UNITED STATES DISTRICT COURT
SOUTHERN DISTRICT OF NEW YORK

LORD & TAYLOR LLC,

Plaintiff,

-against-

ZIM INTEGRATED SHIPPING SERVICES, LTD. and NEW YORK CONTAINER TERMINAL, INC.,

Defendants.

13 Civ. 3478 (AT)

OPINION AND JUDGMENT

ANALISA TORRES, District Judge:

I. Overview

On the evening of Monday, October 29, 2012, Hurricane[1] Sandy made landfall in southern New Jersey, causing billions of dollars in damage along the East Coast of the United States. As a result of flooding at the New York Container Terminal ("NYCT" or the "Terminal") located on Staten Island, 211 cartons containing Plaintiff, Lord & Taylor LLC's, ladies cardigans and sweaters were ruined by wetting damage. Although Hurricane Sandy was figuratively an Act of God, the question before the Court is whether Hurricane Sandy was legally an Act of God that absolves Defendant, Zim Integrated Shipping Services, Ltd. ("Zim"), of liability for Plaintiff's loss.[2] The answer is yes.

[1] To avoid confusion, the Court refers to the storm as "Hurricane Sandy" or "Sandy." However, prior to landfall, as Hurricane Sandy crossed over the colder waters of the North Atlantic and interacted with colder air, the storm lost its tropical characteristics and became a "post-tropical" or "extratropical" storm. *See* Ex. 44, at 3 n.4 ("The primary distinction between tropical and extratropical cyclones is their energy source. Tropical cyclones derive their energy predominantly from the release of latent heat of condensation relatively close to the center, while extratropical cyclones rely mainly on baroclinic processes (large-scale temperature contrasts between warm and cold air masses).").

[2] The parties agree that NYCT was acting as a subcontractor for Zim from October 28, 2012 through November 6, 2012 with respect to the two containers holding Plaintiff's merchandise. Joint Stipulation of Facts ¶ 14, Oct. 20, 2014, ECF No. 60. By stipulation dated October 8, 2013, the Court dismissed NYCT as a defendant.

II. Procedural History

The Court held a bench trial from October 27 to 31, 2014. Post-trial memoranda were fully submitted on December 5, 2014. On January 8, 2015, the Court visited NYCT.

At trial, each party presented one fact witness and two expert witnesses. Robert Nixon, Vice President of Operations at NYCT, testified as a fact witness on behalf of Plaintiff, and Zim called Salvatore Grillo, a former NYCT employee who was present at NYCT on the night of the storm. The Court credits their testimony.

Each party presented its own terminal operations expert. Captain Ivo Knobloch testified on behalf of Plaintiff. Knobloch holds a Bachelor of Technology degree in Ship Management and Ship Operation from the Academy for Nautical Science and Marine Technology in Bremen, Germany. Ex. 57, at I. He has been a marine surveyor and casualty investigator since 1988, and prior to that, worked on ships for about 14 years. *Id.*; Tr. 239. Zim called Donald Hamm as its terminal operations expert. Hamm worked at container terminals in Europe and the United States for 40 years before retiring in 2009. Tr. 522; *see also* Ex. 62. Most recently, from 2003 to 2009, Hamm was president of the Port of Newark Container Terminal. Tr. 524.

Each party also presented a meteorology expert. Lee Branscome, Ph.D., testified for Plaintiff. Branscome earned a Ph.D. in meteorology at the Massachusetts Institute of Technology. Ex. 33, at 1. He is a Certified Consulting Meteorologist and is board certified by the American Meteorological Society. *Id.* Zim called Austin Dooley, Ph.D. Dooley holds a Ph.D. in Physical Oceanography from New York University. Ex. 35, at 22. Dooley was previously an associate professor of meteorology and oceanography at the SUNY Maritime College, an adjunct instructor of meteorology and oceanography at Purchase College, and an adjunct professor of meteorology at the U.S. Merchant Marine Academy. *Id.* at 1. In addition to

the live testimony, the parties provided deposition excerpts constituting the direct testimony of several additional fact witnesses. *See* Joint Pre-Trial Order, Oct. 20, 2014, ECF No. 60.

"In an action tried on the facts without a jury . . . the court must find the facts specially and state its conclusions of law separately." Fed. R. Civ. P. 52(a)(1). Following are the Court's findings of fact and conclusions of law.

III. Findings of Fact

A. Stipulated Facts

Prior to trial, the parties stipulated to the following facts concerning Plaintiff's cargo, the manner of shipment, and the applicable damages.

Plaintiff contracted with Zim, a licensed ocean liner carrier, to transport Plaintiff's merchandise from Hong Kong to New York. Joint Stipulation of Facts ("Jt. Stip.") ¶¶ 1-3, 22, Oct. 20, 2014, ECF No. 60. Zim leased space aboard a ship known as the M/V OOCL Kobe (the "Kobe") to transport the goods in containers. *Id.*

On October 1, 2012, two containers, container GLDU 2916462 ("Container G"), carrying 268 cartons of Plaintiff's ladies cardigans, and container IPXU 3827688 ("Container I"), carrying 443 cartons of Plaintiff's sweaters and cardigans, were loaded onto the Kobe. *Id.* ¶¶ 1, 2. The Kobe departed Hong Kong for the Port of New York on October 1 and arrived in New York on Saturday, October 27. *Id.* ¶¶ 1-2, 4. The Kobe berthed at NYCT at approximately 9:00 a.m. and began cargo operations at approximately 1:00 p.m. *Id.* ¶ 4. The term "cargo operations" means the loading and unloading of cargo containers. The Kobe completed cargo operations at 2:12 a.m. on Sunday, October 28 and left shortly thereafter. *Id.* ¶ 5. Container G was stored outdoors on the asphalt surface of the Terminal; NYCT was unable to determine where Container I was stored. *Id.* ¶¶ 6-7.

As is "usual and customary" on the weekend, NYCT was closed for truck pickup of incoming cargo. *Id.* ¶ 8. At no time did Plaintiff request that Zim or NYCT provide Plaintiff the opportunity to collect its goods on Saturday or Sunday. *Id.* ¶ 9.

Due to Hurricane Sandy, NYCT was closed on Monday, October 29. *Id.* ¶ 10. NYCT "suffered flooding damage on the evening of Monday, October 29, 2012 as a result of the storm surge associated with Hurricane Sandy." *Id.* ¶ 11.

Plaintiff's truckers picked up the containers on November 6 and delivered them to Plaintiff the next day. *Id.* ¶ 12. As a result of Sandy, 118 cartons in Container G and 93 cartons in Container I suffered wetting damage and were destroyed. *Id.* ¶¶ 16-17. Based on the retail sales value of the merchandise, Plaintiff suffered a loss of $206,972. *Id.* ¶ 18. This amount was paid to Plaintiff by its cargo underwriter, Markel Syndicate 3000, which is subrogated to Plaintiff's rights to the claim under the cargo policy. *Id.*

Pursuant to the package limitation provision of the Carriage of Goods by Sea Act ("COGSA"), 46 U.S.C. § 30701 note, formerly at 46 U.S.C. app. §§ 1301 *et seq.*, the parties agree that Plaintiff's damages are limited to $105,500 and that this amount is directly attributable to wetting damage from Hurricane Sandy. *Id.* ¶¶ 19-20.

B. The Terminal

NYCT is one of six container terminals located in the Port of New York.[3] NYCT is situated on the northwest corner of Staten Island. The Terminal sits on land owned by the City of New York (the "City"), which leases it to the Port Authority of New York and New Jersey (the "Port Authority"), which, in turn, leases it to NYCT. Tr. 141, 527-28. This is a common arrangement among terminal operators and local governments in the area. Tr. 529. Constructed

[3] The other container terminals in the Port of New York are: Port Newark, Global, Maher, APM, and Red Hook. Tr. 569.

in the 1960s, NYCT was previously known as the Howland Hook Container Terminal. Ex. 62, at 2. The Ontario Teachers Investment Group purchased the Terminal in 2006, and it was subsequently renamed. *Id.*

The Terminal is an asphalt-covered lot spanning 187 acres. Tr. 456, 491. It is roughly triangular in shape. Tr. 39; *see also* Ex. 62A (aerial photo of NYCT with relevant structures labeled); Ex. 78 (aerial photo of NYCT described during Nixon's testimony). NYCT is bordered along the north by a swamp, Tr. 508, and along the south by railroad tracks that do not belong to the Terminal, Tr. 454. A tidal estuary known as Bridge Creek runs along the north edge and cuts southeast through the Terminal. Tr. 42, 347-48. Located in the northeast area of NYCT is an intermodal rail facility where containers are loaded onto rail cars. Tr. 138. The Terminal is bordered on the east by the Arlington Yard, a rail yard that is owned by the City, managed by Conrail, and connected to NYCT's intermodal rail facility. Tr. 43, 105.

NYCT is bordered on the west by the Arthur Kill, a tidal river. Tr. 89; Exs. 17, 38. The Arthur Kill is a navigable waterway that runs along the west side of Staten Island and separates Staten Island and New Jersey. Ex. 38. At its southern end, the Arthur Kill connects to Raritan Bay. *Id.* The Arthur Kill is considered part of New York Harbor, which also includes the Upper Bay and Lower Bay of New York at the convergence of the Hudson and East Rivers. Tr. 740. Bridge Creek connects to the Arthur Kill at the northwest edge of the Terminal. Tr. 33-34. NYCT has an estimated 3,000-foot bulkhead that runs along the Arthur Kill. Tr. 29, 38-39. The bulkhead, which is the front wall of the Terminal that faces the water, is roughly the same height above the water as the bulkheads of other terminals in the Port of New York because these bulkheads were built in accordance with standards established by the Port Authority and the U.S. Coast Guard. Tr. 543-44.

C. Terminal Operations

NYCT is engaged in the business of stevedoring, which involves transporting cargo onto and off of seafaring vessels. Tr. 577. Cargo is stored in corrugated steel containers that come in standard sizes of 20 or 40 feet long and 8 to 9.6 feet tall. Tr. 222, 535, 546. Containers sit on corner castings, which are standard-sized pieces of steel welded to the corners of a container. Tr. 535-36. The weight of a container rests on these corner castings, and they are used to attach and secure one container to another on a vessel or to lift a container out of a vessel. Tr. 536-37, 541-42; *see also* Ex. 96 (diagram of corner castings). Because the corner castings must be aligned in order to attach and provide stability, containers can only be stacked on other same-sized containers, *e.g.*, 40-foot containers can only be stacked on other 40-foot containers. Tr. 538.

