UNITED STATES DISTRICT COURT
EASTERN DISTRICT OF LOUISIANA

IN RE KATRINA CANAL BREACHES CONSOLIDATED LITIGATION — **CIVIL ACTION**

NO. 05-4182

SECTION "K"

PERTAINS TO: BARGE

Mumford	**C.A. No. 05-5724**	***as to claims of plaintiffs Josephine Richardson and Holiday Jewelers, Inc. - ONLY***
Benoit	**C.A. No. 06-7516**	***as to claims of plaintiffs John Alford and Jerry Alford - ONLY***

FINDINGS OF FACT AND CONCLUSIONS OF LAW

The Court conducted a 13-day bench trial concerning negligence claims brought in two suits by four specific plaintiffs[1] ("Plaintiffs") as stipulated by the parties against Lafarge North America, Inc. ("Lafarge"). Plaintiffs contend that Lafarge's allegedly inappropriate handling of Barge ING 4727 (also referred to as "the Barge") was a substantial cause of the north and south breaches of the eastern flood walls along the Inner-Harbor Navigation Canal ("IHNC") resulting in the inundation of the Lower Ninth Ward of New Orleans, Louisiana during the passage of Hurricane Katrina over the city. Specifically, plaintiffs contend that Lafarge's cumulative decisions and negligent conduct leading up to and through Hurricane Katrina resulted in the Barge causing both breaches.

Plaintiffs have brought these negligence claims based on both maritime law and Louisiana state law. In so doing, they seek the application of the *Pennsylvania* Rule[2] which imposes a presumption of causation on a ship that violates a legal rule intended to prevent

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[1]C.A. No. 05-5724:Josephine Richardson, Holiday Jewelers, Inc. and C.A. No. 06-7516: John Alford and Jerry Alford. These suits were consolidated under the BARGE umbrella in the *In re Katrina Consolidated Canal Breach Litigation*, C.A. No. 05-4182. There are numerous other plaintiffs in each case.

[2]*The Pennsylvania*, 86 U.S. 125, 136 (1873).

collisions and application of the *Louisiana* Rule[3] which imposes a presumption of fault on a vessel that breaks free from its moorings and drifts into a stationary object. Plaintiffs called witnesses to prove that the Barge in question had been improperly moored, broke free of its moorings prior to the storm, and that as a result of microbursts, tidal movement and weather conditions including a 20 foot tidal wave, had careened from a location toward the southern end of the canal northward, hitting the floodwall to cause the North Breach. Plaintiffs contend the Barge then moved southward, bouncing off of the floodwall and eventually hitting the floodwall at the southern end causing the cataclysmic South Breach with the Barge leaving the canal and landing in the Ninth Ward.

Defendant maintains that it is scientifically and physically impossible for the Barge to have been present when the breaches at either the north or the south occurred. The winds which the IHNC experienced were not in the proper direction for the Barge to allide in a manner so as to have caused the failures of the IHNC floodwall. The tides were insufficient as well. In addition, defendant argues that the physical evidence at both breaches support these conclusions and belie much of the limited eye-witness testimony.

Jurisdiction is based on the Court's maritime jurisdiction, 28 U.S.C. § 1333[4]. 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.

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[3]*The Louisiana*, 70 U.S. 164, 168 (1865).

[4]See Doc. 18799 in C.A. 05-4182 where parties so stipulate.

I. FINDINGS OF FACT

A. FACTUAL BACKGROUND

1. The Topography of the Relevant Area

The IHNC, also referred to as the "Industrial Canal" was built in conjunction with a lock in 1923 to provide a means of marine navigation between the Mississippi River and Lake Pontchartrain. It runs generally in a north-south direction. Indeed, it has a heading of 15° meaning it is 15° east of due north. The most southern point of the canal feeds into the Mississippi River and its most northern point feeds into Lake Pontchartrain. During World War II, the Gulf Intracoastal Waterway ("GIWW") was rerouted through the IHNC with the Federal Government leasing the lock and a 2.1-mile reach of the canal. At that time, the United States assumed its operation and maintenance eventually purchasing the lock in 1986. *See IHNC Eval. Report,3/1/97*, www.mvn.usace.army.mil/pd/projectslist.

The River and Harbor Act of 1956 authorized the Mississippi River-Gulf Outlet ("MRGO") a navigation channel which was completed in the mid-1960's and which runs from the Gulf of Mexico to the GIWW (Reach 2) in a north-south direction. The MRGO then turns westward (Reach 1) where it then is co-extensive with the GIWW. The MRGO/GIWW then forms a "T" intersection with the IHNC just above the Florida Avenue Bridge. The MRGO provides a hydrologic connection between the IHNC and Gulf of Mexico. See Appendix Nos. 1 and 2. As pictured in Appendix No. 3, the portion of the IHNC that is relevant for purposes of this litigation is that which runs between the Florida Avenue Bridge at the north and the Claiborne Avenue Bridge to the south. This portion of the IHNC transects the Ninth Ward of New Orleans. The IHNC lock is located immediately south of the Claiborne Avenue Bridge.

Because of the lock's presence, there is no hydrological link between the IHNC and the Mississippi River. The East Bank of the IHNC acts as the western border for the Lower Ninth Ward and is protected by a floodwall constructed by the United States Army Corps of Engineers as part of the Lake Pontchartrain and Vicinity Hurricane Protection Plan ("LPV"). (See Appendix No. 2-red demarcation of LPV).

The Lower Ninth Ward was built on an old cypress swamp and has been subject to constant flooding since the early 1800s. (Def. Exh. 196, Expert Report of C.R. Cushing at 3) ("Cushing Report"). It is located in a polder called the Inter-Levee Basin. The area nearest the Florida Avenue Bridge to the north is the lowest point of the ward with the elevation rising as one moves southward toward the Mississippi River. (Def. Exh. 196, Cushing Report at 4-5). At least one expert attributes this lower elevation to the effects of a pumping station which causes ground to settle which station is located at the most northern point of the area. (Transcript, Bakeer, at 2305). (See Photo at Appendix No. 3).

The Floodwall

The floodwall along this stretch of the IHNC was constructed primarily in 1969 and runs parallel to Jourdan Avenue extending from the Florida Avenue Bridge to the North Claiborne Avenue Bridge and the lock system to the south. The type of construction used is known as an "I-wall." This floodwall was described by defendant's expert Dr. Charles Cushing as follows:

> The reinforced concrete floodwall was supported by a steel sheetpile driven to a depth of -9.76 feet, or over 15 feet deep into the earthen levee. The top of the sheetpile is embedded 4'-2" into the concrete wall, which has an overall height of 8 feet and is 2'-0" thick at the base. The concrete panels of the floodwall top were reinforced by ½" and 3/4" diameter vertical rebars spaced on 9 inch centers and a series of ½"diameter bars oriented longitudinally within the wall. The sheetpile

> itself was a hot rolled steel PZ-27 section , with each panel measuring 18" long by 12" wide, with the web and flanges being 3/8" thick.

Def. Exh 196, Cushing Report, at 30. See Appendix No. 4 for pictorial exemplar. Each sheet was interlocked and welded together to create the continuous wall.

The use of I-walls by the Corps in the LPV system was wide-spread and arguably necessitated by space constraints and costs. How deep an I-wall is embedded into the ground controls the stability of the structure. (Transcript, Reda M. Bakeer, Ph.D, at 2289, 2312) ("Bakeer"). As noted, the sheetpile (which was 20 feet in length) along the IHNC was embedded at approximately minus 10 feet below NAVD88 which appears to be shallowest penetration of sheet pile in the entire LPV system. (Transcript, Robert Bea at 2621). However, at the most northern point along the floodwall, a small portion of the wall was replaced in 1980. This new I-wall was constructed with sheetpile which was 12 feet longer–32 feet in length and its tip penetration was at least 15 feet deeper (approximately minus 25 feet below NAVD88). (Def. Exh. 350) (Transcript, Bakeer at 2304).

In addition, as to the overall height of this floodwall, as noted by Dr. Cushing and supported by the IPET[5] Report, while the design elevation for the floodwall in 1969 was 15.0 above MSL, with changes in the method of calculation of sea level and subsidence, the wall top

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[5]IPET is an acronym which stands the Interagency Performance Evaluation Task Force. After Hurricane Katrina, the U.S. Army Corps of Engineers commissioned an independent team of more than 150 international and national experts from more than 50 different government organizations, universities, and private industry soon after Hurricane Katrina to analyze how the hurricane protection system performed during the hurricane. The final report issued will be referred to herein as the IPET Report.

Other reports concerning the levee breaches issued after Katrina as well. These include the "Team Louisiana" Report which constituted the findings of a team of Louisiana scientists hired by the state of Louisiana to gather and document all available data relevant to the failures. This group became known as "Team Louisiana."

