NEW ORLEANS, May 22 — In a breathless finale that has been called one of this generation's greatest adventures in civil engineering, the Army Corps of Engineers has all but completed its repairs to this city's ruined levee system.
With just days to go before the beginning of the hurricane season, the corps' $800 million effort has even improved the system in many ways, engineering experts say, with tougher concrete flood walls, brawny new canal gates and more than 150 miles of new or repaired levees.

But even though all sides agree that the corps has largely achieved its goal, independent engineers say it is the goal that is the real problem. New Orleans is still very much at risk, they say, because the level of protection the corps has reached is still not as strong as the city needs.

Many experts view this hurricane season, which begins on June 1, with trepidation, and hope that the system is not put to a test like Hurricane Katrina before further improvements can be made.

"Some of these things were poorly designed and were almost pre-ordained to fail," said Wayne Clough, the head of a National Research Council team that formed at the request of the Department of Defense in order to assess the corps' investigation of the disaster. Parts that did not fail in Hurricane Katrina, he said, could still have been weakened by the stress of last year's storms. "Just because they've been restored to their condition pre-Katrina doesn't mean they are perfectly safe," he said.

Raymond Seed, a professor of engineering at the University of California, Berkeley, who is one of the corps' most consistent critics, said he did not doubt that the system was, to use the mantra of the corps, "better and stronger" in many ways. But, he asked, "Better enough?"

Professor Seed and other experts who have studied the crazy quilt of levees, flood walls, pumps and gates that have been in the process of being built for more than 40 years now say that they were never adequate to protect hundreds of thousands of people in an urban setting and that the levees themselves are now known to be fundamentally flawed.

Corps officials say that repairing the damage of the last storm while preparing for new ones is a challenge that their organization is up to. But Maj. Gen. Don T. Riley, the director of civil works for the corps, said he could not guarantee that the system would not fail again.
"You don't know what kind of storm you'll get," he said in a recent interview, emphasizing the need for good evacuation planning.

Gen. Robert Crear, the head of the Mississippi Valley Division of the corps, said, "We know Katrina was not the worst possible case." What happens from here onward, General Crear said, "is a continuous program to improve" the system over time.

The corps' race to complete the $800 million in projects that it took on after last year's storms has been a 24/7 marathon rich with tension, apprehension, slipping deadlines and quick-and-dirty workarounds. The sheer scope of the work can only be fully appreciated from the air.

Where levees were breached and battered away by Hurricane Katrina's surge and waves, millions of cubic yards of new soil have been put into place along more than half the 350-mile levee system, from the shores of Lake Pontchartrain to the swamps at the southern tip of Louisiana.

Sturdy new gates stand at the mouths of the city's three major drainage canals. Storm-damaged pumps are being renewed, along with New Orleanians' capacity to hope.

In the city's ruined Lower Ninth Ward, 4,000 feet of new levee stands, the old weak I-shaped flood wall replaced with stronger walls that resemble an inverted T. For long stretches of the renewed system, the ground behind the flood walls is now armored with a white span of concrete intended to keep any water that makes it over the top from scouring away the earth.

To the east of the city, at the line of defense facing Lake Borgne, a long fat ribbon of freshly compacted earth, is a levee that will end up being 20 feet high and 11 miles long. Along its seemingly endless stretch of brown soil are yellowish sections, where local soil has been supplemented with tough Mississippi clay.

Along Lake Pontchartrain, at the mouths of the drainage canals that cut deep into New Orleans, enormous new floodgates are nearing completion, intended to keep the storm surge from putting the strain on the faulty flood walls that breached in three places and caused much of the flooding in the central city. That ambitious
project has slipped behind schedule. Pumps to drain the canal waters when the
gates are closed are late at the 17th Street Canal, and the gates are behind
schedule at the London Avenue Canal.

But Col. Lewis F. Setliff III, the commander of the task force that has been
rebuilding the system, said he was confident that the projects would be
completed within weeks and that until then, an unseasonably early storm surge
could be blocked, if necessary, with sheet pilings driven across the canals.
Portable diesel-powered pumps would draw water over to the lake side.

It is far from a perfect solution. More powerful, permanent pumping stations are
still years away and would have to be approved by Congress. Until then, the level
of water in the canals must be kept low, and pumping capacity from the
neighborhood pumping stations will have to be reduced — a prospect that greatly
raises the risk of street flooding, but avoids catastrophic breaching.

Getting this far required tough talk with the contractors who carry out the corps'
plans and 12-hour days at the Federal Reserve Bank Building downtown where
Colonel Setliff’s task force set up shop.

At the beginning of the work on the western end of the levee, in St. Bernard
Parish, the contractor, Granite Construction, fell well behind schedule. The corps
had what some workers called a "come-to-Jesus" meeting with Granite about the
schedule, and even shook the company by publishing a request for new bids. By
some estimates, Granite increased its pace by an estimated 40-fold, and is
completing its part of the levee system on schedule.

Some problems remain. The rebuilt eastern wall of the Inner Harbor
Navigational Canal, which breached and destroyed the Lower Ninth Ward, is now
higher than a long stretch of the old wall on the western side of the canal that did
not fail during Hurricane Katrina.

In case of a storm with high waters, the western side would overflow first,
sending floodwaters into the city.
The corps has asked Congress to approve financing for new gates that could be closed to block surges in that large canal, also known as the Industrial Canal. But that additional level of protection is years away.

Although the corps will continue to raise and toughen the flood walls after the June 1 deadline, it has begun to study the larger question of how to improve the overall protection level. An interim report will come out next month, but the study will not be completed until December 2007. And any new initiatives would have to be approved by Congress.

It was in 1965, after Hurricane Betsy flooded New Orleans, that Congress first approved the city's hurricane protection system, authorizing a system based on what the corps would call "the most severe storm that is considered reasonably characteristic of a region." The corps built the system to protect against a hurricane with wind speeds of what is now considered a Category 2 storm, or up to 110 miles an hour. In many ways, though, that standard fell far short of the region's most severe storms like Hurricane Camille in 1969 or the storm that devastated Galveston, Tex., in 1900.

Over the years, experts and federal agencies have urged the corps to build to higher standards, but corps officials did not change course. Corps officials say that they build what Congress authorizes them to build and that shifting large projects is difficult once they are under way.

"The impression that we get is that the corps, once it's locked on a track, will not take input from outside groups," said Ivor van Heerden, a founder of the Louisiana State University Hurricane Center.

Now, Mr. van Heerden said, "It seems like Louisiana is now having to pay for not getting it right the first time."

He said the system at this point could only fully protect against a Category 2 storm.

The degree of vulnerability was underscored on Monday, when an independent team of researchers led by engineering professors at the University of California, Berkeley, and supported by the National Science Foundation released a report
that found the hurricane protection system riddled with errors in design, construction and maintenance — a pattern of inattention to safety that caused the system to crumble in a hurricane that should have, for the most part, caused little more than wind damage and a day or so of street flooding.

"The overall New Orleans flood protection system," Professor Seed said in a briefing last weekend, "must be considered suspect."