UNITED STATES DISTRICT COURT
EASTERN DISTRICT OF LOUISIANA

IN RE KATRINA CANAL BREACHES CONSOLIDATED LITIGATION

CIVIL ACTION

NO. 05-4182

SECTION "K"(2)

PERTAINS TO: *Robinson* C.A. No. 06-2268

FINDINGS OF FACT AND CONCLUSIONS OF LAW

The Court conducted a 19-day bench trial of this tort suit brought by six plaintiffs[1] seeking compensation from the United States based on their contention that as the result of certain defalcations of the U.S. Army Corps of Engineers ("Corps" or "Army Corps") with respect to the maintenance and operation of the Mississippi River Gulf Outlet ("MRGO"), the United States is liable to them under the Federal Tort Claims Act ("FTCA"), 28 U.S.C. § 2671, *et seq.* for damages incurred in the aftermath of Hurricane Katrina. The Court exercised jurisdiction over the parties, and pursuant to 28 U.S.C. § 1331 and 28 U.S.C. § 1346(b) and 28 U.S.C. § 2671 (FTCA) has jurisdiction over this suit by plaintiffs against the United States for the damages alleged. After considering all testimony and evidence presented at trial and the deposition testimony that the Court reviewed prior to the trial, the Court is prepared to rule as follows. To the extent a finding of fact constitutes a conclusion of law, the Court adopts it as such. To the extent a conclusion of law constitutes a finding of fact, the Court adopts it as such.

[1]Norman Robinson, Kent Lattimore, Lattimore & Associates, Tanya Smith, Anthony Franz, Jr. and Lucille Franz are the named plaintiffs. See Graphic No. 11 for a pictorial representation of the location.

Prior to this trial over the course of two years, the Court decided a number of motions by which the United States sought the dismissal of this suit prior to trial. In *In re Katrina Canal Breaches Consol. Litig.(Robinson)*, 471 F. Supp. 2d 684 (E.D.La. 2007) (*Katrina I)*, the Court denied a Rule 12(b)(1) motion in which the Government contended, among other arguments, that the Court lacked jurisdiction over the subject matter of the case based on the Flood Control Act of 1928 ("FCA"), specifically, 33 U.S.C. § 702c, which provides that "[n]o liability of any kind shall attach to or rest upon the United States for any damage from or by floods or flood waters in any place." 33 U.S.C. § 702c. This Court denied the motion and in particular refused to apply the United States' overly broad interpretation of that statute and the seminal case of *Central Green Co. v. United States*, 531 U.S. 425 (2001). Relying on *Graci v. United States*, 456 F.2d 20 (5th Cir. 1971), this Court found that the Corps could be held liable for damages arising out of activities surrounding a navigational channel notwithstanding the fact that those actions caused the failure of certain levees. The Court wrote:

> . . .[T]he Government's position ignores the fact that even the Supreme Court in *Central Green* opened the possibility of a segregation of damages–those for which the Government would be immune under § 702c and those for which immunity would not attach. Indeed, the Government even concurred with this reading at oral argument. (See Transcript of Hearing, October 27, 2006, at 33). For example, would the United States be immune for all damages if a Navy vessel lost control and broke through a levee where the sole cause of the failure of that levee was the Navy vessel's negligence? Thus contrary to the Government's contention that *Central Green* broadens the immunity provided by § 702c, in realty *Central Green* requires the Court to identify *the cause of the damage* rather than base a decision on the mere fact that a flood control project was involved. *Central Green* does not answer the question of what nexus to a flood control project is required for floodwaters to trigger immunity.

Id. at 695. Thus, the Court undertook this trial to determine, *inter alia*, whether the Corps' activities with respect to the MRGO acted like that Navy vessel destroying the levee.[2]

I. FINDINGS OF FACT

A. FACTUAL BACKGROUND

1. Construction of MRGO

In 1943, Congress requested a report from the Chief of Engineers, Secretary of the Army,[3] on the viability of the Mississippi River-Gulf Outlet which report was authorized by the River and Harbor Act and was approved on March 2, 1945. DX-0573 (H.R. Doc. No. 82-245 (1951)) at 1. The genesis of this request was apparently two-fold. The activity experienced at the Port of New Orleans during World War II made clear that an expansion and dispersion of those facilities was necessary in case of future hostilities. *Id.* at 41, ¶¶ 75-76. In addition, a shorter route to New Orleans would provide savings to the maritime industry by decreasing the distance from the Gulf of Mexico to New Orleans by about sixty miles. *Id.* at 35-36, ¶¶ 56-57.

Indeed, the needs of the maritime industry were a substantial focus for the Corps' activities as concerned the MRGO. At the same time, however, the safety of the citizenry of the metropolitan New Orleans area was another of its charges as demonstrated by Congress'

---

[2]Two other opinions that be will be referred to as follows:
In re Katrina Canal Breaches Consol. Litig.(Robinson), 577 F. Supp. 2d 802 (E.D.La. 2008) (*Katrina II*);
In re Katrina Canal Breaches Consol. Litig.(Robinson), 627 F. Supp. 2d 656 (E.D. La. 2009) (*Katrina III).*

[3]The Corps is governed by a hierarchical chain of command in which the Chief of Engineers is the senior officer at Headquarters in Washington, D.C. referred to as the Office of Chief Engineer ("OCE") with the ultimate decision-making authority. Civil works are generally assigned to field officers under the staff supervision of Headquarters. The relevant District in this instance is the New Orleans District ("NOD") which was responsible for, both the MRGO and the Lake Pontchartain and Vicinity Hurricane Protection Plan ("LPV"). The District Engineer is the senior official at NOD and responsible for oversight of Corps programs ongoing in the NOD. The NOD reports to, and is overseen by the Lower Mississippi Valley Division ("LMVD") whose senior official is the Commander who reports to Headquarters.

authorization of the Lake Pontchartrain and Vicinity Hurricane Protection Plan. The tension as to which client's needs were more important plays a decisive role in this tragedy.

On September 25, 1951, a report dated May 5, 1948, from the Chief of Engineers, United States Army ("Chief's Report") was transmitted to the House of Representatives. DX-0573 (H.R. Doc. No. 82-245 (1951)) ("Chief's Report"). It recommended the construction of a deep-draft channel on the east side of the Mississippi River. The route ran from the Inner Harbor Navigational Canal ("IHNC") eastward along the Gulf Intracoastal Waterway ("GIWW") to a point near Michaud, this section being called Reach 1, before striking a southeasterly course to and along the south shore of Lake Borgne and through the marshes to and across Chandeleur Sound to the Gulf of Mexico. This section of the channel is referred to as Reach 2. As Reach 2 moved southward, it cut through Bayou Bienvenue at the channel's more northerly end and Bayou La Loutre at its more southerly end. The channel was to be 36 feet deep and 500 feet wide, increasing at the Gulf of Mexico to 38 feet deep and 600 feet wide. *Id.* at 2. Its construction was to be done "generally in accordance with the plans of the division engineer and with such modifications thereof as in the discretion of the Secretary of the Army and the Chief of Engineers may be desirable." *Id.* at 5, ¶ 3.

In making the decision to place the MRGO at this location, the Corps stated as follows:

> Proponents of additional deep-draft outlets have assumed that such channels can be secured and maintained by dredging, but departmental experience in maintenance and improvement of Gulf-coast entrance channels does not support such assumption where shallow exposed coastal lakes or sounds are encountered. It has been demonstrated repeatedly that such channels should be sited through land cuts or provided with effective barriers to preclude return of dredge spoil into dredge channels. Hence the plan of improvement presented herein for an east-bank outlet and tidewater harbor provides for maximum use of land cuts, for a permanent retention dike across the sound and for jetties at the Gulf entrance.

Id. at 37, ¶ 59. Ultimately, the land-cut channel was authorized in 1956 by Public Law Number 84-455, 70 Stat. 65 (1956) and was to be constructed "substantially in accordance with" the recommendation contained in the Chief's Report. DX-0051 (Pub. L. No. 84-455, 70 Stat. 65 (1956)).

The actual design and construction of the channel occurred in phases and in segments. The first segment approved was that which ran coterminously with the GIWW (Mile 63.77-Mile 68.85).[4] JX-139 (Design Memoranda No. 1-A, Revised July 29, 1957). The second segment approved ran from the end of the east-west portion of the channel and turned southeastward cutting Bayou Bienvenue continuing on above Bayou La Loutre (Mile 63.77 to Mile 39.01). DX-1043 (Design Memorandum No. 1-B September 1958).[5] The next segment ran approximately from Bayou La Loutre to the entrance of the Gulf (Mile 39.01 to Gulf Entrance) and the final portion was for certain retention dikes. DX-1042 (General Design Memoranda No. 2 (June 1959) at EDP-023-667). Its construction was completed to full dimensions in 1968. DX-1027 (1988 Reconnaissance Report) at 14, pdf 25; Doc. 19139 (United States' Proposed Finding of Fact No. 777). A pictorial representation of these waterways can be found in Graphic No. 1 in the Appendix. Graphic No. 1– PX-98.2 "Greater New Orleans Flood Protection System".

Reach 1, Reach 2, the Golden Triangle, the Breach Zone and the Central Wetlands Unit

[4]This segment was approved on September 11, 1957. DX-1042 (Design Memorandum No. 2) at EDP -023-667).

[5]This segment was approved on January 27, 1959. DX-1042 (Design Memorandum No. 2) at EDP -023-667).

Certain Mile Markers of the MRGO will be used as benchmarks in this opinion. Mile Marker 60 is at the very end of the East-West portion of the MRGO–that which runs coterminously with the GIWW or Reach 1. It is at Mile Marker 60 that the "funnel" occurs–that point where the MRGO's North-South leg, Reach 2, feeds into the GIWW. The geographic area to the east of this intersection is referred to as the "Golden Triangle" as the marsh area from that point to the west of the north-western shore of Lake Borgne resembles a triangle.

The MRGO transverses Bayou Bienvenue at Mile Marker 59.[6] Midway between Mile Marker 53 and 52 Bayou Dupre is transversed. The majority of the breaches to the MRGO Reach 2 Levee occurred between these two points (Mile Marker 59 to Mile Marker 52); that area will be referred to as the Breach Zone in this opinion. The Bayou La Loutre Ridge is located between Mile Marker 36 and 37. The Central Wetlands Unit is that marshland which is encircled at the north by the MRGO Reach 1 Levee, to the east by the MRGO Reach 2 Levee, to the south by the 40 Arpent Levee. The Verret Turn or the Chalmette Extension Levee protects those inhabited areas to the south of the 40 Arpent Levee; it extends from the MRGO at approximate Mile 47. *See* Graphic No. 2– JX-0195 FitzGerald Report at 2-2, at pdf 12.

2. The Construction of the LPV

At approximately the same time as the MRGO was on the drawing board, the Corps began to undertake the construction of the Lake Pontchartrain and Vicinity Hurricane Protection Plan. On June 15, 1955, following a series of severe hurricanes, Congress authorized the Corps

[6]The Corps also uses another marking system referred to as "Survey Stations". Survey Station 365+00 approximately marks Bayou Bienvenue crossing the MRGO and Survey Station 705+00 marks Bayou Dupre's location.

to study projects to protect areas along the eastern and southern coasts from hurricane storm surges. JX-0446 (Douglas Woolley and Leonard Shabman, *Decision-Making Chronology for the Lake Pontchartrain & Vicinity Hurricane Protection Project*, March 2008) at § 2.2 at 2-3[7] (referred to hereafter at "HPDC."). Included as a subject for study was the area surrounding New Orleans, which study came to be known as the Lake Pontchartrain and Vicinity Hurricane Protection Plan. ("LPV") (HPDC, § 2.2 at 2-3 and 2.3.1 at 2-18) (See Public Law 84-71).

> In November of 1962, after seven years, an Interim Report produced the "Barrier Plan."
>
> Central to the protection were tidal gates at Chef Menteur Pass and The Rigolets, which would be closed during storms to hold back surges that otherwise would enter Lake Pontchartrain. The Citrus area would have a new, low-level levee along the lakefront, floodwalls at the Inner Harbor Navigation (IHNC), and levees and floodwalls along the Gulf Intracoastal Waterway (GIWW). The Metro New Orleans area would have levee enlargement and floodwalls at the IHNC and the Seabrook lock at the mouth of the IHNC. The portion of Orleans Parish bordering St. Bernard Parish would get levees and floodwalls along the GIWW and the IHNC. The Chalmette area would get levees along the Mississippi River Gulf Outlet (MRGO) that would provide direct protection from [Standard Project Hurricane] SPH surges from Lake Borgne. By 1967, the area would be further protected by adding the Chalmette Extension to the project.

HPDC § 2.3.5 at 2-29.

This study utilized a model to determine necessary levee height and engineering needs known as the "Standard Project Hurricane" ("SPH") which the Corps created in conjunction with the U.S. Weather Bureau to "select hurricane parameter of wind speed and central pressure for defining the SPH." The LPV was to provide a degree of protection equivalent to the surge and wave action predicted to result from the SPH parameters. Also, taken into account was the

[7] This Hurricane Protection Decision Chronology ("HPDC") study was chartered by the Institute for Water Resources (IWR) of the Army Corps of Engineers "to document and examine decision-making for the Lake Pontchartrain & Vicinity Hurricane Protection Project." *Id.* at iii. This exhaustive report provides detailed time lines and discussions concerning what proved to be a fifty-year exercise in ineptitude and gross economic and technological mismanagement.

"Probable Maximum Hurricane" ("PMH") which was a stronger, although less likely event, than the SPH. The design of the project focused on SPH surge protection–the less forceful occurrence. (HPDC § 2.2 at 2-4; § 2.3.5. at 2-26-30).

On September 9, 1965, Hurricane Betsy made landfall over Grand Isle Louisiana, due south of New Orleans, at nearly Category 5 strength. It moved up the Mississippi River which caused the river to rise ten feet at New Orleans. This storm caused catastrophic flooding around New Orleans, Chalmette and the Ninth Ward and provided an added impetus to proceed with the LPV plans. As the MRGO was substantially completed at the time of Hurricane Betsy, an action was brought against the United States for damages arising from that flooding alleging that the United States was negligent in designing, constructing and operating the Mississippi River Gulf Outlet. Ultimately, the district court found that plaintiffs failed to prove by a preponderance of the evidence any fault or negligence by the Government. *Graci v. United States*, 435 F. Supp. 189 (E.D. La. 1977).

In 1965, the "Chief's Report" was transmitted to Congress. It included the reports of the Board of Engineers for Rivers and Harbors and the District Engineer. The report recommended the Barrier Plan and served as the basis for project authorization. DX-0610 (House Doc. 231, 89th Congress, 1st Session). The LPV was passed by Congress on October 27, 1965 as the Flood Control Act of 1965, 29 Stat. 1073, 1077 (42 U.S.C.A. §1962d-5)[8] three years before the MRGO was completed. Congress authorized the project for hurricane-flood protection on Lake

[8]The authorization states:

> The project for hurricane-flood protection on Lake Pontchartrain, Louisiana, is hereby authorized substantially in accordance with the recommendations of the Chief of Engineers in House Document Numbered 231, Eighty-ninth Congress, except that the recommendations of the Secretary of the Army in that document shall apply with respect to the Seabrook Lock feature of the project. The estimated cost is $56,235,000.

Pontchartrain, Louisiana "substantially in accordance with the recommendations of the Chief of Engineers in House Document Numbered 231, Eighty-ninth Congress, except that the recommendations of the Secretary of the Army in that document shall apply with respect to the Seabrook Lock feature of the project." *Id.*

Thus, the Barrier Plan was put into place. It is pursuant to that authorization that the levees involved in this litigation were created. In August of 1966, the Corps reviewed its elevations of the levees with lessons learned from Hurricane Betsy in mind, and by September of 1968, it determined that the design elevations of all project structures were to be raised by 1 to 2 feet. This project was to face numerous obstacles and changes and indeed was not totally completed by the time Hurricane Katrina hit nearly 50 years later. As this Court has related in great detail in the context of the floodwall litigation in the LEVEE Master Class Action, *In re Katrina Canal Breaches Consol. Lit (Levee Class Action)*, 533 F.Supp. 2d 615, 621- 624 (E.D.La. 2008), the Barrier Plan was eventually scrapped for what was known as the High Level Plan.

Under this alternative approach, rather than constructing barriers to prevent storm surge and salinity into Lake Pontchartrain, it was decided to raise the floodwalls in the outfall canals at Seventeenth Street, Orleans Avenue and London Avenue. These changes however, did not affect the construction of the levees that are salient to this case. The crucial levees at issue concern two areas. The New Orleans East Unit consists of those levees which were constructed along Reach 1 and the IHNC. They are known as the Citrus Back Levee, the New East Back Levee, the New Orleans East Levee and the Inner Harbor Navigation (IHNC) floodwalls. These levees protected New Orleans East.

The second series of levees known as the Chalmette Area Unit are those constructed to protect the Ninth Ward and St. Bernard Parish. These levees consist of the MRGO Reach 1 Levee (which runs along the southern bank of the GIWW/MRGO), the MRGO Reach2 Levee and the Verret Levee, also referred to as the Chalmette Extension. Collectively, the Court will also refer to them as the Chalmette levees. As noted, these levees, along with the 40 Arpent Levee (a non-Corps levee) create the boundaries for an area called the Central Wetlands Unit which plays an immense role in the case at hand. HPDC § 2.3.5 at 2-30. *See* Graphic No. 1 PX98.2 - Chad Morris Demonstrative Exhibit "Greater New Orleans Flood Protection System.

3. MRGO Effects on the Environment

Buried in various Corps' reports some of which are discussed, *infra*, are unequivocal, positive statements that underscore the Corps' knowledge that the MRGO would not be a static, unchanging waterway. It was clear from its inception that because of its location, degradation of the area would result unless proper, prophylactic measures were taken. In fact, some measures were included in the Corps' plans; they simply were not implemented in time to prevent immense environmental destruction.

a. Lateral Displacement, Sloughing, Wave Wake and Foreshore Protection

Lateral Displacement and Sloughing

As alluded to above, a seminal issue with respect to Reach 2 of the MRGO and the construction of the Reach 2 Levee abutting that waterway was the need for foreshore protection to protect the banks of the MRGO from wave wash. One of the significant factors making this a requisite had to do with the type of soil through which the channel was cut. In undertaking the construction of the MRGO, the Corps cut through "virgin coastal wetlands." JX-0243 (Russo, Edmund, "Independent Study: Evaluation of Bank Line Revetment Alternatives to Abate Ship Wake Erosion Mississippi River-Gulf Outlet, Louisiana) at 3. As such, the channel transected a deltaic plain created by the Mississippi River that consisted of low-elevation, forested swamps and marshes.

Dr. Duncan FiztGerald, an expert in Sedimentology, Coastal Processes and Coastal Geomorphology, Dr. Sherwood Gagliano, who testified as a fact witness but who is an accomplished geologist, physical geomorphologist and coastal scientist, and Dr. John W. Day, Jr, a Coastal Wetlands Ecologist, all provided convincing testimony concerning the geology and surface features of the subject territory, as well as the effects of the MRGO on the region. This marshland is made up of different types of soil and sediments, all of which have varying attributes. Under the marsh itself, much of Reach Two, and in fact, the majority of the Breach Zone is comprised of primarily interdistributary soil.

This type of soil is also known "fat clay." (Trial Transcript, Duncan FitzGerald, at 339). Fat clays contain a great deal of water and fine grain clay and are subject to a phenomenon know as lateral displacement–that is when loads are placed on this soil, it tends to compress and run toward a path of least resistance–not unlike when a person squeezes a tube of toothpaste. Another quality of this kind of soil is that it tends to "slough" or crumble slowly and fall away

into water. The MRGO at the area of the Breach Zone was dredged to a depth such that its entire length is through an interdistributary strata. *See* Graphic No. 3, JX-0195 (Expert Report of FitzGerald) at 6-3-6-4, at pdf 68-69.

In 1958, the Corps noted that this type of soil would "probably displace laterally under fairly light load." *Id.* at 6-2 citing USACE (1958) Plate 5. That information came from a paper prepared in February of 1958 by Charles R. Kolb and Dr. J.R. Van Lopik, of the Geology Branch, Soils Division of the Corps of U.S. Army Engineer Waterways Experiment Station. PX-059 (Geological Investigation of the Mississippi River-Gulf Outlet Channel "Geological Investigation") at iii. This study's purpose was to determine the soil types that might be encountered in excavating the channel. *Id.* at 1. The report concluded that "as much as 40 percent of the bottom and sides of the channel will consist of [] inter-distributary clays. . . . From the standpoint of side slopes this may appear desirable, but it is possible that poorly consolidated, high water content interdistributary clays will tend to flow laterally into the evacuation particularly under extra weight of a spoil bank." PX-059 (Geological Investigation) ¶ 25 at 10. (FitzGerald Testimony at 350-52). Therefore, the Corps had knowledge that due to lateral displacement of soil into the channel, the Reach 2 Levee would incrementally lower. Moreover, the Corps knew that if the berm fronting the MRGO levee were armored, this effect would be substantially ameliorated.

Wave Wash and Channel Widening

The Corps was also aware that with the operation of the MRGO, a major force would be at play, threatening the integrity of the channel and the Chalmette Unit Levees. The banks of the

channel were expected to slough primarily due to wave wash. This fact is underscored by Design Memorandum No. 1-B for the MRGO, penned initially in September of 1958 and revised in May of 1959 prior to the authorization of the LPV in 1965. The Corps noted that:

> 19. Channel protection. No channel protection is recommended initially; however, **erosion due to wave wash in open areas can be expected in the upper part of the channel slope where the peat and highly organic clays are exposed. Protection for this area can be provided if and when the need for it becomes necessary. No channel protection is included in the overall cost estimate of the** project. . . .

PX-0699 (MRGO Design Memorandum 1-B (Revised 1959)) ¶19 at 5.[9] Thus, the Corps knew that with time foreshore protection would be necessary because of the interaction between the MRGO and the LPV. What apparently was not clear to the Corps was precisely how soon the need for protection would be manifested.

When a large ocean going vessel goes through a contained channel such as the MRGO it produces what is known as "wave wash," a series of wave events, each of which has its own characteristics and each of which has great erosion potential. As described by Dr. Gagliano:

> During the passage of a large ship the lower shoreline is attacked first by the drawdown and return flow. As the drawdown occurs, water flows from the lower shoreline towards the center of the MRGO channel, causing erosion. Depending on tide level, water may also be drawn out of the marsh toward the channel. This can be a very turbulent and erosive process because of the head differential set up between the marsh and the channel. A similar differential causes hydrostatic pressure to be built-up in the exposed bank, forcing water to leave the soil.
>
> After the drawdown phase has been completed the return flow begins. From this point the water level along the shoreline will continue to rise until the original water level is exceeded. The return flow, being a flow of water back towards the shoreline, directly impacts both the lower shoreline and the exposed marsh bank. The diverging waves then begin to reach the shore as water

[9]This statement was made prior to the 1965 approval of the LPV system and thus, apparently, before the impact of the MRGO on that system would have been at issued.

> elevation is at a maximum or mean level, continuing the attack on the upper shoreline.

PX-0203 (The Mississippi River Gulf Outlet: A Study of Bank Stabilization (Dec. 1984)) at 5-1-5-2. The larger the ship, the larger amount of sloughing of the MRGO banks occurred and thus greater widening of the channel occurred. Accordingly, there is ample evidence to find that the dominant cause of erosion on the MRGO shore was ship waves produced by large oceangoing vessels. *Id.* at 4-19. (See Trial Transcript, Podany,[10] at 3399). Thus, the recognized need for foreshore protection was not without reason. Wave wash would clearly result in the widening of the channel and therefore, increase the distance for waves to propagate, increasing the velocity of the flow of water, reducing the size of the berm protecting the Reach 2 Levee and in general placing the levee along Reach 2 in jeopardy.

In fact, Mr. Edmund Russo,[11] the Operations Manager for the MRGO from 2000 to 2005, opined in an article published in July of 2003:

> The channelized nature of the MRGO induces large ship waves during vessel passage. Ship waves strike the bank lines, which consist of very soft organic soils. Severe erosion occurs from these vessel wakes, and materials liberated in the process migrate into the waterway. MRGO bank erosion has historically and is currently occurring at high rates, mainly due to ship wave impact. An analysis of bank line retreat from 1964 to 1996 shows that the banks are being lost at about 12 to 26 ft/yr (Britsch and Ratcliff, 2001). Bank erosion results in channel shoaling, which requires periodic maintenance dredging. The

[10]Thomas James Podany was the Corps' Assistant Chief of Planning Programs and Project management at the time of Hurricane Katrina. He started with the Corps in 1982 after graduating for George Washington University with a degree in civil engineering. (Trial Transcript at 3332). He was a Study Manager in the Planning Division from 1983 to 1994. In 1994 he became Chief of the Environmental Planning Section and Planning Division. He was a Senior Project Manager in 1999, and as the Branch Chief in the CWPPRA Project Management Branch, the Coastal Wetlands Planning, Protection and Restoration Act Branch and then Assistant Chief of Planning Programs Project Management in 2002. He testified about the Corps' approach to bank stabilization.

[11] Edmund Russo was called by the Corps and is the Chief of the Coastal Engineering Branch at the Coastal and Hydraulics Laboratory of the U.S. Army Engineer Research and Development Center in Vicksburg, Mississippi but began working for the Corps in1997. (Trial Transcript. at 3510-11).

> current scenario is largely unsustainable from the engineering, environmental, and economic perspectives.

JX-0243 (Russo, Edmund, "Independent Study: Evaluation of Bank Line Revetment Alternatives to Abate Ship Wake Erosion Mississippi River-Gulf Outlet, Louisiana) at 3. Thus, a primary irritant with respect to the stability of the banks of the MRGO was wave wake, and the Corps' failure to armor the waterway lead to deleterious, interconnected effects. The Court will now examine the Corps' approach to this necessary prophylactic measure.

South Shore Foreshore Protection

As noted, the original MRGO authorization by Congress contemplated armoring the south bank[12] of Reach 2 of the MRGO, and such action was officially authorized and approved by the Chief of Engineers in 1967. (Trial Transcript, Podany at 3421 and 3427). As this shoreline abutted the Reach 2 Levee, a responsible course of action to protect that levee being constructed and its berms from the shoreline's erosion would have included this protection. The south shore protection was never subject to the need to find local participation in its funding as it had been made part of the GDM by supplement. Thus, the cost sharing concerns that arose with the passage of the Water Resources Development Act of 1986 , ("WRDA") were not applicable. (Trial Transcript, Podany at 3424-25 and 3427).

Notably, by the time of the passage of the LPV enabling legislation in 1965, in the Report of the District Engineer which was prepared in November of 1962, the need for prophylactic action was recognized. "Riprap foreshore protection against *erosion by wave wash from*

[12]Because of the alignment of Reach 2 of the MRGO, the north bank is also referred to as the east bank and the south bank is also referred to as the west bank. In the contracts for foreshore protection, the Corps used the north and south alignments.

shipping ***will be provided.***" DX-0610 (Report of District Engineer) at 65, pdf at 86 (emphasis added). Likewise, in the Board of Engineers for Rivers and Harbors July 1963 report, it was noted that riprap would be placed alongside the navigation channel. *Id.*. at 9, pdf at 30. The United States has argued that this fact somehow makes the provision of foreshore protection part of the LPV with the inference that somehow this decision not to arm the banks would be immune under § 702c immunity of the Flood Control Act of 1928. (See ¶¶ 725-741). Such a characterization misses the mark. The fact remains that the failure to provide foreshore protection worked as the Navy vessel hitting the levee. It was a substantial factor in the failure of the Reach 2 Levee which all parties maintain were built to grade.

General Design Memorandum No. 2, Supplement No. 4 for Foreshore Protection as submitted on 29 April 1968 provided a synopsis of the concerns as to whether ultimately the foreshore protection would be considered part of the LPV costs or the MRGO costs. While the Corps at one point took the position that it should be attributed to the LPV, the Chief of Engineers in Washington, D.C. ultimately decided that all of the cost of foreshore protection, not only on the south bank of the MRGO but also on the north bank of the GIWW, should be charged to the MRGO project. DX-1483 (MRGO GDM No. 2, Gen. Supp. No. 4 ("Foreshore Protection" 29 April 1968, Appendix B, Inter-Agency Correspondence dated 24 April 67) at EDP-023-0965, at pdf 77. In a letter to the Honorable Carl Hayden, Chairman of the Committee on Appropriations for the United States Senate, H.R. Woodbury, Jr. Brigadier General of the United States of America, Director of Civil Works stated unequivocally "construction of the navigation project exposed these levees and the foreshore between them and the channel to direct attack with resultant damage from waves generated by seagoing vessel utilizing the waterway.

The navigation project should have included adequate provisions for protecting these levees and their foreshore from this damage." *Id.* Correspondence dated 27 November 1967 at EDP-023-969.[13] While the levees referenced are not the Reach 2 levees, but are rather those that apparently already existed along Reach 1, it is clear that the paramount need for timely providing protection was obvious to the Corps.

Ultimately, the Corps as rationale for its decision to charge foreshore protection to the MRGO stated in relevant part with respect to Reach 2:

> . . . The MR-GO exposes the foreshore fronting this levee to direct attack by waves generated by oceangoing vessels. Therefore, providing the means for achieving the necessary erosion control for those areas, where such control is essential, is considered to be a function of the MR-GO project. By ENGCW-OM 1st Indorsement (sic) dated 15 April 1966 to LMVED-A letter dated 21 March 1966, subject "Hurricane Protection-Lake Pontchartrain, La. and Vicinity - Chalmette Area," the Chief of Engineers directed that the costs for foreshore protection contiguous to the levee plan for the Chalmette area along the MR-GO be charged to the navigation project. This directive was amplified . . . [when in another letter] OCE concluded that the levee foreshore protection along the MR-GO is properly a feature of the Mississippi River-Gulf Outlet project, and the costs for such protection are, in their entirety, chargeable to that project"

DX-1483 (MRGO GDM No. 2, Gen. Supp. No. 4 ("Foreshore Protection") 29 April 1968), pdf version at 33-34 in ¶ 3, EDP-023-0921-22. Thus, the entire portion of foreshore protection of the Chalmette Unit fronting the MRGO project and for the back levee of the Citrus Unit from the S.W. corner to Station 507+44.6 was charged to the MRGO. The balance of the back levee of the Citrus Unit and the back levee of the New Orleans East Unit were determined not to be affected by wave wash from the MRGO and so not included. *Id.* pdf at 77-78, at EDP-023-0965-66.

---

[13]This reference to an "EDP"designation is to the Bates stamp which is on each page that has been PDF'd herein. For the sake of clarity, the Court will include this extra reference when it deems necessary.

Dr. Robert Bea, one of plaintiffs' experts concerning causation, testified that had the Corps employed foreshore protection before 1975, the lateral displacement process could have been prevented or at least slowed down. (Trial Transcript, Bea at 1151-52). Additionally, the significant widening of the channel would have been prevented. Nonetheless, from 1968 until 1982, nothing was constructed. It took 12 years for the Corps, in March of 1980, to determine that at this point that "due to technical problems related to extremely poor foundation conditions, additional study and revision of the original design [for foreshore protection] is necessary." PX 794 (Letter from Col. Sands District Engineer to Jack Stephens, Director of St. Bernard Parish Planning Commission dated 25 March 1980). Thus, the failure to install timely necessary foreshore protection impacted the Reach 2 Levee itself as early as 1980.[14]

In fact, in a Memorandum dated January 29, 1981to the LMVD concerning foreshore protection, the Corps noted that emergency bank repair work was required at the Bayou Dupre Control Structure. "This emergency work is needed at that location to arrest a serious problem that would impact the hurricane protection levee and the control structure." PX-2122 at pdf p.18 (AIN-108-1801). In this same memo from NOD to LMVD dated January 29, 1981, the District Engineer reported on alternative designs for foreshore protection originally approved in July 3, 1968. He noted:

> The previous alinement (sic) plan for foreshore protection along the south bank of the MR-GO called for placement of riprap dike approximately 80 feet landside of the -5 contour. **This plan is undesirable because of the irregular bankline condition that exists due to erosion and because of the large amount of foreshore dike settlement that would occur**.

[14]See also the documents contained in PX-2122 which contain information concerning the process by which the Corps was faced with an emergency situation concerning the MRGO's encroachment and possible degradation of the Reach 2 levee.

PX-2122 (Letter from Col. Sands to LMV, Re: MRGO-Foreshore Protection dated 29 January 1981) pdf at 16, AIN–1108-1799 (emphasis added). Two designs were proposed to be tested. These documents demonstrate that substantial erosion had already occurred which placed the MRGO levee in peril then. Thus, it is clear just from this testimony and documentary evidence that substantial areas of marsh had already disappeared by 1981.

Finally, foreshore protection testing along the Reach 2 levee was begun in 1982 from Station 475+00 to Station 501 in Reach 2 along the Breach Zone.[15] PX-338 (Disposition Form Narrative, Completion Report dated 3 Feb 83). This testing was apparently completed in February of 1983.