Containers transported by sea are loaded and stacked in specialized container ships and are unloaded at a container terminal using large, custom cranes. *See* Ex. 99 (video showing unloading of container from a container ship). The cranes are anchored to a string piece, which is a strip of asphalt under the cranes along the bulkhead. Tr. 543-44; *see also* Ex. 88. NYCT has a total of 3 berths and 9 cranes distributed among the berths for cargo loading and unloading. Tr. 29-30. A crane operator sits within the crane approximately 140 feet above the string piece. Tr. 542. To load or unload a container, the crane operator steers a spreader bar over the container that she intends to move and lands the bar onto the container. Tr. 542. The spreader bar has a twist lock that hooks into each of the container's corner castings, and the crane operator lifts the container onto or off of the ship. Tr. 542; *see also* Ex. 99.

After lifting a container off of a vessel, the crane operator then lowers the container onto a trailer-type wheeled cart known as a bomb cart, which is then used to transport the container to another location in the terminal for storage. Tr. 195, 547; Ex. 85 (photograph of a yellow bomb

cart). A bomb cart has raised sides and corners to hold a container, but it does not have brakes or signal lights and can only be used within a terminal. Tr. 195. Outside of a terminal, containers are typically transported on road chassis. A road chassis is similar to a bomb cart, but it has brakes and signal lights and is permitted on public roads. Tr. 197-98, 533-34; Ex. 87 (photograph of a road chassis); *see also* Ex. 84 (photograph of a blue road chassis and a yellow bomb cart). Containers must be secured by their corner castings when attached to a road chassis, as a road chassis does not have the raised sides of a bomb cart. Tr. 202, 547. Bomb carts are more commonly used during cargo discharge operations because crane operators can simply drop a container onto a bomb cart without needing to align the corner castings. Tr. 547. It is possible to discharge a container directly onto a road chassis, but this practice is not typically employed today. Tr. 547-48. Refrigerated containers and containers holding hazardous materials are always stored on a road chassis. Tr. 50-51.

The Port of New York utilizes the service of members of the International Longshoremen's Association ("ILA"). Tr. 578. In accordance with the ILA's labor agreement with the Terminal, a request for voluntary labor to assist on the weekend must be ordered by Friday at noon. Tr. 578. A terminal is permitted to request voluntary labor on an emergency basis under certain circumstances, but the ILA needs to approve the request, and the decision to work is left to the discretion of the employee. Tr. 578.

D. Weather Advisories

Official weather reports for Hurricane Sandy were issued by the National Weather Service ("NWS") and its hurricane-focused division, the National Hurricane Center ("NHC"). Tr. 267. The NWS is operated by the National Oceanic and Atmospheric Administration ("NOAA"), an agency located within the Department of Commerce. Tr. 267. The NWS and the

NHC provide both text-based and graphic-based tropical storm and hurricane forecast products to the public, including tropical cyclone forecasts and advisories, 5-day graphical tropical weather outlooks, and tropical cyclone wind field graphics. *See* Ex. 71 (Department of Commerce document titled, "National Hurricane Center Product Description Document: A User's Guide to Hurricane Products"). In addition to providing national weather products, the NWS also provides New York area-specific products from its New York office located in Upton, New York. Tr. 700.

A storm surge is "'[a]n abnormal rise in sea level accompanying a hurricane or other intense storm, and whose height is the difference between the observed level of the sea surface and the level that would have occurred in the absence of the cyclone.'" Ex. 46, at 13 (quoting NHC's Glossary of NHC terms); *see also* Tr. 807.[4] The magnitude of a storm surge depends, in part, on the "fetch," which is the amount of water over which a storm's winds blow, building up the storm surge. Tr. 433. If a storm's winds blow over a larger area of water, the storm surge will be greater. Tr. 433.

The severity of a storm surge also depends on the height of the tides when a storm arrives. Due to tidal cycles, there are several measures of the sea level depending on the location and time of day. A measure of the sea level at a particular geographic location is known as a tidal datum, and tidal data is measured by a tide gage. *See* Tr. 706, 843; Exs. 26, 37 (examples of tidal data at Bergen Point West Reach, New York). A tide gage is typically a tube affixed to a structure in the water that contains electronic instruments to measure sea level. Tr. 685. New York has two tide cycles within a single day, meaning two high tides and two low tides. Tr. 685. However, the levels of the high and low tides are not identical. The highest high tide level that

[4] Surge may also occur as a result of non-tropical storms such as nor'easters. Tr. 842.

the water reaches in a year is referred to as mean higher high water ("MHHW"). Tr. 391, 695; *see also* Ex. 35F (Dooley's hand-drawn exhibit of tidal data in the New York area). The lowest low tide level in a year is referred to as mean lower low water ("MLLW"). MLLW is often used as a benchmark for other tide levels and is typically indicated by zero. Tr. 391-92. In New York, the difference between MLLW and MHHW is approximately 5.5 to 5.6 feet. Tr. 686. NOAA also provides averages of the high and low tides for a particular tide gage. The average of the high tides is called mean high water ("MHW"), and the average of the low tides is called mean low water ("MLW"). Tr. 685-86, 693. At trial, most tide references were based on measurements taken at the Bergen Point West Reach tide gage, which is the tide gage closest to NYCT. *See* Tr. 331; Ex. 95.

Storm tide refers to the combined height of the predicted normal tide and the storm surge. Tr. 392-93. For example, Hurricane Sandy arrived when the normal tide was 5.2 feet above MLLW and had a storm surge of 9.3 feet; thus, the storm tide was 14.5 feet. Ex. 41 (NOAA Tides and Currents Graph for Bergen Point West Reach from October 26, 2012 through October 30, 2012); *see also* Ex. 44, at 8 n.9 (NHC report describing storm surge as "the abnormal rise of water generated by a storm . . . expressed in terms of height above normal tide levels"; storm tide as "the water level due to the combination of storm surge and the astronomical tide . . . expressed in terms of height above a vertical datum"; and inundation as "the total water level that occurs on normally dry ground as a result of the storm tide . . . expressed in terms of height above ground level").

Generally, 48 hours prior to landfall, the NWS and the NHC forecasts provide specific estimates of the possible storm surge for a storm. Tr. 360-61. The weather agencies use a computer model called SLOSH, which stands for "Sea, Lake, Overland Surges from

Hurricanes," to simulate the potential storm surge based on the size of the storm, the predicted track, the winds, and other variables. Tr. 283, 360-62.

E. Relevant Weather Forecasts and NYCT Preparation Prior to Hurricane Sandy

1. Monday, October 22 through Wednesday, October 24, 2012

NYCT became aware of Hurricane Sandy's potential impact on the New York area one week before landfall. Tr. 43-44. Robert Nixon and Joseph Cordero, employees of NYCT, described the Terminal's preparations in anticipation of the storm. Nixon became the Vice President of Operations at NYCT in September 2012 and is responsible for the day-to-day operations involving vessel and gate activity. Tr. 43; Nixon Dep. 7:22-8:9. Cordero, an employee of Global Container Terminals, Inc., has worked at NYCT as Director of Marine Operations since 2006 and was also involved in preparations for Hurricane Sandy. Cordero Dep. 7:10-8:14. Cordero's responsibilities included overseeing marine superintendents and planners, ordering labor to work vessels, and acting as a liaison between customers, steamship lines, and the Terminal. Cordero Dep. 9:2-11.

During the week leading up to Sandy, Nixon, who was responsible for container storage, obtained weather information from reports prepared by a private weather service called WeatherWorks. Tr. 44; Nixon Dep. 8:24-9:19. A WeatherWorks Weather Statement issued at 4:11 p.m. on Tuesday, October 23, reported "significant storm potential early next week." Ex. 7, at 2. The statement noted that "two scenarios exist for the storm into Monday and Tuesday: one tracks Sandy too far east and out to sea, leaving the Northeast with only rain showers as a cold front passes through. The second scenario involves the trough wrapping Sandy west-northwestward, thus creating a significant impact somewhere between the Delmarva and Cape Cod. The second scenario would bring heavy, flooding rainfall, damaging winds and substantial

coastal flooding/beach erosion to the Northeast." *Id.* The statement concluded, "while the potential impacts are high, there continues to be much uncertainty in the track and strength of this storm." *Id.*

Throughout the week, Nixon and his staff and other Port of New York terminal operators participated in conference calls with the U.S. Coast Guard and the Port Authority. Tr. 45, 87, 97. On these calls, the Coast Guard and the Port Authority informed the terminal operators about the need to prepare for Sandy. Tr. 87, 97. NYCT does not have standard operating procedures for a hurricane, although a document titled "Hurricane SOP" served as a guide in the event of a hurricane. Tr. 49-51; *see* Ex. 16 (NYCT's Hurricane SOP). According to Nixon, the "Hurricane SOP" document was not a hurricane preparedness plan but was merely used as reference. Tr. 111.

A Weather Statement issued by WeatherWorks at 3:12 p.m. on Wednesday, October 24, stated, in part, "today, Sandy has become a hurricane with max winds of 80 mph and will be striking Jamaica this afternoon. . . . More guidance has been agreeing with Sandy making a turn west-northwestward into a deepening upper trough over the Ohio Valley. . . . [I]f this scenario plays out, heavy, flooding rainfall, damaging winds capable of bringing down trees and power lines, and major coastal flooding/beach erosion will be likely. . . . Keep in mind, this is a changeable situation and an eastern track leading most of Sandy out to sea is still plausible." Ex. 7, at 3.

A NWS Hazardous Weather Outlook issued at 3:40 p.m. on the same day stated, in part, "there is the potential for a major coastal storm with heavy rainfall[,] high winds[,] coastal flooding and beach erosion. This will ultimately depend on the eventual track and evolution of tropical cyclone Sandy as it interacts with a deepening upper level low pressure system approaching the East Coast. The storm may very well just move out to sea[] and have little if

any impact on our weather. Again[,] forecast confidence is still low at this point." Ex. 15, at 1.

