricane to make a damage reconnaissance.

On 25 September, the OEP formally requested the Corps to perform certain engineering investigations and inspections and furnish recommendations and eligibility determinations as to work requested by the local entities. The Corps was later requested to accomplish some recommended work, including debris removal along seawalls in Hancock County (cost being determined) and similar debris removal in Harrison County ($360,000 cost); seawall repairs in Hancock and Jackson Counties (costs being determined); restoration of a small-boat harbor at Pass Christian ($23,000 cost), and at Biloxi ($17,000 cost); restoration of State port facilities at Gulfport ($90,300 cost); and restoration of the Harrison County Industrial Seaway ($7,400 cost). The above Corps work under PL 875, excluding investigative and administrative costs, and also excluding the undetermined costs, total $497,700. Field investigations have been substantially completed.

A Corps contractor has removed about 18,000 cubic yards of debris from Harrison County beaches since starting work on 15 November. The

contract is scheduled for completion 15 December. A contract for similar debris clearance in Hancock County will be negotiated shortly. Other work will be initiated following OEP approval of cost estimates furnished 26 November.

The removal of hurricane-caused shoaling in the navigational channel and harbor projects maintained by the Corps of Engineers is being accomplished, at an estimated cost of $315,000.

ARMY CORPS OF ENGINEERS (CIVIL WORKS) ASSISTANCE IN HURRICANE "BETSY" RELIEF AND REHABILITATION

FLORIDA

On 7 September 1965, when it became apparent that Hurricane "BETSY" would affect Florida, the responsible field officer of the Corps of Engineers activated standing operating procedures for a flood or hurricane emergency. During and following the hurricane, engineers were dispatched to collect and report on hurricane and flood damages; to obtain information on rainfall, tides, beach erosion, and wind-pressure data associated with the hurricane; and to advise whether the Corps' services were needed by local Civil Defense, Red Cross, or other agencies. An eight-man survey team was sent to Miami on 8 September. Three men covered the Florida Keys and five men covered Key Biscayne, Virginia Key, the beaches from Miami Beach to the Palm Beach County line, and the mainland along Biscayne Bay. On 9 September, a Corps engineer accompanied Regional and State representatives from the Office of Emergency Planning in their review of hurricane damages. On 13 September, a beach erosion engineer was sent to the area to investigate the extent of damage to beaches in Palm Beach, Martin, and St. Lucie Counties. On 12 and 13 September, two engineers were sent to investigate erosion of beaches in Lee County.

On 14 September, the Corps of Engineers was formally requested by the OEP to provide assistance to that agency by conducting certain engineering investigations and inspections. The Corps was further requested to make recommendations as to eligibility for PL 875 assistance of required

debris clearance and repair or restoration of dikes, levees and drainage ditches, and of beach protective work proposed as a result of severe erosion in many areas during the hurricane.

Investigations and engineering inspections to determine the extent of damage caused by Hurricane BETSY and remedial measures for restoration are nearing completion. Eligibility reports on the expenses incurred by affected counties and municipalities for emergency repairs and cleanup are being furnished Office of Emergency Planning as they are prepared.

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TABULATION OF INFORMATIONAL DATA

a. Peak number of employees committed to the effort:

HEADQUARTERS	FIELD	
	FEDERAL	EMPLOYED BY CORPS CONTRACTOR
5	941	7,516

b. Estimated cost of hurricane damage to Federal property and facilities:

ITEM	LOUISIANA	MISSISSIPI	FLORIDA
(1) Corps property	$35,000	$ 0	$5,000
(2) Structures and projects maintained by the Corps for:			
(a) Navigation	3,000,000	315,000	102,000
(b) Flood Control	2,400,000	0	0
Totals	$5,435,000	$315,000	$107,000

c. Estimated cost of combined rescue, relief and rehabilitation work (exclusive of b, above):

Assistance under Corps statutory authorities	$3,150,000	0	0
Chlorine barge search and salvage (Project 602)	1,400,000[a]	0	0
Other PL 875 work	32,416,000[a][b]	497,000[c]	(d)
Totals	$36,966,000[a][b]	$497,000 [c]	(d)

NOTES:

(a) Costs are exclusive of military support to U. S. Army District Engineer in Corps missions.

(b) Estimate for PL 875 work in Louisiana includes $4,744,000 for school repair and replacement currently authorized by OEP but to be retroactively transferred to responsibility of the U. S. Office of Education pursuant to Public Law 89-313. The estimate also includes allowance for OEP-directed reimbursements to State and local agencies; by 19 November, these had totaled $3,200,000.

(c) Estimate for PL 875 work in Mississipi is incomplete.

(d) No estimate can yet be made for PL 875 work in Florida.