In a handwritten memo penned on January 19, 1983, and incorporated into a memo signed by Frederic M. Chatry, Chief, Engineering Division, to the Commander of the LMVD concerning the foreshore protection which had been a part of the relevant GDM since 1968, Chatry sought funding in the Fiscal Year Budget for 1985. A design still had not been settled upon. Nonetheless, he stated:

> The need for foreshore protection along the south bank of the MRGO is critical. Erosion along this reach caused by wave wash from ships using the MRGO has occurred at faster rates than originally anticipated. This erosion, if left unchecked, will begin to encroach into the stability berms of the Lake Pontchartrain Hurricane Protection Project's Chalmette Area levees. In some areas the existing banks have **eroded back to about 200 feet from the toe of the levee.**

PX- 2122 (Letter to LMVD from Chatry dated 11 February 1983) at pdf 73-73 and 82 (emphasis added).

[15]Survey Station 365+00 approximately marks Bayou Bienvenue crossing the MRGO and Survey Station 705+00 marks Bayou Dupre's location.

On June 28, 1985, a contract was awarded to construct foreshore protection along the South Bank of Reach 2 from Station 367+60 to 1007+50 (roughly from Mile Marker 59 to Mile Marker 47). The contract was accepted as substantially completed on October 28, 1986. PX 337 (Disposition Form Narrative, Completion Report dated 7 November 1986). By 1988, the Corps reported that the "13 miles along the south bank from Bayou Bienvenue to the end of the leveed reached as authorized by the August 1969 project modification had been completed." See DX-1057 (MRGO Reconnaissance Report Feb. 1988) at 14.

Interestingly, there are documents further indicating that even that protection was not sufficient to the task. The Court reviewed a foreshore protection repair document for the South Bank from Mile 59.4 to 47.0 dated June 7, 1993 (DX-1067); a foreshore protection repair document for Mile 59.4 to Mile 56.0 dated December 29, 1993 (DX-1068); a foreshore repair document for Mile 59.2 to 55.2 dated September 12 1994 (DX-1069); a foreshore repair document for Mile 58.7 to 53.6 dated June 13, 1995) (DX-1071); a foreshore repair document for Mile 59.8 to 59.4 dated March 21, 1996) (DX-1072). These repair documents continue into 1999; however, some documents do not definitively indicate that the repairs are to the South Bank. DX-1073, DX-1074, DX-1076, and DX-1079. Obviously, the Corps knew that the MRGO was causing severe erosion continuously–even to the point that the attempts at protection were not withstanding the currents.

It is not surprising that when commenting on the poor relations with St. Bernard Parish and the landowners adjacent to the MRGO in 1999, Robert L. Gunn, the Operations Manager for the Corps at NOD in "Mississippi River-Gulf Outlet Environmental Disaster or Valuable Economic Port" stated, "[i]n the past the Corps of Engineers did little to explain the proposed

annual maintenance of the project. **The foreshore protection, which protected vital hurricane levees, was not maintained properly or timely."** (PX-722 at NOP–013-3317).

North Bank Foreshore Protection

As to the North Bank , no foreshore protection for the North Bank of Reach 2 was forthcoming until the 1990s by which time catastrophic damage to the wetland banks of the MRGO had occurred. (Trial Transcript, Russo at 3574). It is clear that the Corps had knowledge by the early 1970's that protection was necessary. The extreme loss of wetlands particularly along the North Bank abutting Lake Borgne was recognized in 1973. At extreme risk was the land bridge which prevented Lake Borgne from flowing directly into the MRGO which could catastrophically magnify the force and intensity of storm surge and wave propagation that could occur in the context of a substantial hurricane. PX 1633 (Statement for Rivergate Public Meeting 30 August 1973) at 13. Nonetheless, Col. Early J. Rush, II who served as the NOD commander from 1974 through 1978, testified that he could not recall ever forwarding anything up the chain of command discussing the bank erosion problem which clearly was significant by that time. (Trial Transcript, Rush at 252). Indeed he stated that he never got "any information along that line that there was a major problem." (Trial Transcript, Rush at 254).

This testimony was incredible in light of the fact that on July 15, 1976, the Corps issued a public notice concerning foreshore protection for the Citrus Back Levee along Reach 1 which was in fact signed by Col. Rush. (PX-1344). In addition, he signed an 18 April 1978 memo to LMVD concerning North Bank protection (Citrus Back Levee) in which he stated that South

Bank [fronting the Chalmette Unit levees] foreshore protection would be addressed in a future report with construction scheduled to begin in 1980. DX-1483 (General Design Memorandum No. 2, Supp. 4 Foreshore Protection) at EDP-023-0893-95. Moreover, as will be discussed, *supra*, the land loss was patently visible. Furthermore, the amount of dredging that had taken place to that point would have placed the Corps on notice of the problems with sloughing that the operation of the MRGO was creating. From 1966 to 1972 the Corps spent $3,466,528 in maintenance dredging. PX-1630 (Environmental Impact Statement, October 1972, Gagliano) at 17.

Nonetheless, the Corps clearly took the position that its primary mission was to keep the shipping channel open to deep draft traffic regardless of the consequences. (Trial Transcript, Podany at 3395-96; Trial Transcript, Sands, at 265). In questioning Tom Podany, the Corps' witness concerning reports of the Corps' efforts to investigate measures directed at bank stabilization along the MRGO, it is clear that the Corps' focus was narrow; mitigation was looked at only from the perspective of how it would effect maintenance costs. *Id.* In conducting these studies neither was a dollar amount assigned to the value of human life nor to the cost of the destruction of property. *Id.* Furthermore, the Corps did not include these values in its equations to prioritize projects for funding. (Trial Transcript, Podany, at 3344-46). Also, after the passage of the Water Resources Development Act, 33 U.S.C. § 2201, *et seq.*, the Corps, for the most part, took the position that there would always need to be local participation in the cost of any study, and consequently, any corrective action to be taken as concerned the North Shore foreshore protection.

In September 1979, the Corps of Engineers received two requests, one from Representative Robert L. Livingston, Jr. and the other from Senator Russel Long, both of Louisiana and both asking the Corps to respond to concerns about bank erosion along the MRGO, in particular the development of a north shore levee using MRGO dredge spoil. PX-1033, PX-1034 (Letters of Long, Livingston to Col. Sands). (Doc. 19139, United States Findings of Fact No. 807). Rather than addressing the issue of damage directly, the Corps responded solely to the proposed fix–use of spoil–and opined that there was no federal authority to create erosion protection.

In 1982, Congressman Livingston initiated the passage of a resolution directing the Corps to look into the feasibility of bank foreshore protection along the north shore. DX-1027 (1988 Reconnaissance Report) at 2, pdf 13. It was not until February, 1988 that the ensuing report issued.[16] In the meantime, the Corps conducted a study issued in 1984, "Notice of Study Findings for the Louisiana Coastal Area, Louisiana, Shore and Barrier Island Erosion, Initial Evaluation Study, July 1984" (PX- 1639) in which the Corps stated:

> Construction of the MR-GO has accelerated the natural changes occurring in the St. Bernard Parish wetlands near Lake Borgne. . . . Wind- and wave-generated erosion is also steadily widening the MR-GO. Because of this expansion, the east bank along Lake Borgne is dangerously close to being breached. Once the bank is breached, development to the southwest would be exposed to direct hurricane attacks from Lake Borgne, the rich habitat around the area would be converted to open water, and more marsh would be exposed to the higher salinity water.

(PX- 1639 at 7). Then, the Corps outlined two possible erosion control plans. *Id.* at 8. (Trial Transcript, Podany at 3411-3413).

[16]This report was 100 % federally funded.

With its 1988 federally funded study, "Mississippi River-Gulf Outlet St. Bernard Parish, La. Bank Erosion Reconnaissance Report, February, 1988," [17] the Corps reported:

> Most of the Mississippi River-Gulf Outlet is experiencing severe erosion along its unleveed banks. The erosion is a result of both man-induced and natural forces, including combinations of channelization, ship and wind generated waves, storm activity, and subsidence. Associated with subsidence is eustatic sea level rise that has been estimated at 0.5 feet per century (Nummendal, 1983).[18] Subsidence and sea level rise intensify saltwater intrusion and erosion.
>
> The marshes along the north bank of the Mississippi River-Gulf Outlet have been especially hard hit by these forces and are disappearing at an alarming rate. **Because erosion is steadily widening the MR-GO, the east bank along Lake Borgne is dangerously close to being breached. Once the bank is breached, the following will happen: sediment for Lake Borgne will flow into the channel resulting in large increases in dredging costs to maintain the channel; development to the southwest would be exposed to direct hurricane attacks from Lake Borgne**; **the rich habitat around the area would be converted to open water; and more marsh would be exposed to higher salinity water.**[19]

DX-1057 (Mississippi River-Gulf Outlet St. Bernard Parish, La. Bank Erosion Reconnaissance Report, February, 1988) at 10-11, pdf 63, EDP-023-1033-34. (emphasis added). So, 15 years

---

[17]Reconnaissance Reports were a method used by the Corps to study specific issues to determine whether a Feasibility Study should be conducted which was a precursor to action actually being taken. A Feasibility Study required local participation to defray the cost of the endeavor, and generally, any remedial action so recommended would also require the participation of a local sponsor to defray some percentage of the cost of implementation. This approach was premised on WRDA.

[18]Credible testimony proved that the rate of subsidence in the MRGO area was substantially greater than the average levels in wetlands that where not adjacent to the MRGO.

[19]Mr. Podany tried to distance himself from these finding and opined that they were concerned about large, mile wide breaching, not the "small" breach at Lake Borgne that was present at Hurricane Katrina. However, this testimony was less than credible in light of the fact that when those "small" breaches were found to be dangerous, the Corps was able to justify "emergency" funding for corrective action in the early 1990's. (Trial Transcript, Podany at 3413-21). In addition, in light of the prospective harm to humans that had become evident to the Corps by its own written admission in the 1988 Reconnaissance Report, clearly the Corps had some duty to prevent harm caused by a project which it controlled. Finally, Mr. Podany admitted that he did not author the report and this interpretation was his own.

after the Corps was aware of the extreme loss of wetlands, e.g. the Hsu and Gagliano[20] reports at a minimum, the Corps finally acknowledged in two internal documents the need for north shore protection; however, there was still no attempt to seek funding based on the recognition that the inhabitants of the area were at risk just as Dr. Gagliano foretold in the 1970s.

Furthermore, any argument that this degradation was being caused by "natural" subsidence is suspect. The dynamics causing the widening of the MRGO and the marsh erosion of the north shore were only minimally affected by natural subsidence. Furthermore the rate of subsidence was significantly greater at the MRGO than in other areas demonstrating further its harmful effects. Duncan FitzGerald testified that the rate of subsidence at the MRGO area is 17.6 millimeters per year, where the average subsidence in the area is 5 to 6 millimeters per year. Therefore, the subsidence rate of the MRGO is 3 to 5 times the rate of the surrounding regions in the New Orleans area. (Trial Transcript, FitzGerald, at 396).

The 1988 report concluded that the current bank erosion problem was to become a major maintenance issue requiring a six-times increase in the required average annual maintenance dredging by 2002. *Id.* at 54. Finding this hook, the NOD engineers recommended that the matter should be addressed as a supplement to the General Design Memorandum which would encompass further studies including a feasibility study and would not require local participation. (Trial Transcript, Podany, at 3370). However, upon submission to the LMVD, the LMVD maintained that the modeling used to create the economic justification under the GDM was incorrect, that the anticipated dredging would be half the cost of what the 1988 Reconnaissance Report stated, and as such, a GDM approach modification was not justified. Thus, even though

[20]See discussion, *infra*, at 51.

the shoaling rates were still anticipated to be 3 times the amount that they had been in the past, which was significant, the Corps took the position that under the benefit-cost ratio, it did not warrant a GDM modification approach. (Trial Transcript, Podany, at 3371).

While the Corps conducted studies acknowledging the erosion problem and the need for foreshore protection in 1984 and in 1988, until the cost of providing foreshore protection proved to be less expensive than the continued need for dredging to maintain the channel's navigability, the Corps did not actively pursue funding for this protection. It is apparent that the Corps refused to undertake any foreshore protection project unless it was conducted pursuant to WRDA requiring local participation even though there were other methods by which the Corps could have taken some action–that being seeking a supplement to the General Design Memorandum to directly and swiftly address the erosion issue. (Trial Transcript, Podany at 3424-3429).

Implicit in Mr. Podany's testimony is the sense that these decisions were all based on policy considerations. However, when the safety of an entire region is at stake, negligence cannot be masked by policy. Indeed, his testimony rings hollow considering the Corps had acknowledged that south shore foreshore protection was to be charged against the MRGO as early as 1967 and again recognized in 1968. DX-1483 (MRGO GDM No. 2, Gen. Supp. No. 4 ("Foreshore Protection" 29 April 1968, Appendix B, Inter-Agency Correspondence dated 24 April 67) EDP-023-0965 or at pdf version at 77 and EDP-023-0921-22 or at pdf version at 33-34 in ¶3. Clearly, from the first recognition of erosion, the Corps neglected the north shore of Reach 2. The Corps' sole focus vis foreshore protection became providing protection for the south shore which was accomplished at a deleteriously slow pace. The north shore erosion was

ignored because there was no levee to protect from the harm of the MRGO and because the sole focus of the Corps was to guarantee the navigability of the channel without regard to the safety of the inhabitants of the area or to the environment. The reality of this myopic and telescopic approach is demonstrated by the Corps' practice with respect to the reporting required by the Environmental Protection Act, which will be discussed, *infra*. Moreover, the argument by the Corps that any measure to be taken for foreshore protection would have required approval by Congress, seems inconsistent with the Corps' use of the Chief's "discretionary authority" to change dramatically the LPV from the Barrier Plan to the High Level Plan. Even with the knowledge that the erosion problem was potentially cataclysmic for the lives and property of those who lived in St. Bernard Parish, no move was made to use the Chief's discretionary power to supplement the GDM to provide foreshore protection. Furthermore, never did the Corps prioritize this need or apprise Congress directly of the possibility of disaster that the MRGO created. (Trial Transcript, Podany at 3403-04; Trial Transcript, Peter Luisa at 3615-17; 3624-26). Never was any direct funding approach taken even when the Corps knew it had triggered catastrophic erosion caused by the very channel it had created.

Apparently, in 1991, the State of Louisiana would not sign off on a Coastal Zone Management decision for marsh nourishment and restoration, because the plan did not address severe bank erosion failing a guideline. Instead, the state was insisting on stone dikes for protection. In its own discussion points as to why the banks should or should not be stabilized, the Corps listed as its second reason not to stabilize, "Corps (sic) long standing policy against

repairing bank erosion." [21] PX-2082 (Memo to Headquarters of the Army Corps of Engineers about the Coastal Zone Management Realm, May 30, 1991) at pdf 2, NOP 007-780. The Court finds Mr. Podany's self-serving explanation that this written statement did not mean what it says without weight. He was not involved in the writing or drafting of the memo and had not read it before testifying.

Also, in 1991, Congress approved the funding of construction of dike bank protection, "MR-GO North Bank Protection, Mile 50 to 54." This project provided protection from channel mile 51 to mile 54.1 and was completed in March of 1993. DX-1747 (Mississippi River-Gulf Outlet, Louisiana North Bank Foreshore Protection Evaluation Report, October 1996) at 11-12, pdf 24-25, NOP-002-1333-34 . This stretch is the land bridge of Lake Borgne and is the section of marsh which the Corps identified as being at risk since the 1988 Reconnaissance Report. See DX-1762 (Excerpt: page 1381 of DX 1747, Plate 3 taken from the 1996 Evaluation Report)(delineated as Existing Protection MI 54.1-51). The project was specifically authorized by Congress; ironically, it appears that when the Corps finally deemed something an emergency, Congress came through. (Trial Transcript, Podany, at 3377).

The protection construction was begun in 1992 and was completed in March of 1993. DX-1747 (Mississippi River-Gulf Outlet, Louisiana North Bank Foreshore Protection Evaluation Report, October 1996) at 32. Mr. Podany testified that by 1995, the Corps found that the actual

[21]For instance Col. Sands (his perspective being as that of the late 1970's) testified in response to a question of whether the widening of the MRGO beyond the scope of the design criteria was a concern for the Corps that "[t]he erosion of the north shore of the MRGO was certainly a concern from the standpoint of marsh loss, but it would not be a concern with regard to maintaining the navigation channel." (Trial Transcript, Sands, at 265). Likewise, Gregory Breerwood, who was Chief of Dredging from 1984 to 1986, testified that it was his belief that the widening of the MRGO was something within the authorization of the MRGO project. However, he did admit that if at any time that he or any of his co-workers suspected or determined that a project would have been detrimental to the public, that steps would have been taken either to "go to the proper authorities or to the proper offices to assure that that particular deficiency was dealt with and remedied." (Trial Transcript, Breerwood at 505, 510).

cost of maintaining the foreshore protection was considerably below the estimate used in the 1988 report. Thus, a re-analysis of the benefits and costs based on this new cost information was the genesis for an April 1996 Evaluation Report. *Id.*; (Trial Transcript, Podany at 3377-78).

Nonetheless, before that 1996 Evaluation Report was issued, another Reconnaissance Report was published in 1994, six years after the first Reconnaissance Report. In this report, the Corps was still operating under the mistaken assumption that the cost of the protection was greater than it proved to be. As such, rather than recommend the cost of protection be budgeted as a supplement to the GDM, the Corps took the position that the costs for these bank stabilization matters should be shared by the local population. Yet, the same drumbeat and warnings appear in this report. It reported that since 1968, bank erosion had resulted in the loss of approximately 4,200 acres of highly productive marsh adjacent to the MRGO channel. Again, its focus was in a cost-benefit analysis with respect to the need for dredging caused by shoaling. The only difference was that now the Corps recommended that the local cost sharing burden be 30 percent for the feasibility phase, 15 percent for the construction phase and 60 percent for the operation and maintenance phase. DX-1058 (Mississippi River-Gulf Outlet St. Bernard Parish, La. Bank Erosion Reconnaissance Report, January, 1994) at 2, pdf 3. No local sponsor was found. (Trial Transcript, Podany at 3373).

Returning to the 1996 Evaluation Report, significantly, an Evaluation Report, unlike a Reconnaissance Report, does not require local funding and was funded through the operation and maintenance budget. The Corps again in this report, acknowledged the harm that wave wash was causing to the unprotected banks:

> Severe bank erosion is occurring on the MR-GO navigation channel. Approximately 43 miles of the 66 mile long channel consists of a land cut through

> unstable marsh and shallow water areas. Since its completion in 1968, the top width of the channel has increased from 650 feet to an average of 1,500 feet, in 1987 [10 years before this study], principally due to erosion. The channel banks have eroded beyond the existing channel right-of-way in several locations. Much of the bank erosion is caused by wave-wash and drawdown from large displacement vessel traffic on the restrictive waterway. Passage of these vessels causes very large quantities of water to be displaced from the channel into the adjacent marsh, followed by rapid return flow into the channel. The tremendous forces exerted by these rapid and extreme water level fluctuations cause the relatively soft marsh adjacent to the channel (mostly on the north bank) to break up and be swept into the waterway. Since 1968, bank erosion has resulted in the loss of approximately 4,200 acres of highly productive marsh adjacent to the MR-GO channel. Continued erosion threatens to produce large breaches in the rapidly dwindling marsh buffer between the navigation channel and the open waters of Lake Borgne and Breton Sound. Once the buffering marshes are lost, dredging frequency and quantity in the vicinity of the breached bank will increase significantly. The navigation channel will be exposed to storms, currents and less attenuated tidal action from the north and northeast. Attendant sedimentation and shoaling problems are expected to occur.

DX -1747 (Mississippi River-Gulf Outlet, Louisiana North Bank Foreshore Protection Evaluation Report, October 1996) at NOP-002-1317-18.

The report supported the funding of a stretch of protection alongfive5 critical "reaches" or sections of the North Bank. Of these, only three were completed. [22] The Corps opined:

> The buffering marsh between the MR-GO and Lake Borgne is eroding at approximately 15 feet per year, and this reach of the MR-GO north bank is very close to being breached. However, only a 3.5 mile section of the MR-GO north bank includes erosion protection measures. Consequently, the vast majority of bank continues to erode rapidly. **At the current average rate of bank retreat, approximately 55 acres of intermediate/brackish marsh, adjacent to the north bank of the MR-GO are being converted to open water annually. MR-GO bank erosion, if left unchecked, will result in the loss of approximately 2,700 acres of coastal marsh between the years 2000 and 2050. . . .**
>
> As the marsh within the project area diminishes, significant losses to marsh dependent fish and wildlife species will also occur. Increases in water levels,

[22] Critical Reach 1, MI 56-56.1, Critical Reach 2, MI 44.5, and Critical Reach 3, MI 43-41 were completed prior to Hurricane Katrina. DX-1070, DX-1075, AND DX-1077; (Trial Transcript, Podany at 3383).

> resulting from the general rise in sea level and subsidence of the land will enlarge land/water interface and accelerate saltwater intrusion. The precise effects of vessel traffic on channel erosion were not considered in this study.

Id. at 26-27 or NOP-002-1348 (emphasis added). Thus, regardless of the fact that the Corps knew that the simple operation and use of the channel caused this kind of devastation because it had not armored these banks, nothing was done in a timely fashion.

Mr. Podany testified that not until as noted in the 1996 Evaluation Report "we were given guidance from Congress to look at available operation and maintenance funding and look at whether that could be used to do bank stabilization. (Trial Transcript, Podany at 3373). That "guidance" came from United State House of Representatives, Energy and Water Development Appropriations Bill, 1996, 104th Congress, 1st Session, in which Congress stated:

> The Committee is aware that the authorized 36-foot Mississippi River-Gulf Outlet channel is experiencing serious bank failures on its north bank due to land subsidence, which is significantly increasing dredging costs. The Committee is aware that the Corps of Engineers recently experienced dredging delays, which caused draft restriction, while attempting to resolve environmental issues in the process of obtaining Coastal Zone consistency to dredge the Mile 50-56 reach. To resolve this particular issue the only available solution was to construct a rock dike that provided bank stabilization before dredging could be accomplished. The Committee is of the opinion that to minimize future dredging costs and preserve wetlands, the north bank Mississippi River-Gulf Outlet should be stabilized with riprap or similar hardened protection, as necessary, using available operations and maintenance funds.

DX-1747 (Mississippi River-Gulf Outlet, Louisiana, North Bank Foreshore Protection, Evaluation Report, October 1996) at 3. So basically, once Congress was made aware of the problem by the Corps, Congress instructed the Corps to fix it. Again, the "crisis" was pitched in the context of the viability of the channel; there is no indication that the Corps had informed

them specifically of the findings of the Reconnaissance Report of 1984 and that safety's needs required action.

Thus, it is clear from the testimony and documentary evidence that the Corps knew at least from the early 1970's that the MRGO was endangering the Chalmette Unit Reach 2 Levee. It knew that a primary source of the devastating shoaling was as a result of the wave wash that occurred with each ship that navigated the channel. Even though it was determined unequivocally in 1968 that the funding for the South Bank would be under the MRGO rubric, until 1982 nothing was done and it was not completed until 1986. As to the north shore, the callous and/or myopic approach of the Corps to the obvious deleterious nature of the MRGO is beyond understanding.

b. Salinity Issues

Similarly, increased salt water intrusion and its effects on the environment was another product of the MRGO. In creating the channel a number of ridges which provided protection from saltwater intrusion through tidal shifts were cut. "Narrow, low elevation ridges are the natural levees of active or formerly active distributaries of the deltaic plain that locally separate these swamps and marshes from one another." JX-0195 (FitzGerald Expert Report) at 6-1. These ridges provided a natural barrier for salt water intrusion from the Gulf of Mexico; with their trans-sectioning, an adverse habitat change occurred. (Trial Transcript, FitzGerald, at 298.)

The largest ridge cut by the Corps was the La Loutre Ridge which is found in between Mile Marker 36 and 37. JX- 0195 (FitzGerald Expert Report) Figure 2.3 at 2-2. This ridge is south of Lake Borgne and runs in an east-west direction. It was approximately 10 feet in height

which allowed for the growth of substantial trees and vegetation and was between 200 to 300 feet in width (Trial Transcript , FitzGerald, at 301-302). With the cutting of this and other ridges (those which accompanied Bayou Bienvenue and Bayou Dupre) substantial damage had occurred by the late 1960s. (FitzGerald Report at 2-7).

In essence, marshes that contained larger and denser vegetation gave way to marshes with less dense vegetation which would result in reduced friction in the event of water surges. (Trial Transcript, FitzGerald, at 308-11). Dr. John W. Day also testified and demonstrated that in 1956 the marshes, be they fresh or non-fresh, were low salinity marshes. They had a variety of flora which were tall and dense and would have had a greater impact on surge than the uniformly low marshes of three to four feet as it exists in that area now. He also noted that the 1956 habitats of this area were virtually gone by 1976. According to the Corps' own observations, it recognized that coastal habitats can generally reduce surge by one foot for every 2.75 miles thereof. (Trial Transcript, Day at 685, 687-88); *see also* (Trial Transcript, Bea, at 1196-1197). In addition, the roots of the existing vegetation which created the glue for the marsh soils died and degenerated causing further soil loss. (Trial Transcript, FitzGerald, at 308-311).

In the Report of the Board of Engineers for Rivers and Harbors to the Chief of Engineers of the Department of the Army, dated 24 July 1963 with respect to the LPV ("Board of Engineers Report on the LPV"), it stated the following:

> 11. Improvements proposed.–The reporting officers find that the most suitable plan for **controlling salinity exchange and velocity of flow in the Inner Harbor Navigation Canal, caused by construction of the Gulf Outlet,** would be by construction of a lock at Seabrook, on the lake end of the canal**.** . . . The first cost of the lock and the annual cost of its maintenance and operation, shown

> in Table 1 hereto, would be Federal and are mitigating costs of the Gulf Outlet project.

DX-0610 (Chief's Report) at 9, at pdf 30 (emphasis added). Thus, while the Corps recognized a salinity problem, its focus had more to do with protecting Lake Pontchartrain than with its effects on the wetlands along Reach 2.

The Corps' knowledge of the salinity issue as well as a problem with high velocity currents caused by the MRGO is demonstrated in the 1962 Interim Report on the LPV:

> . . . Hurricane damages result from surges entering Lake Pontchartrain from Lake Borgne through natural tidal passes at Rigolets and Chef Menteur pass **and through improved channels of the Mississippi River-Gulf Outlet** and Inner Harbor Navigation Canal. The surges are intensified by local wind effects, and the combination of waves and surges causes overtopping of the protective works along the shores of the lake. . . . Another and related problem exists in the area. The Mississippi River-Gulf Outlet provides a deep, direct route for the inflow of saline currents from the Gulf of Mexico to the area along its channel and to Lake Pontchartrain, with resultant adverse effect of fishery resources in the area. **The Gulf Outlet Channel also will produce high velocity currents in the Inner Harbor Navigation Canal**, **creating a hazard to navigation and causing serious scour and damage, particularly in constricted areas at bridge crossings.** These adverse effects can be greatly alleviated by construction of a lock for navigation and salinity control at the lake end of the Inner Harbor Navigation Canal at Seabrook. This lock is properly chargeable as a feature of the Gulf Outlet project. A low level lock to the height of the existing protective works will serve the needs of the Gulf Outlet project. By increasing the grade of the rock dike and landward gate bay section and gates, this structure will also serve as an essential part of a hurricane barrier plan by preventing the entry of hurricane surges into Lake Pontchartrain through the Gulf Outlet. The incremental cost of raising the lock to serve the dual purpose of excluding hurricane surges is properly a charge to the hurricane plan.

JX-0278 (Interim Report, 21 November 1962) at i. (emphasis added). In the Board of Engineers for Rivers and Harbors Report on the LPV, the Corps noted that the IHNC was already experiencing notable current velocity increases caused by the MRGO. DX- 0610 (Report dated 24 July 1963) at 8, at pdf 29.

However, the Seabrook Lock was doomed. The Department of the Interior based on the Fish and Wildlife Service's advice maintained that the structure as designed was insufficient and that by these controls having a dual purpose, the Service questioned, "whether the cross sectional dimensions of the control structures will provide sufficient capacity to accommodate the necessary flows for salinity control, particularly if operation of Seabrook Lock for control of salinity is subordinate to navigation interests. Alteration of the salinity regiment in Lake Pontchartrain will result in serious fishery losses." DX-610 (Comments of the Department of the Interior letter dated December 11, 1963) at xvi. Indeed, the body of this letter makes clear that the salinities within the lake will effect the sport and commercial fisheries along the Gulf Coast. The Corps maintained and responded that it had done sufficient studies and that "this matter will be carefully considered and given further study in the detailed design stage of the project." DX-0610 (Letter to the Secretary of the Interior dated 8 January 1964) at xviii. In the Comments of the Bureau of the Budget, which are enlightening, Deputy Director Elmer B. Staats opined:

> Two comments regarding the proposed Seabrook Lock feature are necessary. The report of the Chief of Engineers states that the facility would serve a dual purpose–mitigating anticipated adverse effects of the Mississippi River-Gulf Outlet navigation project, now under construction, and serve as an element in the hurricane surge control project. The Department of the Interior, in its letter of comment, has questioned the adequacy of the Seabrook feature, as presently designed to function effectively as a mitigation device. The Bureau of the Budget supports the Interior request for such further studies, as may be needed, in developing design criteria for the dual purpose Seabrook facility to assure protection of fish and wildlife values in Lake Pontchartrain and in the marshes adjacent to the Gulf Outlet Canal.

DX-0610 (Comments of the Bureau of the Budget dated June 8, 1965) at ix-x. Nonetheless, rejecting the Corps' initial estimation that 93 percent of the Seabrook facility was for mitigation

and 7 percent was for hurricane protection and relying on "supplemental information" that the purposes are "equal" in nature, the Seabrook facility became a feature which had to be cost-shared with the local interests in a 50/50 split resulting in an additional cost to the local interests of $687,000.00 and which could not be budgeted for at the time. In the long run, this cost sharing approach doomed the Seabrook Lock as it was never built.

There were other measures, however, that could have been taken which were not: a water control structure at the Bayou La Loutre Ridge, Bayou Bienvenue and Bayou Dupre. Dr. Day maintained the marsh area inside the Central Wetland Unit would have been saved had this been done. In addition, foreshore protection would also have prevented the widening which contributed more salinity into the area. Wetlands could have been created by using the spoil from the channel and trees could have been planted. (Trial Transcript, Day, at 701-03; 710-711); *see also* PX 462 (Trial Transcript, Gagliano, at 92); (Trial Transcript, Kemp, at 1826:5-10).

In an "Environmental Baseline Study" prepared for the St. Bernard Parish Police Jury in October of 1972, Dr. Gagliano reported the marked increases in the salinity in the channel at Hopedale, Louisiana (south of Lake Borgne and north of Bayou La Loutre) and at a Paris Road Bridge (in Reach 1). *See* Graphic No. 4, PX 462 (Environmental Baseline Study) at 90-91, at pdf 102-103. These figures were generated using data from the Corps, and the report itself was given to them with no response. (Trial Transcript, Gagliano, at 59). By 1973, 47,000 acres of wetlands had been destroyed by the MRGO and an additional 73 square miles of wetlands were lost from 1973 to the time of Katrina. (Trial Transcript, Gagliano, at 63-64.) . The Corps was aware of feasible mitigation methods by the early 1970's, but took no action. (Trial Transcript, Gagliano at 72).

In the LMVD Comments to the Mississippi River-Gulf Outlet Bank Erosion Reconnaissance Report, it stated:

> 2. Page 30, Alternative Plans. The alternative to completely close the MRGO waterway should be evaluated and a discussion of the evaluation should be included in the report. The closure should be located in the vicinity of mile 23 [south of the Bayou La Loutre Ridge] and could be constructed of dredged material from the existing waterway. This alternative will control all future channel maintenance problems by controlling bank erosion, . . . preventing saltwater intrusion, and lessening the recreational losses**. In addition to solving the aforementioned problems, it will also reduce the possibility of catastrophic damage to urban areas by a hurricane surge coming up this waterway and also greatly reduce the need to operate (and could possibly eliminate) the control structures at Bayous Dupre and Bienvenue.** Furthermore, the salinity level in Lake Pontchartrain will be reduced, which , according to some parties, will be a great benefit. Plus, by making this closure the problems/concerns addressed by April Feasibility Study entitled, Mississippi and Louisiana Estuarine Areas, will be substantially reduced.[23]

PX-09 (1988 Reconnaissance Report) at pdf 10 (emphasis added). Trial Transcript, Kemp at 1764-66).

Nothing was ever done to combat the effects of salinity along the wetlands that bordered the MRGO. By 1996, in the aforementioned Evaluation Report, authored after Congress was made aware of the immensity of erosion that had occurred, the Corps wrote:

> Human activities accelerated land loss in the St. Bernard delta. The Mississippi River levees have cut off seasonal sediment-laden overflow that once nourished

[23]The purpose of that study was "to investigate the feasibility of introducing fresh water into the Lake Pontchartrain Basin and western Mississippi Sound in the interest of improving the habitat and fish and wildlife productivity." DX-1753,(Mississippi and Louisiana Estuarine Areas, Freshwater Diversion to Lake Pontchartrain Basin and Mississippi Sound, Feasibility Study and EIS, April 1984) at pdf 5. The study was conducted in response to a House of Representative resolution of 23 September 1976 requesting the Corps "to determine the advisability of modifying the recommendation contained in a previous report concerning the provision of freshwater in various lakes, including Lake Borgne, in the interest of improving the wildlife and fisheries of this area." *Id* at 2, pdf 12. "Average annual salinities have increased by about 0.4ppt in Pass Manchac, by 1.0-2.0ppt on the eastern end of Lake Pontchartrain, by about 2.0 ppt at Chef Menteur Pass near Lake Borgne, and about 4.0 ppt in Bayou La Loutre near Alluvial City." The report then noted that saline marshes have moved inland an average of 2.1 miles and brackish marshes 3.8 miles as a result of the increased salinity. *Id.* at 12-13, pdf 22-23.

