THE SPECTACULAR FAILURE OF THE OUTFALL CANALS

IN NEW ORLEANS DURING KATRINA

HOW DID IT HAPPEN?

Prepared by Sandy Rosenthal, Levees.org Founder

and H.J. Bosworth Jr. PE, Levees.org Lead Researcher

August 22, 2012

After the flooding during Katrina in 2005, top brass with the U.S. Army Corps of Engineers conceded it failed to protect New Orleans from flooding as was its congressional mandated duty.[[1]](#footnote-0) But Corps spokespersons also told major media, consistently over a course of years, that New Orleans officials played a contributing role in the failure of flood walls along the city’s two large outfall drainage canals.[[2]](#footnote-1) The Corps claimed it originally wanted to install gates at the mouths of the 17th Street and London Avenue Canals to prevent storm surge from entering the city, but were disallowed by local agencies. The Corps claimed they were forced to implement the “next fallback plan of building flood walls in the canals,” obviously implying that gates were the better option.[[3]](#footnote-2) The claim is both historically and logically flawed, and is discussed below.  
  
Two Historical Flaws in the Corps of Engineers’s Claims  
  
The project record reveals that the Corps preferred peripheral gates because they were cheaper, not better. In 1965, Hurricane Betsy demonstrated that a major hurricane could overtop the earthen levees of the drainage canals and flood the residential and commercial areas of New Orleans.[[4]](#footnote-3) This despite the efforts of the canal pumping stations which had been continually increased in pumping capacity throughout the twentieth century. In the Flood Control Act of 1965 - legislation enacted in response to Hurricane Betsy - Congress directed the Army Corps to work in consultation with the Sewage and Water Board (SWB) and the Orleans Levee Board (OLB) to examine alternatives for providing hurricane protection at the outfall canals. The Corps initially considered five alternatives but ultimately narrowed their choices to the two most cost-effective alternatives, which were 1) raising the height of the canal walls (parallel protection) or 2) installing gates at the canal mouths. The gates plan had no auxiliary pumps like the gates installed after Hurricane Katrina. The higher walls plan was estimated in the 1980s to cost three to five times more than gates. The Corps indicated that both plans adequately protected the area.[[5]](#footnote-4) The Corps preferred the gates plan because it was much less expensive and because it was consistent with its mandate to implement the “least-cost alternative for providing the authorized project purpose.”[[6]](#footnote-5)

There is a second historical flaw in the Corps’ claims. In a million dollar grant awarded to the American Society of Civil Engineers, the Corps of Engineers requested the elite group to educate the civil engineering community on the lessons learned after Katrina.[[7]](#footnote-6) In dozens of presentations both nationally and abroad, ASCE spokespersons stated that the New Orleans levee board was responsible for 30% of the funding (for storm protection) and as a result wanted to “cut cost at each step of the way.”[[8]](#footnote-7)

Meeting minutes from January 1990 through September 1991 reveal what appears to be highly engaged engineering committee that grilled the Corps with detailed questions about storm proofing the outfall drainage canals. Legitimate concerns were detailed in a briefing paper to the Congressional Delegation. The OLB wrote that “in the event of overtopping of the levees of these canals, many businesses and an estimated 56,000 residents of Orleans Parish would be flooded.” The OLB wanted the more expensive high level plan over the cheaper gates plan (which had no pumps like the gates installed today), because they believed it was superior.[[9]](#footnote-8) These concerns were also discussed in the meeting minutes.

After the 2005 flood, the Los Angeles Times wrote that a “deft behind-the-scenes maneuver by the levee board forced the corps to accept higher flood walls” and to “abandon its floodgate plan.”[[10]](#footnote-9) There is no evidence to support this claim of subterfuge. The fact is the OLB, in full transparency, backed by the New Orleans City Council, the Sewage and Water Board and neighboring communities, went to the state congressional delegation for authorization and money for the much more expensive parallel plan.[[11]](#footnote-10) The Corps was always aware that the OLB was working with Congress toward that end. The plan worked, and Congress ordered the Corps to implement the more expensive high level plan.  
  
While the Corps does not appear to be the entity responsible for promoting the subterfuge myth, this wrong information in the Los Angeles Times article has been repeated in books and other news sources.