2. Thursday, October 25 through Friday, October 26, 2012

On the morning of Thursday, October 25, Nixon convened a meeting at 10:00 a.m. to discuss storm preparedness. Nixon Dep. 16:6-15; Ex. 4 (7:38 a.m. Thursday, October 25 e-mail from Robert Nixon titled, "Hurricane Sandy Prep"). In an e-mail sent at 11:42 a.m., Nixon listed several tasks to be completed as a result of the meeting. Ex. 4 (11:42 a.m. Thursday, October 25 e-mail from Robert Nixon titled, "Hurricane Sandy Meeting 10/25/12"). These tasks included updating the "entire" SOP and distributing it to each department head, ordering extra labor for Monday to prepare the Terminal, moving "grounded loads from low areas that could potential[ly] flood," "[b]reak[ing] down empty stacks according to SOP," and "[c]ommunicat[ing] to Customs not to park in back of CES for fear of flooding." *Id.*

At his deposition, Cordero, who was responsible for marine operations such as ordering labor to work vessels and communicating with customers and steamship lines, said that the main concerns discussed at the Thursday meeting were "mostly high wind damage as well as water breaching the pier, the front side of the pier, the possibility of that; what we had seen in the past during Hurricane Irene." Cordero Dep. 28:7-10. When asked if he recalled when the forecasts began to predict a significant storm surge, Cordero stated, "I would say that somewhere in the Sunday [October 28] time frame as the timing of landfall became a little bit more accurate to depict; and seeing it lining up, the event lining up a lot closer to periods of high tide, that became more of a concern for everyone. But it certainly wasn't something that we could see three days out." Cordero Dep. 29:8-18. Nixon noted that at the Thursday meeting, he was not worried about potential storm surge. Nixon Dep. 16:19-17:3. NYCT's main concern was wind. *Id.* at 25:23-25. With that in mind, Nixon directed that high, single stacks of containers with no

adjacent support be broken down and reassembled. *Id.* at 17:20-18:5. Both empty and laden containers were "block stowed," meaning placed in a low, square formation to provide stability against the wind. Tr. 57-58, 553; *see also* Ex. 83 (photograph of block-stowed containers). NYCT also took measures to protect its equipment. For example, wheel boxes (containers on road chassis) located close to the water were moved upland, Nixon Dep. 17:10-19, and pickup trucks were parked near the LCL[5] building on the southeast edge of the Terminal, Tr. 74. NYCT secured the container cranes and placed containers around the cranes to prevent driving winds from rolling them around. Tr. 69-70. Nixon did not recall whether laden or empty containers were used for this purpose. Tr. 69-70. NYCT also placed sand bags around the power substation located in the northeast corner of the Terminal. Tr. 68-69. Refrigerated containers, which are regularly stored on road chassis and placed in a row in the middle of NYCT near a power supply, were not relocated. Tr. 51-52.

According to Nixon, NYCT did not move containers in order to avoid flood damage. Nixon Dep. 18:6-9; Tr. 56. Although Nixon mentioned moving laden containers from low areas that could potentially flood in his 11:42 a.m. e-mail on Thursday, October 25, at trial he did not recall any specifics regarding this option or any further discussions about it. Tr. 67-68.

At 11:00 a.m. on Thursday, the NHC issued a 5-day forecast map that predicted that Hurricane Sandy would make landfall shortly after 8:00 a.m. on Tuesday, October 30 in the middle of New Jersey. Ex. 15, at 3. The cone[6] containing the probable path of the storm's center extended from North Carolina up through Massachusetts. *Id.*

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[5] LCL stands for "less than container load." Tr. 74.

[6] According to the NHC, "the entire track of the tropical cyclone can be expected to remain within the cone roughly 60-70 percent of the time." Ex. 71, at 34.

A WeatherWorks Weather Statement issued at 2:11 p.m. on Thursday stated, in part, "at this time, out to sea solutions are becoming much less numerous and there is growing concern and confidence that a Northeast landfall is most likely. . . . During the brunt of the storm, winds may be gusting over 50 mph . . . . Heavy rain will also fall with the storm with amounts over 5 [inches] possible, creating a substantial flooding threat. . . . Keep in mind, the wind and rainfall details above are preliminary. As storm confidence grows, expect these impacts to be fine tuned." Ex. 7, at 4.

A NWS Hazardous Weather Outlook issued at 3:26 p.m. on Thursday stated, in part, "there is increasing confidence that the tri-state area will feel the impacts of a major coastal storm late this weekend into early next week. This includes the potential for heavy rainfall and resultant significant urban[,] small stream[,] and river flooding[,] high winds causing widespread downing of trees and power lines[,] and significant shoreline impacts from coastal flooding and beach erosion. The specific impacts will ultimately depend on the exact track and evolution of tropical cyclone Sandy as it interacts with a deepening upper level low pressure system approaching the East Coast." Ex. 15, at 3-4. A NWS Public Information Statement issued at 8:55 p.m. on Thursday stated, in part, "leave low lying or coastal areas[] as well as offshore islands. These are the locations most prone to storm surge. Storm surge is the most dangerous part of a storm such as this one. The surge is a dome of water that comes across the coast as the storm makes landfall." *Id.* at 4-5.

Cordero stated that on Friday morning, NYCT started to move all nonessential vehicles and equipment upland and began to secure loose items by placing them in warehouses. Cordero Dep. 22:16-23:10. Cordero also said that hazardous containers that could have an environmental impact were given priority for placement upland. *Id.* at 37:10-15. Nixon testified that hazardous

containers were moved up against the LCL building in order to provide stability from the wind. Tr. 50.

Salvatore Grillo was a mechanic and facility foreman at NYCT from 1972 until 2014 and became responsible for facility maintenance at the Terminal in 1973. Tr. 443-44. Grillo testified that he had a routine meeting with his supervisor, Tom Fallon, Vice President of Operations, at 12:00 p.m. on Friday, October 26, at which they discussed hurricane preparations. Tr. 449. As a result, Grillo and his team secured air conditioners on the roof, removed debris from the Terminal, removed garbage drums, and secured portable toilets. Tr. 450-51.

The NHC 5-day forecast map from 11:00 a.m. on Friday indicated landfall in Delaware at about 8:00 a.m. on Tuesday, with the cone of the storm's probable path extending from North Carolina through Long Island. Ex. 15, at 7.

A WeatherWorks Storm Alert issued at 2:42 p.m. on Friday, October 26, stated, in part, "a very unique and potentially damaging situation will be monitored the next couple of days as Sandy approaches the area. . . . While the exact landfall is still uncertain (somewhere between Delaware and southern New England), most likely it is along the Jersey Shore. This would mean we see the brunt of the storm with 4 - 8 [inches] of rain possible and prolonged wind gusts of 40 – 60 mph . . . . Again, the exact track and therefore impacts are somewhat uncertain, but the worst of the storm looks to be Monday into early Tuesday." Ex. 7, at 5. The storm alert also contained a "Potential Effects for the Area" section, which stated, "[f]looding (rivers/creeks, along with flash flooding) with the potential for 4-8+ inches" and "[c]oastal flooding may be historic in parts of NJ/NY. Therefore, any tidal rivers or bays in the area will be influenced by coastal flooding and increased tides[.] This may extend into areas not typically tidal." *Id.* at 6.

At 3:00 p.m. on Friday, the U.S. Coast Guard declared "Port Condition Whiskey,"

meaning that gale force winds were expected within 72 hours. Ex. 22, at ZIM00048-49. The U.S. Coast Guard press release stated, "in anticipation of the arrival of Hurricane Sandy and due to the uncertainty of the hurricane path, the Captain of the Port of New York is taking precautionary measures to ensure maritime communities are prepared in case hurricane conditions affect this area." *Id.*

A NWS Hazardous Weather Outlook issued at 4:30 p.m. on Friday reiterated that "the tri-state area will likely feel the impacts of a dangerous coastal storm late this weekend into early next week" and "this includes the likelihood for heavy rainfall and resultant significant urban[,] small stream[,] and river flooding . . . and significant shoreline impacts from coastal flooding and beach erosion." Ex. 15, at 8. The outlook also restated the warning from Thursday's outlook that "the specific impacts will ultimately depend on the exact track and evolution of tropical cyclone Sandy as it interacts with a deepening upper level low pressure system approaching the East Coast." *Id.* A NWS Public Information Statement issued at 7:50 p.m. on Friday repeated its warning about low-lying areas and the potential danger from storm surge. *Id.* at 8-9.

3. Saturday, October 27, 2012

The NHC issued a 5-day forecast map at 5:00 a.m. on Saturday morning that predicted Sandy would make landfall on the southern tip of New Jersey a few hours before 2:00 a.m. on Tuesday. Ex. 15, at 11. This projected landfall time was several hours earlier than was previously indicated in the NHC's 11:00 a.m. Friday forecast map.

At 5:46 a.m. on Saturday, October 27, the NWS issued its first coastal flood watch for the New York City area. Tr. 379-80; Ex. 15, at 12-13. A coastal flood watch is typically issued when the local NWS office has at least a 50 percent confidence level that a coastal flood will occur within 12 to 48 hours. Tr. 367-68. The coastal flood watch stated, in part, that "the tri-

state area will likely feel the impacts of a dangerous coastal storm Sunday evening through the middle of next week. . . . A coastal flood watch is in effect for all coastlines beginning with Sunday evening[']s high tide[] and continuing through Monday. Persistent strong easterly flow will pile water on top of already higher astronomical high tides due to the full moon[,] resulting in possible continuing flood stages between high tide cycles. The most prone for the widespread moderate flooding will be western Long Island Sound shorelines." Ex. 15, at 13. The Hazardous Weather Outlook issued at the same time was nearly identical to the outlook issued at 4:30 p.m. on Friday.

The Kobe arrived in New York and berthed at NYCT at about 9:00 a.m. on Saturday morning. Jt. Stip. ¶ 4. Cordero averred that diverting or not accepting the containers from the Kobe in order to protect them from Sandy was not considered, and the decision to bring the vessel in to load and unload cargo was made by the Kobe. Cordero Dep. 39:15-25.