> the areas near the river. The construction of the MR-GO, the GIWW and numerous other small channels converted large areas of land to open water and increased salinities in the area. **The Mississippi River-Gulf Outlet Navigation Channel has a more significant effect on salinities because it is a deep-draft channel cut through the Bayou La Loutre alluvial ridge to the Gulf of Mexico. Higher salinities cause swamps and marshes to convert to more saline vegetation types which are less robust and more susceptible to erosion.**

DX-1747 (1996 Evaluation Study) at 18, pdf 31, (NOP 002-1340)(emphasis added). At page 30 of the same study, the Corps admitted that "[s]altwater intrusion also contributes significantly to marsh loss in the study area." *Id.* at 30. Had only this realization been publically recognized earlier and been acted upon.

4. State of the Wetlands and MRGO at the Time of Katrina

The actual habitat removed by the 1958-1965 land-cut channel excavation was 2,674 acres of marshland. The Corps disposed of this material by covering habitat with the dredge spoil. That action destroyed another 12,084 acres of marshland for a total of 14,759 acres of marsh effected. JX-0195 (Expert Report of Duncan FitzGerald) at 6-1 ("FitzGerald Report"). The ensuing erosion caused by these land cuts and the subsequent maintenance and operation of the channel was 4,800 acres from 1965 through 2001. Thus, the total loss of land habitat due to the MRGO channel since its creation to 2005 was 19,559 acres or about 14, 791.5 football fields. These figures do not include estuarine habitats effected by water-cuts and the resulting spoil disposal. FitzGerald Report at 2-3.

As a result of the constant erosion of those banks, the Corps had to undertake a continuous dredging program in order to maintain the channel for its navigational purpose.

Indeed, in a stunning report penned by Sherwood M. Gagliano on the Occasion of the Rivergate Public Meeting held by the U.S. Army Corps of Engineers on August 30, 1973, it was reported that as a result of **maintenance dredging,** 196 million cubic yards of material had already been removed from the channel. (Trial Transcript, Gagliano, at 66); PX 1633 (Statement for Rivergate Public Meeting 30 August 1973) at 12[24]. This statement was based on the Corps' own reports and records. Clearly, the sloughing problem was more than evident; moreover, the growth of the channel was exponential. By July of 2004, it is estimated that 30,285,356 cubic yards of material had been dredged pursuant to various maintenance contracts between Mile Marker 66 and 47 (Reach 1 to Reach 2 to the end of the Chalmette Levee System). PX-206 (Notice of Intent to Introduce Summary Evidence) Exh. "E."

As previously noted, *supra* at 29-30 , in October, 1996, the Corps outlined in great detail in the syllabus of the "Mississippi River-Gulf Outlet, Louisiana North Bank Foreshore Protection Evaluation Report," October 1996, the severe nature of bank erosion, the exponential rate of loss of marshland, and that continued erosion threatened to produce large breaches, with the navigation channel being exposed to storms, currents and some tidal action making sedimentation and shoaling increase. DX -1747, ("Mississippi River-Gulf Outlet, Louisiana North Bank Foreshore Protection Evaluation Report,") October 1996" at NOP-002-1317. Thus, between 1965 and 2001, the land cut-more than doubled in size from its original footprint of 3,368 acres to 8,995 acres of open water. (FitzGerald at 1-1, ¶ 5).

[24]At trial, Mr. Gagliano testified and the documents support the fact that at this time (1973) he warned the Corps that without taking proper action, the likelihood of catastrophic flooding was present. (Trial Transcript, Gagliano, at 61-62, 70).

The most effective method to truly understand the overwhelming changes in the channel and to understand the encroachment that was allowed on both sides of the MRGO along Reach 2 is pictorial in nature. Graphic No. 5 which are photographs taken from Dr. FitzGerald's Report depicts the beginning of Reach 2–Station 376 which correlates roughly to Mile Marker 59–that is at the northern most point of Reach 2. Graphic No. 5, JX-195 FitzGerald Report at 2-7, at pdf 17. The land loss from 1959 to the late 1960s is striking in its breadth. The picture taken in 2008, post-Katrina closely resembles a large pond, not a shipping channel.

Graphic 6 is comprised of two pictures with corresponding graphs of the northern section of Reach 2 bordering the northern part of Lake Borgne. Graphic No. 6, JX-195 FitzGerald Report at 2-11, at pdf 21. These graphs demonstrate the bank loss from the original design width to the actual width in 2005. The Breach Zone is approximately from Mile Marker 59 to Mile Marker 52 which correlates roughly with Survey Stations 350 to 750. The bank lost on the East Bank is between a low point of 100 feet to the highest point being 600 feet at Survey Station 590. The West Bank lost as little as 100 feet in one place to as much as 2000 feet at Survey Stations 430 and 450.

Other telling photographs of this same area are contained in the FitzGerald Report in Appendix D, Historical MR-GO Aerial Photography excerpts. In a series of photographs admitted at trial and about which FitzGerald testified, the metamorphosis of Breach Zone is most clearly delineated. In a series of aerial photographs upon which the 2005 shoreline is superimposed, this area is depicted as pre-MRGO (1958) (PX- 96.28.1); immediately after the completion of the MRGO (1965) (PX96.28.5); once the MRGO protection levee was constructed (1976) (PX96.28.9); after more erosion occurred (1985) (PX 96.28.11); once armoring of the

area had occurred along the western shore of the MRGO (1998) (PX 96.28.13); and the actual dimension as of 2005 (PX 96.28.15). Trial Transcript, FitzGerald at 319 -322. See Graphic No. 7 a-f, Dr. FitzGerald testified that the average East Bank erosion was 877 feet and the average West Bank erosion was 433 feet from the time the channel was excavated to 2005. (Trial Transcript, FitzGerald at 323). With an authorized width of 650 feet and the total average channel width being 1970 feet, the MRGO is on the average 3 times its design width. In addition, the average East Bank Erosion was 22 feet per year, the average West Bank Erosion was 11 feet per year for an average of 33 feet per year–meaning that a football field was lost every ten years. (Trial Transcript, FitzGerald at 323).

Thus as overwhelmingly demonstrated at trial, this subsequent erosion resulting in the width of the channel increasing by more than 3 times its authorized width was caused by the Corps' failure to armor the banks of the MRGO to prevent (1) boat wakes causing erosion of the banks; 2) excavation and maintenance dredging causing bank slumping; and 3) saltwater intrusion killing vegetation and promoting organic decay).[25]

5. Effect of Environment on the MRGO Levee and Berm

As noted, the Corps was aware of the malleable and shifting nature of the interdistributary soils through which the MRGO channel was dug and upon which the Reach 2

[25]Local generated winds also contributed to the destruction, along with the primary causes of salt water intrusion and wave wake. As the width of the channel widened, the stronger the effect of the winds became as well.

levee was constructed.[26] Because the Corps failed to armor the banks of the MRGO when it saw the environmental effects that the channel caused, three processes came into play which effected the MRGO levee. Lateral displacement caused a substantial reduction in the height elevation of the levee. The berm which helps protect the levee (both stability and wave berm) was reduced to dangerous levels. Finally, the fetch or the open water length over which wind can blow and create greater wave action increased. As the width or fetch of the MRGO grew substantially more forceful frontside wave attack on the Reach 2 levee during Katrina was created.

Height Reduction

GDM No. 3 provided for the design of the levee along Reach 2 of the MRGO and was in accordance with available Corps guidelines and acceptable engineering practices regarding geotechnical considerations. JX-0210 (Expert Report of Dr. Thomas Wolff) at 13. For the levee along Reach 2, it was anticipated that the foundation settlement would require construction in one to six lifts, with an approximate period of two years between lifts to allow for settlement and consolidation of materials. JX-210 (Expert Report of Dr. Thomas Wolff) at 13. Dredged material from the MRGO would be used to construct the lifts. Thus, the hydraulic fill method was employed to build the levee along Reach 2.

To accomplish this, the Corps would hydraulically dredge out soil from the MRGO and place it in a containment area where the levee was to be. A dike outside of the containment area

[26]Cecil Soileau testified that the Corps did not consider subsidence or the possible degradation of the wetlands in the designing of the Chalmette Unit levees. (Trial Transcript, Soileau, at 224-225). In light of all of the other testimony adduced, the Court found this testimony unconvincing and disingenuous, particularly in light of the Kolb and Lopik study as discussed by Duncan FitzGerald (Trial Transcript at 350) and the provisions in the GDM No. 3 discussed in the Wolff Expert Report (JX-210 at 12-18).

would be built, a pipe would then be placed on top of the dike, and then with a hydraulic dredge, material would be pumped in to fill the area. After the water drained out of the soil, then earth-moving equipment was used to move it. (Trial Transcript, Mosher at 2970-2971). This process adds to the problems encountered with lateral displacement because dredging of materials out of the MRGO and placing them adjacent to the channel created added weight which caused further displacement and sinkage of the material placed thereon.

While this technique was acceptable at the time of the building of this levee, the Corps ended the practice in 2001 recognizing that the method was less reliable than using compacted fill. (Trial Transcript, Mosher at 2976). Indeed, the levee was designed according to the best practices at the time, and the breaches did not result from instability attributable to a negligent design. JX-210 (Wolff Report) at 19.[27] The levee height for the Chalmette Unit was authorized to be 16.0 ft east of Paris Road; however, that height was later increased (as previously noted) to 17.5 feet.

The following graph provides a synopsis of the various lifts and enlargements undertaken by the Corps:

LIFTS	DATE	STATIONS	HEIGHT	SOURCE
First Lift	March 1967	594+00 to 770+00	+13 to +16.5 ft.	JX-201 at 21
First Lift	Jan. 1968	387+40 to 523+00	+ 12 ft.	JX-201 at 21
First Lift	April 1970	770+00 to 995+00	+13 to +17	JX-201 at 21
Second Lift	April 1972	370+00 to 682+00	+10 to +17 ft.	JX-201 at 22
First Enlargement	April 1978	708+95 to 945+85	reshaping/settled 3 ft.	JX-201 at 25

[27] See Doc. 19139, United States Findings of Fact at 85, ¶ 461 and Plaintiffs' Response, Doc. 19203 at 157 by which both the United States and plaintiffs agree to this statement of fact. Indeed, prior to trial the United States represented to the Court that on no account would they argue that the levees did not perform to the design specifications.

First Enlargement	July 1980	360+70 to 699+00	reshaping/settled 4 ft	JX-201 at 25
Second Enlargement	March 1983	706+68 to 945+87	reshaping/settled 1 ft; raising 20 ft height	JX-201 at 26
Second Enlargement	May 1985	308+50 to 692+50	reshaping/settled 4 ft; raising 20.5 height	JX-201 at 27

For reference, recall that Station 365+00 is the approximate location of Bayou Bienvenue and 705+00 is the approximate location of Bayou Dupre; between those two benchmarks, the vase majority of breaching occurred. The lifts which occurred in that area are highlighted on the chart. Notable, is that with respect to April 1972, Second Lift, Sta. 370 to Sta. 682, the MRGO was dredged from Bayou Bienvenu to Bayou Dupre for purposes of obtaining borrow material–that is the lift material itself "as deep as a depth of 70 feet." JX-210 (Expert Report of Wolff) at 22, line 9. With the interdistributary soil being to a depth of 60 feet, is clear that the dredging was another factor in the sinking of these levees. (Trial Transcript, Wolff at 4067-68). This fact is underscored by the subsequent lifts in April of 1978, July of 1980 and May of 1985. It is also curious to note that the MRGO design depth approved by Congress was to 36 feet, not 70 feet.

Regardless of all of these lifts, most of the levee along the MRGO was below the 17.5 design height at the time of Hurricane Katrina. Dr. FitzGerald credibly testified that in reconciling levee heights to interdistributary bay deposits, it is clear that where the interdistributary bay deposits are the thickest, the levee heights are the lowest; conversely, where the levee heights are the highest, the interdistributary bay deposits are the thinnest. (Trial Transcript, FitzGerald, at 368) This data was generated using the Corps' own geographical report done by Kolb and Van Lopik in 1958, prior to the construction of the levee. The heights of the levee were taken from Chad Morris's data. (Trial Transcript, FitzGerald at 369).

Dr. Bea provided an explanation for this phenomenon using one point along the Breach Zone. He presented an historic time line of the levee crest elevation at Station 497+00 (approximately between Mile Marker 56-57) from 1966 to 2007. PX0072 (Bea Declaration No. 1 July 11, 2008) at 35, Figure 26. "At the time Hurricane Katrina hit the MR-GO area, the levee crest elevation had settled approximately 1.5 feet below the target crest elevation of +17.5 feet (NGVD). Also included on this plot are approximations of storm surge elevations (high water marks near Station 497+00 from observations following Hurricanes Betsy (USACE, 1965) and Camille (USACE, 1970)." (Trial Transcript, Bea at 1114-1115). This graph is reprinted herein as Graphic 8, PX-72 Bea's Engineering Forensic Studies, July 11, 2008 at 35, at pdf36 . Using the Lidar images produced by Chad Morris, a professional land surveyor called by plaintiff whom the Court found highly credible, an image of the surface was provided as PX-18112.1 which was introduced as Slide 11 in Dr. Bea's testimony. (Trial Transcript, Bea at 1116). Dr. Bea opined, and the Court accepts as fact, that over the course of time from 1966 to 2005, there was a total settlement of 15.5 feet of this particular area taking into account the incremental amount of settlement that took place with lifts and rises over a period of time. (Trial Transcript, Bea at 1117).

Lateral displacement along the MRGO is not unlike the myth of Sisyphus and his rock. Here, the channel was dug through soil that has a known propensity to laterally displace as explained, *supra*, at 11. The soil removed from the channel was placed on the west bank of the MRGO placing weight or "loading" the marsh. In turn, that action would cause interdistributary soil to slough back into the channel which would then require it to be dredged again, creating a never ending cycle which significantly contributed to the sinking of the MRGO Levee. (Trial

Transcript, Bea, at 1119-1120). See Graphic No. 9, PX-82 (Declaration of Robert Bea) at 69, pdf 69.

Taking into consideration the other forces at play, that is the natural regional subsidence, the consolidation settlement of the levee itself and local lateral squeezing, Dr. Bea testified, and the Court finds credible, that 25% of the shrinkage of the levee crest or height or "protective elevation" was caused by lateral displacement that could have been prevented with foreshore protection, among other things. (Trial Transcript, Bea at 1129). Indeed, the Corps recognized the possible effect of such lateral displacement as being 25% of the cause of settlement in a report penned in 2001. (Trial Transcript, Bea, at 1130 discussing PX-1114 (Geotechnical Investigation Chalmette Area Plan Bayou Bienvenue to Bayou Dupre, June 2001) at 5).

Berm Reduction and Correlation to Breaching

In addition, the widening of the channel through bank erosion caused by wave wash and salinity exacerbated the displacement cycle since the travel path for the lateral squeezing was shortened by virtue of the eroding berm that extends from the toe of the levee. (Trial Transcript, Bea, at 1120). Thus, for example, in an area where the berm was only 150 feet from the toe of the levee, the 17.5 foot design height was reduced to 12.5 feet. (Trial Transcript, Bea at 11135-36); *see* Demonstrative Slide No. 17, Bea Testimony, PX1812.2 (GIS). This particular area is in the Breach Zone, about 7000 feet from the cut in the land bridge of Lake Borgne . (Trial Transcript, Bea, at 1134-35). This lowering in height made breaching more probable. In general, the critical distance between the toe of the levee (that is where the substantial slope of the levee begins) and the bank of the MRGO is 500 feet; less than that expanse makes the levee

lower and more vulnerable. Thus, where the berm is reduced to 200 to 300 feet, the more extreme the problems become. (Trial Transcript, Bea, at 1159-60.) The reason for this relationship is threefold: (1) loss in protective elevation; (2) more water area for wave regeneration which will be discussed more fully, *infra*; and (3) the removal of vegetation on the foreshore that would reduce the effect of incoming waves. (Trial Transcript, Bea, at 1157).

This correlation is demonstrated in certain graphics introduced at trial and published here as Graphics No. 10A-D (PX-1810.13, pdf 1-4). Slides A and B demonstrate visually the relationship between a reduced berm and breaching in the Breach Zone–that is from Mile Marker 59 Mile to Marker 53 or the area between Bayou Bienvenue and Bayou Dupre. It is along this stretch of Reach 2 of the MRGO that the Chalmette Unit Levees failed most catastrophically and where the berms are generally their smallest.

Thus the Court is persuaded that a substantial cause for this phenomenon of MRGO Levee being below design grade was lateral displacement brought about by the negligent operation of the MRGO. The failure to armor these banks in a timely manner compounded by the salt water intrusion that destroyed these wetlands caused the width of the berm of this levee to shrink which helped to exacerbate this Sisyphus-like dilemma. Proper armoring of the banks before 1975 would have been an effective method to stop the lowering of the protective elevation. (Trial Transcript, Bea at 1152-53). A review of the Breach Zone heights at the time of Katrina provides convincing proof to this Court that a correlation exists between the length of the berm and the height of the levee.

Increased Fetch and Lack of Vegetation

As noted, the word "fetch" means the width of the open water that the wind blows over to affect the motion of the water. (Trial Transcript, Bea, at 1162). The wave height, such as that generated by the storm surge created by Hurricane Katrina, is a function of the depth of the water as well as the width of the expense over which the wind impacted the water. (Trial Transcript, Morris, at 175). Because of the increase in the width of the MRGO, the "fetch" grew which resulted in an increase in the intensity of the wave strength that attacked the MRGO Levee. This conclusion was further supported by the testimony of Professor Johannes Vrijling. He stated:

> If the MRGO grows from 0 to 3,000 [feet], what do the wave do? . . .[T]he wave grows because there is a longer fetch to regenerate the wave, the wider the MRGO becomes the more danger it becomes. So it was originally maybe not so dangerous or no MRGO completely than MRGO as authorized it was a little bit, but then it's growing in danger if you let it widen and widen.

(Trial Transcript , Vrijling at 1069-69); PX 2150 (Hand drawn graph). Thus, the intensity and velocity of frontside wave attack is greater with the increased fetch.

A related side-effect of the reduction of the berm and increase in the fetch was the reduction of vegetation which has a demonstrative effect with respect to a reduction of the force of waves breaking against a levee. A 200-foot-wide buffering light vegetation batture reduce wave height 20 to 30 percent of incoming wave height. Dense vegetation is even more effective at destroying incoming wave heights; wave heights with a 200-foot batture with dense vegetation are reduced to less than 10 to 15 percent of the wave heights entering the batture. (Trial Transcript, Bea at 1195-96). Graphic No. 10.5, PX-74 (Declaration No. III Engineering Forensic Studies, Bea, July 11, 2008) at 79-80, at pdf 80-81.

A direct correlation between a vegetated berm and no berm is demonstrated in Figure 45 and 46 contained Dr. Bea's Declaration No. III Engineering Forensic Studies, July 11, 2008 and discussed in ¶ 78 as follows:

> 78. In many cases, there were good correlations between the presence of this defensive line of vegetation and the lack of any significant erosion or breach of the [Reach 2 Levee] during Hurricane Katrina. The process post-Hurricane Katrina LIDAR information summarized in Figure 45 is an example of one such case along the MR-GO Reach 2 [levee] alignment mid-way between Bayou Bievenue and Bayou Dupre (Morris 2008). This section of the [levee] was heavily overtopped during Hurricane Katrina. As shown by the post Hurricane Katrina cross section of the [levee] and the defensive line of vegetation (Figure 45 inset cross section of [levee], there was no significant damage to the elevation or slopes of the [levee]. Figure 46 shows the comparable reverse correlation data (Morris 2008). In this case there was no protective vegetation, and the [levee] was virtually destroyed (Figure 46 inset cross section of [levee]). These two sections of the [levee] were adjacent to each other and had comparable profiles and crown elevations. It is reasonable to expect that the Hurricane Katrina surge, wave and current characteristics were very comparable and that the soils comprising the two sections of the [levee] were comparable (dredged spoil), and that the protective surface vegetation (grass, turf) was comparable. However, the performance of these two sections of the [levee] was dramatically different–the critical variable being the presence or absence of protective vegetation between the channel banks and the toes of the [levee] berms.

PX-74 (Declaration No. III Engineering Forensic Studies, Bea, July 11, 2008), ¶ 79 at 77-78.

Dr. Day added to these findings. He stated:

> Just if you would assume that we had 10 kilometers of wetlands between the Central Wetland Unit and Lake Borgne, based on that relationship with Katrina, the surge alone would have been reduced by 4.5 feet. . . .
>
> Yeah, when we talk about surge reduction, remember that it's the friction that the trees offer, that the surge–separate from the wind, just the surge moving into a swamp, the three dimensional structure of the swamp, the friction is a very important thing. The trees block wind penetration into the canopy such that, effectively, the wind is near zero near the floor of the swamp, and that reduces the energy imparted to the surge. It basically eliminates waves very quickly, and the reduction of the wind pushing the surge reduces the energy on that surge moving through the swamps so that it would slow down considerably.

(Trial Transcript, Day at 708).

Dr. Day further testified that the decimation of the Central Wetlands Unit could have been prevented with the use of structures at Bayou Dupre and Bayou Bienvenue. *Id.* at 711. In addition, a structure at Bayou La Loutre would have prevented saltwater intrusion. In addition, if the Corps had kept the channel to its design width, less salt and its effects would have impacted the area. *See also,* PX-74 (Declaration No. III Engineering Forensic Studies, Bea, July 11, 2008), ¶ 80-82 at 79-85. The Court is persuaded by this testimony and concurs in its conclusions.

6. The Funnel Effect

As Dr. FitzGerald testified, the "funnel effect" is a condition that exists because of land masses that have a funnel shaped morphology. When storm surge is pushed into an increasingly narrow constriction, compounded by the existence of levees or embankments which further constrict the water's flow, water moves upward–that is storm surge increases in height. (Trial Transcript, FitzGerald at 380). Dr. Paul Kemp opined that the MRGO navigation project created a funnel, with the convergence of channels (Reach 1/GIWW and Reach 2) and spoil disposal areas, later augmented by the addition of the LPV berms east of New Orleans, and by the degradation of buffering wetlands to the east of the waterways in the Golden Triangle marsh separating Lake Borgne from the throat of the funnel that "foreseeably amplified the threat posed by hurricane surge to the greater New Orleans area." (Trial Transcript, Kemp at 1742) . Thus, plaintiffs contend that because of the funnel and its dynamic, the storm surge along the Citrus Back Levee along the north shore of Reach 1 was catastrophically higher. This funnel effect was

one about which the Corps was aware, albeit in the context of other geographic locations since 1961. (Trial Transcript, FitzGerald at 381-82).

As a result of the *Graci* litigation after Hurricane Betsy, a study was commissioned in 1966, that being Bretschneider and Collins, *Storm Surge Effects of the Mississippi River Gulf Outlet* (1966) (Bretschneider and Collins Report"). This report concerned whether there was indeed a funnel effect created by the convergence of the Reach 2 into the GIWW/Reach 1. The study concluded that the effect of the MRGO was negligible for all large hurricanes accompanied by slow rising storm surges. PX-0068 (Bretschneider and Collins Report) at 4. This conclusion was based on the peak surge predictions that the relatively rudimentary modeling available at the time provided which demonstrated that the amount of surge was not effected.

However, Dr. Kemp opined that these "conclusions" failed to make clear that there were the actual differences in the time of surge onset and the resulting increase in duration that should have been considered. The graph contained in the Bretschneider and Collins Report at page 48 demonstrates that enlarging Reach 1 to include MRGO hastened the surge onset. It also showed that creating the Reach 2 funnel with the LPV, also hastened surge onset. Finally, this graph makes clear that both actions–widening of the GIWW to include Reach 1 and the creation of the funnel with levees, lead to the earliest onset of surge. (Trial Transcript, Kemp, at 1750); *see* Kemp Demonstrative Slide No. 5; *see also* PX-68 (Bretschneider and Collins Report) at 48. Also, he opined that the greatest cause of the added number of hours of surge was the widening of the channel itself. (Trial Transcript, Kemp at. 1751).

In 1967, the Crosby Plan, which provided for a barrier structure across the throat of the funnel and a floating gate across the MRGO channel, was actually considered by the Corps. It appeared in the 1967 Citrus Back Levee General Design Memorandum as an alternative. (Trial Transcript, Kemp at 1754). As explained in a later penned missive, the plan was eventually rejected as not economically justified, detrimental to the economic interests of the local participants, and was so broad that it would require Congressional review. PX-141 (Letter to G.J. Lannes, Jr., Regional Planning Commission from Colonel Heiberg dated 4/21/1975).

By 1973, Dr. Gagliano and apparently at least one other expert, an oceanographic meteorologist, S.A. Hsu, had raised substantial questions concerning the conclusions of the Bretschneider and Collins report that no additional surge was created by the funnel, and they raised the issue for the need for some type of surge barrier. (Trial Transcript, Gagliano at 52-53; Kemp at 1754-55). In response, Mr. Cecil Soileau prepared for P.A. Becnel, Jr., Chief, Hydraulics and Hydrologic Branch of NOD a "unitive response" that was the drumbeat of the Corps with respect to this issue until 1999 when it undertook another study. In essence, the Corps took the position that the 1966 study was definitive as it had considered these issues prior to the construction of the new levees as demonstrated by the Bretschneider and Collin Report. Furthermore, the flooding during Hurricane Camille mirrored what the report predicted proving that the study was correct. JX-0325 (Apparent Funneling Effects at Paris Road from Convergence of Citrus and Chalmette Hurricane Protection Levees, 6 Feb. 73). The statement concluded:

> Based upon the foregoing, the New Orleans District Corps of Engineers has determined that water levels in the vicinity of Paris Road and Michoud will not be higher than at adjacent locations eastward along the Gulf Intracoastal Waterway or southeastward along the Gulf Outlet Channel; that levee grades have

> been designed adequately to contain the hurricane surge, and that the design hurricane could not flood St. Bernard Parish as a result of this project feature.

Id. at 3, pdf 3; Trial Transcript, Soileau at 213. As noted, a second report concerning potential impacts of the MRGO project was finally commenced in the beginning of 1999, but it was not completed until September of 2005. PX-91 (Expert Report of Paul Kemp, July 11, 2008) at 22. Considering the degradation of the wetlands in the Golden Triangle and the improved modeling techniques for storm surge which had appeared since 1967, it is curious that the Corps did not undertake any kind of review until 1999.

7. Hurricane Katrina

Brian Jarvinen, an expert in hurricane storm surge and previous head of the Storm Surge Unit at the National Hurricane Center, testified concerning the parameters of Hurricane Katrina. Clearly, Hurricane Katrina was one of the most devastating hurricanes that has ever hit the United States, generating the largest storm surge elevations in the history of the United States. (Trial Transcript, Jarvinen at 3632).[28] This surge was due to its intensity, its size, its angle of approach to the coast, its speed, and the bathymetry and coastal shape of southeastern Louisiana. *Id.*

Having hit Miami, Florida as a Category 1 on the Saffir Simpson Hurricane scale, and tacking westward over the southern tip of Florida, it entered the Gulf of Mexico on August 26, 2005, under favorable conditions and exploded into a Category 5 Hurricane. It peaked in intensity in the afternoon of August 28, 2005, with maximum sustained surface wind speed of

[28]These findings were submitted by the United States and agreed to by plaintiffs. (Doc. 19203 in the record of this matter).

175 miles per hour, hurricane force winds extending 100 miles from its center and tropical force winds extending 225 miles from its center. (Trial Transcript, Jarvinen at 3636-37); *see* JX-188, Expert Report of Jarvinen at 5). It weakened as it approached the coast of Louisiana.

Immediately before it made landfall on August 29, 2005, the storm began a weakening process. Hurricane Katrina made landfall at Buras, Louisiana to the east of New Orleans at 6:10 a.m. It was a massive Category 3 Hurricane with winds about 125 miles per hour. (Trial Transcript, Jarvinen at 3637-38). It continued in a straight northern track into the Mississippi Coast with winds of 120 miles an hour. *See* Knabb, Rhome and Brown, *Tropical Cyclone Report, Hurricane Katrina, 23-3- August 2005,* Table 1. Best track for Hurricane Katrina at 17 (National Hurricane Center, 20 December 2005). The storm then began to turn towards the northeast, weakening. (Trial Transcript, Jarvinen at 3638).

Obviously, a storm of such intensity creates an immense storm surge that is a wind generated process. Wind puts energy into the sea surface through the waves and then through currents. The greater the wind, the greater the storm surge will be. *Id*. at 3639. The radius of maximum winds for Katrina were on the average about 37 nautical miles from the center, meaning that it was 9 to 14 miles larger in size than a normal hurricane. *Id.* at 3640. At the heart of this case is the question of the intensity and direction of storm surge that this storm generated, which the Court will now examine in the context of causation.

B. CAUSATION

Plaintiffs' overarching theory of their case is that the operation and maintenance of the MRGO caused the levee along Reach II to be breached catastrophically resulting in Chalmette

and the Lower Ninth Ward flooding. In addition, they maintain that the Corps' failure to place a surge protection barrier at the IHNC caused New Orleans East to flood. In order to unravel the issue of causation, that is whether the MRGO was a substantial cause of the flooding of the individuals that have brought this suit, one must begin by defining the geographic areas where the plaintiffs reside and were damaged as a result of the United States' alleged negligence.

1. Two Polders

The term "polder" means a track of low land reclaimed from a body of water.[29] At issue here are two polders which were described by Dr. Paul G. Kemp who has a Ph.D. in Coastal Studies/ Marine Science and is an Adjunct Associate Professor at the LSU Hurricane Center. He described the St. Bernard Polder in his July 2008 report as follows:

> St. Bernard Polder. "The Parish" extends east from the IHNC along the higher land of the Mississippi River natural levee, and then farther east along the old Bayou LaLoutre (sic) ridge [ ]. The St. Bernard polder includes the Lower 9th Ward even though that neighborhood is a political subdivision of Orleans Parish. It also contains a large swatch of tidal marsh, nearly 32, 000 acres, called the Central Wetlands, located between the main federal LPV berm along the south bank of the MRGO and a lower state-built levee known as the 40 Arpent. . . Two gated structures were constructed as part of the LPV project through the federal [levee] alignment where Bayou Bienvenue crosses on the west end, and at Bayou Dupre farther to the east, to allow water exchange with the MRGO, and for small vessels to pass between the wetlands and the ship channel during normal tides.
>
> The developed and drained portion of the St. Bernard polder lies south of the 40 Arpent Levee, sheltered behind 2.4 to 3.0 miles [Central Wetlands Unit] of former fresh water cypress-tupelo swamp that have become intermediate to salt marshes since the construction of the MRGO. . . .
>
> St. Bernard has some of the highest land on the East Bank of New Orleans, following as it does the natural levee of the Mississippi River and some of its abandoned distributaries. Despite being relatively high by local standards, the St. Bernard polder experienced the most violent, spatially expansive and

[29]Webster's Ninth New Collegiate Dictionary (1985)

> deepest flooding in the entire metro area during the Katrina event. Except for a limited contribution from rainfall, all flooding of the St. Bernard polder was caused by water that passed through or across one or more reaches of the MRGO. This water entered the developed area as a result of catastrophic floodwall failures along the IHNC on the western margin, by overtopping of berms on the MRGO Reach 1 and by flow though breaches in the federally built [levees] along the MRGO. The interior 40 Arpent Levee was protected by over two miles of Central Wetlands and was relatively undamaged, but it averages (six) feet high and was completely overtopped when floodwaters for the MRGO filled the Central Wetlands beyond this level.

JX-91 (Kemp's Expert Report, July 11, 2008) at 15-16. Plaintiffs Kent Lattimore, Lattimore & Associates, Tanya Smith, Anthony Franz, Jr. and Lucille Franz are located in this polder. *See* Graphic No. 11, PX-1771 (Visual representation of the five locations 27 January 2009) at 1. The elevation of each of the locations is as follows:

Plaintiff	Location	Elevation in ft above sea level
Kent Lattimore	2100 Marcelle Drive	5.02
Lattimore & Associates	9117 W. Saint Bernard Hwy.	4.32
Tanya Smith	3920 Despaux Dr.	.22
Lucille and Anthony Franz	3926 St. Claude Ave.	.47

Id. Remarkable is the fact that a higher area like St. Bernard were inundated to a greater depth. *Id.*

The other relevant polder for this lawsuit is known as New Orleans East. Dr. Kemp described it as follows:

> New Orleans East. This compartment includes the easternmost suburbs of Orleans Parish. It is located between the IHNC on the west and Lake Pontchartrain to the north. MRGO Reach 1 and the GIWW form the southern boundary [ ]. Orleans East (sic) consists almost entirely of drained wetlands and is the "deepest of the drained marsh polders, having subsided to 5.8 ft below sea level on average in the area flooded during Katrina [ ]. The federal LPV levees that surround Orleans

> East (sic) have impounded a formerly tidal marsh that covers nearly 22, 00 acres now at or below sea level. . . . MRGO water first entered New Orleans East from MRGO Reach 1 over the Citrus Levee, and to a lesser degree from overtopping of floodwalls on the east side of the IHNC. Floodwaters also entered this compartment later when the federal New Orleans East Back Levee was breached from the GIWW. . . .

