

THE NEW ORLEANS HURRICANE PROTECTION SYSTEM:
LESSONS LEARNED FROM HURRICANE KATRINA

Statement of

Jeffrey Jacobs, Ph.D.

Scholar

National Research Council

and

Study Director

Committee on New Orleans Regional Hurricane Protection Projects

National Academy of Engineering and National Research Council

The National Academies

before the

Committee on Environment and Public Works

U.S. Senate

June 16, 2009

Good afternoon Madam Chair, members of the Committee, and others. My name is Jeffrey Jacobs. I am a Scholar with the Water Science and Technology Board of the National Research Council and I served as the study director for the National Academy of Engineering and National Research Council's Committee on New Orleans Regional Hurricane Protection Projects. The Council is the operating arm of the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine of The National Academies. The Academies operate under an 1863 charter from Congress to provide independent advice to the federal government on scientific and technical matters.

Our committee was convened in December 2005 at the request of then-Assistant Secretary of the Army for Civil Works, Mr. J.P. Woodley, to provide an independent review of the work of the Interagency Performance Evaluation Task Force, or IPET. The IPET group was assembled by the U.S. Army Corps of Engineers to evaluate the performance of the New Orleans hurricane protection system during Hurricane Katrina and to provide advice in repairing the system. During its 3.5-year tenure our committee issued five reports, all of which reviewed draft reports issued by the IPET. Our committee's fifth and final report was issued in April 2009 and it reviewed the IPET draft final report and commented on important "lessons learned" during Hurricane Katrina and its aftermath. My comments this afternoon summarize those lessons as identified and discussed in our final report.

The Limits of Protective Structures

The greater New Orleans metropolitan region is naturally vulnerable to flooding, especially in areas below sea level. Post-Katrina repairs to and strengthening of the hurricane protection structures have reduced some vulnerabilities, but the risks of inundation and

flooding never can be fully eliminated by protective structures, no matter how large or sturdy those structures may be.

Future Footprint of the Hurricane Protection System

Hurricane Katrina illustrated an undue optimism about the ability of the hurricane protection infrastructure in the greater New Orleans area to provide absolute flood protection. Despite weaknesses in the system that were exposed during Hurricane Katrina, reconstruction activities apparently are taking place largely according to the system's pre-Katrina footprint and without consideration of whether this configuration is optimal. For example, the creation of a protection system with a smaller overall footprint might offer advantages in terms of cost and inspection and maintenance requirements. At the very least, there should be discussions that consider the pros and cons of different configurations of protective structures and different levels of protection across the region.

Relocations to Improve Public Safety

Regardless of future levee construction activities, it likely will not be possible to provide equal degrees of flood protection across the city. Higher elevation parts of the region—such as areas on the natural Mississippi River levees—inherently are safer than lower-lying areas—such as extensive areas below sea level in St. Bernard's parish and in New Orleans East. Rebuilding the New Orleans area and its protective system to its pre-Katrina state would leave the city and its inhabitants vulnerable to additional Katrina-like disasters. Planning and design for upgrading the system should discourage settlement in areas most vulnerable to hurricane storm surge flooding. Because protective structures never can provide absolute protection, voluntary relocation of people and neighborhoods out of

particularly vulnerable areas—with adequate resources to improve their living conditions in less vulnerable areas—should be considered as a viable public policy option.

Floodproofing Measures

Where it is not feasible to relocate people and buildings out of vulnerable areas, significant improvements in floodproofing will be essential. To adequately protect the safety of homes and residents in vulnerable areas, the first floor of houses should be elevated to at least a height associated with the 100-year storm event. Raising first floors even higher to meet a more conservative level of flood protection is preferable. In addition to elevating homes and other buildings, critical infrastructure such as electric power, water, gas, telecommunications, and pumping facilities should be strengthened to ensure that interdependent infrastructure systems can function reliably in an extreme flooding event.

The 100-year Level of Flood Protection

The 100-year level of flood protection—which defines areas with a one percent chance of flooding each year—is a crucial flood insurance standard. It has been applied widely across the nation and is being used in some circumstances for reconstruction and planning activities in New Orleans. For areas where levee failure is not a safety concern, the 100-year standard may be appropriate for developing regulations, setting insurance rates, and informing decisions in city planning and disaster preparedness. For heavily-populated urban areas, however, where the failure of protective structures would be catastrophic—such as New Orleans—the 100-year standard is inadequate. By way of comparison, the Association of State Floodplain Managers recommends that a 500-year flood is an appropriate minimum standard for urban areas.

Evacuation Plans

The disaster response plan for New Orleans, although successfully evacuating a large portion of the metropolitan area population, was inadequate for the Katrina event. There is a need for more extensive and systematic evacuation studies, plans, and communication of those plans. A comprehensive evacuation program should include not only well designed and tested plans and criteria for evacuation warnings, but also alternatives such as improved local and regional shelters that could make evacuations less imposing. It also should consider longer-term strategies to enhance the efficiency of evacuations, such as locating facilities for the ill and elderly away from vulnerable areas that may be subject to frequent evacuations.

Risk Communication

Communicating risks posed by hurricanes and storm surge is essential to preparing a vulnerable population for the potential occurrence of a hurricane. Unfortunately, before Katrina, there was a limited understanding and appreciation of the risks of living behind levees. The risks of flooding across New Orleans area should be refined, simplified, and communicated consistently. To achieve more effective communication, the IPET should hire a firm to create a professional summary of the entire IPET draft report in “layman’s” terminology so as to make its findings more accessible to citizens, business owners, and decision makers.

Periodic Assessment and Independent Review

Changing environmental conditions, such as geologic subsidence, may affect the level of protection provided by hurricane and flood protection projects. Furthermore, advances in scientific and engineering theories and methods may render assumptions on which these

projects were based partly or fully obsolete. For the New Orleans hurricane protection system, regular assessments that evaluate underlying environmental, scientific, and engineering factors that affect system performance should be conducted. An independent “second opinion” can help ensure that calculations are reliable, methods employed are credible and appropriate, designs are adequate and safe, potential blind spots are minimized, and other issues are raised as appropriate.

Better hurricane protection and preparedness for New Orleans will require a combination of structural and nonstructural measures and cooperation among federal, state, parish, and other entities, as well as the citizens of New Orleans. The post-Katrina setting poses challenges and open questions, as there is no model for post-hurricane recovery in New Orleans. Building a hurricane protection system to better standards and making wise choices about future development should help create a safer city but there is no clear agreement about the path forward for the New Orleans metro region. What does seem clear, however, is that information regarding the risk of hurricane-induced damages to New Orleans should be more widely acknowledged and appreciated than in the past and accorded a higher priority in future development plans and decisions.

Madam Chair and members of the committee, that concludes my remarks. Thank you for inviting me to speak with you today. I would be pleased to discuss questions that you and your colleagues may have about our committee’s report.

THE NEW ORLEANS HURRICANE PROTECTION SYSTEM:
LESSONS LEARNED FROM HURRICANE KATRINA

Statement of

Jeffrey Jacobs, Ph.D.

Scholar

National Research Council

Water Science and Technology Board

and

Study Director, Committee on New Orleans Hurricane Protection Projects

National Academy of Engineering and National Research Council

The National Academies

before the

Committee on Environment and Public Works

U.S. Senate

June 16, 2009