At 11:00 a.m. on Saturday, the NHC issued Hurricane Sandy Advisory Number 21, which indicated a possible storm surge height of 4 to 8 feet from Ocean City, Maryland up through Rhode Island. Ex. 15, at 15. The "Discussion and 48-Hour Outlook" section of the advisory stated, in part, "[s]torm surge[:] the combination of a dangerous storm surge and the tide will cause normally dry areas near the coast to be flooded by rising waters. The water could reach the following depths above ground if the peak surge occurs at the time of high tide." *Id.* It specified "4 to 8 ft" for "Long Island Sound[,] Raritan Bay[,] and Delaware Bay." This was the *first* weather report for the New York area that provided a definitive range for a possible storm surge. *See* Ex. 46, at 36 (Department of Commerce Service Assessment[7]: "NHC issued its first

[7] As a result of Sandy's significant impact on the Northeast, NOAA established a "Service Assessment Team" to review and report on the agency's performance during Hurricane Sandy and to specifically focus on NWS' weather forecasts, communications with the public through the internet, and storm-surge specific forecasts. Ex. 46, at iv-v.

public advisory of Sandy with explicit surge forecast on Saturday, October 27, at 11 a.m."). The advisory also stated, "[s]urge-related flooding depends on the relative timing of the surge and the tidal cycle[] and can vary greatly over short distances. Given the large wind field associated with Sandy[,] elevated water levels could span multiple tide cycles resulting in repeated and extended periods of coastal and bayside flooding. In addition[,] elevated waters could occur far removed from the center of Sandy." Ex. 15, at 13-15.

At 11:00 a.m. on Saturday, the U.S. Coast Guard declared "Port Condition X-ray," meaning that gale force winds were expected to make landfall within 48 hours. Ex. 9 (11:25 a.m. Saturday, October 27 e-mail from U.S. Coast Guard to Joseph Cordero). According to an e-mail bulletin sent by a Zim employee who participated in a conference call organized by the U.S. Coast Guard, "all cargo ops [are] to stop at about 1500 hrs tomorrow Sunday 28 Oct. and all deep water vessels over 500 MT are to vacate berths by 1800 hrs LT. The port will be closing down and will reopen after Sandy subsides and moves inland." Ex. 23, at ZIM000050.

Grillo continued to prepare for the storm on Saturday by removing debris near the chain-link fence that runs along the perimeter of NYCT and securing the gatehouse and booth at the entrance of the Terminal. Tr. 452-53. Grillo checked in with his supervisor, Tom Fallon, but Grillo was not tasked with any additional hurricane readiness duties on Saturday. Tr. 455-56.

The Kobe began to load and unload containers at about 1:00 p.m. on Saturday. Jt. Stip. ¶ 4. The vessel discharged containers at a rate of approximately 30 containers per hour per crane. Tr. 312; Ex. 28.

A WeatherWorks Storm Alert issued at 1:39 p.m. on Saturday stated, in part, "preparations are [being] made for the very unique and potentially damaging situation expected as Sandy approaches the region. . . . While the exact landfall is still uncertain (somewhere

between Delaware and Long Island), most likely it is along the Jersey Shore. . . . In addition, the threat of bay and tidal flooding is a good possibility as well. Again, the exact track and therefore impacts are somewhat uncertain, but the worst of the storm looks to be Sunday night into late Monday night." Ex. 7, at 7. The storm alert also included a "Potential Effects for the Area" section that repeated Friday's warnings of flooding in rivers and creeks and "historic" coastal flooding in parts of New Jersey and New York. *Id.* at 8.

The NWS in New York issued a flood watch at 4:58 p.m. on Saturday. Ex. 15, at 16. The flood watch stated, in part, "a dangerous coastal storm is expected to bring between 2 and 6 inches of rain early Monday morning into Tuesday. . . . These rainfall amounts will cause widespread urban and poor drainage flooding Monday morning into Tuesday. . . . The urban and poor drainage flooding will likely be exacerbated by fallen leaves clogging drains[] and along coastal areas during the times of high tide." *Id.* at 17. At 5:34 p.m. on Saturday, the NWS issued its first coastal flood warning for New York. Tr. 380; Ex. 15, at 17-18. A coastal flood warning is typically issued 12 hours or less in advance of a coastal flood and indicates that coastal flooding is imminent and that preparations should be completed. Tr. 368. The coastal flood warning stated, in part, "a coastal flooding warning means that flooding is expected or occurring. Coastal residents in the warned area should be alert for rising water[] and take appropriate action to protect life and property." Ex. 15, at 19. The coastal flood warning was issued for the coastlines of the Long Island Sound, the southern and eastern shores of Long Island, parts of New York Harbor, and parts of the Hudson and Connecticut rivers. *Id.* at 18. The warning indicated the "potential for 4 to 8 ft surge Monday night into Tuesday morning" and that "5 to 8 ft waves are possible along exposed eastern and northeastern facing portions of Long Island Sound[,] Peconic Bay[,] and New York Harbor." *Id.* In addition, the coastal flood warning

stated, "timing[:] minor coastal flooding is likely with the evening high tides on Sunday[] with likelihood for widespread moderate flooding by the Monday morning high tide cycle. Major coastal flooding[,] possibly to record levels[,] is likely during the Monday night high tide cycles. Moderate to major coastal flooding is possible into the Tuesday morning and early afternoon high tide cycles." *Id.*

At 8:00 p.m. on Saturday, the NHC issued Hurricane Sandy Intermediate Advisory Number 22A. Ex. 93, at 140. In the "Discussion and 48-hour Outlook" section, the advisory stated, in part, "a turn toward the north is forecast on Sunday night[,] followed by a turn toward the north-northwest on Monday. On the forecast track the center of Sandy will move parallel to the southeast coast of the United States through the weekend[] and approach the coast of the Mid-Atlantic states late Monday. Maximum sustained winds remain near 75 mph [or] 120 km/h[,] with higher gusts. Little change in strength is forecast during the next couple of days." *Id.* at 141. The advisory repeated the 4 to 8-foot storm surge estimate for Long Island Sound, Raritan Bay, and Delaware Bay. *Id.* At 11:00 p.m., the NHC issued Hurricane Sandy Advisory Number 23, which largely reiterated statements from Intermediate Advisory 22A but added, "while little change in strength is forecast during the next couple of days[,] Sandy is expected to remain a large and powerful cyclone." *Id.* at 143-44. Advisory 23 also restated the 4 to 8-foot storm surge estimate for the New York area. *Id.*

4. Sunday, October 28, 2012

At 2:00 a.m. on Sunday, the NHC issued Hurricane Sandy Intermediate Advisory 23A. Ex. 93, at 147. The advisory repeated the predictions about Sandy's forecasted track from the previous evening's advisories, but the storm surge estimates for Long Island and Raritan Bay were increased to 5 to 10 feet. Ex. 93, at 148.

The Kobe completed cargo discharge at 2:12 a.m. on Sunday. Jt. Stip. ¶ 5. It was the last ship to unload containers before the Terminal closed down. Cordero Dep. 10:20-11:7. When Sandy made landfall, NYCT had 2,231 laden containers in its possession. Tr. 85; Ex. 75 (NYCT Storage Recap). Of those, almost 40 percent had been delivered by the Kobe. Ex. 75; Tr. 85.

At 5:00 a.m. on Sunday, the NHC issued Hurricane Sandy Advisory Number 24, which stated, in part, "Sandy [is] expected to bring strong winds and a significant storm surge to the Mid-Atlantic states and Southern New England." Ex. 93, at 150. It also restated the previous advisory's warnings regarding Sandy's path and storm surge. *Id.* A NHC 5-day forecast map accompanying Hurricane Sandy Advisory Number 24 predicted landfall in south-central New Jersey around 2:00 a.m. on Tuesday. Ex. 15, at 22.

A WeatherWorks Storm Alert issued at 5:38 a.m. on Sunday stated, in part, "Sandy remains on track to have major impacts on our area Monday. . . . Tidal flooding is a major concern tomorrow during high tide cycles (7-9 AM and 7-9 PM). The evening high tide may produce significant flooding along inlets and bays with the peak of the storm and high tide coinciding. Rainfall amounts of 2-5 inches will lead to widespread flooding, *but not as severe as what we saw last year with Irene*." Ex. 7, at 9 (emphasis added). The "Potential Effects for the Area" section of the storm alert reiterated a danger of "[f]looding (rivers/creeks, along with flash flooding) with the potential for 2-5+ inches" and that "[c]oastal flooding may be historic in parts of NJ/NY. Therefore, any tidal rivers or bays in the area will be influenced by coastal flooding and increased tides[.] This may extend into areas not typically tidal." *Id.* at 10.

At 7:15 a.m. on Sunday, the U.S. Coast Guard declared "Port Condition Yankee," meaning that gale force winds were expected within 24 hours. Ex. 4 (8:55 a.m. Sunday, October 28 e-mail from John Atkins to NYCT personnel). According to an e-mail bulletin sent by a Zim

employee, "all vessels greater than 500 GT must vacate the port by 1800 hrs tonight. . . . The storm winds are forecast to be 35 to 50 mph with even higher gusts up and down the east coast today from Georgia to as far north as Rhode Island, Connecticut and Massachusetts. The storm surge will be 4 to 8 ft up and down the coast at various time[s] with the 4 high tides and flooding will occur." Ex. 24, at ZIM000069.

At 8:00 a.m. on Sunday, the NHC issued Corrected Hurricane Sandy Intermediate Advisory 24A. Ex. 93, at 153. The advisory provided an increased storm surge estimate for "Long Island Sound and Raritan Bay including New York Harbor" of 6 to 11 feet. *Id.* at 154. The advisory stated, "Sandy [is] expected to bring life-threatening storm surge flooding to the Mid-Atlantic coast[,] including Long Island Sound and New York Harbor" and that "the center of Sandy will move parallel to the southeast coast of the United States today and tonight[] and approach the coast of the Mid-Atlantic states by Monday night. Maximum sustained winds are near 75 mph [or] 120 kh/h[,] with higher gusts. Little change in strength is forecast during the next couple of days[,] and Sandy is expected to bring hurricane-force winds to portions of the Mid-Atlantic states." *Id.* at 153-54.

At 8:02 a.m. on Sunday, the NWS in New York issued a corrected Coastal Hazard Message stating, "life threatening coastal flooding expected Monday[—]threat increasing." Ex. 15, at 25. The Coastal Hazard Message covered New York Harbor and the Arthur Kill, and it stated potential "tidal departures" of "5 to 10 ft above Monday night into Tuesday morning. The higher end of the range relegated to the most flood prone coastal locations where tidal departures will reach 6 to 11 ft. This includes western Long Island Sound." *Id.* at 26.

Later on Sunday morning, Mayor Michael R. Bloomberg issued a mandatory evacuation order for parts of New York City. Ex. 11. According to a press release, Mayor Bloomberg said, "[l]ast night we said this was a serious and dangerous storm. Nothing has changed there. The latest forecasts from [the NWS] are for roughly the path and magnitude of the storm that we talked about yesterday. *What they have changed is the magnitude of the storm surge that we are expecting in the coastal areas*." *Id.* (emphasis added).