PX-91 (Kemp's Expert Report, July 2008) at 15. Plaintiff Norman Robinson resided at 6965 Mayo Boulevard and his house was 7.06 below sea level. The Court will first examine the St. Bernard Polder and the issue of whether the MRGO acted on the Reach 2 Levee so as to cause them to fail like the Navy vessel hitting the levee.

2. St. Bernard Polder

A. Theories of Causation

Plaintiffs contend that the Corps' failure to take timely, appropriate preventative measures (that being primarily foreshore protection) to prevent the exponential growth of the channel from its design width to as much as three times that size, as well as the Corps' failure to address the degradation of the wetlands that was caused by the salinity introduced into the region by the MRGO, put into play certain factors that, when the channel was confronted with Hurricane Katrina's storm surge, created forces which resulted in the cataclysmic failure of the Reach 2 levee.

In support of this theory, plaintiffs introduced expert testimony to prove that the Corps' dredging of the MRGO and its failure to maintain the channel at its Congressionally authorized width in doing so caused:

(1) the berm fronting the MRGO Reach 2 Levee on the south shore to erode substantially increasing the risk of frontside wave attack because of the increased fetch with reduced vegetation fronting the levees;

(2) the north shore of Reach 2 to erode substantially allowing severe widening of the channel;

(3) this combined widening of the channel which increased the fetch along the MRGO to two to three times greater width than it would have been had it been maintained according to its authorized design width; this broadening increased the intensity and size of the waves created by storm surge;

(4) the MRGO Reach 2 Levee to lower because of increased lateral displacement caused by the narrower berm; and

(5) salt water intrusion which degraded the Central Wetlands Unit changing the type of vegetation from cypress and tupelo trees which had greater drag forces in the face of storm surge into salt grasses.

As a result of these changes allegedly caused by the Corps' negligence, plaintiffs maintained that Hurricane Katrina created surge, waves and conveyance that attacked the levee along the MRGO that would not have existed but for the MRGO "as was"– that is in its 2005 parameters. Had the Katrina event occurred with the MRGO as designed, the cataclysmic flooding which occurred in the St. Bernard Polder would not have happened.

The Corps maintained that the shear force of Hurricane Katrina and its resultant storm surge was the cause of the flooding of New Orleans. Maintaining that the MRGO did not cause the breaches in the Reach 2 Levee, the Government put on evidence to prove that neither the

surge nor the waves nor the Reach 2 Levee itself was at all affected by the operation and maintenance of the MRGO. There is one fact upon which both parties agreed–that the Reach 2 Levee was built to design specifications and performed as intended. They also generally agree as to the approximate height of the "still water" surge peak along Reach 2. Mr. Bruce Ebersole, one of the Government's experts, testified that the maximum surge was generally 17.4 to 17.6 feet (Trial Transcript, Ebersole at 2098); Mr. Vrijling found the maximum surge along Reach 2 between 17.6 and 18.0 feet. PX-105 (Polder Flood Simulations for Greater New Orleans: the Neutral MRGO Scenario, July 2008) at 39, pdf 41. The key difference between plaintiffs' and the Corps' theories is the difference in the mechanism of failure, and the key to determining which theory is correct is grounded in one fact that this Court finds unassailable–that is the timing of the peak surge in the MRGO.

B. Mechanism of Failure of the Reach 2 Levee: Overtopping v. Frontside Erosion

During the trial, a videotape was shown of the 40 Arpent Levee being overwhelmed at 8:35 a.m. on the morning of August 29, 2009. PX-2121 (Videotape Footage from Security Camera at 40 Arpent Levee). It was recorded by a remote security camera that was time stamped operating on back-up batteries at the transmitting tower for a television station. It was located off of Paris Road about half a mile from the MRGO Levee near the channel's intersection with the Gulf Intracoastal Waterway. (Trial Transcript at 814-15).

The tape is demonstrably important as it documents visually the force of the water as it overtopped the 40 Arpent Levee–which did not breach–and the exact time that occurred. Subsequent to this event, the St. Bernard Polder was overwhelmed and its catastrophic flooding

occurred. In order for the 40 Arpent Levee to be overtopped in that fashion, the Central Wetlands Unit would have had to be filled with water in such a manner that would result in the overflow at the 40 Arpent Levee at 8:30 a.m.

The trigger for the filling of the Central Wetlands Unit was the failure of the Reach 2 Levee. Thus, the central question to this case becomes what caused the Reach 2 Levees to fail? The Government maintained that the Reach 2 Levee was overwhelmingly **overtopped** by Katrina's enormous storm surge causing backside erosion which resulted in the levee collapsing as it did. The plaintiffs maintained that instead, frontside wave attack caused by the factors previously enumerated created 45% of the erosion, leading to crenelation resulting in the remaining 55% of the destruction being caused by backside erosion. (Trial Transcript, Bea at 1270).

Each side hired experts to gather the necessary data to run computer-run models to try and determine exactly how the flooding of the various polders occurred and whether the results would have been different had the MRGO been at its design configuration.

1. Plaintiffs' Theory of Mechanism of Failure

Methodology

Professor Johannes Vrijling,, a tenured professor from the Netherlands, was tendered as an expert in hydraulics and probalistic design, to ascertain whether the MRGO channel in its degraded form was a significant cause of the flooding experienced by the plaintiffs in this litigation. (Trial Transcript, Vrijling at 824). To accomplish this task, he employed a number of computer modeling programs. He used the FINEL model to calculate the surge levels in the sea

and channels, the SWAN model to calculate the size and period of the waves in the various areas and the Sobek 1D2D ("SOBEK") flood model to simulate the Katrina flooding in each polder. *Id*. at 824-25.

The results "show detailed spatial information about water levels, velocities and rise rates over time and arrival times at desired locations." PX-53 (Polder Flood Simulation for Greater New Orleans, Hurricane Katrina 2005 (July 2007) ("Delft Polder Flood Simulation")) at 1. These models required specific information about topography, bathymetry[30] and habitat at the time of Katrina, as well as the pertinent weather information. Also of utmost importance to obtain valid results, the location, length and sill height, meaning the height of the remaining levee, at the breaches had to be determined. Specifically as outlined in the report, Vrijling noted:

> Data used in the flood simulation:
>
> - digital elevation model (DEM) available for the whole area with 15ft. resolution, the resolution around levee crests is one feet, as supplied by Mr. Chad Morris, a professional surveyor.
>
> - Surge hydrographs (graphs of water level variation over time due to hurricane Katrina were obtained for ten pertinent location adjacent to the polders from Dr. Paul Kemp, a storm surge expert and oceanographer. . .
>
> - Information on the breach locations and sizes was obtained from Geographical Information System (GIS) data delivered by Mr. Chad Morris. Timelines for the breaches were obtained from the Team Louisiana Report.
>
> - Time series of rainfall are delivered by Dr. Lee E. Branscome (CCM, Climatological Consulting Corporation) . . . .

[30]"Bathymetry" means "the measurement of water depth at various places in a body of water; *also:* the information derived from such measurements." Merriam Webster's Online Dictionary, www.meeriam-webster.com/dictionary/bathymetry.

- Eye witness reports from the IPET and Team Louisiana reports.

Id. at 5. Information was also provided by Paul Kemp, John Day, Duncan FitzGerald and Bob Bea. (Trial Transcript, Vrijling at 826). The Court heard the testimony of all of these experts, save Dr. Branscome, and reviewed each of their expert reports, and finds that each provided clear and competent evidence.

Chad Morris, tendered and accepted as an expert in the field of surveying and mapping, compiled technical data in the nature of land surveys of the MRGO and the MRGO Levee using LIDAR and bathymetric information which he used to form a technical database called a GIS as noted above. He also checked for consistency by performing on the ground surveys. (Trial Transcript, Morris at 129). This computer generated report provided detailed findings concerning the heights of the levees involved, the length of the berms prior to Katrina, as well as the height and length of the breaches. He also provided the elevation of the property involved in plaintiffs' claims.

The most stunning visual evidence provided are photographs that show Reach 2 of the MRGO, its design width superimposed on its width at the time of Katrina, the location of the levee breaches with specific sill heights at to each breach. PX 1810.13.[31] His testimony was highly credible and unrefuted and as such accepted by the Court as true.

G. Paul Kemp, a Ph.D. and an expert in coastal geology, oceanography, coastal studies, sedimentology and hydrology, provided the inputs for the storm surge data. He derived this

[31]In Plaintiffs' Post-Trial Brief, Appendix J at 39 an even more complete graphic rendering of all of the testimony and information the Court received is provided and will be discussed in greater detail *infra*. (Doc. 19051).

information using the ADCIRC/SO8[32] model which was developed by defendant's expert J.J. Westerink and was also used by the IPET team in their report. (Trial Transcript, Ebersole, at 2084); (Trial Transcript Kemp at 1739). It must also be noted that Dr. Kemp was actually on the ground at the Reach 2 Levee area in early September of 2005. (Trial Transcript, Kemp at 1728). Dr. Kemp used these "modern numerical modeling techniques to test the effects, the hydraulic oceanographic effects of the MRGO project, both as it was designed and as it was maintained, on surge-induced discharge and overtopping of the structures. . . ." (Trial Transcript, Kemp at 1775). They then used the FINEL2D[33] model for flow and integrated these results with an analysis using the SWAN[34] model for waves.[35] PX-91 (Kemp Report, July 11, 2008) at 40. Dr. Kemp determined the increment of flooding using the breach information provided by Chad Morris. This information was then turned over to Dr. Bea who provided another group of inputs concerning the mechanisms of failure of the Reach 2 Levee.[36] Then, Dr. Kemp applied the SOBEK model, which is a polder modeling program, using varying assumptions to determine whether the MRGO as maintained was a substantial cause of the flooding in the St. Bernard Polder.[37] Thus, Dr. Kemp ascertained how much flooding was actually attributable to the

---

[32]This program studies wind and surge on a large scale. (Trial Transcript, Kemp at 1776); it has also been updated since its initial release.

[33]This program studies wind and surge on a smaller scale. (Trial Transcript, Kemp at 1776).

[34]This program studies near-shore waves. (Trial Transcript, Kemp at 1776).

[35]Dr. Vrijling also stated that he did not think that the wave height at the toe of the levee that was generated by the SWAN model was correct because it understated the value and agreed with Dr. Bea in his use of the "D" wave value (meaning the deepest wave value) when Dr. Bea made his calculations.

[36]These studies incorporated both the effect of Reach 2 as well as the effects of enlarging Reach 1which findings will be addressed, *infra.* (PX-91(Expert Report of Kemp, July 11, 2008) at 40.

[37]Again, this same process was used for the New Orleans East Polder; the results of this determination will be discussed, *infra.*

MRGO. (Trial Transcript, Kemp, at 1775); PX-91 (Mississippi River Gulf Outlet Effects on Storm Surge, Waves and Flooding During Hurricane Katrina, July 11, 2008) at 71.

The three salient models and the parameters thereof which the Court considered in its determination were as follows:

Scenario	MRGO Reach 2 Channel	MRGO/GIWW Reach1 Channel	Reach 2 Levees	Reach 1 Levees	40 Arpent Levee	Vegetation
1	Existing 8/2005	Existing 8/2005	Existing 8/2005	Existing 8/2005	Existing 8/2005	Existing 8/2005
2c Neutral MRGO	None	Pre-MRGO	Existing 8/2005	Existing 8/2005	Existing 8/2005	Pre-MRGO 1958
3	As authorized	As authorized	Existing 8/2005	Existing 8/2005	Existing 8/2005	Pre-MRGO 1958

Plaintiffs argued that Scenario 2c was the appropriate model to use to compare damage as against Scenario 1, that is the "as was" model, to determine whether the MRGO was a substantial cause of plaintiffs' damage. Their contention is that the Corps was legally obligated to operate and maintain a ship channel that did not enhance the risk of flooding, i.e. was hurricane neutral. (Doc. 19051 at 97 n.61). However, the Court finds plaintiffs' analysis in this regard unavailing. As noted, the Court had previously found that the Corp was immune for damages arising from the design and construction of the channel. Thus, the proper model to consider to determine whether the Corps' failure to properly operate and maintain the MRGO must contain a waterway that exists as it was designed which the construct examined in Scenario 3. Thus, Scenario 2c is deemed irrelevant for the Court's analysis.

Dr. Bea testified at trial using the Scenario 3 paradigm, that the Katrina flooding was due to the destruction of the Reach 2 Levee which was caused by the lowering of the protective

elevations caused by the channel growth (dredging, loading, squeezing, continued dredging) and the destruction of the vegetation due to saltwater intrusion which allowed the channel to grow and allowed wave regeneration. (Trial Transcript, Bea at 1257); *see* findings with respect to effects of loss of vegetation on wave regeneration, *infra*, at 47-48. During cross-examination concerning this testimony, Dr. Bea made clear that that "[t]he incoming significant wave heights for Scenario 3 are somewhat more intense than those for Scenario 2c, and that's because of the open width of water for the mandated MRGO channel. The erosive breaching effects at the face of the earthen flood protection structures is not significantly different from Scenario 2c to 3." (Trial Transcript, Bea at 1474). Bea testified that using Scenario 3, the Reach 2 would have survived overtopping, would have filed the Central Wetlands Unit, but St. Bernard Parish and the Lower Ninth Ward, leaving out the IHNC, would not have flooded. (Trial Transcript, Bea at 1479, 1481).

Dr. Bea testified that in a Scenario 3 run, he assumed the Reach 2 Levee would be at the 17.5 design height. Given an 18-foot surge, there would be a half-foot overflow for a very short period of time leading to "a few wet carpets." (Trial Transcript, Bea at 1483). This assumption about levee heights is well founded considering the prior outlined findings concerning the effect of the loss of berm on the levee heights. *See*, *supra* at 46-47.

On cross-examination the Government attempted to impeach Dr. Bea concerning the wave heights at the toe of the levee during Hurricane Katrina used in plaintiffs' calculations. The Government pointed out that the wave heights computed by the Delft modelers (Dr. Vrijling and his group) were very similar in Scenario 3 and Scenario 1. Dr. Bea explained that at the time the Delft modelers configured Scenario 3, there had not be an appropriate transformation of

the shallow and vegetation effects that existed with an "as designed" MRGO. Therefore, although the Delft model shows the wave height at a specific point as 5.8 feet for Scenario 3, Dr. Bea stated that the wave height should actually be 1.5 feet. He stated the reason for this fact is because the appropriate modification of Scenario 3 had not yet been made by him. The Court finds his testimony credible. (Trial Transcript, Bea at 1489-92). However, the primary basis for the Court's acceptance of plaintiffs' theory of causation rests on the determination of the timing of the peak surge at the Reach 2 Levee.

Peak Surge

A vital key to determine which theory (plaintiffs' or defendant's) is more likely to have happened, is to determine when the peak surge occurred. What the Court found most persuasive in accepting as true plaintiffs' theory is that Vrijling's Scenario 1 model demonstrated readily, that while there was no overtopping at 6:30 a.m., water entered the Central Wetlands Unit by that time. Thus, the Reach 2 levee was experiencing frontside erosion and subsequent beaching by 6:30 a.m. In this model, no overtopping occurred before 7:00 a.m., and the flooding at 8:30 a.m. corresponds directly with the flooding witnessed in the 40 Arpent Levee video previously discussed. (Trial Transcript, Vrijling at 829-30); (Trial Transcript, Bea at 1080-82). Graphic No. 12 PX-53 (Polder Flood Simulations for Greater New Orleans, TUDelft, July 2007) at 39-41, pdf 43-45.

Plaintiffs maintained that the peak surge at the Reach 2 Levee occurred at the same time that the overtopping occurred at the 40 Arpent Levee, that is at 8:30 a.m.. Dr. Kemp also testified that these two occurrences must be synchronous. (Trial Transcript, Kemp at 1787-88).

The Court found this testimony equally compelling. Dr. Kemp maintained that the Central Wetlands Unit is 32,000 acres that had to fill up before the 40 Arpent Levee was overtopped which he found to take about 2 hours to accomplish. (Trial Transcript, Kemp at 1783). These findings further supported plaintiffs' theory that the onset of frontside wave attack started at approximately 6:30 a.m.[38] With the increased fetch caused by the Corps' negligence, wave regeneration occurred making the forces against the levee scour out the front of it (which would not have occurred in the absence of the widened MRGO).[39] As a result, the Reach 2 Levee was catastrophically breached by the time the video recorded the overtopping. This conclusion is also supported by Dr. Bea's testimony and modeling with respect to frontside wave attack. (Trial Transcript, Bea at 1189-90).

Empirical proof offered supported this contention unequivocally. "On the ground" source of information was recorded by the lock master at the IHNC who registered a peak surge[40] at the north end of the IHNC lock at 8:50 a.m. indicating that the surge at Reach 2 would have

---

[38]As stated in Dr. Vrijling's Expert Report of July 2007:

> Between 5:00 and 8:30 am the erosion of the MRGO levee takes place, and after 6:30 a.m. substantial volumes of surge water from the MRGO flow into the wetlands bowl between the MRGO and 40-Arpent levee. In the simulation the 40-Arpent levee starts to overflow at 8:00 a.m. and at 8:30 the first water enters Chalmette from a northeastern direction as a consequence of overtopping the 40-Arpent levee. IPET in their report state this overtopping starts at about 8:20am, which is in agreement with Team Louisiana's 8:30 am. IPET also reports that Chalmette flooded from the northeast, strong agreement with the simulation results. (*See* n. 41 for explanation of IPET).

PX-53 (Polder Flood Simulations for Greater New Orleans, July 2007) at 38.

[39]*See* the Court's findings at to effects of an increased fetch at 46, *supra.*

[40]The surge recorded is 14.2 feet at a location which is very close to the large breach on the south into the Lower Ninth Ward at 8:50 a.m. which explains the difference in height from 18 ft to 14.2 ft.

occurred at 8:30 at Reach 2.[41] Kemp Demonstrative Evidence, Slide 25; (Trial Transcript, Kemp at 1782-84). Based on these findings, the Interagency Performance Evaluation Task Force ("IPET")[42] found the peak surge to be at 8:30 a.m. JX-265, IPET, Vo. IV, 26 March 2007, at IV-33, pdf 39; JX-266 (IPET Vol IV, Appendix 1 - hydrographs and High Water Analysis) at IV-1-67-69. (Trial Transcript, Bea at 1190). The defendant's own expert hurricane expert, Brian Jarvinen opined in his Expert Report that the peak surge occurred in St. Bernard Parish at 8:30 a.m. (Trial Transcript, Jarvinen at 3663).[43]

2. Government's Theory of Mechanism of Failure

In sharp contrast, the Government's theory of failure–that is that gross overtopping resulting in catastrophic backside erosion caused the demise of the Reach 2 Levee and the

---

[41]As explained in the IPET report:

> During the passage of Hurricane Katrina, water levels were recorded by an operator from the staff gauge at the IHNC lock. The operator stated that each hour, on the hour , he would read the high and low and record an average value. . . . The staff gauge was surveyed by the IPET datum team and the 15-ft mark was found to be equal to an elevation of 14.3 FAVD88 (2004.65). All IHNC staff gauge readings were reduced by 0.7 to convert to NAVD88 (2004.65) . . .
>
> The rate of water level rise at the IHNC Lock significantly increased, beginning at about 0400 UTC on 29 August(11:00 p.m. CDT on 28 August) when the water level was about 5 NAVD88 (2004.65). Peak water level at the IHNC Lock was observed at approximately 1400 UTC (9:00 a.m. CDT) on 29 August, when the maximum hourly elevation was recorded, but the actual peak my have occurred a little earlier.

JX-265 (IPET, Vol. IV) IV-33, pdf 39.

[42]The IPET report is the nine volume result of an intense performance evaluation of the New Orleans and Southeast Louisiana Hurricane Protection System during Hurricane Katrina. A "distinguished group of government, academic, and private sector scientists and engineers" conducted the exercise. It was created by the Chief of Engineers, U.S. Army Corps of Engineers and was peer reviewed on a weekly basis. Reed Mosher, Bruce Ebersole, Donald Resio, Joannes Westerink and Steve Fitzgerald all participated in the rendering of the report. JX-258, IPET Vol. 1, at I-iv-viii.

[43]"Based upon eye-witness accounts and numerical storm surge models the peak storm tide occurred in the middle of Plaquemines Parish at approximately 0730 CDT, in St. Bernard parish one hour later at 0830 CDT and in East Orleans Parish at 0845 CDT; all within one hour and 15 minutes." JX-188 (Jarniven Expert Report) at 11.

drowning of St. Bernard–rests on the proposition that the peak surge occurred at 7:30 a.m. Only if the peak surge occurred at 7:30 a.m. could the Central Wetlands Unit fill in time for the overtopping of the 40 Arpent Levee to occur. Without that occurrence, there is no explanation using the Corps' theory to explain the indisputable fact that the 40 Arpent Levee overtopped around 8:30 a.m. In fact, the Corps' key witness admitted that he could not explain the arrival of the water at the 40 Arpent Levee at 8:30 a.m. if the peak surge was at 8:30 a.m. using his mechanism of failure. (Trial Transcript, Ebersole at 2721-2722).

While the computer programs used by the Government to prove causation were substantially analogous to those used by plaintiffs, after hearing the testimony and having reviewed the expert reports presented, the Court finds that some of the Corps' models are critically compromised by the use of input data that has been overly "scaled" to obtain the results. The reason for such a finding is that many of the Corps' "facts" or inputs are controverted by hard evidence presented in this case. In addition, the Court found the testimony of Bruce Ebersole highly equivocal and less than candid. Simply put, the Court finds that some of these models were manipulated to arrive at the conclusion that the peak surge occurred at 7:30 a.m so that the Central Wetlands Unit would fill in time to overtop the 40 Arpent Levee at 8:30 a.m.

Methodology

Bruce Ebersole led the team that developed the Corps' theory. He is the Chief of the Flood and Storm Protection Division of the United States Corps of Engineers in Vicksburg with a Bachelor of Science in Civil Engineering and a Masters in Civil Engineering with focus on Coastal Engineering. He has worked for the Corps since he graduated in 1979 from the University of Delaware. JX-211 (Expert Report of Bruce A. Ebersole, P.E., December 17, 2008) Curriculum Vitae; (Trial Transcript, Ebersole at 2046-47). Other members of the team included Dr. Joannes Westerink, Dr. Donald T. Resio, Steven Fitzgerald, Dr. Reed Mosher, and Dr. Thomas F. Wolff.

The relevant and analogous models run by the United States are as follows:

U.S. Scenario	Plaintiffs' Scenario	MRGO/Reach 1/GIWW	Reach 2	Chalmette Levee	Marsh	Description
H1-Katrina Real Run	1	2005 pre-Katrina dimensions	2005 pre-Katrina dimensions	2005 pre-Katrina dimensions	2005 pre-Katrina dimensions	Conditions at Hurricane Katrina landfall
H3 - No MRGO with 1956 wetlands	2c	1958 pre-MRGO (existing GIWW dimensions	None (channel eliminated and topography raised to surrounding area)	2005 pre-Katrina dimensions	1956 pre-MRGO conditions	Conditions at Katrina landfall, if MRGO had not been constructed and marsh had remained in pre-MRGO condition
H6 MRGO as designed with 1956 wetlands	3	Ideal MRGO (approximate design dimensions)	Ideal MRGO (approximate design dimensions)	2005 pre-Katrina dimensions	1956 pre-MRGO conditions	Conditions at Katrina landfall, if MRGO had been at design dimensions and marsh had been in 1956 pre-MRGO condition.

JX-282 (Declaration of Vrijling , January 21, 2009) at 3.

Westerink's ADCIRC SL15

Dr. Westerink is a professor in the Department of Civil Engineering and Geological Sciences with a concurrent appointment in the Department of Mathematics at the University of Notre Dame. He obtained a Ph.D. in Civil Engineering from Massachusetts Institute of Technology. He is a co-developer of the ADCIRC modeling system. (Trial Transcript, Westerink at 3693-95). For his report, he used a newer model of ADCIRC, ADCIRC SL15. As described by Mr. Ebersole, "[w]e did some things differently for this project than we had in the IPET. We used a more rigorous spool plane STWAVE application for this model. So that coupled storm surge and wave modeling was done primarily by Dr. Westerink, with some assistance from a number of others." (Trial Transcript, Ebersole at 2084).[44] This modeling is analogous to that done by Dr. Vrijling.

Dr. Westerink, who never was on the ground in Louisiana, opined at great length as to why and how the new ADCIRC model was better based on his contention that the regional detail is much greater and as such gives a fuller more complete geographic demonstration of the storm surge event caused by Hurricane Katrina. Dr. Westerink concluded that the inclusion of the effects of storm surge along the Mississippi Gulf Coast as those effects impact surge in Reach 1 and Reach 2 and the surrounding land areas was superior to ADCIRC 8's results. A major difference noted using ADCIRC SL15 was that the Government's models demonstrated a significant second surge as the storm surge "bounced" off the Mississippi coast which resulted in a substantial increase in the duration for the storm surge. (Trial Transcript, Ebersole at 2102-04).

[44]The Corps used the wind data that was produced during IPET by a company called Ocenaweather and the Hurricane Research Division of NOAA. (Trial Transcript, Ebersole at 2083).

While there was much testimony and discussion concerning the second surge, particularly in the context of Dr. Westerink's models, the Court finds that the issue of duration is unimportant for purposes of the Court's inquiry. The key to its inquiry is whether the Navy vessel of the MRGO destroyed the Reach 2 Levee in time for the Central Wetlands Unit to fill by 8:30 a.m. for the 40 Arpent Levee to be overwhelmed at that time, not how long the resulting water rested in the polder. The model which most clearly demonstrates the degradation of the Reach 2 Levee in sufficient time to allow for the flooding of the Central Wetlands Unit before 8:30 a.m. and for there to be enough water to cross the 40 Arpent Levee at 8:30 a.m. is the model which the Court accepts as more probable–that is the plaintiffs' model. While Mr. Ebersole raised issues concerning the various models' accuracy vis-a-vis storm surge in Lake Pontchartrain and the Mississippi Gulf Coast, the fact remains that his model's efficacy rests on the peak surge occurring at 7:30 a.m. which is not supported by any evidence other than his own and in stark contrast to the opinion of no less than 4 other sources. In addition it is clear as outlined below that Mr. Ebersole provided input data to achieve his required outcome.

For instance, "the Defense experts have shifted the Hurricane Katrina track some miles to the east of its actual track during the storm. **But this does not significantly materially change any results other than the timing of the peak surge event."** JX-282 (Declaration of Vrijling , January 21, 2009) at 3. This shift indicates to the Court that a "scaling" technique was used to obtain the needed 7:30 a.m. surge result which runs counter to the actual recorded data.

There is another significant instance of scaling which the Court finds troublesome. The IPET results found that the height of the peak surge was 17.5 feet in Reach 2.[45] Dr. Westerink's

[45]As noted above, Dr. Vrijling's model obtained the recorded surge heights without "scaling" of this nature.

result for output at Bayou Dupre was 15.4 feet in Reach 2. In order for Dr. Westerink's result to jive with the IPET report, Bruce Ebersole scaled these surge results by multiplying the Westerink output by 1.12 in order to achieve the needed 12% increase in input of water for Dr. Resio's calculations to jive with the IPET report real findings. (Trial Transcript, Resio at 2919); (Trial Transcript, Ebersole at 2368-69). In addition, Mr. Ebersole found the Westerink model understated the peak in another area by 4%, so in that instance he multiplied the Westerink output by 1.4 to obtain the correct wave height to conform to empirical measurements. (Trial Transcript, Ebersole at 2090). The Court found Mr. Ebersole's explanation unavailing. (Trial Transcript, Ebersole at 2368). The inconsistency between the model results and recorded height, plus Mr. Ebersole's convenient, yet inconsistent multiplication of outputs by different percentages without any other justification than the need to make it fit to empirical evidence, makes these findings suspect in the Court's estimation.

Dr. Donald T. Resio, another expert, is a Senior Technologist at the U.S. Army Corps of Engineer Research and Development Center on Vicksburg, Mississippi. (Trial Transcript, Resio, at 2817-18). However, Dr. Resio does not hold a Master of Science, rather he has a Master of Arts in Physical Geology and again has primarily worked for the Corps of Engineers. He is not a coastal engineer and did no work in determining the actual damage mechanism to the levees, and thus any testimony on that topic was outside of his expertise. (Trial Transcript, Resio at 2915-16). Dr. Resio applied another wave model, COULWAVE, to generate the data to get "the waves and transform them over that very gentle sloping berm in front of the levee and how we transform action to the levee and up and overtopping the levee." (Trial Transcript, Ebersole at 2085). This modeling is analogous to the SWAN calculations done by Dr. Kemp.

These calculations are in stark contrast to those done by plaintiffs' experts. Dr. Resio's calculations were generic in nature and were not site specific. He never visited the area, and he did not perform any survey or area specific LIDAR data to establish his reference points, whereas Dr. Kemp used the real survey results of Mr. Morris. Dr. Resio used data provided by Mr. Fitzgerald and Mr. Ebersole. (Trial Transcript, Resio at 2935-36). This fact leads the Court to examine the most troubling "adjustments" which were done by Steven Fitzgerald at the direction of Mr. Ebersole.

Steven Fitzgerald holds a Master of Science in Civil Engineering from the University of Illinois in 1979. He is a civil engineer specializing in hydrology, hydraulics, and interior flooding analysis and is the Chief Engineer for the Harris County Flood Control District of Houston, Texas. He was a non-Corps of Engineers employee who co-lead IPET's interior drainage team in rendering its report. In accomplishing his task for this litigation, which was to "compute the water surface elevation over time within the St. Bernard Basin," he used the HEC-RAS unsteady model. (Trial Transcript, Fitzgerald at 2724); JX-62 (Curriculum Vitae Steven D. Fitzgerald). This work would be similar to the task performed by Dr. Kemp using SOBEK.

Mr. Fitzgerald was provided the overtopping rates for Reach 2 by Dr. Resio, and he used the hydrographs for his wave inputs from Dr. Westerink which had been scaled up by 12% by Mr. Ebersole. He neither surveyed the area nor did any on the ground research. (Trial Transcript, Fitzgerald at 2769-70). By using these scaled-up inputs, the validity of his analysis starts on shaky ground. However his method for determining the location, height and width of those breaches is even more suspect.

With respect to the breaches along the Reach 2 Levee, he described his methodology as follows: "[t]he irregular breaches along MRGO were aggregated into 11 breaches for modeling purposes. Determining when the breach commenced and reached its final geometry during the inflow is difficult. Mr. Bruce Ebersole provided guidance for determining when the breach occurred, which is referred to as the trigger elevation." See JX-279 (Steven Fitzgerald Expert Report) at 13. Indeed, Mr. Fitzgerald testified that he was instructed by Mr. Ebersole "to pick a point 1 foot below the lowest part of the crest, 1 foot below the lowest crest elevation." (Trial Transcript, Fitzgerald at 2764). From a review of a graphic depiction of this methodology, these flow results seem to the Court to be less than reliable. See Graphic No. 13 PX-2138.3 Graphic representation of Fitzgerald's Trigger Points.[46]

This issue of accuracy is further underscored by reviewing a table showing the trigger elevations as modeled by Mr. Fitzgerald in comparison to the actual crest elevations of the Reach 2 Levee prior to Hurricane Katrina. The estimates of these trigger points used by Mr. Fitzgerald are substantially lower than the 1 foot reduction attested to by Mr. Fitzgerald and Mr.Ebersole. (Trial Transcript, Fitzgerald at 2763-2766). Chad Morris took the actual crest elevation data and compared it to Mr. Fitzgerald's trigger points and found that most crests were much higher than those used by Mr. Fitzgerald. Since the actual crests were much higher that those used by Mr. Fitzgerald, the Corps' theory of massive overtopping that was acting on the levees at 6:30 a.m. causing catastrophic backside erosion by 7:30 a.m. becomes improbable since the water levels

[46]Interestingly, when asked about methodology for Dr. Westerink's inputs or the effect of triggering breaches in his model when there was not yet any surge overtopping, Mr. Fitzgerald's response was "[t]hat's outside of my expertise." (Trial Transcript, Fitzgerald at 2767). Oddly, during Mr. Ebersole's cross-examination, when cornered to admit to an anomaly, he would say that Mr. Fitzgerald would have to respond to that. (Trial Transcript, Ebersole at 2405 (how long it takes for the Central Wetlands Unit to fill); 2416 (what time water arrived at the 40 Arpent Levee); 2419 (when the peak surge occurred). It was quite clear to this Court that Mr. Ebersole prevaricated and was less than candid in many instances during his cross-examination.

were insufficient to be above the actual crests at that time as would be required for back-side breaching. (Trial Transcript, Fitzgerald at 2767).