The ILIT report is another compendium concerning the findings of the Independent Levee Investigation Team. This report contains the observations and finding of an investigation by an independent team of professional engineers and researchers which was headed by Dr. Robert Bea who testified as an expert for the defendants in this matter.

height was as low as 11.1 ft. The United States Corps of Engineer's own report notes that "incorrect assumptions were made about the datums used for the design, construction and maintenance of the height of floodwalls, resulting in floodwalls built lower than their design height." *Id.* at 32 citing ASCE Report page 66-67.

The EBIA

Between the subject floodwall and the waterway itself, there is a tract of land known as the East Bank Industrial Area ("EBIA") upon which a number of industrial sites were located. Because of the United States' decision to replace what was considered an outdated lock, the Corps undertook the remediation of the area in 2004-2005 as it intended to dredge a bypass canal along it. Two concerns were presented in this undertaking–environmental and mechanical. It had to insure that any contaminated soil in the area caused by the previous industrial tenants would be removed safely. Also, any obstruction to the dredging process had to be eliminated. Thus, all remaining structures, both on land and subsurface, such as piers, pilings, slabs and the like, had to be removed. (Def. Exh. 361, Bea Demonstrative Exhibits, RB22-23). This remediation was completed in April of 2005. Testimony, Bea at 2641-42.

The Lafarge Terminal

The Lafarge North America cement terminal ("the Lafarge Terminal") is located on the west bank of the IHNC. (See photograph at Appendix No. 3). The wharf includes a fendering system and outboard pilings spaced at intervals of nine to ten feet along the dock. (Def. Exh.

196, Cushing Report at 17). From this facility cement was distributed to different companies, as well as Lafarge's own ready mix operations. The cement was transported by manned and unpropelled barges that were moved by tug boats. It is here that the Barge at issue was moored prior to Hurricane Katrina.

The ING 4727 is a typical hopper barge with a 12-foot deep hull, and is 35 feet wide, 200 feet long, and constructed of steel. It has a coaming that surrounds the cargo opening that is five feet high. On top are fiberglass dome shaped portable covers to keep cargo dry. When such a barge is loaded it has a 10-foot draft, which would mean that the 12-foot hull would have 2 feet of freeboard. When such a barge is empty, her "light draft" is 1 feet 4 ½ inches, creating a large, approximately 13-14 foot "sail" or "windage" area extending above the water including the combing and fibreglass dome. (Transcript, Cushing at 2040-41; DX-196, Cushing Report, Fig. 92 and 93, Appendix No. 16).

B. ACTIVITY AT LAFARGE TERMINAL PRIOR TO HURRICANE KATRINA

On Friday, the 26th of August, 2005, Hurricane Katrina was in the Gulf of Mexico. The National Hurricane Center Advisory 12 issued at 11:00 a.m. EDT and projected a three day track which placed New Orleans within the potential strike zone of the hurricane, with the Hurricane forecasted to make landfall east of New Orleans on the Mississippi/Alabama Gulf Coast. (PX-18). By Advisory 14, issued at 5:00 p.m. that same Friday, it was predicted that Hurricane Katrina was to strike within 100 miles of New Orleans. By 5:00 a.m. Saturday morning, August 26, 2005, in Advisory 17, New Orleans was at the center of the cone with Hurricane Katrina striking New Orleans sometime on Monday, August 29, 2005.

Lafarge had been without access to a weather reporting service, or any alternative, due to construction, for approximately one month prior to Hurricane Katrina. (Transcript, Busch at 63). Thus, there was no monitoring of the weather situation. Operations continued without taking this looming catastrophe into consideration.

The Barge was delivered by noon on that Friday. It was filled will Type H cement which is used in the oilfield and which was to be off-loaded with trucks to pick it up on Saturday. Lafarge did not vary this plan even though there was a major hurricane in the Gulf of Mexico and New Orleans was already noted in the possible strike zone cone by 11:00 a.m. on Friday. Unloading operations of the Barge began at 12:20 p.m. on Friday and took approximately 20 hours, ending at around 8:00 or 9:00 a.m. on Saturday morning. (Testimony, Busch at 53). Once unloading commenced, it was imperative for the integrity of the Barge that it be completed.

Mr. Busch, who was the assistant terminal manager in charge at the time, returned to the terminal around 7:00 a.m. on Saturday to meet with a contractor. He testified at trial that he was unaware of the storm's track at that time. At 8:00 a.m. he met with the employees; however, there was no discussion concerning hurricane preparation. It was at approximately this same time that an employee's wife called thus alerting the employees at Lafarge that the hurricane had changed course; that it was no longer headed towards Florida and that it was aimed directly at New Orleans.

It was also approximately at that time Busch learned that the floodgates that were adjacent to the terminal were to be shut by the New Orleans Levee Board. This action, taken in preparation for a direct hit by a major hurricane, required Lafarge to get all equipment and oil

drums on the land side of the wall. (Testimony, Busch at 55). It was after that work was completed, that securing the barges became the focal point of the Lafarge employees.

There were two tiers of barges at the Lafarge dock. The North Tier was comprised of five loaded barges, and the South Tier was comprised of the two Ingram barges, one loaded and the subject Barge unloaded. The only attempt to have the unloaded ING 4727 Barge moved was made when Mr. Busch contacted Zito Fleeting to release the barge for pick-up; however, Mr. Busch did not speak with any person, rather he left a message on the answering machine. He also contacted Joe Domino, Inc. ("Domino") to "top around" the two barges placing the empty barge on the water side rather the wharf side of the canal. (Transcript, Busch at 58). The reason for the Domino call was that Mr. Busch was uncomfortable leaving an unloaded barge next to the wharf. The reason is that an unloaded barge rides substantially higher (approximately 8 feet) in the water than a loaded barge, and thus would be more likely to injure the dock than the loaded one.

Three other employees were on site–Earl Smith, Louis Robin and Roland Johnson. (Transcript, Busch at 56). Mr. Busch instructed Mr. Smith to run the lines "long" to allow the Barge to move with the anticipated rising water caused by Hurricane Katrina and its storm surge. Mr. Smith testified that he had never had any training in mooring a light barge as most of the time, a light barge would be removed from the terminal. In addition, there were no written mooring procedures to follow. While there was a Hurricane Preparation Checklist for the New Orleans terminal (PX-37), Mr. Smith had never seen it.[6]

[6]Much was made at trial with respect to this checklist requiring all barges to be cabled to the shore; however, there was some testimony that the dock had been refitted (apparently since this checklist was made) so that cable was no longer compatible with the dolphin system and simply was not used in that manner. (Transcript, Busch at 67-68). A review of the list makes clear that the focus thereof was to insure that there were no loose items on the

From the overall testimony, it is clear that Mr. Smith did not put lines on all five cleats that would have secured the Barge because he thought someone was coming to remove the barge. (Transcript, Mr. Smith at 137 and 154). Likewise Mr. Robin testified that he had been told that ING 4727 was going to be moved out that evening. (Transcript, Louis Robin at 583 and 586). In addition Mr. Busch agreed that there should have been a rope on each of the five cleats between the two Ingram barges, which there was not; there were only three. Furthermore, the Lafarge employees did not tie the barges using "two parts[7]" meaning doubling one line back and forth twice rather than two separate lines. A rope that is long enough to double from barge to shore or barge to barge is stronger than two separate ropes on the same cleats.

In addition, it is clear that Lafarge did not have a properly licensed VHF marine radio at the facility; and as noted, there were no written mooring procedures or diagrams. While the terminal was required to have a high water procedures manual, it did not have one. There was no hurricane plan or established procedure as to when to stop barges from coming into the terminal and when to move barges out during a weather event such as this one. (Transcript, Busch 71-74).

Mr. Busch testified that he spoke to Jennifer Arnold, one of the safety directors for Lafarge at around 9:00 a.m. or 10:00 a.m. on Saturday, and she instructed him that once everything that needed to be done was completed, he was to leave immediately. As such, he left the facility between 12:00 and 12:30 p.m. prior to Domino's performing the requested top-around procedure.

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dock.

[7]A "part" is a term used to describe a rope going from one tie or cleat to

Mr. Eric Thigpen who was employed by Unique Towing but executing for Domino Lafarge's request to "top around" the barges also testified. According to the ship log, the process began at 2:25 p.m. on Saturday, August 27, 2005 and was completed by 3:00 p.m. (PX-52). He was present when they "flipped the boats around." (Transcript, Thigpen at 168). He stated that at that time, there were only three single lines or single parts of rope between the two Ingram barges. (Transcript, Eric Thigpen at 166). After the procedure, he looked for more rope to secure the barges together. He apparently did add some line to the connection between the full Ingram barge and the dock. (Transcript, Thigpen at 170). But there was no rope available to add additional line between the two barges. He also testified that had his tug been requested to take the empty barge out, it could have done so. (Transcript, Thigpen at 176).