At 11:00 a.m. on Sunday, the NHC issued Hurricane Sandy Advisory Number 25, which repeated its 8:00 a.m. warning that "Sandy [is] expected to bring life-threatening storm surge flooding to the Mid-Atlantic coast[,] including Long Island Sound and New York Harbor." Ex. 93, at 156. The advisory also stated that "the center of Sandy is expected to be near the coast Monday night" and "Sandy is expected to transition into a frontal or wintertime low pressure system prior to landfall. However[,] this transition will not be accompanied by a weakening of the system[,] and in fact a little strengthening is possible during this process." *Id.* at 157.

Grillo reported to work at the Terminal on Sunday morning and continued to clean debris and secure the Terminal. Tr. 456-57. Cordero recalled that the Port of New York closed at about 1:00 p.m. on Sunday. Cordero Dep. 14:14-16. When asked whether NYCT altered its preparations in response to Sunday's updated forecast calling for a greater storm, Cordero noted that by Sunday morning when the forecast was updated, nonessential personnel had been evacuated because the Port was to be closed by midday Sunday. *Id.* at 70:4-16. Cordero said that safety was the primary concern: "As conditions deteriorated beyond that point, I don't believe anything could have been done without potentially putting people in harm's way, which we absolutely were not going to do. Life and limb first." *Id.* at 70:17-21.

A WeatherWorks Storm Alert issued at 2:39 p.m. on Sunday stated, in part, "Sandy is still expected to have a major impact on our area during the day on Monday and extending into early Tuesday." Ex. 7, at 11. The "Potential Effects for the Area" section of the storm alert stated, in italics, "[s]torm surge will likely be worse than Irene and has the potential to hit record levels." The section also reiterated that "[f]looding (rivers/creeks, flash flooding, and poor drainage flooding enhanced by leaf clogged storm drains) with the potential for 2-5+ inches" and "[c]oastal flooding may be historic in parts of NJ/NY." *Id.* at 12.

As is customary on weekends, NYCT was closed on Saturday and Sunday for truck pickup of incoming cargo, although NYCT remained open for vessel traffic. Jt. Stip. ¶ 8. NYCT remained closed on Monday, October 29, due to the arrival of Hurricane Sandy. *Id.* ¶ 10.

At 11:00 p.m. on Sunday, the NHC issued Hurricane Sandy Advisory Number 27, which stated, "Sandy [is] about to start its northward turn [and is] expected to bring life-threatening storm surge[,] coastal hurricane winds and heavy Appalachian snows." Ex. 93, at 168. The advisory also stated, "the center of Sandy will move over the coast of the Mid-Atlantic states late Monday or Monday night," and repeated its 6 to 11-foot storm surge estimate for New York Harbor. *Id.* at 169-70.

5. Monday, October 29, 2012

Grillo reported to work on Monday morning with a full crew of 8 to 9 workers. Tr. 459-60. At the regular 12:00 p.m. meeting, it was decided that Grillo and two others would stay late during the hurricane in order to monitor and mitigate any wind damage, such as loose aluminum siding coming off a building or broken windows. Tr. 460-61.

A WeatherWorks Storm Alert issued at 1:17 p.m. on Monday, October 29 stated, in part, "Sandy is currently a strong Category 1 hurricane, with maximum sustained winds of 90 mph. . . .

Areas with tidal influence from bays/rivers will see extreme coastal flooding, possibly exceeding historic proportions with this evening's high tide cycle." Ex. 7, at 13.

At approximately 7:30 p.m. on Monday, Sandy made landfall near Brigantine, New Jersey, which is northeast of Atlantic City. Ex. 44, at 4. At the Bergen Point West Reach tide gage, the storm tide reached a peak of 14.54 feet. Ex. 41. Thus, Sandy's storm surge at Bergen Point West Reach was about 9.36 feet. Ex. 41. The surge was likely higher at NYCT, which is located 2 miles away from Bergen Point and deeper into the Arthur Kill. Tr. 690; *see also* Ex. 95 (map of NYCT relative to Bergen Point West Reach). Much of the northwestern portion of Staten Island was inundated with storm water. Ex. 45 (U.S. Geological Survey, Hurricane Sandy storm tide mapper).

Grillo testified that at about 7:50 p.m. on Monday, he traveled to the northwest corner of NYCT and examined the bulkhead. Tr. 465-66, 501. Grillo stated that he was concerned about the rising waters and impending high tide at the bulkhead, so he decided to drive to the main power substation in the northeast corner of the Terminal to turn off the power. Tr. 465-66, 501. As Grillo drove along the north end of NYCT, a drive that takes 5 to 10 minutes, water began to cover the Terminal and blocked his path. Tr. 467-68. By approximately 8:10 p.m. on Monday, the Terminal was flooded. Tr. 466, 468. Because water had begun to surround the steps of the substation, Grillo called one of his staff to bring a backhoe to extract him. Tr. 466. Grillo planned to climb into the bucket of the backhoe to be lowered into the substation and turn off the power. Tr. 501, 503. But, by the time Grillo's crew arrived with the backhoe, the substation was already flooded. Tr. 501, 508. Although Grillo did not know from which direction the water covered the Terminal, he was certain that water had breached the bulkhead. Tr. 468. Grillo testified that as he drove from the bulkhead to the substation, he could see the water "chasing"

him. Tr. 502. According to Grillo, the drive from the bulkhead to the substation and the subsequent flooding took less than 10 minutes. Tr. 503. Grillo said that he may have seen 20 to 30 containers floating in the Terminal, but he was scared at the time and could not recall. Tr. 464. Grillo returned to and remained in the administration building for the duration of the storm. Tr. 490-91. By the following day, most of the flood waters had subsided. Tr. 492.

F. Extent of Damage to Plaintiff's Cargo and the Terminal

A total of 211 cartons of Plaintiff's cardigans and sweaters were ruined. The insured value of the sweaters based on retail value was $206,972, but the COGSA package limitation reduced Plaintiff's amount of damages to $105,500. Jt. Stip. ¶¶ 18-19. The parties agree that the damage to Plaintiff's cargo was "directly attributable to wetting damage associated with Hurricane Sandy." *Id.* ¶ 20.

Testimony from Grillo and Nixon and photographs taken by Grillo during and after Hurricane Sandy indicate that the Terminal suffered significant flood damage as a result of the storm. According to Grillo, the water reached at least 4 feet high near the power substation, as indicated by the height of the leaves lining the chain-link fence. Tr. 470-71; Exs. 76B, 76C. Nearly all of the transformers in the substation in the northeast corner of the Terminal were damaged by water. Tr. 461. In addition, there was flooding in the area of the intermodal yard. The control booth for the railroad crossing was flooded and ruined by about 50 inches of water. Tr. 489-90.

Nixon stated that near the bulkhead, the rows of empty containers positioned closest to the water were "annihilated" by the storm, and some of these containers were found on the other side of the Arthur Kill. Tr. 149-50. Based on his understanding that road chassis are 42 inches high, Grillo estimated that the flood waters reached approximately 48 inches high between the

200 and 300 sections in the north-central area of the Terminal because he could no longer see the road chassis that had been parked in that area. Tr. 471-74; Ex. 62A (aerial photograph of the Terminal with a circled "x" indicating where Grillo had seen road chassis earlier in the day on Monday, October 29 but could not see them that night during the flooding); Ex. 76A (aerial photograph of Terminal with sections labeled); *see also* Ex. 76D (photograph of Terminal taken by Grillo from a vehicle during Hurricane Sandy). One photograph taken on the morning after the storm shows a container resting on a concrete divider. Ex. 76N. Grillo testified that the dividers are at least 30 inches high and that as many as 6 or 7 containers wound up in that position. Tr. 496-97. This evidence demonstrates that the flood waters were powerful and destructive—high enough to breach a container on top of a concrete divider nearly 3 feet high. *See also* Tr. 494-95 (Grillo's testimony regarding seeing floating containers during the storm); Ex. 76K (photograph taken by Grillo during Hurricane Sandy with an orange floating container in the distance).

In one photograph, approximately 18 to 24 inches of water surrounds the administration building where Grillo worked. *See* Ex. 76E. Another photograph shows pickup trucks inundated with 24 inches of water and parked outside of that building. Tr. 475-76, 483-84; *see also* Ex. 76F (photograph of backhoe partially submerged in water near the administration building); Ex. 62A (aerial photograph of the Terminal with a "B" indicating where the backhoe in Ex. 76F was located). Grillo testified that the water in that area peaked at about 30 inches. Tr. 476. Grillo also stated that his own car, which was parked in front of the administration building, was partially flooded and that he had to replace the brakes. Tr. 505-06. When asked whether he attempted to relocate his car to another dry space in the Terminal, Grillo said, "[it] was on a high spot." Tr. 506.

Grillo also testified that the west half of the Terminal along the bulkhead suffered some of the worst flooding. The morning after Sandy, Grillo saw 5-foot-high watermarks on the 6 refrigerated units located next to the refrigerated warehouse. Tr. 480-82. Containers that were used to prevent wind from picking up Cordero's office trailer were "all over," and some had washed over the bulkhead into the Arthur Kill. Tr. 485-86.

Nixon also surveyed the damage to NYCT the day after the storm. He estimated that 4.5 to 5 feet of water flooded the Terminal in certain sections. Nixon Dep. 39:25-40:4. Nixon stated that hundreds of empty containers were damaged, but he was not sure how many laden containers were damaged. Tr. 115-16. He also testified that some non-refrigerated laden containers on chassis fell over. Tr. 56. The administration building where Grillo remained during the evening did not flood, although water surrounded it. Tr. 144. Two NYCT trucks were totaled, and the Terminal invested in repairs for several other trucks. Tr. 144. Cordero's trailer, which was located in the center-west portion of NYCT along the bulkhead, was dislodged from its concrete foundation and was inundated with 18 to 24 inches of water. Tr. 72, 486-87. In addition, NYCT's "Hurricane SOP" document was partially destroyed by wetting damage. Tr. 110. Nixon believed that at least 3 feet of water impacted the container cranes, and between 18 and 24 inches of water entered the refrigerated facility or "fruit warehouse" in the southwest corner of the Terminal along the bulkhead. Tr. 73-74. Because of the damage, NYCT did not reopen until Monday, November 5, 2012, a week after the hurricane. Tr. 28.