For instance, in Exhibit PX-2183.3, the first "block" in which "13" appears therein, is a segment which constitutes one of the 11 "breaches" used by Mr. Fitzgerald. That "breach" is a mile and half wide and its real elevation prior to Hurricane Katrina, for the most part, was substantially above 15.5 feet. Nonetheless, Mr. Fitzgerald's model triggered the breaching at one foot below 13 feet for that entire width which would increase the flow of water into the Central Wetlands Unit at a far greater rate than would have really occurred. The following table provides a better indication of how skewed the trigger points used were:

MRGO REACH COMPILED BREACH DATA[47]

Approx. Centerline Station	Water Surface Trigger Fitzgerald (ft)	Crest Elevation Morris on the ground (ft)	Distance Below the Crest (ft)
4025	13.0	16 - 17.5	3 - 4.5
4720	14.5	16 - 17	1.5 - 2.5
50830	14.7	16 - 17	1.3 - 2.3
53750	15.0	16 - 17	1 - 2
56820	14.5	15.5 - 16	1 - 1.5
60380	14.5	15.5	1
62800	14.0	15.5	1.5
66800	14.5	17	2.5
70790	14.5	18'	3.5
76385	16.0	17.5 - 18.0	1.5 - 2
82475	16.0	17.5	1.5

[47]Derived from PX1487.1 and PX 2138.3. See (Trial Transcript, Fitzgerald at 2764-66).

While Mr. Fitzgerald would not agree that these differences would have a dramatic effect on his calculations, the Court finds such testimony less than forthright. Common sense dictates otherwise. Furthermore, Mr. Fitzgerald did not calculate how fast the breaches evolved; again that information came from the ever present hand of Bruce Ebersole. (Trial Transcript, Fitzgerald at 2790). These findings also raise questions concerning the conclusion of Dr. Reed Mosher.

Dr. Reed L. Mosher has been a Geotechnical Engineer for over 30 years. (Trial Transcript, Mosher at 2963). Yet another Corps employee, he serves as the Director of the U.S. Army Engineer Research and Development Center which is the laboratory for information technology with respect to Army civil works. (JX-42-curriculum vitae). As such, he provided testimony concerning the levees themselves. Dr. Thomas Wolff, an Associate Professor of Civil Engineering at Michigan State University, is an expert in civil engineering, geotechnical engineering and probalistics. (JX-35, Curriculum Vitae of Thomas D. Wolff, Ph.D, P.E.) He made no calculations himself and worked with Dr. Mosher. (Trial Transcript, Wolff at 3971).

Dr. Mosher offered the opinion that (1) breaching and erosion which occurred along the Reach 2 Levee was primarily caused by overtopping; (2) the primary factor that led to the erosion and breaching from overtopping was construction of the levee using hydraulic placement of soil; and (3) the erosion and breaching of the levee and the subsequent flooding that occurred was more severe because the protective elevations of the levee were below the authorized elevations. (Trial Transcript, Mosher at 2964-65). However, the Court is skeptical with respect to these opinions.

As seen in Figure 4 of his report, Dr. Mosher used pre- and post-elevations of the levee along Reach 2 with water levels with peak surge and wave conditions that were from the IPET report. These surge levels were different that what he had been provided by Mr. Ebersole. (3141). JX-212 (Expert Report of Mosher, December 18, 2008) Figure 4 at 14. Using the IPET numbers, the peak surge was 20 feet as detailed in his report; however, at his deposition, he testified that peak surge was 20 up to22 feet which numbers he obtained from Mr. Ebersole. (Trial Transcript, Mosher at 3143; JX-114 (Deposition of Mosher (November 25, 2008)) at 59-60. Yet, Bruce Ebersole's hydrograph showed that the surge did not even get to 17 feet at Bayou Bienvenue. (Trial Transcript 3146); JX-211 (Expert Report of Bruce Ebersole, December 17, 2008) at 40. So, through trial testimony, it became clear to the Court that even though Dr. Mosher had Mr. Ebersole's peak surge estimates, Dr. Mosher intentionally overstated the surge to support his theory of back-side erosion. (Trial Transcript, Mosher at 3145, 3149). Likewise, as noted, Mr. Fitzgerald had the triggering of the breaches occurring below the crest contrary to Mosher's own theory. (Trial Transcript, Mosher at 3166-3170); (Trial Transcript, Fitzgerald at 2760).

Furthermore, to the extent that the Corps sought to imply with Mosher's testimony that it constructed an "egg-shell" levee, it would seem that such a levee would be even more susceptible to front-side wave attack. If the Navy vessel ran into a papier mache levee, the vessel would still be a substantial factor in the damage. As previously noted, considering the Corps' consistent pre-trial position that the levees were built to design and performed as designed, the Court will only consider this deficiency argument in the context of whether front-

side or back-side erosion was the primary cause of the Reach 2 Levee failures. (Trial Transcript, the Court at 2976).

Moreover and more importantly, the contention that the hydraulic-fill material doomed the Reach 2 Levee to fail is belied by the condition of the Verret Levee. During cross-examination, Dr. Mosher testified that the east-west portion of the Verret Levee was made of hydraulic sand fill with a three foot clay cap from the Mississippi River; however that portion of the levee that extends in a more northeastern direction to form a right angle with the Reach 2 Levee, that arm (called during the trial the Verret Turn) is made of hydraulic fill; it had **no** significant breaching. *See and compare* JX-212 (Mosher Expert Report) at 11(Figure 1 St. Bernard breach locations) and at 12 (Figure 2 Constructed levee soil sources); (Trial Transcript, Mosher at 3129-31). Notably, the Verret Levee and the Verret Turn have vegetation before each and were not subject to direct, perpendicular wave attack, unlike the Reach 2 Levee. They survived for the most part in tact. (Trial Transcript, Bea at 1371). Thus, again, Dr. Mosher's generalization is called into question.

In addition, testimony was offered to support the proposition that the sinking of the Reach 2 Levee was due to settlement of the material that was used to build it rather than lateral displacement. (Trial Transcript, Mosher at 2982). Clearly, the Corps anticipated that hydraulic-fill levees were subject to settlement and would require reshaping and numerous lifts. (Trial Transcript, Wolff at 2005-07). However, a comparison of the Verret Levee Low Area to the Reach 2 Low Area provided another perspective on the rate these levees lowered. See PX98.20 (Picture of Levee Structures and Grade Levels). As noted, the Verret Levee was built of hydraulic sand fill with a clay cap from the Mississippi River whereas the Reach 2 Levee was

constructed solely of hydraulic fill from the MRGO. JX-212 (Expert Report of Mosher, Figure 2, constructed levee soil sources) at 12. However, Dr. Wolff testified that both soils were soft and compressible and thus comparable with the Verret Levee soil being a "little better." (Trial Transcript, Wolff at 4060). Notably, both levees were built on substantial depths of interdistributary soil (between 40 to 60 feet). (Trial Transcript, Wolff at 4066-67). Factually, what is striking to the Court and supports plaintiffs' contention that a levee would sink more readily when it is adjacent to the MRGO, is that in 1980, the MRGO levee between Bayou Bienvenue and Bayou Dupre was raised to an elevation of 20.5 feet with which Dr. Wolff agreed. Between 1985 and 2005, that levee lost 7 feet of elevation. Along the Verret Levee, the last lift was in 1990. It raised the elevation to 17.5 feet. Between 1990 and 2005, that area subsided to 14.5 feet which is a loss of 3 feet over a period of 15 years. Thus, it is apparent that the Reach 2 Levee sunk 75% faster than the Verret Levee. (See Graphic No. 14, Levee Sinkage Diagram, PX-28.20). While Dr. Wolff would not concur in the analysis, all of these points support plaintiffs' theory.

Finally, as to Mr. Ebersole, the Court found his testimony less than credible. He often made sweeping statements of fact and when questioned on specifics, he would "defer" to the "expert" in the area, would be obstreperous, or simply could not explain himself. For instance, even though he admitted that he had to "scale up" the results of the ADCIRC SL15 modeling results for the surge level at Reach 2 by 12 percent, when asked to comment on the efficacy of the model, he deferred to Dr. Westerink. (Trial Transcript, Ebersole at 2348). Another example is when he would not agree that the water arrived at the 40 Arpent Levee at 8:30 a.m., he

deferred to Mr. Fitzgerald because he had done the interior flooding analysis." (Trial Transcript, Ebersole at 2415).

While inferring all the while that interior modeling for the flooding of the Central Wetlands Unit and the St. Bernard Polder was all Mr. Fitzgerald's doing, Mr. Ebersole clearly "suggested" to Mr. Fitzgerald to alter the speed with which the breaches formed from an hour to an hour and half so that the water would arrive at 8:30 a.m. at the 40 Arpent Canal. (Trial Transcript, Ebersole at 2417-18). Yet, he continued to state that "he was not involved in the interior flooding I would rather Mr. Fitzgerald comment on these issue." (Trial Transcript, Ebersole at 2417). He also claimed that he had never read the Fitzgerald report. Yet, it became clear through the testimony of Mr. Fitzgerald and his billing text that Mr. Ebersole was quite involved in the creation of Mr. Fitzgerald's results with there being numerous notations of "coordination" between the two.

An entry for the billing period August 23, 2008, through November 9, 2008, Fitzgerald Invoice No. 5, states, “[c]ontinue to coordinate with DOJ and hydrodynamics team on the modeling effort. Work with the interior drainage modeling team. Focus is on developing a levee crest consistent with hydrodynamic analysis, running HEC-RAS, evaluating results, and writing report. Close coordination with all parties continuing.” (PX 2136 at pdf 11). An entry for 11/5-8/2008 states, "[r]efined levee and floodwall locations and elevations through coordination with Bruce, using superior lidar profiles and aerials provided by Bruce. . . ." (PX-2136, Bills of Steven Fitzgerald at pdf 12). These entries culminate on Dec. 13, 2008 when Mr. Fitzgerald “coordinated report clarity with DOJ and Bruce and finalized report." (PX-2136 at pdf 11,)

(Trial Transcript, Fitzgerald at 2771-78). Yet Mr. Ebersole repeatedly opined that he had never read Mr. Fitzgerald's report.

Finally, the most glaring instance of his inability to respond to a direct question was his failure to respond to the Court, as previously noted, when the Court questioned him on the 8:30 a.m. surge data, and he could not explain the arrival of the water at the 40 Arpent Levee at 8:30 a.m. if the peak surge at the Reach 2 Levee was at 8:30. (Trial Transcript, Ebersole at 2721-2722). See also Trial Transcript, Ebersole at 2680). This failure is the fatal flaw in the Government's analysis. The proof of an 8:30 a.m. surge time is overwhelming. If one were to accept the Government's theory of overtopping as the failure mechanism, but triggered that overtopping at the verified 8:30 a.m. peak surge at the Reach 2 Levee, there simply would not be enough water in the Central Wetlands Unit for the overtopping of the 40 Arpent Levee to occur. This application of known and verified facts eviscerates the Government's theory of the case.

Mr. Ebersole also presented numerous photographs that were taken from a video of the length of the Reach 2 Levee which showed the state of levee immediately after the storm. These photographs depict different kinds of scouring and damage which occurred as a result of Katrina's storm surge. Mr. Ebersole contended that these photographs proved his theory of backside erosion based on the number of incidents of sand plumes which he testified indicated that such breaches were caused by backside erosion. "You only get that sediment deposit in that elongated form due to water flowing over the levee and pushing the eroded soil some great distance in a landward direction." (Trial Transcript, Ebersole at 2631). In response to the Court's question, Mr. Ebersole then stated that if it were largely due to front-side erosion, he

would expect to see traces of sediment that would have been pulled downslope, deposited closer to the toe." *Id.*

However, during cross-examination, two salient points were made. One concerned "headcut" evidence advancing into a surface erosion band. There were points where there was neither evidence of front- nor back-side erosion. Thus, these photographs are inconclusive at best. (Trial Transcript, Ebersole at 2632). Also, another point was made when Mr. Ebersole was commenting on the particularly deep nature of a scour hole at the back side of the toe which "formed on the back side as that water would have come rushing into this breach and been concentrated in this particular vicinity . . . working to scour a hole at that particular location of the inboard toe." (Trial Transcript, Ebersole at 2633-34). He admitted that this phenomenon would have happened whether it was front-side wave attack or overtopping because once the top has eroded, water flows through the hole to cause this marker regardless of the method by which the hole was formed. (Trial Transcript, Ebersole at 2634).

Another point about which Mr. Ebersole provided testimony concerned "grass lift-off"–that is the force of energy that it would take for front-side erosion to occur. This testimony included purported models and studies by various experts in the field to refute plaintiffs' theory of the case. However, even Mr. Ebersole opined that there is limited engineering guidance available at present for estimating wave-induced erosion on the front face of the grass-covered earthen levee and that no reliable numerical model is presently available which properly treats all the important physics and factors. JX-211 (Expert Report of Ebersole) at 82.

Furthermore, while at the present time, they are able to use a real physics based approach to relate the two dynamics: water moving over and erosion damage on the back side, Mr.

Ebersole admitted that there is also not enough data to fully understand back-side erosion.[48] (Trial Transcript, Ebersole at 2614-15). In addition, taking Mr. Ebersole's testimony at face value, if his theory and calculations were correct, clearly no portion of the Reach 2 Levee should have withstood the gross overtopping he designed. Thus, it is apparent to the Court that much of the models concerning how erosion is measured is a sheer guess–these models are valiant attempts at understanding physical phenomena. The volume and depth measurements remain unexplained. (Trial Transcript, Ebersole at 2615).

Dr. Wolff opined in his expert report, in decrying the validity of Dr. Bea's model:

> Models can corroborate a hypothesis by offering evidence to strengthen what may be already partially established by other means. Models can elucidate discrepancies in other models. Models can also be used for sensitivity analysis–for exploring "what if" questions–thereby illuminating which aspects of the system are most in need of further study, and where more empirical data are most need. Thus the primary value of the models is heuristic: Models are representation, useful for guiding further study but not susceptible to proof.

JX-210 (Expert Report of Thomas Wolff) at 47 (citing Oreskes, N., Shrader-Frechette, K., and Belitz, K., "Verification, Validation and Confirmation of Numerical Models in the Earth Sciences," *Science*, Vol. 263, 4 February 1994, pp. 641-646). However, it appears to the Court that while Dr. Wolff argues that Dr. Bea's modeling is replete with conjecture, the fact of the matter is that the Government's model depends on one fact that is overwhelmingly disproved by hard, empirical evidence. The peak surge at Reach 2 occurred at 8:30 a.m. not at 7:30 a.m.

[48]When asked by the Court how long would it take for overtopping to destroy a levee or seriously compromise it, Mr. Ebersole testified "[o]ur state of understanding is such that we're not able to really have a criteria that we can really accurately tease out the role of duration. I think the important point is just how high these rates are above our threshold values." (Trial Transcript, Ebersole at 2207).

3. New Orleans East Polder

Simply put, plaintiffs' theory against the Corps in reference to the flooding of the New Orleans East Polder is that the MRGO caused a greater conveyance of water which in turn caused the levees protecting the New Orleans East Polder to be overtopped and/or breached. Plaintiffs contend that the Corps was negligent for failing to have constructed a surge protection barrier across the throat of the funnel which would have prevented virtually all of the flooding in New Orleans East.

Plaintiffs further contend, as previously noted, that the MRGO created a funnel effect, which enhanced the surge especially due to the increased depth and width of the MRGO along Reach II and that the failure of the Corps not to mitigate that circumstance was not prudent. Dr. Kemp testified that as result of the widening and deepening of the MRGO, the velocity of the water became very high around the Paris Road Bridge. It is his opinion that no breaching of theNew Orleans East Levee would have occurred because of the reduced velocities which would have resulted from the construction of a surge protection barrier. Moreover, he testified that the overtopping of the Citrus Back Levee would have been reduced by about 30% in Scenario III. (Trial Transcript, Kemp at page 1840); PX-91 (Kemp Expert Report) at 111.

Dr. Kemp testified that under Scenario III there would be less flooding and no breaching as to the New Orleans East Polder. He testified that about one half of the water would have hit the New Orleans East Polder without the widening of the MRGO and only 18% of the water with no MRGO (i.e. a surge barrier). Therefore, as to plaintiffs, Norman Robinson and his wife, they would have had approximately 6 feet of water if the MRGO had remained as designed and with pristine wetlands. Of course, with the MRGO as widened and deepened and the degradation of

the wetlands, the Robinsons received approximately 12 feet of water. (Trial Transcript, Kemp at 1851).

In essence, plaintiffs are alleging the Corps was negligent, not only in the operation and maintenance of the MRGO, but in its failure to construct a surge protection barrier that would have prevented increased velocities and flow that affected the New Orleans East Levee system and ultimately caused the flooding.

The Corps relies in part on the Bretschneider and Collins Report which ultimately concluded in part "it is seen that the effect of the Mississippi River Gulf Outlet is almost negligible for all large hurricanes accompanied by slow-rising storm surges." (Trial Transcript, Kemp at 2021); PX-0068 (Bretschneider and Collins Report) at 4.

It should be noted that the surge modeling done by the Corps and plaintiffs did not vary significantly between the MRGO as designed and the MRGO as widened in reference to the maximum still water height. The modeling shows that the actual still water height was not much different in Scenario I or Scenario III. However, the plaintiffs' theory is not dependent upon the still water height, but the actual amount of water conveyed as result of the widening and deepening of the MRGO.

Dr. Kemp criticized the Breitscheider & Collins Report arguing that the Corps misinterpreted certain aspects thereof. Moreover, Dr. Kemp points to a critique of that report by Dr. Hsu done in 1972. (Trial Transcript, Kemp at 2019-21). The Breitscheider & Collins Report findings were confirmed in relation to the surge that was recorded during Hurricane Camille. Nonetheless in hindsight, it may have been prudent to commission another study of the effect of the MRGO in its widened dimension; however, this undertaking was not completed prior to

Hurricane Katrina.[49] Notwithstanding this fact, plaintiffs did not present sufficient evidence that the Corps was unreasonable or negligent in relying in the conclusions set forth in that report.

Utilizing the duty risk analysis discussed, *infra*, the Court finds that under the circumstances a duty did not exist to construct a surge protection barrier. Thus, there could be no breach of that duty and no liability on the part of the Corps for the flooding in the New Orleans East Polder.

Moreover, this Court has already held that the Corps is only exposed to liability for negligent operation and maintenance of the MRGO and is not liable for any negligence relating to the original design and construction of the channel. To the degree that plaintiffs' claims rest on the proposition that a "funnel" caused an increase in volume of surge and velocity, that funnel was inherent in the original design. As noted, Norman and Monica Robinson were the only plaintiffs residing in the New Orleans East Polder. As demonstrated in Scenario 3, under an "as designed" construct, meaning the MRGO in design dimensions with no harm to vegetation, their property would have experienced approximately six feet of flooding. This fact indicates that a substantial portion of the harm would have arisen from the original design and presents substantial causation issues which will not be discussed based on the Court's finding of no negligence. Additionally, §702c is implicated in the construction of a surge barrier as it is might be considered part of a flood protection system. Moreover, the Court is not convinced that the

[49]A second study was conducted by the Corps beginning in 1999 but was not completed until Septeber of 2005 after Hurricane Katrina. PX-204 (Mississippi River Gulf Outlet Effects on Storm Surge, Waves and Flooding During Hurricane Katrina, July 11, 2008) at 22, at pdf 23.

breaching and/or overtopping in the New Orleans East Polder are likewise free of §702c issues.[50]

4. Conclusions as to Causation

Based on the foregoing analysis, the Court finds that the Corps' negligent failure to maintain and operate the MRGO properly was a substantial cause for the fatal breaching of the Reach 2 Levee and the subsequent catastrophic flooding of the St. Bernard Polder occurred. This Court is utterly convinced that the Corps' failure to provide timely foreshore protection doomed the channel to grow to two to three times its design width and destroyed the banks which would have helped to protect the Reach 2 Levee from front-side wave attack as well as loss of height. In addition, the added width of the channel provided an added fetch which created a more forceful frontal wave attack on the levee.

These findings are visually supported with another graphic presented in post-trial briefing by plaintiffs. See Graphic No. 15A-D. These photographs depict all of the salient information adduced at trial. The bright green channel shows the authorized dimensions of MRGO in comparison to the vastly larger yellow shoreline of the degraded MRGO. The red measurements show the amount of southern shore that was lost because of the Corps' lassitude in building the foreshore protection that was needed and was authorized in the initial legislation. The pink measurements demonstrate the narrowness and reduction in berm width from the needed 500 feet to as small as 134 feet. The blue measurements show the loss of the north shore marshland

[50]The Government has introduced a number of exhibits and some testimony relating to the decision not to construct a surge protection barrier (the so-called Crosby plan) as not being economically feasible and several other considerations. This evidence implicates the discretionary function exception which will not be discussed here due to the Court's finding of no negligence.

which add to a substantially increased fetch which created greater wave action that acted on that levee. Finally, the white encased numbers show the pre-Katrina sill heights and the teal marks show with accuracy and specificity the effect of the Corps' failures on its own levee–the specific breaches and the resulting sill heights. Indeed, a picture speaks a thousand words. The Corps' "Navy vessel" devastated this levee.

As to the models used by plaintiffs, the Court recognizes that some "scaling" was done by plaintiffs as well; however, the salient, overarching point which the Court finds unequivocally is that the peak surge at the Reach 2 Levee occurred simultaneously with the topping of the 40 Arpent Levee at 8:30 a.m. The explanation provided by plaintiffs met the burden of proof sufficient for this Court to find that their explanation of the breaching of the Reach 2 Levee is correct.[51] On the eighth day of trial, Dr. Kemp testified concerning a graph entitled "Observed, Modelled, and Adjusted Katrina Hydrographs: IHNC@ Lock." See Graphic No. 16, Kemp's Demonstrative Slide No. 163. Dr. Vrijling's FINEL model jived perfectly with the Lockmaster's observations at the IHNC lock which were accepted as true by the IPET team. That reality is overriding. The Corps' entire theory of the mechanism of failure–backside erosion–rests on a 7:30 a.m. peak surge at Reach 2, not 8:30 a.m. as plaintiffs' model concludes (that being the ten minute difference between 8:40 a.m. and 8:30 a.m. for the peak to run up the MRGO and hit the IHNC Lock). Mr. Ebersole could not make his theory work without changing and "scaling" far too many of his inputs into the various models.

[51]The Court is aware that a number of points of contention were raised by the Government concerning plaintiffs' arguments and methods; however, the Court is convinced that the plaintiffs' model and the empirical evidence that the peak surge occurred at the Reach 2 Levee at 8:30 a.m. clearly underscores the efficacy of plaintiffs' theory and renders its alleged pitfalls unimportant in the larger picture.

As to the flooding of the St. Bernard Polder, one distinction must be drawn between the Lower Ninth Ward flooding and the St. Bernard flooding. As noted, there were two catastrophic breaches of the floodwalls at the IHNC which caused some flooding of the Lower Ninth Ward prior to the breaching of the 40 Arpent Levee. There was clear testimony by both plaintiffs and defendant that the north and south breaches of the east side of the IHNC did not contribute greatly to the Lower Ninth Ward being flooded. (Trial Transcript, Bea at 1225-26). Dr. Bea testified that plaintiffs and defendants agreed that about 88 to 90 percent of the Lower Ninth Ward was caused by the Reach 2 breaches (Trial Transcript, Bea at 1224, 1259), and Mr. Fitzgerald testified that they do not disagree in a significant level. (Trial Transcript, Fitzgerald at 2745). As such, the Court will address the effect of the IHNC breaches in the context of damages, *infra.*

II. Conclusions of Law

A. Immunity and Exceptions to the FTCA

The Government raised the following defenses to this action:

A. Section 702c Immunity based on the Flood Control Act of 1928

B. The FTCA's "Due Care" Exception

C. The FTCA's Discretionary Function Exception

For the reasons that follow the Court finds neither the immunity of § 702c or the exceptions to the FTCA are available to the Corps.

1. The Flood Control Act

As noted at the outset of this opinion, this Court has consistently rejected the Government's reliance on § 702c to protect its actions from this suit. Based on the Court's reading of *Central Green Co. v. United States*, 531 U.S. 425 (2001) and the Fifth Circuit's analysis on this subject in *Graci v. United States*, 456 F.2d 20 (5th Cir. 1971), this Court granted in its May 2, 2008, opinion plaintiffs' motion for summary judgment to reject the Corps' § 702c defense "insofar as the United States may be found liable for damages caused by its negligence that are extrinsic to the LPV." *In re Katrina Canal Breaches Consolidated Litigation (Robinson)*, 577 F. Supp.2d 802, 827 (E.D.La. 2008). Trial of this matter has rendered this Court even more convinced of the validity of its decision in this regard.

The course of conduct of the Corps, i.e. its failure to provide foreshore protection to insure that the MRGO channel remained within its design dimensions, does not concern the LPV directly. Indeed, the Corps acknowledged that foreshore protection was to be charged to the MRGO with respect to the south shore of the MRGO and was discussed initially in terms of the prevention of the eroding effect of wave wake on the channel.

As noted above, Design Memorandum No. 1-B for the MRGO, penned initially in September of 1958 and revised in May of 1959 prior to the authorization of the LPV in 1965 stated:

> 19. Channel protection. No channel protection is recommended initially; however, **erosion due to wave wash in open areas can be expected in the upper part of the channel slope where the peat and highly organic clays are exposed. Protection for this area can be provided if and when the need for it becomes necessary. No channel protection is included in the overall cost estimate of the** project. . . .

PX -0699 (MRGO Design Memorandum 1-B (Revised 1959)) ¶19 at 5. Indeed, by 1967, as noted, the Chief of Engineers in Washington, D.C., apparently aware of the need, ultimately decided that all of the cost of foreshore protection, not only on the south bank of the MRGO but also on the north bank of the GIWW, should be charged to the MRGO project. DX-1483 (MRGO GDM No. 2, Gen. Supp. No. 4 ("Foreshore Protection" 29 April 1968, Appendix B, Inter-Agency Correspondence dated April 24, 1967) at EDP-023-0965, at pdf 77.

Thus, the Corps' decisions were made in the context of the MRGO project, not within the context of the LPV. None of these decisions directly concerned the LPV or its construction. Foreshore protection and addressing salinity issues had to do with wave wash that was causing severe erosion of the banks of the MRGO and led to an exponential growth of the channel far beyond that which was approved by Congress. Thus, the failures at issue here are extrinsic to the LPV and are not subject to §702c immunity. There is no reason for the Court to revisit its decision with respect to the Flood Control Act, and it will not do so.

2. The Federal Tort Claims Act and the Relevant Exceptions

This Court has previously set out in detail the statutory provisions upon which this suit is based and the exceptions sought to be applied by the Government in *In re Katrina Canal Breaches Consolidated Litigation*, 471 F. Supp.2d 684 (E.D.La. 2007) and *In re Katrina Canal Breaches Consol. Litig.(Robinson)*, 627 F. Supp.2d 656, 689(E.D. La. 2009). This opinion will reiterate the legal analysis found in those opinions in light of the testimony, exhibits and factual findings outlined above.

First, as to the burden of proof, "[a]s is generally the case with waivers of sovereign immunity, the plaintiff bears the burden of proving that the government's waiver is applicable. On a related point, several federal courts have held that the burden of proving the applicability of an exception to a waiver of sovereign immunity falls on the United States." Wright and Miller, 14 *Federal Practice and Procedure* § 3658 at n. 11 and n. 12. *See Ashford v. United States,* 511 F.3d 501, 505 (5th Cir. 2007) (Government could not show as a matter of law that it had discretion where prison policy required placing plaintiff in solitary where inmate raised safety concern)("Government needs to establish there was room for choice in making the allegedly negligent decision" for first DFE exception to apply); *Merando v. United States*, 517 F.3d 160 (3d Cir. 2008) (plaintiff bears burden of demonstrating that his claims fall within the scope of FTCA but United States has the burden of proving the applicability of the discretionary function exception); *Marlys Bear Medicine v. United States*, 241 F.3d 1208, 1213 (9th Cir. 2001) (burden of proof of the applicability of the discretionary function exception is on the United States) (citing *Prescott v. United States*, 973 F.2d 696, 702 (9th Cir. 1992)); *Carlyle v. United States*, 674 F.2d 554 (6th Cir. 1982) (plaintiffs' allegations must fall facially outside the exceptions of §2680; however, Government must prove applicability of a specific provision of § 2680; plaintiff need not disprove every exception under discretionary function exception); *Adams v. United States,* 622 F.Supp.2d 996, 1000 (D.Id. 2009) ("The burden of proving the exception is on the [Government]." *See Bear Medicine v U.S. Dept. of Interior,* 241 F.3d 1208 (9th Cir. 2001)); *Sexton v. United* States, 132 F. Supp.2d 967 (M.D.Fla. 2000) (burden of proving applicability of affirmative defense of discretionary function exception falls on the United States); *Cazales v. Lecon, Inc*, 994 F.Supp. 765 (S.D. Tex. 1997) (plaintiff bears initial burden of proving that

subject matter jurisdiction exists under the FTCA; however, the United States bears ultimate burden of proving that discretionary function exception applies in particular case). *But see LeRose v. United States*, 2008 WL 2704517 (4th Cir. 2008) (plaintiffs bore burden of proof to show unequivocal waiver of sovereign immunity existed and to show that none of the FTCA waiver exceptions applied); *Welch v. United States*, 409 F.3d 646 (4th Cir. 2005) (burden is on plaintiff to show that unequivocal waiver of sovereign immunity exists and no exceptions under FTCA apply); *Hawes v. United States*, 409 F.3d 213 (4th Cir. 2005) (burden is on plaintiff to defeat assertion by United States of discretionary exception to Federal Tort Claims Act sovereign immunity waiver).

Thus, at a minimum, it is clear that the Fifth Circuit in *Ashford* placed the burden of proof on the United States on the first prong of the discretionary function exception to demonstrate that the decisions which it claims are shielded by the discretionary function exception are indeed subject to the exercise of judgment assuming plaintiff has properly pleaded a mandate. It is not so clear where this Circuit lies in terms of the burden of proof as to the second prong, that is whether the Government must demonstrate that the action falls into the realm of a policy decision or whether that burden rests with plaintiffs to show that the decision at issue is in the nature of a technical, engineering, or professional judgment or other non-policy based actors rather than about policy.

Regardless, the Court finds that plaintiffs have met the burden of proof that their claims fall under the FTCA. Furthermore, the Government has failed to meet its burden of proof that the applicable exceptions are applicable for the reasons that follow. However, even if the burden

of proof with respect to the exceptions were to rest with the plaintiffs, plaintiffs have fulfilled that burden under the facts of this case.

a. The FTCA

As explained in *United States v. S.A. Empresa de Viacao Aerea Rio Grandense (Varig Airlines)*, 467 U.S. 797 (1984):

> The Federal Tort Claims Act, 28 U.S.C. § 1346(b), authorizes suits against the nited States for damages:
>
> > for injury or loss of property, or personal injury or death caused by the negligent or wrongful act or omission of any employee of the Government while acting within the scope of his office or employment, under circumstances where the United States, if a private person, would be liable to the claimant in accordance with the law of the place where the act or omission occurred.
>
> The Act further provides that the United States shall be liable with respect to tort claims "in the same manner and to the same extent as a private individual under like circumstances." [28 U.S.C.] § 2674.

Varig Airlines, 467 U.S. at 807-08. Clearly, plaintiffs have demonstrated that their claims properly arise under the law of negligence as set forth under the Louisiana Civil Code and as such their invocation of the FTCA is proper.

The inquiry then goes to whether an exception to the FTCA applies. Congress did not waive the sovereign immunity of the United States in all respects. Section 2680 of Title 28 of the United States Code provides two salient exceptions–the due care exception and the discretionary function exception. The statute provides:

> (a) Any claim based upon an act or omission of an employee of the Government, exercising due care, in the execution of a statute or regulation, whether or not such statute or regulation be valid, or based upon the exercise or performance or the failure to exercise or perform a discretionary function or duty

> on the part of a federal agency or an employee of the Government, whether or not the discretion involved be abused.

28 U.S.C. §2680(a). The first part of this statute is known as the "due care exception" and the second part of the statute is known as the "discretionary function exception." Both operate to shield the United States from liability based on the FTCA. The Government has invoked both shields.

b. Due Care Exception

The "due care" exception immunizes the Government from suit with respect to claims based on the execution of a statute or regulation and requires "for its application that the actor have exercised due care." *Lively v. United State*s, 870 F.2d 296, 297 (5th Cir. 1989); *Buchanan v. United States*, 915 F.2d 969 (5th Cir. 1990). This provision "bars tests by tort action of the legality of statutes and regulations." *Dalehite v. United States*, 346 U.S. 15, 32 (1953). Thus, the test for the application of the "due care" exception is to determine (1) whether the statute or regulation in question specifically proscribes a course of action, and (2) if mandated, whether due care was exercised. *Welch*, 409 F.3d at 652; *Crumpton v. Stone*, 59 F.3d 1400, 1403 (D.C. Cir. 1995).