Based on the foregoing facts as underscored by the convincing testimony of the expert witness Donald Green,[8] it is clear that there were at least three defalcations with respect to the mooring of the IMG 4727. There was a failure to moor at every cleat; there was a failure to double up the lines;[9] and there was a failure in the configuration–that being the height differential caused by the tethering of a full barge to an empty barge. This decision resulted in the outboard ING 4727 being six to eight feet higher than the ING 4745. Because of that fact, the lines between the two vessels were at an angle so that the barges could not be "butted up close to each other." This arrangement resulted in the ING 4727 having "some movement

[8]He is a retired Coast Guard Commander who served 23 and a half years. After his eight year tour at sea, he was assigned to marine safety specializing in marine safety. He now is president of a Coast Guard approved training facility for mariners seeking Coast Guard credentials.

[9]Green also testified that the single part usage indicated that it was a temporary mooring, underscoring the belief that Mr. Busch believed that the barge was to be removed from the terminal. In addition, a single part line could come undone in a 36 mile per hour wind. (Transcript, Green at 490-91 and 523).

within its confines." (Transcript, Donald Green at 479-80) ("Green"). "If there is any movement, any tide, any wind, whichever, that would play against the light barge, it would move out, at least two, three feet away from the adjacent barge because of the angle of the lines." (Transcript, Green at 483.)

C. **IHNC TRAFFIC SATURDAY AND SUNDAY BEFORE THE STORM**

Saturday, there were a number of vessels traversing the canal, going through the lock. (PX-24 and 25). However, this area is a no wake zone, requiring vessels to proceed at an extremely slow rate of speed, from 2 to 4 knots. (Transcript, Captain James Hall at 1937) ("Hall"). The vessel traffic along the IHNC continued Saturday; however, the lock to the Mississippi River closed after 3:44 a.m. on Sunday, August 28, 2005, when the SUNNY COOK completed its locking procedure. (Transcript, Michael O'Dowd, at 2219). The Canal Lock Shift Logs for Saturday through its closing early Sunday morning note the weather was calm.

As the city of New Orleans was being evacuated, two persons traveling separately over the Claiborne Bridge testified that they saw a loose barge toward the southern end of the canal. Gertrude LeBlanc, who lives at 1736 Tennessee Street in the Ninth Ward, testified that she left her home about 11:00 a.m. or 12:00 noon on Sunday morning (Transcript, Gertrude LeBlanc at 369). She stated that as she crossed the Claiborne Avenue Bridge, she looked to her right and there was a barge in the canal near Derbigny Street, which is approximately one block from the Claiborne Avenue Bridge. (Transcript, LeBlanc at 372). She noted that it was parallel to the floodwall, closer to the Lower Nine side of the canal, that it was a rust colored barge with an oval

or curved top, which description fits the ING 4727. She testified that it did not appear to be moving and there was no tug boat. (Transcript, LeBlanc at 373-75).

Another witness, Frazier Tompkins, III, testified that he too saw a barge when he crossed the Claiborne Avenue Bridge at about 10:15 to 10:20 a.m. on Sunday morning. He did not remember the shape or color of the barge, but remembered that it was large. It was at a slight angle towards the levee–one end closer than the other and it was closer to the Lower Nine side of the Canal. He could not tell if it was moored and the side closest to the bridge was between Derbigny and Roman. He also testified that the barge was there at 4:00 p.m. that evening when he went back to pick up his fiancée. (Transcript, Frazier Tompkins at 404-07).

Contrary testimony and evidence to these witnesses' came from Mr. O'Dowd, Lockmaster of the IHNC lock, and Captain James Hall, a seasoned mariner who was on board a ship at the same time period. Mr. O'Dowd testified that he was in the IHNC lock area from approximately noon on Sunday along with his family where they rode out Hurricane Katrina. From the north end of the lock, the mooring buoys in the Industrial Canal in the vicinity of where Mrs. LeBlanc and Mr. Tompkins opined that they had seen a loose barge were visible to Mr. O'Dowd. On Sunday, when he reported for work, the weather was clear. (Transcript, O'Dowd at 2217). He testified that he did not see any other vessel in the canal other than a Corps' survey boat that was moored on the long guide wall. He saw neither a loose barge in the canal nor a moored barge on the buoys in the canal. If there had been one, it would have been reported. (Transcript, O'Dowd at 2221-2222).

Captain James Hall was working on that Saturday and Sunday as the captain of a tug owned by Stagg Marine, the M/V MR. WAYNE. His vessel was radar equipped on which he

would be able to see vessel traffic. He was working in the vicinity making runs between Southern Scrap which is north of the Lafarge Terminal and the Industrial Canal and Black Bay which is southwest of New Orleans, due south of the MRGO. (DX-23). On Sunday, at about 6:00 p.m. he proceeded to the Florida Avenue Bridge because he intended to ride out the storm in the IHNC waters between the Claiborne and Florida Avenue bridges. However, because the Florida Avenue Bridge was down, he was unable to do so. He stayed in the area approximately 45 minutes to an hour and could see the Claiborne Avenue Bridge. He had binoculars and was using them as well that day. He looked over the entire area and saw no moored barge down by the Claiborne Avenue Bridge. He did not see any barge loose in the area. No loose barge appeared on his radar screen. (Transcript, Hall at 1946-1950). In addition, there is no evidence that the Coast Guard ever received any notice of a vessel being loose on the canal from Saturday until after Hurricane Katrina hit. After the passage of those 45 minutes, Captain Hall eventually tied up at the New Orleans Bulk Terminal southeast of the Lafarge Terminal in the GIWW. He road the storm out at that location.

Accordingly, while it is clear Lafarge failed in its procedures and action concerning the movement and mooring of ING 4727, the Court finds from a preponderance of the evidence that the Barge did not break loose from its mooring prior to the arrival of Hurricane Katrina. The weather was clear during that time; there were no high winds to cause the Barge to move. It is unlikely that there would have been sufficient wake caused by any of the vessels traveling in the canal to cause the Barge to come free. Finally, the testimony of two persons who were in the vicinity from Sunday through the storm and whose primary focus was the IHNC and vicinity must

be given greater weight than individuals who were transient through the area and only saw the area as they passed by in their respective cars.

D. HURRICANE KATRINA: WIND AND WATER

A fundamental characteristic of a hurricane is the inward counter-clockwise spiraling nature of its winds. This feature is dictated by the physics of the equations of motion and the structure of the hurricane. Thus, the wind pattern is a result of the fundamental laws of physics applied to the atmosphere. This meteorological principle is referred to as Buys-Ballot's Law which provides that any type of circulation around a low-pressure center is going to be counter-clockwise. (Transcript, Dr. Austin Dooley at 1842 ("Dooley") and DX-198, Dooley Expert Report at 8). The center of a hurricane or severe tropical cyclone is referred to as "the eye." It is roughly circular and although the winds are calm at the axis of rotation of the hurricane, strong winds may extend into the eye. (DX-198, Dooley Expert Report, at 8). Thus, the area experiencing the north-west quadrant of the wind field of a hurricane will experience winds blowing in a north, north-easterly direction prior to the passage of the eye past that area.

Hurricane Katrina eventually hit the southeastern Louisiana coast near Buras at 6:10 DCT on Monday, August 29, 2005, as a Category 3 storm with maximum sustained winds of 110 knots at its center. (DX-198, Dooley Expert Report at 9). Katrina then continued northward across the Mississippi Delta; its final landfall occurred near the Louisiana/Mississippi border adjacent to the mouth of the Pearl River at 9:45 a.m. on the 29th of August. (DX-198, Dooley Expert Report at 10; Transcript, Dooley at 1848). This track resulted in the eye of the hurricane being to the southeast of the IHNC at 7:00 a.m. on Monday morning and placed the IHNC in the northwestern

quadrant of the storm. (See Appendix No. 5 and 6, Map 2). (Transcript, Dooley at 1848). The center of Katrina passed New Orleans sometime between 8:45 and 9:00 a.m. on the morning of August 29, 2005. (Transcript, Dooley at 1848). Thus, between 7:00 and 9: 45 a.m., the prevailing winds were in a northeasterly direction at the IHNC which is at 15°. (Transcript, Dooley at 1849). As the system got closer to the IHNC, the winds became more northerly, then as the system passed beyond the IHNC, the winds became more westerly. Eventually, the winds came more out of the west as Katrina moved farther away. In reality, the maximum one-minute sustained wind speed at the IHNC as Katrina passed was between 70 and 80 knots. (Transcript, Dooley at 1849-50 and DX-347, AD-066)[10]. A clear visual translation of these wind bearings on the Barge in the IHNC is found at Appendix No. 8, DX 196, Cushing Report at 80.

These facts were confirmed applying the best wind data for the IHNC using a hindcast that was produced by Oceanweather, Inc. ("OWI"). The hindcast looked at the horizontal pressure patterns of the storm and the vertical pressure patterns of the storm. Using these factors, the wind field of the storm was reconstructed. In fact this company's work was also used in the IPET investigation. (Transcript, Dooley at 1851).