IV. Conclusions of Law

Prior to trial, the parties stipulated that this case is governed by COGSA, "which applied *ex proprio vigore* until the cargo was discharged from the vessel on October 27, 2012, and then by contract until delivery to Lord & Taylor on November 6, 2012." Joint Stip. of Law ¶ 1, Oct. 20, 2014, ECF No. 60; Exs. 18, 19. COGSA governs "all contracts for carriage of goods by sea to or from ports of the United States in foreign trade" and imposes various duties on carriers while providing exceptions from liability in certain instances. 46 U.S.C. § 30701 note.

Under COGSA, a plaintiff seeking recovery for damaged goods must first make a *prima facie* case by showing that the carrier accepted the cargo in good condition but that the plaintiff received the cargo in damaged condition. *M. Golodetz Exp. Corp. v. S/S Lake Anja*, 751 F.2d 1103, 1109 (2d Cir. 1985). Once a *prima facie* case is established, the burden then shifts to the carrier to show that the cause of the damage was one of the exceptions listed in COGSA. *Id.* at 1110.

Before trial, in exchange for a stipulation as to the value of the cargo, Zim conceded that "the subject cargos were damaged by water during Hurricane Sandy while on the NYCT . . . [and] the burden of proof now shifts to [Zim] to establish that the damage was caused by one of the exceptions set forth in Section 4(2)(a) through (q) of COGSA." Def. Pre-Trial Mem. 18; *see also* Jt. Stip. ¶¶ 11, 20. Zim argues that it is not liable because of three excepted causes in COGSA: (1) Act of God; (2) Perils of the Sea; and (3) Clause Q.

A. The Act of God Defense under COGSA

To prevail on an Act of God defense under COGSA, a carrier must show that "the damage from the natural event could not have been prevented by the exercise of reasonable care by the carrier or bailee." *Mamiye Bros. v. Barber S.S. Lines, Inc.*, 241 F. Supp. 99, 107 (S.D.N.Y. 1965), *aff'd*, 360 F.2d 774 (2d Cir. 1966); *see also* Gilmore & Black, *The Law of*

Admiralty § 3-33 (2d ed. 1975) ("A common carrier is not liable for any accident as to which he can shew that it is due to natural causes directly and exclusively, without human intervention, and that it could not have been prevented by any amount of foresight and pains and care reasonably to be expected from him.") (citation omitted).

"[H]urricanes . . . are considered in law to be an 'Act of God.' Even though storms that are usual for waters and the time of year are not 'Acts of God,' a hurricane that causes unexpected and unforeseeable devastation with unprecedented wind velocity, tidal rise, and upriver tidal surge, is a classic case of an 'Act of God.'" *Skandia Ins. Co. v. Star Shipping AS*, 173 F. Supp. 2d 1228, 1239-40 (S.D. Ala. 2001), *aff'd sub nom. Skandia Ins. Co. v. Star Shipping Co.*, 31 F. App'x 201 (11th Cir. 2001). However, the mere existence of a hurricane does not entitle a defendant to rely on the Act of God defense. *See Bunge Corp. v. Freeport Marine Repair, Inc.*, 240 F.3d 919, 926 (11th Cir. 2001) (affirming rejection of Act of God defense when district court found that reasonable preparations were available to defendant vessel owner to prevent damage caused by Hurricane Opal).

When evaluating defenses such as Act of God or Perils of the Sea, courts must assess whether weather conditions were foreseeable at the given time and location. *Thyssen, Inc. v. S/S Eurounity*, 21 F.3d 533, 539 (2d Cir. 1994). In addition, an absence of negligence is key, and a defendant must demonstrate that no reasonable precautions were available to prevent the damage at issue. *Sidney Blumenthal & Co. v. Atl. Coast Line R. Co.*, 139 F.2d 288, 291 (2d Cir. 1943) ("The carrier answers that the hurricane was an act of God—to which we agree, but to which we answer that an act of God is no excuse, if negligence be shown."); *see also Petition of United States*, 425 F.2d 991, 995 (5th Cir. 1970) ("The test for determining [if the defendants] were free from fault is whether they took reasonable precautions under the circumstances as known or

reasonably to be anticipated.").

Zim argues that Hurricane Sandy was a storm of such "catastrophic proportions" that it was an Act of God that could not have been reasonably prepared for. Plaintiff argues that Hurricane Sandy was foreseeable and that NYCT did not take reasonable precautions to protect Plaintiff's goods.

B. The Exercise of Reasonable Care During Hurricane Sandy

In determining whether NYCT could have prevented the damage to Plaintiff's merchandise, the Court must first evaluate: (1) what NYCT knew about Hurricane Sandy prior to the storm making landfall on the evening of Monday, October 29, 2012; (2) the severity of Sandy; and (3) whether NYCT was negligent in its preparations or whether nothing could have been done.

1. When Sandy's Storm Surge Became Foreseeable

Plaintiff emphasizes the importance of foreseeability in this analysis because the greater the foreseeability of a storm, the greater the availability of reasonable measures to guard against damage.[8] If, for example, Sandy's 9-foot storm surge were foreseeable at least 4 to 5 days prior to landfall, NYCT could have delayed the arrival of incoming container ships and could have advised cargo owners to pick up their cargo before the storm hit. *See, e.g.*, Tr. 604-07. If, however, the storm surge were not foreseeable until shortly before landfall, fewer reasonable options would have been available because of the shorter timeframe to implement any preparations and the potential danger that NYCT's crews would have faced.

In most respects, Plaintiff's emphasis on foreseeability is correct. *See, e.g.*, *Consol.*

[8] At trial, Plaintiff clarified that it does not argue that NYCT should have made long-term structural changes prior to Hurricane Sandy, such as increasing the height of the bulkhead. Rather, Plaintiff's argument addresses NYCT's actions taken in the days leading up to Hurricane Sandy and, particularly, the manner NYCT stored containers in anticipation of the storm. Tr. 531-32.

Aluminum Corp. v. C.F. Bean Corp., 833 F.2d 65, 67 (5th Cir. 1987) ("Foreseeability obviously marks the limits placed on a defendant's duty; the precise meaning of the concept is vital."); *In re Tecomar S.A.*, 765 F. Supp. 1150, 1175 (S.D.N.Y. 1991) ("The test for determining whether a storm constitutes a peril of the sea is whether—in light of all the circumstances—the storm was expectable."); 8 James W. Bartlett, III et al., *Benedict on Admiralty* § 5.02[E][5] (Joshua S. Force ed., 7th ed. rev. 2013) ("The test for perils of the sea and acts of God is foreseeability and is determined on a case-by-case basis." (citing *Thyssen, Inc.*, 21 F.3d 533)). Foreseeability, however, depends on certainty, and certainty is a matter of degree. Hurricanes happen every year and—to an extent—are clearly foreseeable. But, the regularity of their occurrence does not defeat the Act of God defense. The foreseeability inquiry is not limited solely to whether the path of the storm is consistently well-predicted throughout the forecasts leading up to landfall. Rather, a determination of foreseeability must also account for the other information about the storm that was available to those in its path, including the potential track, wind speeds, and storm surge, and the confidence of these predictions at the time they were made. After all, a warning that a storm is coming is of limited utility if the warning provides little or no information as to its severity and the locus of its impacts.

In this case, a review of the relevant, publicly available forecasts and advisories reveals a high degree of uncertainty regarding Sandy's predicted impact throughout the week and into the weekend before landfall on the evening of Monday, October 29.[9] That New York Harbor was potentially in the path of the storm was apparent by Tuesday, October 23, and NYCT concedes that it first became aware of Hurricane Sandy almost a week before it arrived. *See* Tr. 86.

[9] The Court relies on the forecasts from the NWS, the NHC, and WeatherWorks based on testimony from various witnesses regarding what information they did or would have relied upon. *See, e.g.*, Tr. 44 (Nixon stating that he relied on WeatherWorks storm alerts); Tr. 288 (Knobloch stating that he would have relied on NWS reports).

However, even through Wednesday, October 24, the various forecasters' level of confidence with respect to Sandy's possible landfall along the Eastern Seaboard, let alone its specific impacts, was low. *See* Ex. 15, at 1 (3:40 p.m. Wednesday, October 24, 2012 NWS Hazardous Weather Update for New York: "Sunday through Tuesday . . . [t]here is the potential for a major coastal storm . . . . The storm may very well just move out to sea[,] and have little if any impact on our weather. Again[,] forecast confidence is still low at this point . . . ."); Ex. 7, at 3 (3:12 p.m. Wednesday, October 24, 2012 WeatherWorks Weather Statement: "Keep in mind, this is a changeable situation and an eastern track leading most of Sandy out to sea is still plausible.").

At trial, Branscome, Plaintiff's meteorology expert, suggested that the potential severity was evident in the first Hazardous Weather Outlook issued on Wednesday, October 24. Tr. 350-51. But, the only language that he could point to in that report stated that Sandy was a "major coastal [storm] with heavy rainfall[,] high winds, coastal flooding[,] and beach erosion." Ex. 15, at 1. Nothing in that forecast provided specific information regarding the impact of Hurricane Sandy or indicated that Sandy would be as bad as or worse than previous hurricanes. And, as Branscome conceded, the various forecast models disagreed as to whether Sandy would turn into the East Coast or turn out into the Atlantic Ocean until the evening of Thursday, October 25, when every forecast model finally agreed on an East Coast landfall. Tr. 397-98 ("[Branscome:] So [at 8:00 p.m. on October 24,] the level of concern is rising. We, meteorologists consider [the European forecasting model] a very good model and so that's a concern, certainly. The other models, still taking it off shore. Next we get to the last map . . . on this exhibit and we see the results of the forecast models on the evening of the 25th. And now we see that the, all the models have lined up, they're all bringing the storm on shore.").