The Government contends that the due care exception applies to plaintiffs' claims concerning the Corps' design, operation, repair, and maintenance of the MRGO because plaintiffs failed to present any evidence that the Corps deviated in any way from the statute authorizing the construction of the MRGO, Public Law 84-455, 70 Stat. 65 (1956). Plaintiffs contend that the Corps was negligent in not installing (1) foreshore protection, (2) a gate at the confluence of the GIWW and the MRGO, (3) a salt barrier at the Bayou La Loutre Ridge, and

(4) remediation of the wetland loss that had resulted form the MRGO. The Corps argues that none of these "preventative measures" can be described as deviations or violations of the legislation authorizing constructing the MRGO, and thus these claims are subject to this exception. (Rec. Doc. 19176, Defendant United States' Post-Trial Memorandum of Law at 24).

To begin, prior to trial the Court found that as concerned the initial design and construction of the MRGO, these actions were shielded by the discretionary function exception. On summary judgment, the Court granted the Government's motion finding there was no violation of any mandate and the decisions made in the construction and design of the MRGO were policy driven. *In re Katrina Canal Breaches Consolidated Litigation (Robinson),* 627 F. Supp.2d 656, 689 (E.D.La. 2009).[52]

However, with respect to the issue of the maintenance and operation of the MRGO, the Government's argument in this regard clearly misses the mark and misinterprets the claims brought against it. The Corps' mandate was to create, dredge and maintain a deep-draft channel on the east side of the Mississippi River that ran from the IHNC eastward along the GIWW to a point near Michaud wherein the channel was to strike a southeasterly course through to and along the south shore of Lake Borgne and through the marshes to and across Chandeleur Sound to the Gulf of Mexico. The channel was to be 36 feet deep and 500 feet wide, increasing at the Gulf of Mexico to 38 feet deep and 600 feet wide. DX-0573 (H.R. Doc. No. 82-245 (1951)) ("Chief's Report"); DX-0051 (Pub. L. No. 84-455, 70 Stat. 65 (1956)). Nothing was presented at trial that convinced this Court that with this mandate, the Corps was also given the latitude to

[52]The Court recognizes that the order language at the end of that opinion does not jive with the ruling in the body of the opinion. The Court made clear to the parties long before trial that it had found that the discretionary function barred claims with respect to the design and construction of the MRGO, and that issue was not subject to trial. The Court will issue an order to amend that language to clarify the opinion in that regard at a later date.

allow the channel to multiply in width and negatively impact the Reach 2 Levee in the manner in which it did. This grant did not and could not have given the Corps the ability to ignore the unbridled growth of the channel. Foreshore protection and actions to relieve the effects of the increased salinity on the surrounding marshes, which were the causes of that growth, were recognized as probable from its inception. By 1967, the Corps recognized the need for that foreshore protection at least for the south shore of the MRGO and simply did not act on the knowledge. Due care was clearly absent in the Corps' actions as to the maintenance and operation of the MRGO. This exception is unavailable to the Corps.

c. Discretionary Function Exception

The discretionary function exception bars claims based on the performance of a discretionary function and has no requirement to exercise due care. In fact, the statute specifically dictates that immunity attaches regardless of whether the discretion is abused. *Lively*, 915 F.2d at 297. In *Ashford*, the United States Court of Appeals for the Fifth Circuit recently set forth a succinct and workable explanation of the two distinct prerequisites for the application of the discretionary function exception. In discussing whether the exception applied as a matter of law, the court stated:

> We begin with the basics. Generally, sovereign immunity bars suits against the Government; this notion "derives from the British legal fiction that 'the King can do no wrong,' and therefore can never appear as a defendant in 'his' own courts." [Santana-Rosa v. United States, 335 F.3d 39, 41-42 (1st Cir.2003) (internal citation omitted)]. Under the FTCA, however, the Government has waived sovereign immunity for personal injury claims caused by "the negligent or wrongful act or omission of any employee of the Government while acting within the scope of his [or her] office or employment, under circumstances where the United States, if a private person, would be liable to the claimant in accordance with the law of the place where the act or omission occurred." [28 U.S.C. §

> 1346(b)(1)]. While the FTCA takes two steps forward in allowing individuals to receive compensation for the negligent conduct of the Government, it takes one step back with the numerous statutory exceptions that limit the circumstances under which individuals may bring suit. *Id.* [28 U.S.C.§ 2680]. Perhaps the exception that is the most frequent retreat is the discretionary-function exception, which affords the United States protection against any FTCA claim "based upon the exercise or performance or failure to exercise or perform a discretionary function or duty on the part of a federal agency or an employee of the Government." *Id.* [28 U.S.C. §2680(a)]. The Supreme Court has added some flesh to that bare-boned statutory skeleton, setting up a two-part test to determine whether the discretionary-function exception has been triggered. [*United States v. Gaubert*, 499 U.S. 315, 322-23, 111 S.Ct. 1267, 1273-74, 113 L.Ed.2d 335 (1991)]. First, for the exception to apply, the challenged act must involve an element of judgment. [*Id.* at 322, 111 S.Ct. at 1273]. In other words, the Government needs to establish there was "room for choice" in making the allegedly negligent decision. [*Id.* at 323, 111 S.Ct. at 1274]. If a "federal statute, regulation or policy" specifically prescribes a course of action for the federal employee to follow, the employee has no choice but to adhere to the directive. [*Id.* at 322, 111 S.Ct. at 1273]. If the Government can establish that the challenged act involved an element of judgment, step two of the test is met and the discretionary-function exception will apply only if that judgment is of the kind that the exception was designed to shield. [*Id.* at 322-23, 111 S.Ct. at 1273-74].

Ashford, 511 F.3d at 504-05 (5th Cir. 2007). Indeed, the Supreme Court case law interpreting the discretionary function exception unequivocally denies the Government its protection where the actions are unauthorized because they are unconstitutional, proscribed by statute or exceed the scope of an official's authority. *Castro v. United States*,560 F.3d 381 (5th Cir. 2009), *citing Thames Shipyard & Repair Co. v. United States*, 350 F.3d 247, 254 (1st Cir. 2003).

Accordingly, the second inquiry focuses on whether that judgment or choice is based on considerations of public policy. As stated in *Berkovitz v. United States*, 486 U.S. 531 (1988), "'[t]he basis for the discretionary function exception was Congress' desire to 'prevent judicial "second-guessing" of legislative and administrative decisions grounded in social, economic, and political policy through the medium of an action in tort.' *United States v. Varig Airlines* [467 U.S.] at 814." *Berkovitz* 486 U.S. at 537. "[T]he discretionary function exception insulates the

Government from liability if the action challenged in the case involves the permissible exercise of policy judgment." *Id*. Thus, the Fifth Circuit has stated:

> that if Government activity involves conduct that is rooted in policy, the discretionary function exception bars a cause of action based on that conduct unless the Government employee violated a mandatory regulation that restricts his discretion or judgment. Under this interpretation two types of activity would fall within the exception: violations of specific, mandatory regulations or statutes and ordinary common law torts where the exercise of discretion is not based on policy considerations.

Lively, 870 F.2d at 299.

However, the inquiry into what constitutes a "policy" decision is not an easy one. The Government often seeks its cover arguing that virtually every decision is one based in policy. However, the Fifth Circuit specifically rejected the contention of an overly broad application of the exception; the exception is not so limited. The appellate court found that such an interpretation:

> would subsume the FTCA: virtually any decision to act or not to act could be characterized as a decision grounded in economic, social or public policy and, thus, exempt. Although we construe the exception broadly, we have never construed it so that the exception swallows the rule. We therefore reaffirm our holding that in determining whether the discretionary function exception applies, we examine the nature and quality of the activity to determine if it is the type that Congress sought to protect.

Id. Pretermitting the mandate question, the Court will first address the issue of whether a policy decision was involved in this matter.

In the instant matter, the Corps maintains that the Corps' failure to implement mitigation measures and to warn Congress that such measures were necessary is a matter of judgment and choice grounded in considerations of policy and thus protected activity. It argues that there can be no liability for failing to adopt the specific mitigation measures identified because those

measures required additional congressional authorization and funding. As such the Government contends that Congress's failure to appropriate funds for functions is protect by the discretionary function exception. *See Cato v. United States*, 70 F.3d 1103, 1110 (9th Cir. 1995) ("Legislative conduct is discretionary for purposes of the [discretionary function] exception."). In addition the Corps argues that the failure to adequately warn Congress is likewise excepted because inadequate or incomplete reporting to an ultimate decision maker with discretionary authority has repeatedly been held to fall within the bar of the discretionary function exception. Likewise, even if it were permissible to examine the adequacy of the information transmitted by the Corps, the Corps's selection of information to transmit would itself be a protected discretionary function.

Plaintiffs respond that the Corps's defalcations with respect to the maintenance and operation of the MRGO were in direct contravention of professional engineering and safety standards and thus the Corps is prohibited from seeking protection from this exception. Ignoring safety and poor engineering are not policy, and clearly the Corps engaged in such activities. The Court finds the latter argument more compelling in light of the facts and circumstances of this case.

i. The Corps' Failure to Provide Foreshore Protection and Address the Effects of Salt Water Intrusion Were Non-Policy Decisions Concerning Technical, Engineering and Professional Judgments that Directly Involved Safety

This inquiry–whether the Corps' actions were in the exercise of policy or non-policy decision making–is the Court's starting point. As previously noted the purpose of the exception it to prevent judicial second-guessing of "legislative and administrative decisions grounded in social, economic, and political policy through the medium of an action in tort." *United States v. Varig Airlines* [467 U.S.] at 814." *Berkovitz* 486 U.S. at 537. While the Corps maintains that all of its decisions were policy driven, when those decisions concern safety and engineering judgments, this exception is not an absolute shield.

In *Berkovitz,* the Supreme Court specifically rejected the argument that "the exception precludes liability for any and all acts arising out of the regulatory programs of federal agencies." *Id.* at 538. It examined the regulatory scheme under which a polio vaccine was placed into commerce. First, since the government agency had no discretion to issue a license without first receiving the required test data, and plaintiffs in that case alleged that it had not done so, the Supreme Court found that the discretionary function provided no bar. *Berkovitz,* 486 U.S. at 543. In addition, to the extent that plaintiffs averred that the agency licensed the vaccine without determining whether the vaccine complied with regulatory standards or after determining that the vaccine failed to comply, there was no basis for the imposition of the exception as the agency had no discretion to deviate from the mandated procedure. *Id* at 544. Finally, the Supreme Court noted that if plaintiffs' claim was that the Government had made a determination in compliance with regulatory standards, but that determination was incorrect, the

"question of the applicability of the discretionary function exception requires a somewhat different analysis." *Id.* The Supreme Court continued:

> In that event, the question turns on whether the manner and method of determining compliance with the safety standards at issue involve agency judgment of the kind protected by the discretionary function exception. **Petitioners contend that the determination involves the application of objective scientific standards, . . whereas the Government asserts that the determination incorporates considerable "policy judgment."** In making these assertions, the parties have framed the issue appropriately; **application of the discretionary function exception to the claim that the determination of compliance was incorrect hinges on whether the agency officials making that determination permissibly exercise policy choice.** The parties, however, have not addressed this question in detail, and they have given us no indiction of the way in which the DBS interprets and applies the regulations setting forth the criteria for compliance. Given that these regulations are particularly abstruse, we hesitate to decide the question on the scanty record before us.

Id.. at 545. With respect to whether the release of the vaccine survived a motion to dismiss, the Supreme Court noted that the discretionary function did prevent suit for the formulation of policy as to the appropriate way in which to regulate the release of vaccine lots; however, "if the [Government's] policy leaves no room for an official to exercise policy judgment in performing a given act, or if the act simply does not involve the exercise of such judgment, the discretionary function exception does not bar a claim that the act was negligent or wrongful." *Id.*

The central issue is whether the actions or inactions of the Corps with respect to the maintenance and operation of the MRGO constitute policy decisions that are protected by the discretionary function exception. As stated, without addressing for now the issue of whether the alleged violations implicate the violation the mandates contained in the National Environmental Policy Act of 1969 which would rendered this exception inapplicable under the first prong of the test, the salient issues to consider as to this second prong of the discretionary function exception

is whether the Government actor was (1) acting in contravention of its own regulations or standards or (2) exercising a policy choice.

Plaintiffs have proven that the Corps knew the dangers that the MRGO was creating by virtue of its own engineering mistakes. The most glaring issue the Court sees is in the context of the state negligence claim itself–its failure to implement foreshore protection when it recognized or should have recognized the extreme degradation that failure caused to the Reach 2 Levee. In addition, the Corps' failure to warn Congress officially and specifically and to provide a mechanism to rectify the problem by properly prioritizing the requested funding to alleviate life threatening harm which the MRGO posed is the key. Regardless of the policy issues, where:

> the Government has undertaken responsibility for the safety of a project, the execution of that responsibility is not subject to the discretionary function exception. The decision to adopt safety precautions may be based in policy considerations, but the implementation of those precautions is not. For example, in ***Kennewick [Irrigation Dist. v. United States,* 880 F.2d 1018 (9th Cir. 1989)], where a break in an irrigation canal was at issue, we held that the canal's design was protected from liability but that the actual construction was based not on policy, but rather on technical considerations, and therefore not subject to the discretionary function exception. . . .**
>
> The Government cannot claim that both the decision to take safety measures and the negligent implementation of those measures are protected policy decisions. This argument would essentially allow the Government to "administratively immunize itself from tort liability under applicable state law as a matter of 'policy.'" *McGarry v. United States*, 549 F.2d 587, 591 (9th Cir. 1976).

Marlys Bear Medicine, 241 F.3d at 1215 (emphasis added).

Indeed, as noted above, Corps' officials admitted at trial that the Corps had a duty to report to Congress the fact that the MRGO was a threat to human life. As noted, *infra* at n. 20, Gregory Breerwood, the Corps' Chief of Dredging from 1984 to 1986 testified that if at any time that he or any of his co-workers suspected or determined that a project would have been detrimental to the public, that steps would have been taken either to "go to the proper authorities

or to the proper offices to assure that particular deficiency was dealt with and remedied." (Trial Transcript, Breerwood at 505, 510). The failure of the Corps to recognize the destruction that the MRGO had caused and the potential hazard that it created is clearly negligent on the part of the Corps. Furthermore, the Corps not only knew, but admitted by 1988, that the MRGO threatened human life. DX-1057 (Mississippi River-Gulf Outlet St. Bernard Parish, La. Bank Erosion Reconnaissance Report, February, 1988) at 10-11, pdf 63, EDP-023-1033-34, and yet it did not act in time to prevent the catastrophic disaster that ensued with the onslaught of Hurricane Katrina.

Furthermore, the Court finds compelling the *Marlys Bear Medicine* analysis of the Government's contention that it does not need to prove it actually considered the policy it invokes for discretionary function protection, rather it only must demonstrate that the decision is susceptible to policy analysis. In *Marlys Bear Medicine*, the Government argued that its decision not to ensure that adequate safety measures were taken with respect to the training of loggers was a policy decision due to limited funds. The appellate court noted that the Government's logic was based on its having misconstrued the Ninth Circuit's language in *Miller v. United States*, 163 F.3d 591, 593 (9th Cir. 1998) which stated that a "'decision need not be actually grounded in policy considerations, but must be, by its nature, susceptible to a policy analysis,'" language that actually comes out of *Gaubert*. *Marlys Bear Medicine*, 241 F.3d at 1216. The appellate court noted:

> The government misconstrues *Miller* in two fundamental ways. First, our inquiry into the nature of a decision is not meant to open the door to ex post rationalizations by the Government in an attempt to invoke the discretionary function shield. We have held that the Government has the burden of proving the discretionary function exception applies, see *Prescott*, 973 F.2d at 702, and this is not done by mere subjective statements. There must be reasonable support in the

> record for a court to find, without imposing its own conjecture, that a decision was policy-based or susceptible to a policy analysis. The passage from *Miller* is a paraphrase of a section of the Supreme Court's opinion in *United States v. Gaubert*, 499 U.S. 315, 324-35, 111 S. Ct. 1267, 1113 L.Ed.2d 335 (1991), addressing cases where "established governmental policy [. . .] allows a Government agent to exercise discretion." There was no such established policy here. Moreover, the quoted language was used illustratively to draw a distinction between protected discretionary activities (*e.g.*, selecting the method of supervising savings and loan associations) and unprotected discretionary activities (*e.g.*,driving a car), not to widen the scope of the discretionary rule. It therefore should not be used to allow the Government to create after-the-fact justifications for the purpose of liability protection.
>
> **Second, none of our cases have suggested that this language from *Miller* is intended to change our long-held doctrine that safety measures, once undertaken, cannot be shortchanged in the name of policy.**

Id. 241 F.3d at 1216-17 (emphasis added). Clearly, in this instance the Corps shortchanged the inhabitants of New Orleans and the environs by its myopic approach to the maintenance and operation of the MRGO. It simply chose to ignore the effects of the channel; it only examined the requirements to keep the channel open regardless of its effects on the environment and the surrounding communities. Indeed, prior to Hurricane Katrina, it grounded its engineering position that the MRGO had no adverse effects with respect to storm surge on the Bretschneider and Collins report done in 1966. The findings of that study were based on the "as designed" parameters of the channel–that is 500 feet wide by 36 feet deep. By 1972, any layperson, much less an engineer, could see that the dimensions of the channel had already grown excessively. JX-0195 (FitzGerald Report) at E2. There is no policy involved in such immense engineering failures which threatened the safety of a major metropolitan area which duty the Corps is charged with protecting.

Another instance, cited by the Supreme Court in *Berkovitz*, as illustrative of the scope of the discretionary function exception, is that found in *Indian Towing Co. v. United States*, 350

U.S. 61 (1955). It has been noted that the discretionary function exception was not at issue in *Indian Towing*; nonetheless, it has been used in the analysis of discretionary function exception cases by the Supreme Court. The Supreme Court characterized *Indian Towing* as follows:

> The plaintiff in that case sued the Government for failing to maintain a lighthouse in good working order. The Court stated that the initial decision to undertake and maintain lighthouse service was a discretionary judgment. . . . The Court held, however, that the failure to maintain the lighthouse in good condition subjected the Government to suit under the FTCA. . . . The latter course of conduct did not involve any permissible exercise of policy judgment.

Berkovitz, 486 U.S. at 538 n. 3. Indeed, the Supreme Court stated eloquently in the *Indian Towing* decision:

> [T]he Coast Guard need not undertake the lighthouse service. But once it exercised its discretion to operate a light. . ., it was obligated to use due care to make certain that the light was kept in good working order; and, if the light did become extinguished, then the Coast Guard was further obligated to use due care to discover this fact and to repair the light or give warning that it was not functioning. If the Coast Guard failed in its duty and damage was thereby caused to petitioners, the United States is liable under the [Federal] Tort Claims Act."

Indian Towing, 350 U.S. at 69.

Considering the facts as found above, clearly, once the Corps exercised its discretion to create a navigational channel, it was obligated to make sure that the channel did not destroy the environment surrounding it thereby creating a hazard to life and property. When the Corps designed the MRGO, it recognized that foreshore protection was going to be needed, yet the Corps did nothing to monitor the problem in a meaningful way. It was as if the Corps built a factory; it knew after a period of time it would produce deadly emissions; but instead of checking the emissions and correcting its ill-effects before people died of its fumes, the Corps stood by noticing the horrible nature of the air and the soot-ridden nature of that factory and did nothing.

Clearly by 1968, the Corps even recognized that the cost of that protection was properly charged to the MRGO from which the Court can infer that it recognized that such protection was needed, and still the Corps did nothing to protect the berms and south shore of the channel until 1982. By 1988, it knew that indeed all of the engineering blunders that it had made now put the Parish of St. Bernard at risk, despite the existence of a levee which it had spent money to construct, yet it did not do anything until 1991 to protect the north shore. The Corps cannot mask these failures with the cloak of "policy." At some point, simple engineering knowledge–like wave wake is going to destroy the surrounding habitat and create a hazard–cannot be ignored, and the safety of an entire metropolitan area cannot be compromised.

Additionally, at some point during the time continuum from the MRGO's construction, the Corps certainly could have warned Congress about the potential catastrophic loss of life and property. It did not, and funding only comes with knowledge. Even the Corps' own witness testified that it was a failure of duty for the Corps to fail to remediate a known safety problem. (Trial Transcript, Luisa at 3620). Moreover, as was made clear to this Court through the testimony adduced by Mr. Podany (Trial Transcript, Podany at 3343-44) and Mr. Luisa (Trial Transcript, Luisa at 3616-20), there were methods for the Corps to prioritize budgeting matters, and the Corps never placed foreshore protection or any other action to remediate the damage caused by its own non-action at the top of the budgeting heap. Mr. Luisa testified that he had never even seen a funding request for the MRGO. Furthermore, as demonstrated in the late 1990s, once an "emergency" was recognized, the Corps found funding within the extent operating budget to install foreshore protection on the north shore. (Trial Transcript, Luisa at 3620-21). Likewise, it became clear through testimony that the Corps was able to fund foreshore

protection through the maintenance and operation budget when the exigencies were sufficient; it is illogical to think that it could not have taken the same course of action earlier had it not been so negligent. (Trial Transcript, Russo at 3573-74).

This analysis is underscored by a number of cases. In *Copes v. Scott*, 45 F.3d 445 (D.C.Cir. 1995), the District of Columbia Circuit determined that, although the Park Service's failure to maintain an adequate skid resistance on a road surface fell within the discretionary function exception, its failure to post adequate warning signs about the nature of the surface did not. The Court in *Copes* discusses at length the method by which a court must determine whether policy is involved. It framed the inquiry as follows:

> No matter the level at which the decision was made, the nature of the decision, or the impact it had on others, we have consistently held that the discretionary function exception applies "only where 'the question is not negligence, but social wisdom, not due care but political practicability, not reasonableness but economic expediency.

Id. at 450, *citing Sami v. United States*, 617 F.2d 755, 766 (D.C.Cir. 1979) (mere presence of choice-even if that choice involves whether money should be spent-does not trigger the exception).

In *Copes*, it was clear in reaching its decision that the Park Service's failure to maintain an adequate skid resistance on a road surface, that the court recognized that "no regular maintenance would have prevented the road from deteriorating in the way Cope alleges." *Id*. at 451. The facts of that decision are clearly distinguishable from the case at bar. Here, the Corps knew that wave wash would eventually require the construction of foreshore protection. It simply ignored the degradation of the channel and was negligent in its oversight of the project.

This negligence acted to destroy the very protection that the taxpayers underwrote. The Corps made numerous engineering blunders which impacted negatively the safety of an entire region.

Recently, another district court undertook a failure to warn issue using the *Copes* analysis. In *Hayes v. United States*, 539 F. Supp.2d 393 (D.D.C. 2008), plaintiff brought a negligence action against the United States for its failure to warn that a gate along a Rock Creek Park Trail was closed and caused plaintiff to be thrown off his bicycle. The court there rejected the Government's contention that because the relevant regulations concerning signage contemplated the weighing of policy considerations, its actions were shielded from suit. The court stated:

> The conclusion that sign placement decisions are discretionary, however, does not end the Court's inquiry. In order for governmental conduct to fall within the protection of the discretionary function exception, the Court also must determine that the discretion involved is "of the nature and quality that Congress intended to shield from tort liability." *United States v. Varig Airlines*, 467 U.S. at 813, 104 S. Ct. 2755. To be so shielded, the nature of the decision being challenged must have been "grounded in social, economic, and political policy[.]" *United States .v Gaubert*, 499 U.S. at 323, 111 S.Ct. 1267 . . . .
>
> In this case the government argues that decisions regarding sign placement in Rock Creek Park involve the balancing of economic, engineering and aesthetic concerns. . . . Specifically, the government argues that NPS employees consider factors such as: (1) the policy of minimal intrusion upon the natural and historical setting fo the surrounding area, (b) the policy of avoiding the proliferation of signs, (c) engineering judgment, (d) the safety of trail users, (e) aesthetics, (f) the enjoyment of trail users, and (g) budgetary constraints. . . . The government implies that the presence of these considerations in decision-making suffices to insulate these decisions from suit under the FTCA. This argument misses the point.
>
> Under the second step of the *Gaubert* analysis, the question is not whether the challenged decision *involved* policy considerations but whether the nature of the decision is grounded in such considerations. *See United States v. Gaubert*, 499 US. at 324-25, 111 S. Ct. 1267; *Macharia v. United States*, 334 F.3d at 67; *Cope v. Scott*, 45 F.3d at 449. While NPS may, in fact, consider economic, engineering and aesthetic concerns in deciding whether and in what manner to place signs along the portion of the Rock Creek Park Trail in question, the government has

> failed to demonstrate how the nature of these sign placement decisions implicates and is grounded in public policy concerns.
>
> . . . .
>
> The [*Copes*] court found that "engineering judgment" was not a "matter of policy" or an "exercise of policy judgment." *See Cope v. Scott*, 45 F.3d at 452 (citing *Berkovitz v. United States*, 486 U.S. at 545, 108 S. Ct. 1954). The court also rejected the government's invocation of general "economic considerations," reasoning that "[b]udgetary constraints underlie virtually all government activity," *Cope v. Scott*, 45 F. 3d at 449 (quoting *ARA Leisure Servs. v. United States*, 831 F. 2d at 196), and that to permit general economic concerns to trigger the discretionary function exception "would allow the exception to swallow the FTCA's sweeping waiver of sovereign immunity." *Id.*

Hayes, 593 F.Supp. at 402-03.

Certainly, a negligent, on-going engineering decision to let a navigational channel's contours run amuck so that it becomes a substantial cause in the destruction of another huge, expensive Congressional undertaking–that is the Reach 2 Levee–cannot be the kind of decision "of the nature and quality that Congress intended to shield from tort liability." *United States v. Varig Airlines*, 467 U.S. at 813. The Corps' decisions were squarely in the realm of acting to insure the safety of the very channel that the Corps constructed as well as the Reach 2 Levee. The Corps' lassitude and failure to fulfill its duties resulted in a catastrophic loss of human life and property in unprecedented proportions. The Corps' negligence resulted in the wasting of millions of dollars in flood protection measures and billions of dollars in Congressional outlays to help this region recover from such a catastrophe. Certainly, Congress would never have meant to protect this kind of nonfeasance on the part of the very agency that is tasked with the protection of life and property.

Without question, if the facts were that a non-governmental third-party had caused the same degradation of the Reach 2 Levee, which damage this Court is convinced was a substantial

factor in the drowning of St. Bernard Parish, the Department of Justice would be seeking remuneration for the outlays that the Government has made in the reconstruction of the Reach 2 Levee and the expenses incurred in rebuilding the metropolitan New Orleans area. If the FTCA applies so broadly as to shield the Corps from this negligence, then there is no oversight at all available to the taxpaying citizens of this area as well as the nation to insure that the Corps does its job. Congress cannot have meant the shield to be so great.

Another instance where the Government was not shielded by the discretionary function exception can be found in *Andrulonis v. United States*, 952 F.2d 652 (2d Cir. 1991). There, a bacteriologist was severely and permanently injured when a federal government scientist from the Center for Disease Control ("CDC") failed to warn about the obvious dangerous conditions he should have noticed in the laboratory when the rabies virus he had supplied was being used. Suit was brought against the Government and the Second Circuit affirmed the court's finding of liability against the Government. The appellate court found that the CDC doctor's failure to warn of the dangers presented was not the type of conduct for which Congress had waived sovereign immunity, since the doctor's decision not to act did not implicate any policy consideration.

Another seminal discretionary function exception case, which has been alluded to herein, *United States v. Gaubert*, 499 U.S. 315 (1991) was decided by the Supreme Court when the *Andrulonis* suit was on appeal, and the Court summarily vacated the appellate court's opinion in *Andrulonis* and remanded it for further consideration in light of *Gaubert*. The Supreme Court in *Gaubert* emphasized that the discretionary conduct is not confined to the policy or planning level and the importance of the regulatory structure in which the government actors worked.

Andrulonis, 952 F.2d at 654. This approach was warranted in the Court's opinion because the lower courts had been using that approach–that is looking at the level at which a decision was made–to determine whether a policy decision was implicated. Quoting *Gaubert,* it noted:

> For a complaint to survive a motion to dismiss, it must allege facts which would support a finding that the challenged actions are not the kind of conduct that can be said to be grounded in the policy of the regulatory regime. *The focus of the inquiry is not on the agent's subjective intent in exercising the discretion conferred by statute or regulation, but on the nature of the actions taken and on whether they are susceptible to policy analysis. Id*. at 1274-75.

Id. In its opinion, the Second Circuit focused on *Gaubert*'s clarification of *Indian Towing*. The Second Circuit noted:

> *Gaubert*'s import lies in its clarification of *Indian Towing* and its rejection of any simplistic reliance on the dichotomy between planning-level actions and operational-level actions. Policy considerations, however, remain the touchstone for determining whether the discretionary function exception applies. Indeed, the Court carefully reiterated that the exception "'protects only governmental actions and decisions based on *considerations of public policy'" Gaubert*, 111 S. Ct. at 1274 (emphasis added) (quoting *Berkovitz v. United States*, 486 U.S. 531, 537, 108 S. Ct. 1954, 1959, 1000 L.Ed.2d 531 (1988)), and further stated that "the actions of Government agents involving the necessary element of choice *and* grounded in the social economic, or political goals of the statute and regulations are protected." *Id.* (emphasis added).

Andrulonis, 952 F.2d at 654.

The Government argued in that case that the doctor's decision to allow an experiment to proceed was necessary to fulfill the policy objectives of the CDC and thus should be protected. The appellate court rejected that approach noting that to do so would mean that the CDC would be insulated from liability for its employees actions except "only those where the agent had acted contrary to a clear regulation." *Id.* at 655. This scope is too broad. Thus, the appellate court affirmed its previous decision stating, "The general policy of wanting to eradicate rabies and granting officials some discretion to achieve those ends is far too broad and indefinite to insulate

Dr. Baer's negligent conduct in the circumstances of this case." Thus, Dr. Baer's actions "cannot be said to be based on the purposes of the regulatory regime seeks to accomplish." *Id.*

In the context of this litigation, the Government's position is likewise overly broad–that is that all actions taken implicated the Government's policy with respect to maintenance of the MRGO. With safety at the nucleus of the decision, simple engineering mistakes cannot be shielded. *See Copes,* 45 F.3d at 452. (engineering judgment no more matter of policy than objective scientific principles found to be exempt exercise of policy judgment found in *Berkovitz*).

In *Whisnant v. United States*, 400 F.3d 1177 (9th Cir. 2005), a commissary operated and maintained by a government agency over the course of three years became infested with mold which by October 2000 was found to be toxic and carcinogenic. Plaintiff delivered and oversaw employees of his employer who worked there. Whisnant contracted pneumonia, and experienced other ailments. He filed suit against the United States alleging that the Government ignored indications of the dangerous condition of the meat department and intentionally or recklessly permitted employees and customers into it. The district court granted a motion to dismiss based on the discretionary function exception because the agency regulations did not prescribe a specific course of actions with respect to either mold specifically or inspections generally, and because the government's choice in selecting an independent contractor was a decision grounded in policy considerations.

As characterized by the Ninth Circuit Court of Appeals:

> The court rejected Whisnant's argument that the discretionary exception did not apply because he was suing on the basis of the government's negligence in inspecting the premises rather than the government's negligence in selecting Johnson Controls as its maintenance contractor: according to the court,

> Whisnant's "allegations of negligence are irrelevant" to the jurisdictional question. The court also rejected Whisnant's claim that the government's conduct fell outside of the exception because it occurred at the "operational" rather than the "planning or policy-making" level: the court found that the Supreme Court had abolished the operational-planning distinction.

Whisnant, 400 F.3d at 1180. In extremely thorough treatment of the second-prong of the discretionary function exception, the appellate court reversed the district court.

The court began by noting that government action "can be classified along a spectrum, ranging from those 'totally divorced from the sphere of policy analysis,' such as driving a car, to those 'fully grounded in regulatory policy,' such as the regulation and oversight of a bank." *Id.* at 1181, *citing Gaubert*, 499 U.S. at 325 n. 7. The determination of where on that spectrum a set of the facts rests is the challenge the court faces. Reviewing Ninth Circuit jurisprudence, the court then posited that there were two "trends" in the case law. One dominant theme being the need to distinguish between design and implementation–design being shielded; implementation not. The second trend is where professional judgment–particularly judgments concerning safety–are rarely considered to be susceptible to social, economic or political policy. *Id.* The court then reviewed the case law as follows:

> Thus, for example, in a suit alleging government negligence in the design and maintenance of a national park road, we held that designing the road without guardrails was a choice grounded in policy considerations and was therefore shielded under the discretionary function exception, but maintaining the road was a safety responsibility not susceptible to policy analysis. *See ARA Leisure Servs. v. United States*, 831 F.2d 193, 195 (9th Cir.1987). Similarly, in a suit alleging government negligence in the design and construction of an irrigation canal, we held that the decision not to line the canal with concrete was susceptible to policy analysis, but the failure to remove unsuitable materials during construction was not. *See Kennewick Irrigation Dist. v. United States*, 880 F.2d 1018, 1027-28, 1031 (9th Cir.1989). In three cases concerning injuries resulting from the government's failure to post warnings concerning hazards present in national parks, we held that the government's decision not to post signs warning of obvious dangers such as venturing off marked trails to walk next to the face of a

> waterfall, and the government's decision to use brochures rather than posted signs to warn hikers of the dangers of unmaintained trails, involved the exercise of policy judgment of the type Congress meant to shield from liability, *Valdez v. United States*, 56 F.3d 1177, 1178, 1180 (9th Cir.1995); *Childers v. United States*, 40 F.3d 973, 976 (9th Cir.1994), but that such policy judgment was absent when the government simply failed to warn of the danger to barefoot visitors of hot coals on a park beach, *Summers v. United States*, 905 F.2d 1212, 1215 (9th Cir.1990). And in an action for the death of a prospective logger "trying out" for a job with a government contractor at a logging site under the management of a government agency, we held that while the government's authorization of the contract was protected under the discretionary function exception, the government's failure to monitor and ensure safety at the work site was not. *Bear Medicine*, 241 F.3d at 1212, 1214, 1217.