Dr. Dooley using four grid points produced by OWI interpolated them to demonstrate precisely the direction and force of the winds experienced by the IHNC as best as could be determined using this data. (Appendix No.7 DX-347, AD-018).[11] This study confirmed that at 4:30 a.m. the wind was from the northeast at 46.66°. (See DX-347, AD-21). By 7:00 a.m., the wind was still coming out of the northeast at 29.49°. (See DX-347, AD-23). At 7:30, the wind

[10]DX-347 comprise the demonstrative exhibits used at trial by Dr. Dooley.

[11]Point "E" of this graph indicates the IHNC.

continued to become more northerly in direction and was now blowing at 20.11° . (See DX-347, AD-24). Thus, from 4:00 to 7:45 a.m. is clear and beyond peradventure that the winds at the IHNC blew in a northeasterly direction. Therefore, since the Lafarge Terminal lies on the west bank of the IHNC, these winds would have pushed the Barge towards the west and away from the east bank where the breaches occurred.

In essence, in order for Plaintiffs to prevail they must prove by a preponderance of the evidence that the Barge somehow navigated across the canal against sustained winds to cause the North and then the South Breach. This would require a highly anomalous weather or tidal event such as a series of microbursts or a 20-foot tidal wave. These anomalies did not occur.

As such, even if the Barge had been loose, which this Court finds not to have occurred, there is no possible way for a Barge without motor power to travel north from close to the Claiborne Bridge along the canal to near the Florida Avenue Bridge with the wind blowing from the north. Plaintiffs' contentions belie physics and common sense. This conclusion is further confirmed by the wind data obtained from the Lakefront airport. Looking at the information recorded from 3:00 a.m. to 7:53 a.m., the wind direction is in line with the hindcast models. The Lakefront Airport is about 4.1 to 4.2 miles north of the IHNC. While there is more oscillation in the Lakefront wind records, the difference can be accounted for by virtue of discrete increments of time used there which were "snapshots" in time whereas the hindcast values were averages over a period of time. Nonetheless, the evidence is overwhelming that the wind could not have moved the Barge northward either from the southern location posited by Mrs. LeBlanc and Mr. Tompkins or from the Lafarge terminal which is also south of the north breach. There is no credible evidence which contradicts this finding.

Plaintiffs posited that there were microbursts which caused the vessel to move in a direction contrary to the prevailing winds. To that end Dr. David Mitchell, a forensic meteorologist, testified using synoptic scale radar images. These images allegedly show the mesoscale systems and winds plaintiffs contend drove the Barge to both the north and south to cause the IHNC breaches. Mesoscale systems are thunderstorm systems imbedded in the hurricane system which are smaller in scale than the hurricane itself. Imbedded within those systems can be other microsystems or smaller mesosystems which can produce tornadic winds or tornadoes. (Transcript, Mitchell at 934-35).

Dr. Mitchell testified that during a thunderstorm event, microbursts occur which produce unpredictable, omnidirectional winds which cannot be measured since a microburst wind is the result of a "straight down" dropping of extremely cold air. (Transcript, Mitchell at 955-56). Thus, plaintiffs contend that these "bursts" moved the Barge in a northeasterly direction across the canal in opposition to the 70 knot prevailing winds coming out of the north. Dr. Mitchell's testimony and this theory are unconvincing for a number of reasons.

First, Dr. Mitchell's testimony relied on non-"dealiased" radar[12] data which in the Court's opinion rendered Dr. Mitchell's opinions unreliable. In addition, even if there had been a microburst, the Court is unconvinced by the evidence presented that any microburst or mesocyclone which might have occurred would be of such strength so as to have catapulted the Barge to the north breach then to the south breach. Microburst winds last only three to five

[12]Dealiasing is the process of using algorithm techniques to folding radar data to determine the actual velocity of winds. This process is necessitated by the fact that radar "flips" at 64 knots per hour because of the limitations of Doppler radar. Therefore, an aliasing process must take place because the wind appears t be coming toward the radar (being green in color) when it is in reality going away from the radar. (Testimony, Mr. Leslie Lemon, at 1755-57, 1761-65).

seconds, and as noted, there is no way to calculate which way winds would blow after a microburst event. (Transcript, Mitchell at 1036). Thus, no evidence was presented to demonstrate, nor can this Court envision, that a three to five second wind burst(s) occurred, and if so, such was or were sufficient to move the Ingram Barge in the manner which is required for plaintiffs' theory of the case to be based in reality. Indeed, even if there were radar evidence of a mesocyclone, there is no way to ascertain whether the perturbation caused by the mesocyclone actually affected the ground as radar is actually limited to 700 or 800 feet above the surface. (Transcript, Mitchell at 1057).[13]

The Court found the testimony of Mr. Leslie Lemon, a meteorologist who works for the University of Oklahoma, more informative and more convincing. He has been involved with Doppler radar and the development of a number of the systems upon which these opinions were based. Based on the totality of his testimony and having thoroughly reviewed all of the materials provided by Dr. Mitchell and Mr. Lemon, the Court is convinced that there were no mesocyclones in the subject area. Indeed, Dr. Mitchell admitted that there were no tornados reported by the National Climatic Data Center. (Transcript, Mitchell at 1035).

Further undercutting Dr. Mitchell's testimony was the fact that he had testified in other Katrina litigation that damage to houses in the area was not caused wind. (Transcript, Mitchell at 1045-1054). He had testified that there was never a mesocyclone or microburst wind from

[13]Even Plaintiffs' own expert, Hector Pazos admitted that he did not have solid evidence to demonstrate how the Barge could have traveled from the southern point where Mrs. LeBlanc and Mr. Tompkins had placed the Barge on Sunday to the North Breach. "What I have is not very solid. It's a remote possibility that, with variable winds that always exist, it could have traveled. Although it's not the most possible answer." Transcript, Hector Pazos at 851).

Hurricane Katrina that reached ground level at the location of a specific property located at 2637 Tennessee Street (DX-27) which is about 2 blocks from the north breach.

The Court's conclusion that the plaintiffs' theory that the Barge was moved by microburst winds and currents is not credible is further buttressed by the eye-witness testimony of the Lockmaster O'Dowd. [14] He testified that during the storm, after day break, that the waves were moving towards the river (in a southern direction) and were about between a foot and two feet. In addition, from the pictures introduced at trial and his testimony, it is clear that there was no 20-foot monster wave. (DX-37, LNA001347). No giant wave ever hit the lock. (Transcript, O'Dowd at 2226). In addition, O'Dowd testified that the wind was coming "out of the north, blowing towards the west." This fact was later confirmed with the testimony of Dr. Joseph Suhayda, the Interim Director of the LSU Hurricane Center. (Transcript, Suhayda at 3012-13, 3042-43).

Likewise, Captain Hall, who was tied up at the Old New Orleans Bulk Terminal in the GIWW southeast of the Lafarge Terminal, was equally convincing. He was tied up at about sundown on Sunday and testified that from approximately 7:38 p.m. on Sunday through 8:00 a.m. Monday morning, the wind was always coming from the east on to the stern of his vessel. (Transcript, Hall at 1955). Likewise, as to storm surge, Captain Hall was anchored in the major conduit for the storm surge from the MRGO, that is the GIWW, in an area that experienced the highest of surges. He testified that his boat was lifted by at least 20 feet picking his vessel over the dock and requiring that he cut the outer lines around 9:00 a.m. on Monday morning. (Transcript, Hall at 1956). However, the surge was gradual, like going through a lock, over the

[14] A series of pictures were admitted at trial, DX-37. While not identified by individual number in the transcript, the Court will use the LNA exhibit number designation in this opinion for the ease of the reviewing court.

course of several hours, again belying any testimony of "monster waves". (Transcript, Hall at 1957).

E. THE BREACHES

As noted, two breaches occurred along the IHNC's East Bank. A photograph of the area post-breaching can be found at Appendix No. 9. The northern end of the North Breach occurred where the previously mentioned shorter, older sheet pile connected to a new and longer sheet pile failed. The wall collapsed with the sheet piling flipping in an accordion like manner resulting in a 180 foot gap. The South Breach resulted in a 793 foot gap and it is through that gap that the ING 4727 traveled into the Lower Ninth Ward, over a school bus eventually coming to rest on utility wires abutting a house.

The specifics of the two breaches, that is the timing of their development and how they occurred, are at the heart of this case. As Dr. Gennaro G. Marino, plaintiffs' expert engineer who prepared a failure analysis on the eastern floodwall at the IHNC stated, "it is important to make the best possible assessment of the time of failure of the breaches. This establishes the site conditions at the time of failure." (PX-397, Expert Report of Marino at 3-16).