Throughout Thursday, October 25, and Friday, October 26, there was "increasing

confidence" that the New York area would be impacted by Sandy, but uncertainty remained about the storm's exact path and the extent of its impact. *See* Ex. 15, at 4 (3:26 p.m. Thursday, October 25, 2012 NWS Hazardous Weather Update for New York: "There is increasing confidence that the tri-state area will feel the impacts of a major coastal storm late this weekend into early next week . . . . The specific impacts will ultimately depend on the exact track and evolution of tropical cyclone Sandy as it interacts with a deepening upper level low pressure system approaching the East Coast."); Ex. 93, at 92 (11:00 p.m. Thursday, October 25, 2012 NHC Hurricane Sandy Advisory 15: "Interests elsewhere along the East Coast of the United States should monitor the progress of Sandy. Watches and warnings will likely be required for portions of this area early Friday morning."); Ex. 7, at 5 (2:42 p.m. Friday, October 26, 2012 WeatherWorks Storm Alert: "A very unique and potentially damaging situation will be monitored the next couple of days . . . . Again, the exact track and therefore impacts are somewhat uncertain, but the worst of the storm looks to be Monday into early Tuesday."); Ex. 15, at 7-8 (4:30 p.m. Friday, October 26, 2012 NWS Hazardous Weather Update for New York: "The tri-state area will likely feel the impacts of a dangerous coastal storm late this weekend into early next week. This includes the likelihood for heavy rainfall and resultant significant urban[,] small stream[,] and river flooding . . . . The specific impacts will ultimately depend on the exact track and evolution of tropical cyclone Sandy . . . .").

In addition, key variables affecting Sandy's storm surge—the location and timing of Sandy's landfall—shifted throughout the end of the week. Branscome postulated that although the forecast track deviated somewhat during the week, these shifts did not alter the foreseeability of the storm surge because Sandy was a massive storm, and throughout the forecasts, New York remained on the right side of the projected track, which is the most dangerous side and receives

the largest storm surge due to counter-clockwise winds pushing water onto land. Tr. 368-70, 376-77. However, the evidence indicates that even if a shift in the exact location of landfall would not spare New York City from a powerful storm, it would have a significant effect on the resulting storm surge.[10] As the Department of Commerce concluded in its report assessing the quality of Sandy forecasts: "[s]torm surge height and location are closely correlated with the track and landfall time of a storm," and "a shift in track just 12 hours before landfall can result in changes in storm surge of 10 feet or more for a specific location." Ex. 46, at 35. Notably, Dooley, Zim's meteorology expert, observed in his report that Sandy's proposed landfall ranged from Delaware to central New Jersey throughout the late week and early weekend. Ex. 35, at 9-10. Moreover, the timing of landfall changed throughout the weekend—a highly relevant factor given that tide cycles would either increase or decrease the surge threat depending on the time of landfall. *See* Tr. 438, 817. According to the 11:00 a.m. forecast on Thursday, October 25, Sandy was predicted to make landfall at low tide on Tuesday, October 30, at 9:00 or 10:00 a.m. Tr. 437; *see also* Ex. 15, at 3. However, the storm sped up later in the weekend and made landfall 12 hours earlier. Tr. 438. Had Sandy arrived on Thursday morning as forecasted, both experts agreed that the storm surge would have been significantly lower than it was. Tr. 438, 734-35.

Branscome testified that Sandy's storm surge became foreseeable as of 11:00 a.m. on Thursday, October 25 because the projected path indicated that Sandy would make landfall south of New York City and the resulting storm surge would be pushed into New York Harbor. Tr. 400-01. But, none of the forecasts, advisories, or outlooks available at that time provided specific storm surge estimates, a point that Branscome conceded at trial. *See* Tr. 359

[10] Knobloch conceded that had the storm made landfall in Delaware, he believed that there would have been less damage from storm surge in New York Harbor. Tr. 297.

("[Branscome]: We cannot say we know for sure that it is going to create a 9-foot storm surge at your location. It is just not possible to do that as far . . . in advance. What we can do and what the meteorologists are doing is saying, we know this is a big storm.").[11] Similarly, the NWS public information statements available at the time only said that there was an "increasing chance" of a "strong coastal storm." Ex. 15, at 4-5. They did not provide additional information regarding the levels of possible storm surge, another point that Branscome acknowledged. Tr. 353-55 (Branscome noting that there was no numerical value associated with the word "chance" used in the public information statement). Moreover, the limited, tangible estimates of wind speeds and rainfall were still couched in a high degree of uncertainty. Ex. 7, at 4 (2:11 p.m. Thursday, October 25, 2012 WeatherWorks Weather Statement: "During the brunt of the storm, winds may be gusting over 50 mph, bringing down trees and power lines . . . . Heavy rain will also fall with the storm with amounts over 5 [inches] possible, creating a substantial flooding threat. . . . Keep in mind, the wind and rainfall details above are preliminary. As storm confidence grows, expect these impacts to be fine tuned."). From Thursday through Friday, and even into Saturday morning, the language in the forecasts remained consistently ominous yet vague. In a post-Sandy report which assessed NOAA's forecasting performance, the Department of Commerce recommended that "[t]he NWS should develop more effective and consistent products to communicate severe weather impacts, specifically: [c]oncise summaries of weather and its impacts using non-technical text and graphical material provided in a short and easy-to-

[11] At trial, Branscome was asked about a Friday evening local FOX News broadcast that speculated about a possible 10-foot storm surge, and, when asked how FOX News arrived at this estimate, Branscome suggested that FOX News might have contacted the NHC regarding its preliminary SLOSH models. Tr. 362-63. To the extent that Plaintiff suggests that NYCT should have relied on the FOX News evening weather report to prepare for Sandy or should have contacted the NHC on its own, the Court finds this argument unpersuasive. NYCT relied on public and private weather forecasts as well as information from the Port Authority and the U.S. Coast Guard; there is no evidence suggesting that this information was less reliable than an evening news weather report that no NYCT employee testified about viewing.

read format, [and] [c]onfidence or uncertainty and worst-case scenario information." Ex. 46, at 27. With respect to storm surge, the report concluded that the "NWS lacks sufficient forecast guidance on inundation associated with wave run-up and coastal rivers making it difficult to forecast impacts from coastal storms." *Id.* at 39. It further determined that providing explicit storm surge graphics and high-resolution mapping tools that would illustrate the impacts of storm surge was "*the highest priority of the Sandy Service Assessment Team and should be in place for the 2014 hurricane season*." *Id.* at 38.[12]

Finally, on Saturday, October 27, at 11:00 a.m., the NWS provided its *first* explicit estimates for storm surge in the New York area. Ex. 15, at 15; *see also* Ex. 46, at 36. The NWS predicted a 4 to 8-foot surge in the area from Ocean City, Maryland to the Connecticut/Rhode Island border. This 4 to 8-foot forecast range remained consistent up until Sunday at 2:00 a.m., when the NHC increased its prediction to 5 to 10 feet, Ex. 93, at 148, and then 6 to 11 feet at 8:00 a.m., *id.* at 154, for Long Island Sound and Raritan Bay, including New York Harbor. Accordingly, based on the available forecasts, the Court concludes that the severity of Sandy's storm surge became foreseeable at 2:00 a.m. on Sunday, October 28, 2012, when the NHC issued the first storm surge forecast range encompassing Sandy's eventual storm surge of 9.4 feet.

Although specific storm surge estimates were not available until Saturday, Plaintiff contends that early advisories nonetheless warned of a "major storm" with "historic flooding." Plaintiff argues that given the history of hurricanes in the area, NYCT should have been prepared for the possibility of a Category 1 hurricane making landfall and generating a 6 to 9-foot storm surge. However, when asked how and when a reader of the publicly available weather advisories

[12] The report also noted that the NWS' storm surge terminology referenced different tidal data and impact descriptions that proved confusing. Ex. 46, at 40. It recommended that the NWS use a single datum and adopt a unified format and language when describing storm surge. *Id.*

was informed that Hurricane Sandy was going to be "historic" and exceed previous experience, the earliest language that Branscome, Plaintiff's meteorology expert, pointed to came from the WeatherWorks storm alert issued on Friday, October 26, at 2:42 p.m., *see* Ex. 7, at 5-6. Tr. 371-73. Although the alert uses the word "historic," when read as a whole, it does not forecast a storm of Sandy's eventual magnitude. For example, the alert begins by stating that "a *very unique* and *potentially damaging* situation will be monitored the next couple of days as Sandy approaches the area." Ex. 7, at 5 (emphasis added). The initial paragraph concludes by noting, "[a]gain, the exact track and therefore impacts are somewhat uncertain, but the worst of the storm looks to be Monday into early Tuesday." *Id.* In the section titled, "Potential Effects for the Area," which includes the word "historic" referenced by Branscome, the complete sentence describing coastal flooding states: "Coastal flooding may be historic in parts of NJ / NY. Therefore, any tidal rivers or bays in the area will be influenced by coastal flooding and increased tides[.] This may extend into areas not typically tidal." *Id.* at 6. The warning, however, does not say what makes the coastal flooding "historic" and suggests only that "historic" flooding *may* occur in *parts* of New Jersey and New York Harbor. Furthermore, the projected track map on that same page sends Sandy into Delaware, not the New Jersey shore, and significantly south of New York. *Id.* The language in this storm alert does not indicate that Sandy would be as large or devastating as it ultimately was. It reflects a significant amount of uncertainty regarding Sandy's forecast track and possible impacts. Branscome also pointed to a Friday, October 26 press release issued by the Port Authority that stated that the Port Authority was making preparations for "anticipated landfall of a significant coastal storm early next week, which forecasters say will bring hurricane force winds, heavy rain, record high tides and coastal flooding to the region." Ex. 10; Tr. 374. The language in the press release is no more indicative

of Sandy's unprecedented nature than any of the other documents highlighted by Plaintiff, as it provides no context to aid the reader in understanding what constitutes "record high tides and coastal flooding." It is also a press release, not a weather forecast or advisory.

Reliance on the word "historic" to prepare for a hurricane would have been unreasonable and unsound. The parameters of a "historic" storm surge are not defined in any of the forecasts. The only definition was provided by Branscome who offered alternate explanations at trial:

> THE COURT: When the term "historic" is used in these weather forecasts, do you think that that's making reference to the 1821 hurricane . . . when there was a 13-foot storm surge?
>
> [Branscome]: Well, that was the history – I mean history of the area is, you know, goes back to 1821 which that's the earliest we know how the number for the height of a surge. There is some uncertainty there as to exactly what that might mean. You can interpret it that way certainly. That's a storm surge history of New York City.
>
> THE COURT: Well, how else could you interpret it?
>
> [Branscome]: Another way of interpreting it [is,] is it record setting for the Battery tide gage, essentially what happened in Lower Manhattan.
>
> THE COURT: And the gage existed since when?
>
> [Branscome]: I think it was about 1920. So that's another way of looking at it. It's not clear exactly what that means. Certainly if somebody were to say, well, what's the – if you go back and certainly the history of storm surge flooding, storm surges from hurricanes in the New York City area was available before Sandy. And if you have a knowledge of what the history was, you wouldn't have to include the 1821 storm which generated a 13-foot storm surge. Now if you're going to be a little – define it particularly for tide gage data, well, then you start at 1920.