Whisnant, 400 F.3d at 1181-82. The Court then noted that these cases comport with the Supreme Court's pronouncement in *Indian Towing*. The Court reiterated its previous statement, "[a]s we have summarized: 'The decision to adopt safety precautions may be based in policy considerations, but the implementation of those precautions is not . . . [S]afety measures, once undertaken, cannot be shortchanged in the name of policy.'" *Id., citing Bear Medicine*, 241 F.3d at 1215, 1216-17.

Based on that analysis, the appellate court then found that Whisnant's suit was not barred by the discretionary function exception. It noted that plaintiff had not alleged the government was negligent in designing its safety inspection procedures; instead, plaintiff contended that it was negligent in following through on those procedures by ignoring reports and complaints describing the unsafe condition of the meat department. The court continued:

> Like the government's duties to maintain its roads in safe condition, to ensure the use of suitable materials in its building projects, and to monitor the safety of its logging sites, the government's duty to maintain its grocery store as a safe and healthy environment for employees and customers is not a policy choice of the type the discretionary function exception shields. Cleaning up mold involves professional and scientific judgment, not decisions of social, economic, or political policy. "Indeed, the crux of our holdings on this issue is that a failure to adhere to accepted professional standards is not susceptible to a policy analysis."

> *Bear Medicine,* 241 F.3d at 1217 (internal quotation marks omitted); *see also In re Glacier Bay,* 71 F.3d 1447, 1453 (9th Cir.1995) ("Decisions involving the application of objective scientific standards are not insulated by the discretionary function exception because they do not involve the weighing of economic, political and social policy." (quoting *Kennewick,* 880 F.2d at 1030) (alterations omitted)). Because removing an obvious health hazard is a matter of safety and not policy, the government's alleged failure to control the accumulation of toxic mold in the Bangor commissary cannot be protected under the discretionary function exception.

Id. at 1183.

The court subsequently noted that the danger with the discretionary function exception is more pronounced where the government takes on the role of a private landowner. It noted:

> Every slip and fall, every failure to warn, *every inspection and maintenance decision* can be couched in terms of policy choices based on allocation of limited resources. As we have noted before in the discretionary function exception context, "[b]udgetary constraints underlie virtually all governmental activity." Were we to view inadequate funding alone as sufficient to garner the protection of the discretionary function exception, we would read the rule too narrowly and the exception too broadly. Instead, in order to effectuate Congress's intent to compensate individuals harmed by government negligence, the FTCA, as a remedial statute, should be construed liberally, and its exceptions should be read narrowly. *Id.* (quoting *ARA Leisure,* 831 F.2d at 196) (additional citations omitted) (emphasis added).

Id. at 1183-84.

Here, the Court finds that the Corps' non-action to provide in a timely manner foreshore protection and properly maintain the MRGO so as to insure that it existed within the design dimensions is squarely within the purview of *Indian Towing's* dictates as a non-policy based action or omission. *See Ayala v. United States*, 980 F.2d 1342 (10th Cir. 1992) (where mining inspector offers technical assistance, technical judgments are not protected by the discretionary function exception where choice was governed by objective principles of electrical engineering); *Aslakson v. United States*, 790 F.2d 688 (8th Cir. 1986) (decision of governmental agency not to

elevate certain power lines running over lake did not involve evaluation of relevant policy factors and thus not subject to the discretionary function exception).

Further support for this position can be found in *Bean Horizon Corp. v. Tennessee Gas Pipeline Co.*, 1998 WL 113935 (E.D. La. Mar. 10, 1998), where Judge Edith Clement while a district court judge found that there were material questions of fact preventing summary judgment on the discretionary function exception. Suit had been brought against the Army Corps for damages allegedly caused when a dredge dropped a spud on a pipeline that had been improperly marked by the Corps in the contract under which the dredge was operating and where a Quality Insurance inspector was assigned to the dredge.

> Once the Corps takes an action, it must act reasonably with respect to those who are likely to rely upon it. For this very reason, the Corps has a "continuing duty" to use due care to make certain that its charts accurately depict the location of pipelines "once it [takes] it upon itself to indicate the position of one of the pipeline on the chars." *Southern Natural Gas Co. v. Pontchartrain Mat.*, 711 F.2d 1251, 1257, n.8 (5th Cir. 1983).

Bean, 1998 WL 113935 at *7.

In *Alabama Electric Cooperative, Inc. v. United States*, 769 F.2d 1523 (11th Cir. 1985), an electric cooperative brought suit against the Corps for costs of stabilizing its tower which had been undermined by erosion allegedly caused by the Corps. The cause of the erosion was described as follows:

> During 1970 and 1971, the Corps prepared plans and specifications for a series of eleven dikes or jetties along the Alabama River, the purpose of which was to reduce dredging costs by narrowing the channel and accelerating the current, which would theoretically wash away more silt. One of these dikes was located about one-half mile upstream from AEC's tower, extending out from the opposite bank. The alleged effect of this dike was to deflect the current toward the east bank and AEC's tower. Erosion increased substantially and in August of 1981, AEC determined that its tower was in danger of being undermined. Accordingly, AEC stabilized the tower by driving pilings around its base at a cost of $576,114.09.

> AEC subsequently brought this action under the FTCA to recover for the cost of stabilizing the tower

Id. at 1525. During discovery, the Corps admitted that it had not intended to affect the banks of the river and that there was no intention to widen the river at the dike location involved in the suit. A technical report was also produced by Corps which had been published by it prior to the design and construction of the dikes. In that report, factors were noted as relevant in the design and construction of dikes including, among a myriad of things, the necessity of bank protection to preserve property; the necessity that all engineering factors and variable which affect river channel geometry be considered and understood; and the requirement that the river engineer determine the effects of a design in advance.

The Corps took the position that even though this report was "a recognized authority on dike design," the responsible engineer did not recall consulting the publication. Furthermore, it maintained that its engineers were not required by regulation to consider this technical report and that the cooperative had not alleged a specific violation of any specific regulations. In reality, the engineers' testimony indicated that the techniques used for purposes of construction of the dike at issue fell woefully short of the technical elements indicated as necessary by the Corps' own report.

The district court had dismissed the suit finding that the acts of design and construction were discretionary functions exempted from liability. The Eleventh Circuit reversed, finding that the discretionary function exception did not shield the Corps from liability caused by engineering errors. The appellate court began by examining the "nature of the conduct" as required under *Varig* and *Berkovitz* and found that it is clear that there is "nothing to suggest that all *design* decisions are inherently 'grounded in social, economy, and political policy.'" *Id*. at 1531.

The court then reviewed various cases where design decisions were found to be nondiscretionary decisions and others where the design decisions were found to be discretionary. It started with *Seaboard Coast Line R.R. Co. v. United States*, 473 F.2d 714 (5th Cir. 1973). In that case plaintiff contended that a drainage system negligently designed by the Army Corps diverted water undermining its railroad right-of -way. The Fifth Circuit found that the government made a policy decision when it made the *initial decision* to build the drainage system. However, once that decision was made, it was required to perform the building of the drainage ditch in a non-negligent manner. *Id., citing Seaboard Coast*, 473 F.2d at 716.[53] After a painstaking examination of cases, the court concluded:

> where the Corps makes a social, economic or political policy decision concerning the design of a particular project, that decision is excepted from judicial review under § 2680(a). ***In the absence of such a policy decision, the Corps' design decisions are subject to judicial review under the state law tort standards that would normally govern an action for engineering malpractice.***

Alabama Electric, 769 F.2d at 1536-37 (emphasis added).

Based on the foregoing, clearly, the Corps's actions do not satisfy the second prong of the discretionary function. Clearly, the Corps failed to maintain and operate the MRGO in a manner so as not to be a substantial factor in the destruction of the Reach 2 Levee. In addition, it failed to take action that it could have taken to place foreshore protection using the very operation and maintenance funds which proved to be sufficient to fund these actions in the 1990s. Instead, it ignored the safety issues for the inhabitants of the region and focused solely on the maritime

[53]The 11th Circuit properly noted that as *Alabama Electric* was pre-*Varig*, the finding that the *only* policy decision was in the initial decision to build the drainage system, the approach might have to be reexamined. However, the key is to determine whether whatever decision and construction decisions are alleged to have been negligent were policy driven. As noted, the decisions were not policy driven, they were decisions concerning safety that were negligently made.

clients it serviced so well. Furthermore, the Corps failed to inform Congress of the dangers which it perceived and/or should have perceived in the context of the environmental damage to the wetlands caused by the operation and maintenance of the MRGO; in no manner can that decision be shielded by the discretionary function exception. Although the Government has introduced evidence that certain Louisiana congressman as well as other officials had knowledge of certain problems with respect to the MRGO, such general knowledge does not alleviate the Corps' professional duty and obligation to give a specific and detailed accounting of the potential for catastrophe that could occur by virtue of the continual deterioration caused by the MRGO. In the event the Corps' monumental negligence here would somehow be regarded as "policy" then the exception would be an amorphous incomprehensible defense without any discernable contours. Therefore, there is substantial cause to find the discretionary function exception is inapplicable in this instance. The Court will now examine whether the Corps violated its mandate under NEPA and thus cannot be immune from suit.

ii. The Corps Violated a Mandatory Duty in Its Preparation of Various Statements Required Under NEPA Making the Discretionary Function Exception to the FTCA Unavailable.

A. First Prong of the Discretionary Function–Violation of a Mandate

Returning to the first prong concerning a mandate, as stated in *Gaubert*, 499 U.S. at 322, if a "federal statute, regulation or policy" specifically prescribes a course of action for the federal employee to follow, the employee has no choice but to adhere to the directive." Thus, if a Government official violates a mandate, the shield of the discretionary function exception is

removed. The National Environmental Policy Act of 1969, 42 U.S.C. §§ 4321-4370f ("NEPA"), is such a statute.

It is a procedural, not a substantive environmental statute. *Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 351 (1989) ("NEPA merely prohibits uninformed rather than unwise agency action"); *Vermont Yankee Nuclear Power Corp. v. Natural Resources Defense Council, Inc.*, 435 U.S. 519, 558 (NEPA's function is to promote a fully inform and well-considered agency decision; statute does not impose substantive duties on an agency); *Sierra Club v. Espy*, 38 F.3d 792, 802 (5th Cir. 1994) ("NEPA is a procedural statue that . . . does not command the agency to favor an environmentally preferable course of action, only that it make its decision to proceed with the action after taking a hard look at environmental consequences"). Procedural regularity has been strictly scrutinized by courts. *Calvert Cliffs Coordinating Committee, Inc. v. Atomic Energy Comm.*, 449 F.2d 1109 (D.C.Cir. 1971). *See also* 40 C.F.R. § 1502.1 (NEPA procedures are designed "to inform decision makers and the public of the reasonable alternatives which would avoid or minimize adverse impacts or enhance the quality of the human environment").

However, the failure to follow its procedural dictates has been held to defeat the Government's invocation of the discretionary function exception as demonstrated in *Adams v. United States*, 2006 WL 3314571 (D. Idaho Nov. 14, 2006) (Winmill, J.). In this suit concerning the use of Oust, a herbicide, over 70,000 acres of land for a particular project which apparently caused damage to plaintiffs, the Bureau of Land Management's (BLM) filed a motion to dismiss based on the discretionary function exception. The Court noted:

> Applying an herbicide with its attendant risks [decreased reproductive success noticed in rats and slightly toxic to aquatic organisms] to over 70,000 acres of land

> has the potential to be a "major Federal action significantly affecting the quality of the human environment," *see* 42 U.S.C. § 4332(2)(c), triggering at the very least NEPA's duty to prepare an Environmental Assessment (EA), *See* 40 C.F.R. § 1501.4, and perhaps a full EIS. *See Ramsey v. Kantor*, 96 F.3d 434, 442-43 (9th Cir. 1996). Indeed that is why the BLM prepared an EIS in 1991 that examined the use of herbicides other than Oust on rangeland covering a three-state area. . . .
>
> The BLM's failure to comply with NEPA meant that the agency had no discretion–it could not proceed until it complied with NEPA.
>
> . . .
>
> Finally, the BLM argues that NEPA provides no private right of action. This misperceives plaintiffs' use of NEPA. They use it not to recover any remedy but to argue that the BLM was under a mandatory duty. That is not an improper use of NEPA.

Id. at *1-2.

Furthermore, as demonstrated below, the NEPA mandates are clear and unambiguous. There is no basis to argue that a NEPA mandate is a "general guideline" such that non-compliance would not constitute a violation of a mandate. *See Hughes v. United States*, 110 F.3d 765 (11th Cir. 1997) (general postal service guidelines concerning security of post office do not constitute mandate); *Autery v. United States*, 992 F.2d 1523 (11th Cir. 1993) ("saving and safeguarding of human life takes precedence over all other park management activities" guideline is too broad to be considered mandate); *Zumwalt v. United States*, 928 F.2d 951 (10th Cir. 1991) (Management Policies and Project Statements by National Park Service constituted general guidelines with non- placement of warnings along "natural state" monument).

To understand the Court's analysis, a review of NEPA's requirements must be undertaken.

B. NEPA's Regulatory Scheme

NEPA embodies "a broad national commitment to protecting and promoting environmental quality." *Robertson* , 490 U.S. at 347 *citing* 42 U.S.C. § 4331. In *O'Reilly v.*

United States Army Corps of Engineers, 477 F.3d 225 (5th Cir. 2007), the appellate court succinctly reviewed NEPA's framework, terminology and objectives.

> "NEPA . . . was intended to reduce or eliminate environmental damage and to promote 'the understanding of the ecological systems and natural resources important to' the United States." *Dep't of Transp. v. Pub. Citizen*, 541 U.S. 752, 756, 124 S.Ct. 2204, 159 L.Ed.2d 60 (2004) (quoting 42 U.S.C. § 4321). Instead of mandating particular environmental results, NEPA "imposes procedural requirements on federal agencies, requiring agencies to analyze the environmental impact of their proposals and actions." *Coliseum Square Ass'n, Inc. v. Jackson*, 465 F.3d 215, 224 (5th Cir.2006) (quoting *Pub. Citizen*, 541 U.S. at 756-57, 124 S.Ct. 2204).

Id. at 228.

The lynchpin of the NEPA for purposes of this trial as set forth in § 4332(C) requires all agencies of the Federal government to:

> (C) include in every recommendation or **report on proposals for legislation** and **other major Federal actions significantly affecting the quality of the human environment**, a detailed statement by the responsible official on–
>
> (i) the environmental impact of the proposed action,
>
> (ii) any adverse environmental effects which cannot be avoided should the proposal be implemented,
>
> (iii) alternatives to the proposed action,
>
> (iv) the relationship between local short-term uses of man's environment and the maintenance and enhancement of long term productivity, and
>
> (v) any irreversible and irretrievable commitments of resources which would be involved in the proposed action should it be implemented.

42 U.S.C. § 4332(C); *see also Coliseum Square Ass'n, Inc. v. Jackson*, 465 F.3d 215, 224 (5th Cir. 2006). This mandated detailed report, known as an Environmental Impact Statement or "EIS," serves a dual purpose:

> It ensures that the agency, in reaching its decision, will have available, and will carefully consider, detailed information concerning significant environmental impacts; it also guarantees that the relevant information will be made available to the larger audience that may also play a role in both the decision making process and the implementation of that decision.

Robertson, 490 U.S. at 349. Thus, as stated early on in the case law concerning NEPA:

> Environmental impact statements are not confidential or internal documents for agency eyes alone. . . , "NEPA was intended not only to insure that the appropriate responsible official considered the environmental effects of the project, **but also to provide Congress (and others receiving such recommendation or proposal) with a sound basis for evaluating the environmental aspects of the particular project or program."** [*Save Our Ten Acres v. Kreger*,] 472 F.2d at 466.

Environmental Defense Fund, Inc. v. Corps of Engineers of U.S. Army, 492 F.2d 1123, 1140 (5th Cir. 1974) (emphasis added).

EIS

Federal agencies receive guidance in their preparation of an EIS from the Council of Environmental Quality ("CEQ"). "Established by NEPA with the authority to issue regulations interpreting that statute, the CEQ has promulgated regulations determining what actions are subject to that statutory requirement." *Coliseum Square Ass'n*, 465 F.3d at 224 *citing* 40 C.F.R. § 1500.3; *see also Pub. Citizen*, 541 U.S. at 757, 124 S.Ct. 2204.

As noted, "NEPA requires an agency to produce a **full EIS** only where the agency proposes to undertake a project that qualifies as a 'major Federal action[ ],' and then only when that action 'significantly affect[s] the quality of the human environment.'" *O'Reilly*, 477 F.3d at 228 *citing* 42 U.S.C. § 4332(2); *Coliseum Square*, 465 F.3d at 228. The CEQ regulations provide definitions for a number of these determinative terms.

Major Federal Action

CEQ defines a "[m]ajor Federal action" as "actions with effects that may be major and which are potentially subject to Federal control and responsibility." 40 C.F.R. §1508.18 The relevant regulation continues:

> (a) **Actions include new and continuing activities, including projects** and programs entirely or partly **financed,** assisted, **conducted**, regulated, or approved **by federal agencies**; **new or revised agency** rules, regulations, **plans**, policies, or procedures; and legislative proposals (§§1506.8, 1508.17). . . .
>
> (b) **Federal actions tend to fall within one of the following categories:** . . .
>
> (3) Adoption of programs, such as a group of concerted actions to implement a specific policy or plan; systematic and connected agency decisions allocating agency resources to implement a specific statutory program or executive directive.
>
> (4) Approval of specific projects, such as construction or management activities located in a defined geographic area. Projects include actions approved by permit or other regulatory decision as well as federal and federally assisted activities.

40 C.F.R. § 1508.18 (emphasis added). Thus, the need for an EIS may arise where a continuing activity causes significant effects with respect to a specific construction project in a defined geographic area. Clearly, plaintiffs have demonstrated that there was continuing activity in the form of dredging that helped cause increased salinity and bank erosion. This fact will be discussed in greater detail, *infra.*

Significantly

The regulations also provide a definition for the term "significantly" which states in relevant part:

Significantly as used in NEPA requires considerations of both context and intensity:

(a) *Context*. This means that the significance of an action must be analyzed in several contexts such as society as a whole (human, national), the affected region, the affected interests, and the locality. Significance varies with the setting of the proposed action. **For instance, in the case of a site-specific action, significance would usually depend upon the effects in the locale rather than in the world as a whole. Both short- and long-term effects are relevant.**

(b) *Intensity*. This refers to the **severity of impact**. Responsible officials must bear in mind that more than one agency may make decisions about partial aspects of a major action. The following should be considered in evaluating intensity:

(1) Impacts that may be both beneficial and adverse. **A significant effect may exist even if the Federal agency believes that on balance the effect will be beneficial.**

(2) The degree to which the proposed action **affects public** health or **safety.**

(3) **Unique characteristics of the geographic area such as** proximity to historic or cultural resources, park lands, prime farmlands, **wetlands,** wild and scenic rivers, or ecologically critical areas.

(4) The degree to which the effects on the quality of the human environment are likely to be highly controversial.

(5) **The degree to which the possible effects on the human environment are highly uncertain or involve unique or unknown risks.**

(6) The degree to which the action may establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration.

(7) **Whether the action is related to other actions with individually insignificant but cumulatively significant impacts**. **Significance exists if it is reasonable to anticipate a cumulatively significant impact on the environment. Significance cannot be avoided by terming an action temporary or by breaking it down into small component parts.**

(8) The degree to which the action may adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National

Register of Historic Places or may cause loss or destruction of significant scientific, cultural, or historical resources.

> (9) The degree to which the action may adversely affect an endangered or threatened species or its habitat that has been determined to be critical under the Endangered Species Act of 1973.
>
> (10) Whether the action threatens a violation of Federal, State, or local law or requirements imposed for the protection of the environment.

40 C.F.R. § 1508.27 (emphasis added). Thus, parsing this regulation, an action could be considered "significant" where the "context" is (a) localized and (b) has long-term effects and where the "intensity level" is determined to be severe (c) by balancing beneficial versus adverse effects noting that even if the balance of the effects is considered beneficial, if they are severe a report is mandated, (d) by determining whether it would effect a unique characteristic of the geographic area such as wetlands, (e) by ascertaining whether it involves uncertainty or unknown risks to the human environment and (f) by determining whether one would reasonably anticipate a cumulatively significant impact on the environment. Again, the history of the maintenance and operation of the MRGO fits this description. The effects of the channel on the natural and human environment were significant. Although the record does not demonstrate the Corps ever found such effects were not significant, any find to the contrary was arbitrary and capricious.

Cumulative Impact and Improper Segmentation

"Cumulative impact" is also defined as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions . . . . Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time." 40 C.F.R. § 1508.7. In

applying this regulation, the Fifth Circuit instructs that " a consideration of cumulative impacts must also consider '[c]losely related and proposed or reasonably foreseeable actions that are related by timing or geography." *O'Reilly*, 477 F.3d at 234-35, *citing Vieux Carre Prop. Owners, Residents & Assocs., Inc. v. Pierce*, 719 F.2d 1272, 1277 (5th Cir. 1983).

For instance in *O'Reilly*, the residents of a Louisiana parish affected by dredging and filling of wetlands by a private land developer sued the Corps challenging its issuance of a finding of no significant impact (FONSI) (*See* discussion *infra* re: Environmental Assessments ("EAs") with the issuance of a permit to dredge. In that case, the Court found that the Corps, prior to the request to dredge at issue therein, had already issued 72 permits within a three mile radius of the proposed development covering a total of 18,086.4 acres of which 400.9 were wetlands. *Id*. at 235. In the EA, the Corps stated how "fragmentation" of the wetlands can occur resulting in increased environmental pressures; that there could be a major cumulative impact as a result of all of the dredging if the local population did not become more "pro-active" and acknowledged that this was only the first phase of a project that might have as many as three phases. The appellate court noted, "[s]uch language would seem to warrant a finding of significance, but instead the Corps states, without any exposition, that 'mitigation for impact caused by the proposed project, possible future project phases, and all Corps permitted projects will remove or reduce e[x]pected impacts.'" *Id.* at 235. The court then found that this bare assertion without an explanation of the basis for it rendered a finding that the Corps had acted arbitrarily in the issuance of that EA. *Id.*

A "separate-but-similar" concern is "improper segmentation" which occurs when "Federal agencies may plan a number of related actions but may decide to prepare impact statements on

each action individually rather than prepare an impact statement on the entire group. This decision creates a 'segmentation' or 'piecemealing' problem." *O'Reilly*, 477 F.3d at 236 n. 10. "An analysis of improper segmentation, however, requires that where 'proceeding with one project will, because of functional or economic dependence, foreclose options or irretrievably commit resources to future projects, the environmental consequences of the projects should be evaluated together." *Id*. at 236, *citing Fritiofson [v. Alexander]*, 772 f.2d [1225] at 1281, n. 10 (5th Cir. 1985).

The commentator noted that with respect to cumulative impacts:

> A common example is a highway planned to connect two cities which the highway agency divides into two segments. It then prepares an impact statement covering only the first segment, which does not create environmental problems. The second segment does create environmental problems because it goes through a wilderness area. An objection may be made that by preparing an impact statement only on the first segment the highway agency has committed itself to a continuation of the highway through the wilderness area. If the highway agency had considered both segments together, it could have considered the cumulative impact of the highway on the wilderness area. It could have also considered a location for the highway that would have avoided the wilderness area. The segmentation of the highway in this example has allowed the highway agency to subvert NEPA's purposes.

Daniel R. Madnelker, *NEPA Law and Litigation* §9:11. Likewise, the cumulative impact of the operation of the MRGO, the dredging required by virtue of the failure to provide foreshore protection in a timely fashion was required to be addressed forthrightly. The Corps failed to do so.

EAS

The regulations further provide a vehicle for an agency to prepare a less vigorous report known as an EA where the proposed action is neither "categorically excluded from the

requirement to produce an EIS **nor would clearly require the production of an EIS.** See §§ 1501.4(a)-(b)." *Department of Transp. v. Public Citizen*, 541 U.S. 752, 757-58 (2004) (emphasis added). The Supreme Court in *Public Citizen* continued:

> The EA is to be a "concise public document" that "[b]riefly provide[s] sufficient evidence and analysis for determining whether to prepare an [EIS]." § 1508.9(a). If, pursuant to the EA, an agency determines that an EIS is not required under applicable CEQ regulations, it must issue a "finding of no significant impact" (FONSI), which briefly presents the reasons why the proposed agency action will not have a significant impact on the human environment. See §§ 1501.4(e), 1508.13.

Id. The *O'Reilly* case demonstrates that an EA can be insufficient if indeed the circumstances clearly require the production of an EIS or a SEIS (Supplemental Environmental Impact Statement) because of the "incremental impact of the action when added to other past, present, and reasonably foreseeable future actions" such as the continual dredging of the MRGO.

Supplemental Statements

> "[**An] agency bears a continuing obligation to update its environmental evaluation in response to substantial changes to the proposed action or significant new circumstances**. 40 C.F.R. § 1502.9(c)(1) (1992). The results of this later evaluation are published in a supplemental environmental impact statements ("SEIS"). Based on the findings of the SEIS, the agency must consider anew whether to proceed with the proposed project.

West Branch Valley Flood Protection Association v. Stone, 820 F. Supp 1, 5-6 (D.C. 1993) (emphasis added); *Association Concerned About Tomorrow, Inc. v. Dole*, 610 F. Supp. 1101, 1112 (N.D. Tex. 1985). That "process is triggered when new information presents a '*seriously* different picture of the environmental landscape' such that another in-depth look at the environment is necessary." *West Branch Valley*, 820 F. Supp. at 6., *citing Wisconsin v.*

Weinberger, 745 F.2d 412, 418 (7th Cir. 1984). Section § 1502.9 (c)(1) of the regulations instructs agencies on the procedures for supplemental statements. It states:

> (c) Agencies:
>
> (1) **Shall** prepare **supplements** to either draft or final environmental impact statements if:
>
> (i) The agency makes **substantial changes in the proposed action** that are relevant to environmental concerns; or
>
> (ii) there are **significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts.**

40 C.F.R. § 1502.9(c)(1) (emphasis added).

In *Friends of the Clearwater v. Dombeck*, 222 F.3d 552, 557-58 (2000), the Ninth Circuit noted that in view of NEPA's purpose:

> [A]n agency that has prepared an EIS cannot simply rest on the original document. The agency must be alert to new information that may alter the results of its original environmental analysis, and continue to take a "hard look at the environmental effects of [its] planned action, even after a proposal has received initial approval." [*Marsh v. Oregon Natural Resources Council*, 490 U.S. 360, 374 (1989).](citations and quotations omitted). It must "ma[ke] a reasoned decision based on . . . the significance–or lack of significance–of the new information,"*Id.* at 378, . . . or, 109 S. Ct. 1851, and prepare a supplemental EIS when there are "significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts." 40 C.F.R. § 1502.9(c)(1)(ii). "If there remains major Federal action to occur, and the new information is sufficient to show that the remaining action will affect the quality of the human environment in a significant manner or to a significant extent not already considered, a supplemental EIS must be prepared." *Marsh*, 490 U.S. at 374.

Friends of the Clearwater v. Dombeck, 222 F.3d 552, 556-58 (2000) (footnote omitted); *Blue Montains Biodiversity Project v. United States Forest Service*, 229 F.Supp.2d 1140, 1147-48 (D. Or. 2002). Moreover, "an agency is not free to ignore the possible significance of new information. Rather, NEPA requires that the agency take a 'hard look' at the new information to

determine whether a SEIS is necessary." *Blue Mountains*, 299 F.Supp.2d at 1148,*citing Headwaters v. BLM*, 914 F.2d 1174, 1177 (9th Cir. 1990).

C. Corps' Failure to Comply with NEPA Would Result in the Inapplicability of the Discretionary Function Exception as a Violation of a Mandate

The Corps published its "Final Composite Environmental Statement for Operation and Maintenance Work on Three Navigation Projects in the Lake Borgne Vicinity Louisiana" in March of 1976. PX-186 (Final Composite Environmental Statement for Operation and Maintenance Work on Three Navigation Projects in the Lake Borgne Vicinity Louisiana, U.S. Army District New Orleans, New Orleans, Louisiana, March, 1976) ("FEIS 1976"). Plaintiffs contend that the Corps' FEIS 1976 failed to satisfy the requirements of NEPA in numerous ways.[54] In addition, plaintiffs argue that at no time after 1976 did the Corps prepare any

[54]A sampling of the 15 alleged deficiencies are that the Corps failed to provide:

a. a description of the wetlands environment in the MRGO vicinity as it existed prior to the proposed maintenance dredging and operation of the MRGO, in violation of 40 CFR Part 1500.8(a)(1);

b. a description of the interrelationships and cumulative environmental impacts of the proposed maintenance dredging and operation of the MRGO as it impacts the storm surge environment in the vicinity and other related Federal projects (for example specifically but not exclusively, the locks at Seabrook and Rigolets); the wetlands environment in the MRGO vicinity, and channel erosion, as required by 40 CFR Par 1500.8(a)(1), (a)(3);

c. a description of the probable adverse environmental effects of the Operation, Maintenance and Dredging on the storm hazards in the environment which could not be avoided as required by 40 CFR part 1500.8(a)(5);

d. the interrelationships of the MRGO on other related Federal projects, in particular, the relationship that the MRGO has or may have on the LPV in violation of 40 CFR Par 1500.8(a)(1). Plaintiffs' Exh. 184, John Saia 30(b)(6) Dep. (Sept. 30, 2009 at 126-127; Plaintiffs' Exh. 192, 1976 FEIS at I-11-13;

e. any detail regarding the probable impact of the proposed maintenance dredging and operation of the MRGO on the wetlands environment in the MRGO vicinity as the affect storm surge and channel erosion, as required by 40 CFR part 1500.8(a)(3); and

additional FEIS or SEIS that concerned the effects of the ongoing operation and maintenance activities and the impact of those activities on the human environment. One of the most glaring inconsistencies in the Corps' actions is that after the 1988 Reconnaissance Report wherein the Corps acknowledged significant environmental issues, such as drastic loss of marsh due to erosion and the possible devastating effects on urban areas due to that erosion, the Court still did not supplement the 1976 EIS. The Corps never addressed mitigation measures, alternatives or risks to human life and property, or any other disclosures required by NEPA and its implementing regulations. Finally, between 1980 and 2004, the Corps performed a total of 26 EA's of the MRGO relating to operation and maintenance in which in each instance the Corps found that the operation and maintenance had no significant impact (FONSI) and thus improperly segmented these reports.

The Corps responds that deciding whether to produce an SEIS was a matter of policy-based judgment. They contend that (1) deciding whether "new circumstances or information" was "significant" required an exercise of policy-based judgment contending that bank erosion and loss of marsh were not "significant new circumstances" and that construction impacts to the marsh did not require an SEIS; (2) that NEPA's regulations did not provide a "fixed or readily ascertainable standard" for determining whether an SEIS was required; (3) that the lack of a SEIS did not cause plaintiffs' damage; and (4) even if plaintiffs could show that the Corps concealed or actively

---

> f. any analysis concerning the impact of the operation and maintenance of the of the MRGO on the health and safety of the human environment related to erosion of the banks along the MRGO. Plaintiff's Exh. 181, Gregory Miller 30(b)(6) (Oct. 14, 2008) at 281-282.

(Rec. Doc. 19051, Plaintiffs' Corrected Post-Trial Brief, App. S at 77-79).

misrepresented the dangers posed by the MRGO, the FTCA's deceit and misrepresentation exception, 28 U.S.C. § 2680(h), would bar those claims.

The Court rejects the Corps' arguments and finds that the Corps is not entitled to the protection of the discretionary function exception because it violated the mandated requirements set forth in NEPA. It did so in at least three ways: (1) the 1976 FEIS was fatally flawed; (2) the Corps never filed a SEIS even after it acknowledged substantial changes caused by the maintenance and operation of the MRGO; and (3) it improperly segmented its reporting guaranteeing that the public and other agencies would remain uninformed as to the drastic effects the channel was causing.

While it is clear that decisions to file EISs, SEISs and EAs are committed to the judgment of the agency, *Kleppe v. Sierra Club*, 427 U.S 390, 410 (1976); *Sabine River Auth. v. United States Dep't of Interior*, 951 F2d 669, 677-78 (5th Cir. 1992), that is not the inquiry before this Court. Plaintiffs have presented substantial, clear and convincing evidence outlined above that the Corps itself internally recognized that the MRGO was causing significant changes in the environment–that is the disappearance of the adjacent wetlands to the MRGO and the effects thereof on the human environment–which triggered reporting requirements. The Corps cannot ignore the dictates of NEPA and then claim the protection of the discretionary exception based on its own apparent self-deception.