1. The North Breach

The Court will first discuss the North Breach. One hypothesis is that the North Breach occurred at around 6:00 a.m. based primarily on the video deposition[15] testimony of William Villavasso who was the chief operator of Pump Station No. 5, located at the foot of the IHNC

[15]His testimony was by video deposition as he is deceased.

floodwall at the Florida Avenue Bridge. The pumping station sits on an inclined area very near to the North Breach, and Mr. Villavasso looked numerous times out of double doors on that faced the IHNC. (See Appendix No. 10).

Mr. Villavasso testified that he saw water splashing over the IHNC flood wall which then flowed into the street; he made these observations around 3:00 or 4:00 a.m. Monday, August 29, 2005. (Transcript, Villavasso at 621). Mr. Villavasso stated that around 6:00 a.m. he heard an explosion, a boom. It was still dark. When he looked at the wall, he saw sections of it "tumble over." He then saw what appeared to be a metal structure which looked like the tip of a barge. (Transcript, Villavasso at 624). What he saw was "not a clear-focused picture", but "something protruding which I thought was seeing a barge there." (Id. at 625).

After the floodwall broke, he saw massive amounts of water pouring through the wall and terrific flooding ensued. Because the engines in the pumping station were electrically powered, it was imperative that Central Control for the Sewerage and Water Board Pumping Stations terminate the power or else all of the workers in the pumping station would have been electrocuted. (*Id*. at 627). In fact, Central Control Center logged this call at 6:10 a.m. confirming this portion of testimony with hard, concrete written evidence. (PX-397, Expert Report of Marino at 3-16).

However, as to the contention that Mr. Villavasso saw the tip of the Barge, there is less reason to credit this testimony. One of Mr. Villavasso's co-workers testified that Mr. Villavasso had never spoken to him about seeing a barge until about two years after the storm, raising the question as to whether the testimony concerning "seeing a barge" is credible. His deposition was taken on December 18, 2007, more than two years after the incident. Furthermore, the

testimony itself is somewhat equivocal as he described the conditions as dark, he was near-sighted and was not wearing his glasses. In addition, it is physically impossible for the Barge to be in that location for all of the reasons previously stated. Thus, the Court does not credit this portion of Mr. Villavasso's testimony.

The Court's decision is buttressed by Dr. Cushing's compelling analysis as to the occurrence Mr. Villavasso witnessed. Cushing opined that had the Barge been where Villavasso testified, he would not have seen only the "tip" of the Barge. As previously explained, the freeboard of the unloaded Barge would have resulted in Villavasso seeing14 feet of the Barge protruding above the floodwall. (Transcript, Cushing at 2100). As Cushing posits, the much more likely scenario is that what he saw was the actual flipping of the sheet piling that resulted in the twisted, steel accordion that was the North Breach after the storm. (DX-205, Expert Report of Dr. Reda M. Bakeer at 50) (See Appendix No. 10).

Having accepted as true that the North Breach manifested its full measure at 6:00 a.m. the testimony as to the timing of Mr. Terry Mark Adams' experiences are suspect.[16] Mr. Adams lived in a house about one block away from what was to become the North Breach of the eastern IHNC floodwall. His home was raised on concrete pillars. He testified that he awoke at 5:00 a.m., because that is the normal time he awakens. However, the clock was blinking indicating a power outage. He stated that when he put this feet on the floor, the carpet was wet. (Transcript, Adams at 253). He then saw water coming up through the tub in his bathroom. So he prepared to get into the attic. He gathered provisions, including a life jacket and a flashlight as the water

[16] By this, the Court does not in any manner mean to impugn his sincere belief; however, it is clear from all of the testimony received that the mayhem which occurred that morning makes the testimony with respect to timing less than compelling.

continued to rise. By the time he pulled down the attic stairs, Mr. Adams testified that the water was waist deep. The water rose from his feet to his waist in five or six minutes. Transcript, Adams 254-55).

Once he accessed the attic, he proceeded to knock a hole in the roof and got on top of it. (Transcript, Adams at 256). He testified that it wasn't totally dark, but it was not light when he went out. He looked at the levee immediately across from his house. He testified that water was coming over the levee and from under the base of the floodwall too at the same time. (Transcript, Adams at 258). He stated at that time, the floodwall was still in tact.

He stated that he then looked down toward the Claiborne Avenue Bridge and saw a big object that looked like a big black house "easing down the wall just bumping into the wall." (Transcript, Adams at 261). And then he heard a big boom and it came into the neighborhood resulting in ferocious flooding and moving his house. (Transcript, Adams at 264). If it were between 5:00 a.m. and 6:00 a.m., the Barge would be moving in a direction contrary to the prevailing winds which have been established beyond peradventure. As such, the Court discounts this testimony as it pertains to the Barge having caused either breach.

The Barge Was Not a Cause of the North Breach

Thus, the Court finds Plaintiffs' contention that the Barge caused the North Breach impossible. The testimony of Plaintiffs' expert, Hector Pazos, is unavailing and not persuasive. Plaintiffs' theory of liability as concerns the North Breach rests on the Barge alliding with the

floodwall; Court finds that such an allision did not occur.[17] The Court heard testimony concerning various mechanisms of failure with respect to the North Breach including the quality of the floodwall, the weakness that the 1980 deeper sheetpile being connected to the 1969 sheetpile created, the permeability of the soils, the remediation of the EBIA and alleged failures as to the proper execution of that work which allegedly caused increased underseepage and uplift rendering the floodwall vulnerable to failure with the increased loading caused by the storm surge experienced at the IHNC. While the Court received extensive testimony concerning these many possible causes of this breach, for purposes of this litigation, the Court makes no finding as to the ultimate cause(s) of that failure. Numerous causes are plausible; however, considering the on-going litigation in the *In re Katrina* umbrella against other parties that are not represented here, the Court finds that gratuitous comment on all of the various theories offered would be ill-advised at this juncture.

2. The South Breach

As to the South Breach, the Barge obviously came into contact with the IHNC floodwall as demonstrated by the damaged concrete cap, the scrape markings on the bottom of the vessel and the vessel's presence in the Lower Ninth Ward. The specific inquiry then for purposes of this trial is whether that impact was the cause of the floodwall failure and resulting flood damage or a simply consequence thereof. The Court finds that the physical evidence indicates

[17]Mr. Pazos opined that the photographs showing scrapes in the concrete on the water side of the IHNC floodwall proved that the Barge moved from the North Breach southward scraping the floodwall along the way. However, this attribution is without merit. It is clear that the "scrape marks" are nothing more than the remnants of grass cutting machines used along the levee. (Transcript, Bea at 2664-65). Furthermore, there was no twenty-foot "wave"; there was only a gradual surge that occurred over the course of the morning of the 29th).

overwhelmingly that the floodwall cataclysmically failed prior to the Barge coming into contact with the floodwall. For the reasons that follow, the Court finds that the Barge was lifted by the storm surge and moved by the westerly winds hours after substantial flooding had occurred and was continuing.

The Court will not make findings as to the specific cause(s) for the South Breach for the same reasons as stated with respect to the North Breach; however, a number of factors more probably than not affected the stability of the floodwall as it faced hydrostatic loading and overtopping caused by the enormous storm surge the IHNC floodwall encountered at the time of Hurricane Katrina. The Court will first examine the overwhelming evidence that there was (1) substantial storm surge the morning of August 29th at the IHNC; (2) there was no wind to propel the Barge in a **easterly** direction before at the earliest 9:00 a.m.; thus (3) the Barge could not have been present when the South Breach began around 7:00 a.m. on the morning of August 29, 2005.

Storm Surge

At the IHNC lock, the lockmaster used a gauge to determine the average floodwater elevation as a function of time. (Transcript, Bea at 2654; DX-145, IPET, Vol. IV Figure 1-57). Using these calculations and other information generated by the ILIT team, Dr. Robert Bea opined that at 1:00 a.m. on the morning of the 29th, the water elevation was at 7 feet. The water continued to rise steadily while the breaching occurred, which breaching Dr. Bea estimated occurred between 4:00 a.m. and 8:00 a.m. At 4:00 a.m. the still water level at the IHNC was at 9.2 feet; by 8:00 a.m. it reached 13.7 feet. At 9:00, the level peaked at 14.2 feet. Dr. Bea then

posited that the external mean water level at 10:00 a.m., which would be the time when a full west wind would act on the freeboard of ING 4727, would have been 12.2. feet.

As previously noted, the Court finds no physical or scientific evidence that there was any kind of giant wave or tidal action in the IHNC at the time of the South Breach that could have propelled the Barge. Because of the existence of the IHNC lock, the tidal surge was akin to filling a bathtub with water. (Transcript, Cushing at 2053). Currents in the canal were very, very weak, on the order of a hundredths of a knot. Any current would have had minimal effect on Barge compared to the wind acting on the barge.

