

Additional Views

Senator Pete V. Domenici

On Corps of Engineers and Levee Issues

Hurricane Katrina: A Nation Still Unprepared develops its conclusion based on available, albeit incomplete, data. The Army Corps of Engineers is continuing to collect and synthesize data on the storm. The Interagency Performance Evaluation Task Force (IPET) established by the Chief of Engineers to provide credible and objective scientific and engineering answers to fundamental questions about the performance of the hurricane protection and flood damage-reduction system in the New Orleans metropolitan area has not yet completed their analysis. Their report is scheduled for completion in June 2006. The IPET team consists of more than 150 experts from more than 50 federal, state, and local agencies, as well as international, academia and industry groups.

As this team was established by the Corps, outside oversight was considered essential to validate the team's results. The oversight is set up as follows: the Corps IPET team will collect the facts, the National Research Council Committee on New Orleans Regional Hurricane Protection Projects will synthesize the facts, and the American Society of Civil Engineers is the external review panel to verify the data and develop conclusions.

The IPET Mission has five focus areas. They are:

The Flood Protection System – What were the design criteria for the pre-Katrina hurricane protection system, and did the design, as-built construction, and maintained condition meet these criteria?

The Storm – What were the storm surges and waves used as the basis of design, and how do those compare to the storm surges and waves generated by Hurricane Katrina?

The Performance – How did the floodwalls, levees, pumping stations, and drainage canals, individually and acting as an integrated system, perform in response to Hurricane Katrina, and why?

The Consequences – What have been the societal-related consequences of the Katrina-related damage?

The Risk – Following the immediate repairs, what will be the quantifiable risk to New Orleans and vicinity from future hurricanes and tropical storms?

The hurricane and flood damage-reduction projects in the New Orleans metropolitan area were designed for a compact, relatively fast-moving Category 3 storm. This was the so-called standard project hurricane.

Katrina was a huge, powerful, relatively slow-moving hurricane. The United States Geological Survey (USGS) says that the storm surge from Hurricane Katrina was the largest recorded storm surge ever to hit the United States.

Some of the preliminary information from the report shows that levee subsidence had caused some levee segments to be lower than designed, and consequently did not provide

the protection level intended. For instance, the levees along the Industrial Canal were nearly three feet below the design elevation due solely to subsidence.

Unanticipated failure mechanisms in the I-wall design resulted in catastrophic failure of the I-walls along two of the interior drainage canals with water levels below the tops of the floodwalls. These failure modes had been modeled, but had not been incorporated in the design as they were not anticipated to occur at these locations.

Earthen levees were subjected to long-period ocean waves. This type of wave is not usually associated with more compact hurricanes typical of the Gulf of Mexico. These long-period waves carry tremendous energy and ripped huge chunks out of the levees as the waves overtopped the structures. Vivid images of this destruction were captured showing waves breaking over the levee along the Mississippi River Gulf Outlet during Hurricane Katrina as well as pictures created after the storm showing the same levee section and how it was damaged by these breaking waves. This type of wave action was not incorporated in the design of the earthen levees.

While these preliminary results from the IPET team do not absolve the Corps of Engineers, the State of Louisiana, or local officials from blame in design and maintenance of the levees, Katrina was a huge storm when it made landfall. It packed a Category 5 storm surge even though wind speed may have been as low as Category 3 when it made landfall. The storm surge was the devastating factor on the flood-control infrastructure. Further, the interior drainage system, developed over a 100-year period mostly by non-Federal interests, proved to be inadequate to deal with the flooding caused by the storm surge and attendant flooding.

The preliminary information from the IPET study shows that the design assumptions that were made when the project was authorized and throughout the 40-year period of construction were likely faulty, in hindsight. However, as a storm like Katrina was not considered typical for Gulf hurricanes, the same design decisions may well have been repeated if we were building the project today, had this storm not occurred.

Somewhat as a validation of the above statement is that FEMA was in the process of revising the 100-year flood plain maps for New Orleans prior to Katrina. Had Katrina not occurred, these maps would have, in all likelihood, validated existing, but faulty, conclusions. However, after Katrina occurred, FEMA reworked their analysis to incorporate the data from Katrina. The result was drastically altered 100-year flood plain maps for the New Orleans metro area. These new maps indicate that the levees currently in place do not provide protection from a 100-year flooding event. Prior to Katrina, it was believed the same levees provided a 200-year level of protection. This revised analysis demonstrates the power and magnitude of Katrina by showing how drastically it altered the hydraulic assumptions in the metro area.

Supplemental appropriations to date have provided the Corps necessary funding to respond to immediate disaster needs and restore the hurricane and flood-protection system to pre-Katrina conditions before the start of this year's hurricane season on June 1st. Additionally, funding has been provided to complete the hurricane and flood-protection system as originally conceived and designed.

The latest supplemental proposal is intended to strengthen the obvious weaknesses in this system by closing off the interior drainage canals and the Industrial Canal to storm surge. This will provide increased protection to the central area of New Orleans. Proposed levee raisings will increase protection levels for the New Orleans metropolitan area. Armoring of the levees will protect many of the levees in St. Bernard and other hard-hit areas from the wave action that was so devastating during Katrina. Restoration of coastal areas will provide

protection by reducing storm surge, and storm-proofing the interior pump stations should allow this vital system to continue operating during hurricane events.

Studies by the Corps are on-going to determine the ultimate level of protection that should be provided for the greater New Orleans and south Louisiana area. These studies will provide preliminary interim recommendations in June 2006, with a final report scheduled for December 2007. These studies are anticipated to provide the basis for additional investments in hurricane and flood-system improvements to the greater New Orleans and south Louisiana area.