Two Logic Flaws in the Corps’ Claims  
  
There are two logic flaws in the Corps of Engineers’ claim that local agencies contributed to the failed canal walls and are thus partly responsible. First, there is an obligation for the Corps to build its Congress-mandated flood protection competently. It is not logical to say that the local agencies should bear responsibility for the Corps’ poorly built canal walls just because the Corps preferred the less expensive gates-only plan.   
  
Second, there were about 50 breaches in the Corps-built Lake Pontchartrain and Vicinity Hurricane Protection Project on August 29, 2005.[[12]](#footnote-11) Any attempt by the Corps to "pass the buck" regarding the failed outfall drainage canal walls is founded in an unexamined assumption that the Corps’ gates-no-pumps plan would have protected the city from flooding. We note that after Katrina, the Army Corps installed flood gates with enormous auxiliary pumps.[[13]](#footnote-12)

The Tragedy of the Botched E-99 Study

Interestingly, buried deep in the preeminent report on the Katrina flooding is a stunning analysis showing that the Corps of Engineers had misinterpreted one of its own studies, the so called E-99 study which apparently led directly to the flooding of the city’s main basin with the highest concentration of people, property and infrastructure. This analysis is found in the Decision-Making Chronology for the Lake Pontchartrain & Vicinity Hurricane Protection Project, prepared by water experts Douglas Woolley and Leonard Shabman for the U.S. Army Corps of Engineers published in March 2008.

At seems that in 1985, the Corps of Engineers Division Headquarters initiated a Sheet Pile Test (a.k.a E-99 study) in the Atchafalaya Basin, a region with soils similar to those on New Orleans. The Corps botched the study and wrongly concluded that:

“...when foundation soils were poor, sheet pile penetration depth beyond a certain point would not significantly increase I-wall stability under the type of short-term loading conditions believed to characterize hurricane events….”[[14]](#footnote-13)

In other words, the Corps incorrectly determined it only needed to drive sheet piles down to depths of seventeen feet instead of between thirty-one and forty-six. The Corps believed that “sheet pile penetration beyond a certain depth would not improve wall stability and therefore was a wasteful expenditure.”[[15]](#footnote-14)  
  
This switch by the New Orleans District to significantly shorter sheet piles saved the District $100,000,000.[[16]](#footnote-15) But these cost savings “came at the expense of engineering reliability” according to the Chronology.[[17]](#footnote-16)

On August 29, 2005, the newly enhanced floodwalls along the outfall drainage canals slid laterally and collapsed causing at least $27 billion in direct residential, commercial and public property damage in the city's main basin.[[18]](#footnote-17) Post-Katrina investigations revealed that the walls collapsed because the steel sheet pilings were too short and allowed dangerous water underseepage.[[19]](#footnote-18)

"The storm surge was still more than four feet below the tops of the flood walls at the sites at the times of the levee failures. Deeper sheet piles would likely have prevented these catastrophic failures”, said Dr. Seed in a letter to the author.[[20]](#footnote-19)

In January 2008, the U.S. District Court, Eastern District of Louisiana placed responsibility for the flood wall collapses and resulting flooding in downtown New Orleans squarely on the Army Corps of Engineers.[[21]](#footnote-20) However, the Corps of Engineers could not be found financially liable due to sovereign immunity established by the Flood Control Act of 1928.

*“While the United States government is immune for legal liability for the defalcations alleged herein, it is not free, nor should it be, from posterity’s judgment concerning its failure to accomplish what was its task...because of §702c, there is neither incentive, nor punishment to insure that our own government performs these tasks correctly,” wrote Judge Duval.[[22]](#footnote-21)*

Conclusion:  
  
In a fitting endnote, a recent response to a records request by the author reveals that the Corps of Engineers cannot produce any data to support its claims that local New Orleans agencies are partly responsible for the failure of the flood walls along the city’s outfall drainage canals.[[23]](#footnote-22)

“It is not possible to determine exactly which documents…were relied upon, considered, reviewed, read or discussed,” responded Ken Holder, Public Affairs Chief for the Corps’ New Orleans District.

Nonetheless, statements by senior Corps spokespersons in the months and years after Katrina, which have been oft-repeated in media, books and articles, were injurious to the flooding victims because they may have alienated the nation’s citizens and ultimately prejudiced members of Congress.  
  