The Configuration of the Terminal and the Wind Direction

The Lafarge Terminal, as pictured in Appendix No. 3, has to its south a wharf that is owned by the Port of New Orleans and operated by Namasco. It runs in an east-west direction and is the southern boundary of what is known as the "Turning Basin." At this wharf's most eastern edge there is a covered gantry which protrudes over the water in a north-south direction and provides the Court with substantial physical proof as to when the Barge began to move toward the IHNC floodwall. (Transcript, Cushing at 2128) (See Appendix Nos. 11 and 12).

As a result of there being a Turning Basin, the Barge was nestled into an area out of the IHNC proper. As previously noted, the Barge is 200 feet long, 35 feet wide, 12-feet deep on the hull, and has a combing that surrounds the cargo opening that is five feet high. When the barge is light, as was the case here, her draft is 1 foot 4.5 inches providing a substantial sail area above the water as well as substantial height above the water line.

Dr. Charles Cushing, a naval architect and marine-ocean engineer, testified convincingly that because the storm surge would have lifted the Barge and because the empty Barge would have been riding high, had the Barge left its moorings before 8:00 a.m., the gantry would have been damaged as the still water level of the IHNC would have been 13.7 feet combined with the height of the Barge riding light. Instead, because the gantry was not damaged, it is clear that the Barge could not have moved from its moorings before 9:00 a.m. since it is only at that time that a more westerly directed wind would have moved the Barge in an easterly direction toward the eastbank of the IHNC without damaging the structure. (Transcript, Cushing at 2129-30). (See Appendix No. 12). As further physical proof that the Barge did not hit the gantry, the fiberglass portable cover on top of the Barge sustained no damage as well. (Transcript, Cushing at 2130).

Plaintiffs' theory of the South Breach as testified to by Dr. Marino is that the floodwall failed around 6:30 a.m. after it was hit three times by the Barge. The impact analysis and model that was presented in Court was done without momentum calculations for the Barge, and Dr. Marino was unable to explain from a meteorological (wind) standpoint, how this phenomenon could have occurred. (Transcript, Marino at 1343-44). In essence, Dr. Marino was unable to testify as to the angle of the barge's trajectory, the speed of the barge, the force acting on the barge or its momentum when it contacted the wall. Mr. Pazos did not supply an explanation either. The inextricable fact remains that there was no wind blowing from the west at 7:00 a.m. in the morning. From 4:30 a.m. to 7:00 a.m., it is clear that the wind was blowing in a northeasterly direction at the IHNC –from 46.66 degrees on a compass at 4:30 a.m. to 29.49 degrees at 7:00 a.m. Thus the wind was blowing the Barge into the dock not away from the dock. (See Appendix No. 11); (Transcript, Cushing at 2128-2129). Based on the previously noted meteorological

testimony, there is simply no proof in the record that there was a force at work that could have propelled the Barge to hit the floodwall at the South Breach at 6:30 a.m.

Team Louisiana findings support the Court's analysis; it found that the wind came from the northeast until 8:30 or 9:00 a.m. on the 29th of August making it impossible for the Barge to be traveling in an easterly direction. Dr. Paul Kemp testified that there were never the winds necessary to push the barge into the wall except other than after the breach. (Transcript, Kemp at 2988-89). Furthermore, it is equally clear that the damaging flooding began around 7:00 a.m.

Timing of the South Breach

All of the independent studies, IPET 2007, ILIT 2006, Team Louisiana 2007 find the time of the south floodwall failure to be from about 7:00 a.m. to 8:00 a.m. on the morning of August 29th. (DX-206, Expert Report of Bea at 48). These findings are confirmed in reviewing a listing of 911 calls received that morning which list was prepared by Dr. Marino. (Transcript, Marino at 1274). (PX-397, Marino Report, Table 3.1). Clearly, a time-stamped, tape-recorded contemporaneous statement is the most relevant and persuasive evidence of when the cataclysmic flooding occurred and a contemporaneous indication of the depth of that flooding at the time of the call. A review of that table provides the following information:

MapLocation/Name	Time of 911 call	Address	Description of Call
26 Allison Berryhill	6:53 a.m.	1022 Deslonde	House flooded; roof caved in.
27 Bianca Knight	7:00 a.m.	4702 St. Claude	Water up to bed
28 Raymond Winfield	7:01 a.m.	2418 Lamanche	In attic water up to ceiling
29 Andy	7:07 a.m./7:46a.m.	2301 Tennessee	6 relatives stuck in attic/family stuck in attic

39 Nelda Simmineaux	7:11 a.m.	939 Deslonde	Water in house; lady in wheel chair
31 Christopher	7:13 a.m.	1419 Andry	House flooded; water waist high
32 Johnny Murray for James Washington	7:18 a.m.	1921 Tupelo	Calling for friends trapped in attic; water in attic
33 Sidney Washington	7:18 a.m.	1310 Reynes	Water 15 feet. People on 2nd story @ 5 ft. before under water.
34 Arcioa Sutton	7:18 a.m.	2523 Jourdan	On roof, water at waist
35 Isaac Holmes	7:28 a.m./7:55 a.m.	2025 Caffin	Flooded drifted/ Water up to roof
37 Ms. Green	7:28 a.m.	2414 Tupelo	In attic. House floated to Arabi
38 Timothy King	7:30 a.m.	1118 Reynes	Waist deep water in house
40 Patricia Ann Collins	7:37 a.m.	2544 Dubreil	In attic. Almost to attic. Water rising (near Jackson Barracks)
43 Tonette Taylor/ Clarence Smith	8:03 a.m.	5423 N. Rampart	Water up to ceiling

Having read all of the deposition testimony as well as listening to testimony at trial, it is clear to the Court that persons living through the harrowing experience of rapid, cataclysmic flooding resulting in death for some, as well as the horrific circumstances of survival for others, have serious difficulty in pinpointing the exact time of those experiences. Two such eyewitnesses were Sidney Williams and Arthur Murph.

Sidney Williams lived at 1720 Tennessee Street which was between Derbigny and Roman Streets, basically one to two blocks from Claiborne Avenue and two blocks from the floodwall, where he road out the storm. He testified by deposition which was taken on February 19, 2008 and resumed on October 9, 2008. In the deposition he opined that he woke up around 2:30 a.m. and by 3:30 a.m. the water was more than 2 feet high and was starting to seep into his house. He then testified that he made a hole in the roof from the attic. (DX-309, Dep. of Williams, 2/19/08 at 41). He then testified that he heard the first bang while in the attic, then when he got on the roof

he heard two more "booms"[18] and he saw the Barge hit the wall, bounce off and hit the wall again. (Dep. of Williams, 2/19/08 at 41, 47). The Barge was on the water side of the floodwall at the time. (DX-309, Dep. of Williams, 2/19/08 at 49-50). After that, the house floated off. (*Id.* at 57).

However, prior to that deposition, and nearer in time to the actual incident, Mr. Williams gave a recorded interview on March 20, 2006 to an investigator for Centanni Investigative Agency. At that time, he gave a conflicting description of what he saw. Williams stated:

> Yeah, when we. . . right after we got on the roof. We laid down. We all laying on the roof. I mean, enough to make you jump each, every time the sound went off, you know. And, uh, we was there for maybe about ten minutes before our house decided to float over to the neighbor's house and then we heard a loud cracking in our roof, so we was able to walk over on the neighbor's roof. And, uh, once we got on there, we was on there about an hour before we even noticed a barge. And how we noticed the barge, the back additional we was leaning up against started going down in the water and made us climb over on the next house. That's when we seen the barge out there like it was over the wall, you know. We didn't know it had done broke the all. That's what they said, you know. It didn't, to me (laughing), it sounded more like they blew the wall, and that wasn't the worst part of it. Tat aint't all they did. They, after the wall broke, they opened the floodgates on us. We had water coming in on us everywhere man.

(DX-310, Exh. 5 to 10/9/08 Dep. of Williams at 23-24). He continued that it was his opinion that "they" blew the levee because "they wanted to widen the canal for years and nobody would sell." (DX-310, Exh. 5 to 10/9/08 Dep. of Williams at 29). He stated that the water was high enough for it [the Barge] to float over the wall. (*Id.*) Williams continued, " . . ., but I think that barge would have floated over that wall. It didn't-I don't bel- I truly honest believe, man, that barge did

[18]Much was made concerning "booms" that occurred and that somehow that is proof that the Barge was hitting with the floodwall. However, it is clear from the preponderance of the evidence that as these floodwalls failed all over the city of New Orleans, "booms" were heard all over indicating the rupturing of the waterstops and failures of the floodwalls.

not break that wall. If it would have, then we, you know, it would have broke the wall be- be- after the got-before the water got so high. An empty barge gonna rise with the water. I mean." (*Id.* at 29-30). Considering such contradictory statements, the Court will not consider the deposition testimony of Mr. Williams in terms of causation.