D. Standard of Review

In determining whether the Corps failed to meet the standards required by NEPA–that is failed to follow its procedural dictates, the Court is confronted with the issue of the proper standard of review. While this issue does not arise in an administrative context, those standards

would seem applicable to this instance. As to whether an EIS is sufficient or adequate, the Fifth Circuit acknowledged that under the Administrative Procedure Act ("APA"), 5 U.S.C. § 706, "a reviewing court shall 'hold unlawful and set aside agency action, findings, and conclusions found to be -(A) arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with the law.'" *Mississippi River Basin Alliance v. Westphal*, 230 F.3d 170, 174 (5th Cir. 2000) citing 5 U.S.C. § 706; *Citizens for Mass Transit, Inc. v. Adams*, 630 F.2d 309, 313 (5th Cir. 1980). In order to undertake this determination, the appellate court has set forth three criteria to determine the adequacy of an EIS:

> (1) whether the agency in good faith objectively has taken a hard look at the environmental consequences of a proposed action and alternatives;
> (2) whether the EIS provides detail sufficient to allow those who did not participate in its preparation to understand and consider the pertinent environmental influences involved; and
> (3) whether the EIS explanation of alternatives is sufficient to permit a reasoned choice among different courses of action

Id. citing *Isle of Hope Historical Ass'n, Inc. v. U.S. Army Corp of Engineers*, 646 F.2d 215, 220 (5th Cir. 1981). *See Daniel R. Madnelker, NEPA Law and Litig* § 10:16 (2009). Obviously, as this is not undertaken under the APA, the Court does not have the administrative record to determine if the conclusion are supported thereby; however, considering the testimony of the Corps witnesses, the Court feels comfortable in undertaking this analysis. Likewise, to determine whether to supplement an EIS based on new information is primarily a question of fact requiring agency expertise and thus is also subject to an "arbitrary and capricious" standard. *Marsh v. Oregon Natural Resources Council*, 490 U.S. 360, 377 (1989).

E. Factual Background with Respect to NEPA Compliance

Operation and Its Effects

As discussed, the 1976 FEIS focused on the maintenance and operation of the MRGO which as the result of sediment, required substantial dredging. From the "Summary," it is clear that the approach the Corps took was simply to examine what the effects of dredging and the placement of the spoils; that approach was the only focus for this report. As concerned bank erosion in the context of Operation and Maintenance, the 1976 FEIS noted that:

> (2) Channel bank erosion. The channel was originally dredged with one vertical to two horizontal feet side slopes. Slopes tend to erode near the top and fill near the bottom as they come to equilibrium angle of repose**. Since construction, the distance between the banks visible above the waterline has increased. Channel bank erosion has been a significant source of sediment in the channel through the land area.**
>
> (3) Other sediment sources. The proportion of sediment coming in from adjacent waters is not yet clearly defined. Prior to construction, Lake Borgne had no major western inlet-outlet of the magnitude now provided by the MR-GO. **Channels between the MR-GO and Lake Borgne are eroding westward at a rate of about 4.5 feet per year (Department of the Army, 1974 E.)** Some of these sediments from Lake Borgne may be entering the MR-GO. . . . another sediment source is the marsh material released by marsh deterioration. This material may be transported to the MR-GO by tidal action, storms, and hurricanes.

PX-186 (FEIS 1976) at I-6, at pdf 18 (emphasis added). From 1963 to 1976, 30 million cubic yards were removed for operation and maintenance purposes which was twice as much as that removed for the initial cut.

This statement ignores and does not mention the concept of wave wash, which the Corps knew would be a problem from the outset, something that increased the need for dredging and which was a major impact of the operation of the MRGO by definition. Neither words "wave

wash" nor "wave wake" even appear in the 1976 FEIS. The effect of wave wash has been a factor with respect to the MRGO since its inception. To prepare a document concerning the operation of this channel and not address this factor, particularly in light of the horrific loss of wetlands that it was causing, was arbitrary and capricious. Indeed, the Corps' own Thomas Podany testified that by 1982, it was widely understood the harmful effect of vessel wave wash and storm wind generated waves on the channel and that as a result the bank had widened. (Trial Transcript, Podany at 3399). This Court cannot but comment that the Corps' approach reminds the Court of the old adage, "Close your eyes and you become invisible." It is beyond arbitrary and capricious–it flies in the face of the purpose of NEPA and ignores the very heart of what "operation" means.

Human Environment and Safety

The 1976 FEIS did not direct itself at all to the health and safety of the human environment with respect to potential bank erosion along the MRGO and its potential impact on the human environment. The Corp's own witness, Gregory Miller so testified. He likewise admitted the same in his Rule 30 (b)(6) deposition. (Trial Transcript, Miller at 3232-34). As noted above, the Corps simply ignored the effect of an ever growing MRGO without any foreshore protection on the viability of the protection that the Reach 2 Levee was to provide.

Salinity and Alternatives

Another change that should have triggered a SEIS is that concerning the Corps' response to the Environmental Protection Agency, Region VI Comments. When the EPA commented that continued maintenance operation will result in degraded water quality and perpetrate increased

salinity levels in the Borgne-Pontchartrain Lake Systems, it stated, "In order to minimize the existing adverse and future long-term (secondary) impacts of the MR-GO, we recommend that mitigative measures that could reduce salinity levels in the Lake Borgne-Pontchartrain System be incorporated into the operation and maintenance of the MRGO project." The Corps response rested on the "fact" that:

> Completion of the Seabrook Lock Complex as covered in the Lake Pontchartrain, Louisiana and Vicinity Hurricane Protection project will reduce salinity levels in Lake Pontchartrain. The proposals for salinity control measure in the MR-GO system would require authorization for new construction features. Such new construction features would require environmental and socio-economic investigation and impact analysis. Consideration of these measures in this assessment of the impacts of the project operation and maintenance is not appropriate.

PX-186 (FEIS 1976) at IX-3, at pdf 203.

Likewise, the Louisiana Department of Public Works commented concerning a more meaningful and factual statement with the reference to the locks at Rigolets and Seabrook. It noted that "a more full explanation is needed to understand that the two structures mentioned do not themselves provide hurricane protection nor control salinity changes." PX-186 (FEIS 1976) at IX-7-8, at pdf 207-08. The Corps response was:

> *Response*: Hurricane protection will be provided by the Lake Pontchartrain, Louisiana and Vicinity project. This project will include a lock and control structure at the Rigolets, a navigation structure and control structure at Chef Menteur Pass, and a lock and control structure at Seabrook. The structures at Seabrook can be operated to modify salinities in Lake Pontchartrain. The structures at the Rigolets and Chef Menteur will be designed and operated to maintain existing hydrologic conditions in Lake Pontchartrain.

Id. at IX-8. These structures were never built and frankly were at risk and known to be at risk since Save Our Wetlands filed suit concerning the EIS that had been completed on the LPV on December 8, 1975 and construction of the locks was enjoined on December 7, 1977. Any reliance by the Corps on these locks to be an agent to combat salinity was highly suspect at that

point and indeed, by February of 1980, the Corps had determined to forego the Barrier Plan. Yet no SEIS was ever filed in this respect.

Environmental/Long-Term Effects

In the summary of the 1976 FEIS, the Corps wrote:

> b. Adverse Environmental Effects: O&M actions periodically change the biotic composition of the designate deposition areas. These areas thus remain in pioneer stages of development. Effects of increased levels of turbidity near dredge operation are believed to be local and temporary. Effects of resolubilization of pollutants when dredged material is resuspended are yet to be determined.

PX-186 (FEIS 1976) at ii, pdf 4. This summary is emblematic of the Corps' approach. The fact that the "operation" of a channel would include ships and the effects thereof apparently is beyond the scope of the report in the eyes of the Corps.

In the comments received by the Corps to the Draft EIS, the Environmental Protection Agency noted that the draft statement should discuss the associated long term project induced impacts resulting form the construction of the MRGO, specifically the loss of 23,000 acres of marsh. PX186 (FEIS 1976) at IX-12. In response the Corps simply stated that this report was solely aimed at the operation and maintenance and was not intended to address impacts of original construction. (FEIS 1976, at IX-3). Such an approach is contrary to the aims and mandates of NEPA as outlined above.

Subsequent Supplements and Reports

1985 SIR

The only filing which augmented the FEIS was filed nine years later and after the LPV Barrier Plan was abandoned. The sole purpose of this filing was to address the Corps' failure to discuss in the 1976 FEIS the need for and the impact associated with the use of over-depth or advanced maintenance. The Corps in this SIR makes absolutely no mention of the subsidence that had occurred since the "overdepth or advanced maintenance" had been undertaken. It does not even note that the top-width of the MRGO had increased considerably which, considering that by 1987 it had gone from 600 feet to 1500, must have been the case. In terms of the "Affected Environments and Impacts," the findings are utterly conclusory in nature and do not mention in any manner the bank erosion that in less than 3 years resulted in specific findings of eminent danger. This document likewise raises issues of non-compliance with its NEPA mandate in light of *O'Reilly*.

1988 Mississippi River-Gulf Outlet, St. Bernard Parish, La., Bank Erosion, Reconnaissance Report [55]

The Corps addressed in this report the options for structural bank erosion abatement along three reaches of "critical" erosion on the north bank of the channel. The study was authorized by the Committee on Public Works and Transportation of the United States House of Representatives at the request of Representative Robert L. Livingston "in light of extensive erosion which has been occurring in St. Bernard Parish along the unleveed banks of the Gulf Outlet Channel."

[55]PX-9,(*Mississippi River-Gulf Outlet, St. Bernard Parish, La., Bank Erosion, Reconnaissance Report* ("1988 Recon Rpt") .

In this document, the Corps notes, "[m]ost of the Mississippi River-Gulf Outlet is experiencing severe erosion along its unleveed banks. The erosion is a result of both man-induced and natural forces, including combinations of channelization, ship and wind generated waves, storm activity and subsidence." (1988 Recon. Rpt., at 10) . The report notes that the marshes along the north bank are disappearing "at an alarming rate" and continues:

> Because erosion is steadily widening the MR-GO, the east bank along Lake Borgne **is dangerously close to being breached.** Once the bank is breached, the following **will happen**: sediment from Lake Borgne will flow into the channel resulting in large increases in dredging costs to maintain the channel; **development to the southwest would be exposed to direct hurricane attacks from Lake Borgne**; the rich habitat around the area would be converted to open water; and more marsh would be exposed to higher salinity water.

PX-9 (1988 Recon. Report) at 10-11, pdf at 63-64 (emphasis added).

In a section entitled "Future Conditions" and subsection entitled "Land Resources" the Corps stated:

> Based on recent trends, the study area will continue **to experience drastic losses due to erosion.** The MR-GO east bank along Lake Borgne is dangerously close to being breached. . . .
>
> As the marsh within the project area diminishes, **significant losses to marsh dependent fish and wildlife species will also occur**. Increases in water levels, resulting from the general rise in sea level and subsidence of the land will enlarge land/water interface and accelerate saltwater intrusion.

1988 Recon. Rpt. at 23, pdf at 76 (emphasis added).

Discussing "Problems, Needs, and Opportunities", albeit in the context of the effects on wildlife, the Corps wrote:

> Saltwater intrusion also contributes significantly to marsh loss in the study area. Subsidence and lack of sediment deposition affect marsh loss to a lesser degree. Erosion and disintegration of the banks of the MR-GO has created many additional routes for saltwater to intrude into formerly less aline interior marshes. **Consequently, salinity in the marshes has increased significantly in the last 20 years.**

1988 Recon Rpt. at 27, pdf at 80 (emphasis added).

In discussing various plans that would be possible to address the bank erosion issue, the Corps in a subsection entitled "No Action" stated:

> The unleveed banks of the MR-GO will continue to erode in the absence of remedial action. **Currently, banks of the unleveed reaches are retreating at rates varying from five to over 40 feet per year. The average rate of retreat of the north bank in the 41-mil land cut portion of the waterway is about 15 feet per year.**

1988 Recon. Rpt. at 30, pdf at 83 (emphasis added). Also, buried in the exhibit is a letter dated 10 March 1988 wherein Col. Lloyd Brown of the Corps suggests to the Commander of the Lower Mississippi Valley Division (LMVD) that they proceed directly with a preparation of a supplement to the General Design memorandum for the MR-GO navigation project. Again, Thomas Podany admitted that no later than 1988, the Corps had extensive knowledge about the impact of the MRGO on channel bank erosion and widening (Trial Transcript, Podany at 3401). It is truly beyond cavil that with this report, the Corps acted arbitrarily and capriciously in not filing an SEIS to examine the degradation and problems outlined above.

Mississippi River-Gulf Outlet General Reevaluation Study Report (Draft) September 2005

Finally, while not dispositive as this document is only a draft, it is demonstrative of the attitude and approach to reporting as well as the Corps' negligent approach to the maintenance and operation of the MRGO, the "Mississippi River-Gulf Outlet General Reevavluation Study Report (Draft) was produced in September of 2005. It recommended the continuance of the same operation and maintenance practices and stated, "Because the recommended plan is to continue

current O & M practices, the revaluation EIS was discontinued. The original EIS for the channel [1976 FEIS] written in May 1976 remains valid." JX-349 (Mississippi River-Gulf Outlet General Reevaluation Study Report (Draft) September 2005) at 72-73, 75 pdf .

Use of EAS and FONSIs to Avoid Discussion of Cumulative Effects

The testimony of Dr. Day and the demonstrative exhibits used during his testimony demonstrate beyond peradventure that the Corps' use of EAS and FONSIs was a method by which it avoided having to ever produce another EIS or SEIS. (Trial Transcript, Day at 735-740). Indeed, there was testimony adduced that the Corps chose not to take a course of action because it did not want to file an EIS and deal with the fallout therefrom.

E. The Corps was Arbitrary and Capricious in its Insufficient 1976 FEIS, its Failure to File a Single SEIS and in Its Improper Segmentation and Use of EAS and FONSI's with Its Dredging Activities

Certainly, the exponential increase in the width of the channel caused by erosion brought about by wave wash and the Corps' failure to provide foreshore protection in a timely manner constitute "significant" changes in the environment which triggered the Corps' obligation to file a more complete FEIS in 1976, file a SEIS subsequent to that, perhaps earlier but on no account later than 1988. Moreover, it is clear the Corps knew for a substantial period of time that there were "significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts." 40 C.F.R. § 1502.9(c)(1). A review of the evidence presented leads this Court to believe that the Corps was obdurate and arbitrarily and

capriciously violated its NEPA mandate. Clearly, where an agency's own findings and reports demonstrate a positive belief and objective recognition that the environmental impact of a project that requires on-going action, such as dredging for its maintenance, has created a new detrimental circumstance, such as the decimation of an extremely large swath of wetlands, a SEIS would be mandated. Furthermore, the utter failure to ever properly examine the effects of the growth of the channel on the safety of the human environment violates NEPA. For all of these reasons, the Corps does not have the benefit of the discretionary function exception.

F. Causal Connection to Plaintiffs' Harm

Considering the foregoing review of testimony and documentary evidence, the Court finds that there is the causal connection between the Corps' failures to file the proper NEPA reports and the harm which plaintiffs' incurred. The loss of wetlands and widening of the channel brought about by the operation and maintenance of the MRGO clearly were a substantial cause of plaintiffs' injury. Had the Corps adequately reported under the NEPA standards, their activities and the effect on the human environment would have had a full airing.

iii. Section 2680(h) of the Exceptions to the FTCA

The Corps has raised another exception to the FTCA contending that if the Corps misrepresented or hid the true facts from Congress, any such claim would be barred by the misrepresentation exception to the FTCA. 28 U.S.C. § 2680(h). This exception, as it is relevant to this dispute, applies to claims "arising out of ... misrepresentation." This exclusion does encompass claims for negligent as well as intentional misrepresentation. *Saraw Partnership, v. United States*, 67 F.3d 567, 569 (5th Cir.1995). The *Saraw* Court held that if the

"misrepresentation" is collateral to the negligence urged by the plaintiffs the exception will not apply. *Id.* at 571. Moreover, the *Saraw* Court held that "the essence of an action for misrepresentation is the communication of misinformation *on which the recipient relies*." *Id.* In this case, any so-called "misrepresentation" would certainly be collateral to the negligence comprehensively discussed in the findings of fact herein. Moreover, there is no showing of reliance by the plaintiffs on any alleged misrepresentation made by the government. In fact, the Court is not even certain what misrepresentation would be involved here that would in any way fit into the context of § 2680(h).

In *Commercial Union Insurance Company v. United States*, 928 F.2d 176, 179 (5th Cir.1991), the Court held that there is a two-step process for determining whether a negligence claim is barred by the misrepresentation exception of the FTCA. The Court held that it must be determined whether a chain of causation from the alleged negligence to the alleged injury depends upon the transmission of misinformation by a government agent. *Id.* Certainly, this does not apply here under the most strained interpretation of plaintiffs' theory of the case.

In *JBP Acquisitions, LP v. United States of America*, 224 F. 3d 1260 (11th Cir. 2000) the Court stated:

> JBP argues that the misrepresentation exception does not bar its claims because its claims against the Government are not grounded in "misrepresentation," but instead in the Government's negligent performance of an operational task. In *Block* [*v. Neal*, 460 U.S. 289, 296, 103 S. Ct. 1089, 1093, 75.Ed.2d 67 (1983)], the Supreme Court made clear that the misrepresentation exception "does not bar negligence actions which focus not on the Government's failure to use due care in communication information, but rather on the Government's breach of a different duty." *Block*, 460 U.S. at 297, 103 S.Ct. at 1093-94 (holding that respondent's claim against the government for negligent supervision of the construction of her home was not barred by the misrepresentation exception because the government's "duty to use due care to ensure that the builder adhere to previously approved plans and cure all defects before completing construction is distinct from any duty to use due care in communication information to respondent"); *see also Guild v. United States*, 685 F.2d

> 324, 325 (9th Cir.1982) (explaining that "[t]he Government is liable for injuries resulting from negligence in performance of operational tasks even though misrepresentations are collaterally involved. It is not liable, however, for injuries resulting from commercial decisions made in reliance on government misrepresentations.") Specifically, JBP argues that the Government was negligent in selling it the loan securing the Property and then continuing to act as though it had ownership interest in the Property by negotiating a condemnation award with MAOGA. JBP contends that its tort claims are based on the Government's negligent performance of a particular task, not on the Government's misrepresentations, and, therefore, the claims are not barred by the misrepresentation exception.

Id. at 1265.

In *McNeil v. United States*, 897 F.Supp. 309 (E.D. Texas.1995), the Court held that the FTCA does not bar negligent actions that do not focus on the Government's failure to use due care in communicating information, but on the Government's breach of a government duty. This is clearly the case here and the argument that § 2680(h) applies is completely devoid of merit.

d. Conclusions With Respect to the Discretionary Function Exceptions

The Government has cited a number of cases where the discretionary function exception applied under a variety of circumstances. Plaintiffs have likewise cited cases where the discretionary function did not apply. The Court has reviewed all of these cases, in addition to literally hundreds of other cases discussing the discretionary function exception. The significant majority of the cases dealing with this issue have found that the discretionary function exception applies, where no mandate is involved. This Court has found that a mandate does apply, because of the Corps' failure to comply with NEPA and therefore the Corps cannot avail itself of the discretionary function exception. The Court has also found that even if there were not a mandate the Court could not avail itself of the discretionary function exception pursuant to *Indian Towing* and it progeny.

Clearly, when there is not a mandate, if the decisions at issue are based on policy, the discretionary function exception generally applies. It is the Court's opinion that the negligence of the Corps, in this instance by failing to maintain the MRGO properly, was not policy, but insouciance, myopia and shortsightedness. For over forty years, the Corps was aware that the Reach II levee protecting Chalmette and the Lower Ninth Ward was going to be compromised by the continued deterioration of the MRGO, as has been exhaustively discussed in this opinion. The Corps had an opportunity to take a myriad of actions to alleviate this deterioration or rehabilitate this deterioration and failed to do so. Clearly the expression "talk is cheap" applies here. In the event the gross negligence of the Corps in maintaining the MRGO would be regarded as policy, then the discretionary function exception would swallow the Federal Torts Claim Act leaving it an emasculated statute applying to automobile accidents where government employees are involved or medical malpractice where a government physician is involved. This was clearly not the intent of Congress. Safety concerns are not a talisman in deciding whether to apply the discretionary function exception, but certainly are a very significant consideration. Here, there was no balancing or weighing of countervailing considerations. The failure to maintain the MRGO properly compromised the Reach 2 Levee and created a substantial risk of catastrophic loss of human life and private property due to this malfeasance. Nothing the Corps has introduced into evidence tips the balance in its favor.

B. Negligence and the FTCA

"The FTCA authorizes civil actions for damages against the United States for personal injury or death caused by the negligence of a government employee under circumstances in which a private person would be liable under the law of the state in which the negligence acts or

omission occurred." *Quijno v. United States*, 325 F.3d 564, 567 (5th Cir.2003) (citing 28 U.S.C. § 1346(b)(1) 2674). In this case, Louisiana law controls because the incident occurred here.

Articles 2315 and 2316 of the Louisiana Civil Code provide that every person is responsible for damages caused by his fault or negligence. *See Pitre v. Louisiana Tech Univ.*, 673 So.2d 585, 589 (La.1996). The relevant inquiries are:

> (1) Was the conduct of which the plaintiff complains cause-in- fact of resulting harm?
> (2) What, if any, duties were owed by the respective parties?
> (3) Whether respective duties were breached?
> (4) Was the risk and harm caused within the scope of protection afforded by the duty breached? and
> (5) Were actual damages sustained?

Id. at 589-90.

The existence of a duty presents a question of law which is determined by the facts of each case and the particular risk and harm and plaintiff involved. Moreover, whether a defendant has breached of duty is a question of fact. *Bursztajn v. United States of America*, 367 F.3d 485, 489 (5th Cir. 2004). The Court has already answered the first question by finding that the defendant's conduct was the cause in fact of at least some of the plaintiffs' harm, as is set out, *supra*, in the section on Causation. Under Louisiana law, a land owner owes a duty to discover any unreasonably dangerous condition and either correct that condition or warn of its existence. *Pitre*, 673 So.2d at 590. "It is the Court's obligation to decide which risks are unreasonable, based on the facts and circumstances of each case. *Id.*

As to the second inquiry, here it is manifestly evident that the Corps had a duty not to negligently expose the levee system along Reach II to harm, and it is likewise quite evident that if that levee system were harmed that there was great risk or harm to both people and property. In answer to the third question, such duty was obviously breached as extensively set forth in the

findings of fact and conclusions of law set forth herein. Clearly, as to the fourth question, the risk of harm was within the scope of protection afforded by the duty breached as levees are designed to protect persons and property. The fifth question is like-wise manifestly evident in that there were catastrophic damages that resulted from the breach. Therefore, this Court finds that the Corps of Engineers was negligent under the La. Civ. Code arts. 2315 and 2316 and is thus liable for damages arising from the destruction of the Reach 2 Levee.

The Court rejects plaintiffs' argument that the Corps is liable under La. Civ.Code art. 667 which provides:

> Although a proprietor may do with his estate whatever he pleases, still he cannot make any work on it, which may deprive his neighbor of the liberty of enjoying his own, or which may be the cause of any damage to him. However, if the work he makes on his estate deprives his neighbor of enjoyment or causes damage to him, he is answerable for damages only upon a showing that he knew or, in the exercise of reasonable care, should have known that his works would cause damage, that the damage could have been prevented by the exercise of reasonable care, and that he failed to exercise such reasonable care. Nothing in this Article shall preclude the court from the application of the doctrine of res ipsa loquitur in an appropriate case. Nonetheless, the proprietor is answerable for damages without regard to his knowledge or his exercise of reasonable care, if the damage is caused by an ultrahazardous activity. An ultrahazardous activity as used in this Article is strictly limited to pile driving or blasting with explosives.

La. Civ. Code art. 667.

Plaintiffs allege that they are "neighbors" of the MRGO and its banks, and therefore, are entitled to the relief provided by this article. In *TS & C Investments, L.L.C. v. Beusa Energy, Inc.*, 637 F.Supp.2d 370 (W.D.La.,2009), the court in discussing "neighbors" as defined by art. 667 stated:

> The Louisiana Supreme Court has not declared whether parties similarly situated to the plaintiffs should be considered "neighbors" under Article 667. The magistrate judge concluded plaintiffs are not "neighbors" as that term is used in Article 667, noting "words are to be taken in their ordinary meaning and understood in their normal sense in connection with the context." La. Civ. Code art. 11; *Succession of Doll v. Doll*, 593 So.2d 1239, 1249 (La. 1992); *Wood Marine*

> *Service, Inc. v. Board of Com'rs For East Jefferson Levee Dist.,* 653 F.Supp. 434, 445 (E.D.La.1986), The magistrate judge noted that in its ordinary meaning, "neighbor" is a person who lives near another. Black's Law Dictionary (8 ed. 2004). The magistrate judge also relied on two cases-a federal district court case from the Eastern District of Louisiana and the *Louisiana Crawfish Producers* case-in support of his position. In the federal district court case- *Barasich v. Columbia Gulf Transmission Co.,* 467 F.Supp.2d 676, 690 (E.D.La.2006) (J. Vance)-nine residents, businesses and property owners located along 17 parishes off the Louisiana coast filed suit and alleged defendant oil companies' activities contributed significantly to Hurricanes Katrina's and Rita's destructive impact by damaging Louisiana's marshland. Judge Vance observed Article 667 does not contemplate the "neighbor" relationship plaintiffs asserted, where much of the properties owned by the plaintiffs were hundreds of miles apart.

Id. at 382-83.

Although plaintiffs in *TS & C Investments* were in some instances more than 20 miles away from the site, here the closest plaintiff in St. Bernard or the Lower Ninth Ward would be 3 miles away from the Reach 2 Levee and the MRGO. The Central Wetlands Unit and the 40 Arpent Levee separate the MRGO from the inhabited portion of St. Bernard Parish. Although there is a paucity of guidance in the law as to the proximity required so as to be a "neighbor" for purposes of art. 667, the Court finds that the distance here is too attenuated for these plaintiffs to be so considered.

C. DAMAGES

The Court will outline its approach in determining damages in this matter. As the Court did not allow recovery under La. Civ. Code art. 667, the law of vicinage does not apply; therefore, plaintiffs cannot recover damages for mental anguish when they are not at or near the property at the time the damage occurs. *Harper v. Illinois Central Gulf R.R.,* 808 F.2d 1139 (5th Cir. 1987); *Napolitano v. F.S.P. Inc.,* 797 So.2d 111 (La.App. 4th Cir. 2001). However, the Court will award

damages for inconvenience as some Louisiana cases have allowed stand-alone damages for inconvenience by separating them from mental anguish damages resulting from the loss of property. As the Court has previously stated:

> *Kemper v. Don Colemen, Jr. Builder, Inc.*, 746 So.2d 11 (La.App.2d Cir. 2000), involved the flooding of a number of houses resulting from the failure of the developer to warn of the likelihood of flooding in a subdivision. The court did not award mental anguish resulting from the property damage citing the rule of law set forth herein above. However, the court stated, "While the trial court's award of general damages is not appropriate as an award for mental anguish, it is appropriate as compensation for the inconvenience suffered by the plaintiffs as a result of the flood." *Kemper*, 746 So.2d at 21, citing *Thompson v. Simmon*, 499 So.2d 517 (La.App.2d Cir. 1986). Thus, the court treated inconvenience separate and apart from mental anguish rubric.

In re Katrina Canal Breaches Consolidated Litigation, 2009 WL 982104,*2 (E.D.La. April 13, 2009).

Plaintiffs' damage expert was Scott Taylor who evaluated all losses sustained by each plaintiff including the residence, contents, and additional living expenses. The Government took issue with his approach in determining the value of the contents of the various plaintiffs' homes and/or business. Concerning that method, Mr. Taylor testified that he started at a baseline that the contents would be valued at approximately at 50 percent of the value of the dwelling which is standard practice in the insurance industry. He would then would have the respective plaintiff compile a list and state values for the items contained therein as well. He would review all of this information and arrive at a value. (Trial Transcript, Taylor at 1592-93). Clearly, making this determination is somewhat subjective and is inherently imprecise. Nonetheless, such an approach has been judicially sanctioned. *Pete v. Trent*, 583 So.2d 574 (La. App. 3d Cir. 1991). The Court will now address the individual damages to be awarded hereunder.

Lucille and Anthony Franz

Although plaintiffs argue in their brief that the10 feet of water that impacted the Franz's house is all substantially attributable to the MRGO, the Court finds to the contrary. The Franzs live near the floodwall of the IHNC which breached in two places. Plaintiffs contended that the MRGO was a substantial factor in the breaching of the IHNC floodwalls. This contention is directly contradicted by the unequivocal testimony of plaintiffs' own expert, Dr. Robert Bea. Dr. Bea testified in trial that in either Scenario 1 or 2c, the east walls of the IHNC would have failed regardless of the MRGO. The Court finds the destruction of the home was caused by the six feet of water that rushed through the breaches of the IHNC floodwall causing the destruction of the foundation of the Franz home.

However, the Court notes that the Franz home is a two-story residence and their living quarters are contained on the second story. (Trial Transcript, Franz at 574-75). Clearly without the Reach 2 Levee breaching, the second floor would have not been flooded and the majority of the contents would not have been damaged.[56] The Franzs' list of contents is found at PX-1715, and the majority thereof is clearly in the area where the Franzs lived. Mr. Scott Taylor, plaintiffs' damage expert valued the contents at $120,000 as set forth in his expert report. PX-1714 (Expert Report of Scott Taylor) at 40.

The Court has reviewed the list of contents, examine the report and the testimony of Mr. Taylor and the Franzs and awards $100,000.00 for lost contents.

Tanya Smith

[56]The Court recognizes that at least some of Mr. Franz's winter clothes were lost as they were stored on the first floor. (Trial Transcript, Franz at 571).

The Court has reviewed the testimony of Tanya Smith and the expert report of Scott Taylor in this regard. PX-1709. It should be noted that Ms. Smith purchased her home in 1997 and made significant upgrades including an in-ground pool and hot tub. She spent approximately $165,784.00 for the repair of her home and approximately $14,000.00 of that amount was for upgrades. Mr. Taylor testified that it would cost $22, 716 .00to rebuild the other structures on the property. Her list of contents lost are estimated by Ms. Smith as $143,493.00, and she also seeks additional living expenses in the amount of $44,400.00. The Court also notes that she received $101,000.00 as a Road Home grant. It is the Court's opinion that this not an item to be deducted from her losses as she is obligated to reimburse the Road Home from any insurance proceeds or other recovery she may receive. The Court makes the following award:

Damage to home	$151,784.00
Rebuilding Other Structures	$ 22,716.00
Contents[57]	$105,000.00
Additional Living Expenses[58]	$ 32,500.00
Inconvenience	$ 5,000.00
TOTAL	**$317,000.00**

Kent Lattimore

Having heard the testimony of Kent Lattimore and Scott Taylor and reviewed his expert report for Mr. Lattimore PX-119, the Court awards the following damages:

Damage to home	$ 46,065.00
Contents[59]	$ 45,000.00

[57]It is the Court's opinion that the contents list was overvalued and did not appropriately account for depreciation.

[58]The Court notes that the food costs and transportation seem excessive.

[59]In reference to the contents of Mr. Lattimore's home, he had a number of specialty items such as scuba equipment which justified this amount of this award.

Additional Living Expenses	$ 38,600.00
Inconvenience	$ 5,000.00
TOTAL	**$134,665.00**

Lattimore and Associates

Having heard the testimony of Kent Lattimore and Scott Taylor and having reviewed his expert report for Lattimore and Associates, PX-117, the Court awards the following:

Damage to Building	$118,033.25
Contents	$ 50, 000.00
TOTAL	**$ 168,033.25**

Norman and Monica Robinson

Due to the finding of no negligence on the part of the Corps as concerns the installation of a surge protection barrier, no damages are due to Norman and Monica Robinson.

Accordingly,

For the reasons contained in the foregoing Findings of Fact and Conclusions of Law,

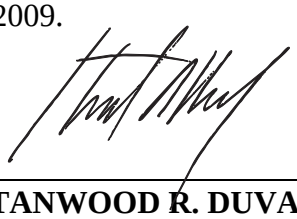
IT IS ORDERED that judgment be entered in favor of certain plaintiffs and against the United States of America in the following manner:

Anthony and Lucille Franz	$100,000.00
Tanya Smith	$317,000.00
Kent Lattimore	$134,665.00
Lattimore and Associates	$168, 033.25

with legal interest to run pursuant 28 U.S.C. § 1961 from date of entry of judgment plus its costs.

IT IS FURTHER ORDERED that judgment be entered in favor of the United States of America and against Norman and Monica Robinson with each party to bear his/her/its own costs.

New Orleans, Louisiana, this 18th day of November, 2009.



STANWOOD R. DUVAL, JR.
UNITED STATES DISTRICT COURT JUDGE