Levees.org will continue its mission to revise the initial inaccurate template until one day, the truth about the worst civil engineering disaster in U.S. history becomes household knowledge.

1. Testimony GAO-05-1050T, United States Government Accountability Office, Before the Subcommittee on Energy and

   Water Development, Committee on Appropriations, House of Representatives, September 28, 2005. [↑](#footnote-ref-0)
2. Sheila Grissett, “Science stronger, corps chief asserts,” *New Orleans Times Picayune,* December 5, 2007. [↑](#footnote-ref-1)
3. John Schwartz, “Army Corps Admits Flaw in New Orleans Levees,” *New York Times,* June 1, 2006. [↑](#footnote-ref-2)
4. Douglas Woolley and Leonard Shabman, Decision-Making Chronology for the Lake Pontchartrain & Vicinity Hurricane Protection Project, Final Report for the Headquarters, U.S. Army Corps of Engineers, 2-47. [↑](#footnote-ref-3)
5. Ibid. 2-48. [↑](#footnote-ref-4)
6. Ibid, ES-15. [↑](#footnote-ref-5)
7. "Research and Analysis of the Performance of Hurricane and Flood Protection Projects in Southeast Louisiana." U.S. Army Engineer Research and Development Center, Vicksburg Consolidated Contracting Office. Grant Number: W912HZ-06-1-0001 [↑](#footnote-ref-6)
8. ASCE-sponsored presentation by Larry Roth, a former ASCE employee, at the Ginn College of Engineering at Auburn University in April of 2007. Accessed 8-11-2012 http://youtu.be/lLNtA-5C5m0 [↑](#footnote-ref-7)
9. Briefing paper: USACE’s Hurricane-Flood Protection Project - London Avenue Canal and Orleans Avenue Canal Work, Board of Commissioners of the Orleans Levee District to Members of Louisiana Congressional Delegation, September 11, 1990. [↑](#footnote-ref-8)
10. Stephen Braun and Ralph Vartabedian, “Levees Weakened as New Orleans Board, Federal Engineers Feuded,” *Los Angeles Times,* December 25, 2007. [↑](#footnote-ref-9)
11. Briefing paper: U.S. Army Corps of Engineers’ Hurricane-Flood Protection Project Lake Pontchartrain and Vicinity, LA -- London Avenue Canal and Orleans Avenue Canal Work, Board of Commissioners of the Orleans Levee District to Members of Louisiana Congressional Delegation, September 11, 1990. [↑](#footnote-ref-10)
12. Map created by U.S. Army Corps of Engineers, uploaded to www.levees.org http://levees.org/2/wp-content/uploads/2012/08/LeveeBreachesMap-NO-2-1-e1309608321488-1-1.jpg [↑](#footnote-ref-11)
13. Peter Eisler, “Probe: New Orleans flood control pumps not reliable,” *USA Today,* August 25, 2009. [↑](#footnote-ref-12)
14. Woolley and Shabman, 4-19. [↑](#footnote-ref-13)
15. Ibid, 4-23. [↑](#footnote-ref-14)
16. Ibid, 4-26, 4-27. [↑](#footnote-ref-15)
17. Ibid, 4-28. [↑](#footnote-ref-16)
18. Christine F. Anderson, Jurjen A. Battjes, David E. Daniel, and Billy Edge, *New Orleans Hurricane Protection System, What Went Wrong and Why.* (Reston, VA: American Society of Civil Engineers, 2007), 37-38. [↑](#footnote-ref-17)
19. Robert Bea, “Failure of the New Orleans 17th Street Canal Levee & Floodwall During Hurricane Katrina,” Paper presented at the Challenge of Sustainability in the Geoenvironment*,* New Orleans, LA, March 9-12, 2008, 12. [↑](#footnote-ref-18)
20. Ray M. Seed, letter to author, August 16, 2012. [↑](#footnote-ref-19)
21. Adam Nossiter, “In Court Ruling on Floods, More Pain for New Orleans,” *New York Times,* February 1, 2008. [↑](#footnote-ref-20)
22. United States District Court, Eastern District of Louisiana. Re: Katrina Canal Breaches Consolidated Litigation, No. 05-4185. January 30, 2008 [↑](#footnote-ref-21)
23. Ken Holder, letter to author, February, 14, 2012. [↑](#footnote-ref-22)