Another individual was Arthur Murph who testified at trial. Mr. Murph's home was actually destroyed by the Barge, and he was an eyewitness to the entire incident as he road the storm out in his home and ultimately on top of his roof. However, his assertions were inconsistent and virtually impossible to follow. His testimony with respect to timing was suspect considering that he maintained that the flooding occurred on Sunday night. Also, at trial he gave testimony under oath that was contrary to a recorded statement concerning the circumstances under which he first saw the Barge.

In a recorded, unsworn statement, he declared that the first time he saw the Barge, it was like a block of steel coming at him riding sideways. However, at trial, he stated that the first time he saw the Barge, it was "sitting." Plaintiffs' counsel offered evidence that between the time the statement was made and the testimony at trial Mr. Murph had entered into a settlement of his claim against Lafarge. The company purchased a new house for him. However, Lafarge continues to hold a collateral mortgage on the property, the terms of which are sealed. Taking all of these circumstances into consideration, Mr. Murph's demeanor and his lack of reasonable specificity in his testimony, this Court will not consider or credit his testimony with respect to causation.

The Barge Is Not a Substantial Cause Of the South Breach

Thus, based on the storm surge, the wind, the configuration of the Lafarge Terminal and the time of the breaches, the Court concludes that the ING 4727 was not a cause of the cataclysmic flooding that resulted from the South Breach of the IHNC Eastbank Floodwall. This determination is consistent with all of the other independent studies issued concerning the flooding which occurred in the aftermath of Hurricane Katrina. The IPET, ILIT, and Team Louisiana[19] all concluded that the cargo barge ING 4727 did not play any substantial role in the development of these breaches and did not cause any flooding. (DX-206, Expert Report of Bea at 72).

It is clear from the testimony of Dr. Bea, Dr. Bakeer and Dr. Cushing that a number of other factors in combination were more likely than not the cause of this breach. These factors include anomalies in the construction of the floodwall itself– the depth of the sheetpile; the two instances of deviation from straight line alignment in the floodwall at the Southern Breach which match the curvature of the ultimate breach itself; (DX- 205, Expert Report of Reda M. Bakeer, Figure 74; DX-356, RMB-059); the existence of filled canals (the Jourdan Avenue Canal and an outflow canal) which may have increased the water flow underneath the floodwall. (Transcript, Reda M. Bakeer at 2370-74). Other possible factors are the general permeability of the subsoil and the remediation of the EBIA which also could have exacerbated the flow of water under the floodwall. These conditions could have encouraged the "uplift" which apparently damaged the floodwall integrity. Also, the overtopping of the floodwall could have caused the erosion of the soil that supported the floodwall, allowing it to move with the pressure exerted by the storm surge. Regardless of what caused the collapse of the southern part of the IHNC

[19]See Footnote 5.

floodwall, the Court finds by a preponderance of the evidence that Dr. Cushing's explanation of the manner by which the Barge came into contact with the severely compromised floodwall and floated over it eventually coming to rest in the Lower Ninth Ward is more likely than not what actually occurred. As Dr. Bea testified, at 9:00 a.m. the still water level in the IHNC was 14.2 feet, by 10:00 a.m., which is the time that these experts testified that the Barge came into contact with the floodwall, the still water level in IHNC was 12.2 feet.

Dr. Cushing testified that the Barge traversed the floodwall after the floodwall failed at the south end of the south breach. (Transcript, Cushing at 2114). This opinion was based on physical evidence that was found at that location. (Transcript, Cushing at 2116). In a series of graphics that were introduced at trial as DX-349, CC-086-091, Dr. Cushing convincingly demonstrated that the Barge came into the Ninth Ward after the South Breach had occurred. (See Appendix No. 13). Using Figures 60 and Figure 89 from his Expert Report, he opined that it is clear the Barge did not strike the panel found in the foreground of the photograph the way it struck the panel in the background. Dr. Cushing maintained that the foreground panel was already leaning at an angle, while the background panel was leaning but more erect. These conclusions are supported by the position of the rebars and the striations that are present on the bottom of the Barge as well as the location of the debris caused by the crushed cap of the floodwall. (Transcript, Cushing at 2116-19). (See rebar striations at DX-349, CC 092-94)

Dr. Cushing described the process as follows:

> The barge would have crossed–the leading edge of the barge would have crossed the already fallen floodwall without touching it; but, when it finally contacted the south end of the south breach, then it couldn't move any further south, and it would have moved directly inward, or in an easterly direction, into the Lower Ninth Ward grounding on the fallen floodwall. And therefore, the striations were formed as it crossed into the Lower Ninth Ward.

> When the barge had fully entered the Lower Ninth Ward, then the floodwall–the floodwaters, which were at that point nearly the level of the water on the –on the canal, would have been flowing more–and I don't want to use the word gently, but at a lesser velocity [than at the initiation of the breach in full] carrying the barge to a point where it stopped. And the waters were fanning out at this point as they were entering the Lower Ninth Ward. The barge would have pivoted around the leading edge, so it would have pivoted into this position and then moved slightly southward to its final resting point.

(Transcript, Cushing at 2120). (See DX-349, Cushing Demonstrative, CC-096-097 for graphics of Barge and striations caused as it crossed failed floodwall); (see also, DX-196, Cushing Expert Report at 94-98 for more demonstrative graphics) (Appendix No. 13).

Dr. Bea also testified to the same sequence of events noting that at the time the Barge moved into the Ninth Ward the water in the canal was quite high. He stated:

> The breaching process at the south breach initiates at approximately 8 a.m. The barge enters at the last stage. Water is flowing into the Lower Ninth Ward at the same time the barge is being driven by the northerly hurricane winds. And actually at this time turning to northwesterly, driven into contact with the lower end of the south breach, clips off the top of the floodwall and floats across to that first row of houses, passing over the top of the school bus that has been a prominent feature that we've paid attention to at this location.

(Transcript, Bea at 2619-20). Team Louisiana arrived at virtually the same conclusion.[20]

Thus, the most telling physical evidence that this Barge floated into the Lower Ninth Ward at a time when the water was already at a catastrophic level are photographs that show unequivocally that the Barge floated over a bus on its path and over telephone lines upon which the vessel settled when the water subsided. Both Dr. Bea and Dr. Cushing noted that this

[20]The Team Louisiana Report stated, "We found that while the barge had indeed struck the I-wall at the south end of the breach, the angle of the steel reinforcing bars in the concrete cap exposed by the collision suggested that the section of wall struck was already leaning having failed earlier. The barge had clipped the end of the already formed breach as it was sucked through. (DX0144 Team Louisiana Page 67 contained in DX 349, Cushing Demonstratives, CC-106).

photographic evidence proves that the breaching had already occurred prior to the Barge hitting the floodwall because otherwise the Barge would not have left the bus undamaged and the Barge would not have ended up on top of the telephone wires. (See Appendix No. 14). Plaintiffs provided no other explanation for this phenomenon.

As stated by Dr. Bea in commenting on the significance of the image found at RB-063 in DX-361 which image was captured at trial and marked as DX- 360 with a red dot over the spot where the submerged school bus rests with the Barge resting to the left or east of it:

> Well, I was always concerned about how the barge could get to its final resting position with that school bus in the way. It indicated clearly to me that the water level inside the Lower Ninth Ward was very deep, and that the barge had been able to float over the top of that school bus, hence, explaining how it could appear where it did relative to the barge after the waters had receded.

(Transcript, Bea at 2685) (Appendix No. 15, DX-360).

Thus, for all the reasons stated above, the Court finds that the ING 4727 caused neither or the South Breach of the IHNC floodwalls, nor the catastrophic flooding caused thereby for which plaintiffs seek damages. The flooding began around 7:00 a.m. at the South Breach and the area was so flooded by the time the Barge exited the IHNC around 10:00 a.m. that it floated over a bus and telephone wires. Simply put, the Barge was a consequence not a cause. The Court will now turn to the Conclusions of Law.

II. CONCLUSIONS OF LAW

A. Applicable Standards

"The analysis of a maritime tort is guided by general principles of negligence law." *Consolidated Aluminum Corp. v. C.F. Bean Corp.*, 833 F.2d 65, 67 (5th Cir. 1987). A plaintiff

must demonstrate that there was a duty owed by the defendant to the plaintiff, a breach of that duty, an injury sustained by plaintiff, and a causal connection between defendant's conduct and the plaintiff's injury. *In re Cooper/T. Smith v. Gnots-Reserve, Inc*., 929 F.2d 1073 (5th Cir. 1991) citing *Thomas v. Express Boat Co.*, 759 F.2d 444, 448 (5th Cir. 1985). Thus, as part of its negligence claim, a plaintiff must prove that a defendant's alleged negligence caused its damages. *See Bach v. Trident S.S. Co.*, 920 F.2d 322, 327 (5th Cir. 1991), *vacated and remanded other grounds by* 500 U.S. 949 (1991). Causation has the "sub-elements of: (a) cause in fact and (b) proximate or legal cause." *In re Mid South Towing Co.*, 418 F.3d 526, 532 (5th Cir. 2005).

To establish cause in fact – "but for" causation – the plaintiff must show by a preponderance of the evidence that a particular event would not have occurred but for the defendant's negligent acts. *Moser v. Texas Trailer Corp.*, 623 F.2d 1006, 1012-13 (5th Cir. 1980). "However, where there are concurrent causes of an accident, the proper inquiry is whether the conduct in question was a substantial factor[21] in bringing about the accident." *Hennigan v. Cooper/T. Smith Stevedoring Co., Inc.*, 837 So. 2d 96, 102 (La. App. 2002). The defendant's action cannot be a "substantial factor" in causing the plaintiff's harm when the action is only an insignificant cause. *Chavez v. Noble Drilling Corp.*, 567 F.2d 287, 289 (5th Cir. 1978) (citations omitted). Stated differently, if the plaintiff's harm would have occurred in the absence of the defendant's act or omission, the act is not a substantial factor. Thomas J. Schoenbaum, *Admiralty and Maritime Law*, §5-3 (4th ed. 2004).

[21] In *Admiralty and Maritime Law*, Thomas Schoenbaum states that while the "but-for" test for cause in fact is sometimes used in admiralty cases, the "substantial factors" test is more appropriate when multiple parties are involved. Schoenbaum posits that while the tests may appear different, they are actually similar because "a defendant's act cannot be a 'substantial factor' if the plaintiff's harm would have occurred without it." Thomas J. Schoenbaum, *Admiralty and Maritime Law*, §5-3 (4th ed. 2004).

Proximate cause involves a policy determination as to whether the plaintiff's injuries were a reasonably foreseeable result of the defendant's alleged negligent conduct. *Consolidated Aluminum Corp.*, 833 F.2d 65 at 68. The Fifth Circuit summarized its understanding of proximate cause as:

> [A] harm [is] the foreseeable consequence of an act or an omission if harm of a general sort to persons of a general class might have been anticipated by a reasonably thoughtful person, as a probable result of the act or omission, considering the interplay of natural forces and likely human intervention. *Id.*

However, the court does not have to find the actor's conduct to be a legal cause of harm to another where "after the event and looking back from the harm to the actor's negligent conduct, it appears to the court highly extraordinary that it should have brought about the harm." REST 2d TORTS §435(2). For example, "[an] 'Act of God' defense[22] denies that the defendant's acts or omissions, even assuming they did not meet the standard of reasonable care under the circumstances, caused the accident." *Fischer v. S/Y Neraida*, 508 F.3d 586, 596 (11th Cir. 2007). A successful "act of God" defense requires the defendant meet the heavy burden of showing that "all reasonable measures would have been futile." *Id.* Thus, the accident would be unavoidable. *Id*.

"Maritime law, however, uses evidentiary, fault, causation, and other presumptions throughout its resolution of negligence suits, [Thomas J. Schoenbaum, 1 *Admiralty & Maritime Law]* § 14-3 (4th ed. 2004). These presumptions shift the burden of production and persuasion to

[22] An "act of God" defense is an argument of superseding causation. *Fischer*, 508 F.3d at 595. The defense has been widely defined as "[a]ny accident, due directly and exclusively to natural causes without human intervention, which by no amount of foresight, pains, or care, reasonably to have been expected could have been prevented;" and/or "a disturbance . . . of such unanticipated force and severity as would fairly preclude charging . . . [Defendants] with responsibility for damage occasion[ed] by the [Defendants'] failure to guard against it in the protection of property committed to its custody." *Skandia Insurance Co., Ltd. v. Star Shipping AS*, 173 F.Supp.2d 1228, 1239 (S.D. Ala. 2001) (quoting *Compania De Vapores Insco S.A. v. Missouri Pacific R.R. Co.*, 232 F.2d 657, 660 (5th Cir. 1956), *cert. den.*, 352 U.S. 880 (1956)).

the defendant."*Combo Maritime, Inc. v. U.S. United Bulk Terminal, L.L.C.*, 615 F.3d 599, 604 (5th Cir. 2010). In the instant case, Plaintiffs invoke two such burden shifting presumptions–the *Louisiana* rule and the *Pennsylvania* rule.

The *Louisiana* Rule

The rule of *The Louisiana*, 3 Wall. (70 U.S.) 164 (1864) creates a presumption of fault that shifts the burden of production and persuasion to a vessel who drifts into an allision with a stationary object. *Id.* at 173; *Combo Maritime*, 615 F.3d at 604. However, as the *Combo Maritime* court explained its effect, "'Once evidence is presented. . . presumptions become superfluous because the parties have introduced evidence to dispel the mysteries that gave rise to the presumptions.'" *Id.* at 605 citing *In re Mid-South Towing Co.*, 418 F.3d 526, 531 (5th Cir. 2005) and others. The court also noted that the presumption must be confined to the issue of breach of duty only–not

> "causation (either in fact or legal cause) or the percentages of fault as assigned to the parties adjudged negligent." *Mid-South Towing*, 418 F.3d at 532. Application of [one of these presumptions] does not supplant the general negligence determination which requires a plaintiff to prove the elements of duty, breach, causation and injury by a preponderance of the evidence. *M/V MORGAN*, 375 F.3d at 572-73 (citing *Bunge Corp.*, 558 F.2d at 798; *Brown & Root Marine Operators Inc. v. Zapata Off-Shore Co.*, 377 F.2d 724, 726 (5th Cir. 1967).

Combo Maritime, 615 F.2d at 605. The Fifth Circuit then noted that there are three ways in which a defendant can rebut the presumption, "(1) that the allision was the fault of the stationary object; (2) that the moving vessel acted with reasonable care; or (3) that the allision was an unavoidable. . . ." *Id.*

In the instant case, the Court has found unequivocally that the ING 4727 did not ever allide with the IHNC floodwall at the North Breach which was northwest of the Lafarge Terminal at a distance of approximately 1400 feet. Thus, this presumption is without any force as to that breach. Furthermore, Lafarge has rebutted this presumption as it applies to the South Breach. While it is clear that indeed ING 4727 allided with the IHNC floodwall at the southern end of the South Breach which was to the southeast of the Lafarge Terminal at a distance of approximately 3000 feet or more than half a mile away, the Court finds that it did not cause the breach which caused the catastrophic flooding. It was neither a cause in fact nor a substantial cause of the breach. It was propelled through the existing breach as a result of 70 knot winds blowing from the west by 10:00 a.m. the morning of the 29th and was sucked through the already breached floodwall as it rode the surge-ridden waters of the IHNC. Not a single Plaintiffs' expert gave credible testimony to explain how the Barge could move against the force of these well-documented winds. As noted in the Finding of Facts, it is clear that the flooding had already occurred as demonstrated by the photograph showing the undisturbed bus with the Barge resting on the land side thereof. This presumption cannot override the overwhelming evidence presented as outlined in detail above that the Barge did not cause the South Breach.

The *Pennsylvania* Rule

As this Court has stated previously in *Tokio Marine and Fire Ins. Co., Ltd. v. M/V Flora*, 199 WL 14000 (E.D.La. Jan. 11, 1999), under the *Pennsylvania* Rule, when a vessel involved in an accident is shown to have breached a statute or regulation, it must show not only that its breach was not a contributory cause of the accident but that it could not have been. *The Pennsylvania v.*

Troop, 86 U.S. (19 Wall.) 125 (1873). In effect, the burden of proof is shifted as to the causation issue once it is established that the vessel violated the statute or regulation. *Garner v. Cities Serv. Tankers Corp.*, 456 F.2d 476, 478 (5th Cir. 1972). The *Pennsylvania* Rule applies wherever a statute or regulation that is "intended to prevent collisions" is violated. *The Pennsylvania*, 86 U.S. at 136.

Pretermitting whether Lafarge violated any specific statute or regulation as it pertained to the mooring of the ING 4727, it is again clear that Lafarge has proven that it was not only "not a contributory cause of the accident" but it simply was not a cause of the breaching and catastrophic flooding that damaged plaintiffs. The evidence as outlined in detail above supports this conclusion. Simply put, the Barge did not do it.

III. CONCLUSION

The horror and tragedy of the flooding that occurred in the Lower Ninth Ward is one that must not be taken lightly. The testimony of those caught in the maelstrom is heartbreaking and defies belief that such a catastrophe could occur. However, where as here there is overwhelming evidence that the ING 4727 did not cause in any manner cataclysmic flooding of the Lower Ninth Ward, the Court must so find. Accordingly, finding no just reason for delay, pursuant to Fed. R. Civ. P. 54(b),

IT IS ORDERED that judgment be entered in favor of Lafarge North America, Inc. and against Josephine Richardson, Holiday Jewelers, Inc., John Alford and Jerry Alford dismissing Plaintiffs claims in their entirety with each party to bear its, his or her own costs.

New Orleans, Louisiana, this 20th day of January, 2011.

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