Tr. 378.

Branscome's muddled definition of "historic" reveals how useless the term was to those tasked with hurricane preparedness. If a reader considered "historic" to include the 1821 Hurricane's 13-foot storm surge, then Sandy's 9-foot surge would not be unprecedented or record setting. If a reader instead chose to narrow the definition of "historic" to post-1920

storms, then Sandy would be unprecedented because the surge was almost 4 feet higher than the previous record of Hurricane Donna's 5.5-foot storm surge. Given that not even Branscome—a professor of meteorology—could offer a precise definition of "historic," NYCT could not have been reasonably expected to prepare for flooding over the bulkhead based on the warning of a "historic" storm surge.

Importantly, reliance on such language is flawed because it does not provide the critical information that NYCT needed to know before engaging in a large scale flood preparation effort—whether the storm surge was predicted to exceed the height of its bulkhead and flood the Terminal. Although water from Bridge Creek likely contributed to the inundation of the Terminal, the preponderance of the evidence suggests that the most damaging flooding (and the flooding that ruined Plaintiff's merchandise) resulted from water from the Arthur Kill that washed over the bulkhead and inundated the Terminal. *See supra* Section III.G (findings of fact discussing damage to property along the bulkhead).[13] The height of the bulkhead is crucial in determining whether NYCT acted reasonably under the circumstances because if, earlier in the week, storm surge levels had been predicted to exceed the bulkhead, then the flooding of the Terminal was foreseeable well in advance of Sandy's arrival, and NYCT would have been obligated to take reasonable measures to protect cargo against flooding damage.[14] Nixon testified at trial that he believed the bulkhead to be about 9 feet above the "height of the water at high water," although this opinion was based on Nixon's conversations with Joseph Cordero. Tr. 74-76. Grillo testified that he believed the bulkhead was between 6 and 8 feet over "high tide,"

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[13] In addition to the testimony from NYCT employees regarding tide marks on Terminal property near the bulkhead, Grillo's testimony that the water "chas[ed]" him as he left the bulkhead heading toward the substation near Bridge Creek further supports the conclusion that most of the Terminal was flooded by the Arthur Kill when its waters breached the bulkhead. *See* Tr. 502.

[14] By contrast, NYCT would have no reasonable options available to protect cargo if, for example, a 15-foot wave from an unexpected tsunami breached the bulkhead and flooded the Terminal.

Tr. 512, and Hamm testified that the bulkhead was about 8 feet over "mean high water" based on his knowledge of industry standards and his own personal observations, Tr. 543-44, 573. Although these numbers differ,[15] they all coalesce around 8 feet.[16] Accordingly, the Court finds that NYCT reasonably believed that the bulkhead was approximately 8 feet above high tide.

Prior to Saturday at 11:00 a.m., none of the NWS, NHC, or WeatherWorks forecasts, advisories, or alerts provided a numerical estimate of the height of the storm surge. Starting on Saturday at 11:00 a.m. and through Sunday at 2:00 a.m., NHC predicted a surge of between 4 and 8 feet. Thus, even an 8-foot surge—the highest end of the range predicted by the NWS and NHC—would only meet and possibly slightly exceed the bulkhead. The forecasts provided on Saturday into Sunday morning did not give any indication that the storm surge would exceed 8 feet or would flood the entire Terminal as ultimately occurred. It was not until 2:00 a.m. on Sunday, October 28, the day before Sandy arrived, that the first forecasts predicted the worst case scenario—that the storm surge might exceed the 8-foot bulkhead at NYCT. Accordingly, the Court concludes that at 2:00 a.m. on Sunday, October 28, 2012, NYCT should have foreseen that Sandy's storm surge might breach the bulkhead, flood the Terminal, and cause damage to cargo.

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[15] As noted by Plaintiff, one explanation for these differences in the perception of the bulkhead height may involve different assessments made by different individuals at various points in the tidal and lunar cycles. Tr. 804-05.

[16] Knobloch's calculation of a 6.26-foot bulkhead is not accurate because it is based on his use of the 9.9 feet measurement from the 1995 Army Corps of Engineers report, *see* Ex. 39, at 46, but as Knobloch conceded, the 9.9-foot measurement merely refers to the "facility low point," not necessarily the height of the bulkhead. Tr. 334-35. Knobloch did not know where the facility low point was, Tr. 334-35, whereas Branscome stated that the facility low point was at the back of the Terminal near Bridge Creek based on his review of topography maps, Tr. 427-28. Plaintiff also attempts to deduce the height of the bulkhead based on the height of the flood waters in the Terminal. In particular, Plaintiff infers that the bulkhead could not have been higher than 6.6 feet above high tide because Sandy's storm surge was approximately 9.4 feet, *see* Ex. 41, and the container cranes were inundated with 3 feet of water, Pl. Post-Trial Mem. 8. The problem with this approach is that it ignores numerous other flood water heights around the Terminal that controvert this bulkhead height estimate. Although the flood waters may have reached 3 feet along the cranes and, therefore, appear to neatly confirm Plaintiff's 6.6-foot estimate, there is also testimony that flood waters reached heights of approximately 5 feet along the refrigerated units also near the bulkhead, Tr. 480-82, 4 to 5 feet in the 200 and 300 sections of the Terminal, Tr. 472-74, and about 30 inches around the administrative building, Tr. 476. Because the tide marks vary significantly throughout the Terminal, they are an unreliable indicator of the bulkhead's height.

3. Plaintiff's Proposed Options

Having established when Hurricane Sandy's storm surge became foreseeable, the Court next turns to what options were available to prevent the damage to Plaintiff's merchandise. NYCT and Zim argue that they acted reasonably in response to the threats from Sandy as they arose. Knobloch, Plaintiff's expert, contends that there were ways that Zim or NYCT could have protected the cargo from wetting damage despite the lack of a specific contingency plan. Knobloch's proposed options include:

(a) delay discharge of the cargo from the Kobe, decline to accept laden containers onto the Terminal, or arrange to load laden containers onto other container vessels to ride out the storm;
(b) provide cargo owners with the option to collect laden containers during the weekend on October 27 and 28;
(c) place laden containers above empty containers or on road chassis;
(d) place laden containers on rail cars in the intermodal facility area; and
(e) deploy makeshift flood barriers.

Ex. 57, at 6-7. Zim maintains that these measures were "impractical or impossible, and in any event[,] would not have prevented the damage." Def. Pre-Trial Mem. 22. The Court agrees and finds that Knobloch's proposals were not viable. Each option is evaluated in turn.

(a) Delay Discharge of the Cargo from the Kobe, Decline to Accept Laden Containers onto the Terminal, or Arrange to Load Laden Containers onto Other Container Vessels

Knobloch postulated that Zim could have delayed the discharge of its cargo from the Kobe into NYCT's custody until after Sandy had abated. Ex. 57, at 6. Although Knobloch noted at trial that Zim could not have prevented the Kobe from berthing at NYCT, he contended that Zim could have contacted the ship and requested that the Kobe keep Zim's cargo on board. Tr. 227-28. Knobloch also suggested that NYCT could have declined to accept the vessel's containers. However, testimony from both terminal experts and from Nixon supports the conclusion that the Kobe's captain, Zim, and NYCT all acted reasonably in permitting the cargo

to be discharged on Saturday into Sunday morning. When asked why NYCT did not decline to accept the Kobe's containers in light of a looming hurricane, Nixon testified that "[i]t's something I wouldn't have done because we had room on the facility, and we have an obligation to work their vessels if they want to work them. . . . Unless the [Captain of the Port of New York] is telling us we can[not] work a ship, we're going to work the ship." Tr. 113. This view was not only corroborated by Hamm, who testified that declining to accept cargo is a drastic measure that must be supported by sufficient facts,[17] but also by Knobloch. When asked on direct examination whether the shipmaster has a say in whether to bring the vessel in for the loading and unloading of cargo, Knobloch stated that as a shipmaster, his main concern is the "ship and crew and the cargo. And if all those are green, meaning a go, I obviously would be able to get into a port and deliver my ship to a terminal for them to conduct the cargo operations." Tr. 227. There is no evidence that weather conditions known at that time posed a danger to the Kobe, the crew, or the cargo. *See, e.g.*, Ex. 7, at 7 (1:39 p.m. Saturday, October 27, 2012 WeatherWorks Storm Alert: "Short Term Forecast: Sunday: Cloudy and turning breezy. A few showers possible later in the day (no issues expected at this point)."). Knobloch noted that there is an industry custom and practice of interrupting cargo operations in the event of hazardous weather depending on the projected winds and geography of the terminal. Tr. 229-30. Tellingly, during the duration of the Kobe's berthing, the Port of New York remained open on orders of its Captain, and no terminals were instructed to turn away incoming vessels. Tr. 114-15, 151-52.[18] Based on the forecasts in effect when cargo operations began, both the Kobe and

[17] In particular, Hamm noted that if faced with a 6 to 11-foot storm surge prediction, NYCT could have declined to accept cargo due to impending and near-certain flooding. Tr. 580-81. However, Hamm believed that until Sunday morning, the situation in New York did not yet appear as calamitous as it ultimately was, and there was no indication yet of a 6 to 11-foot storm surge. Tr. 581.

[18] Knobloch testified that the Captain of the Port of New York and the U.S. Coast Guard issue advisories in the event of inclement weather that state "whether or not it is safe for [vessels] to navigate and is safe for them to . . . stay." Tr. 225. Knobloch also noted that the Port Authority is a landlord to the Terminal and is concerned about its

NYCT reasonably believed that the unloaded containers would be safe, and it would be unreasonable to now find that the Kobe, Zim, or NYCT should have put the brakes on cargo operations when the Port was open, the weather was clear, and the weather reports did not yet predict conditions that would imperil the cargo.

In addition to prohibiting the Kobe from unloading its containers, Knobloch suggested that NYCT could have loaded the Terminal's laden containers onto nearby container ships to wait out the storm. Knobloch stated that the transfer of laden containers onto other ships could have begun on Friday morning and have been completed by Saturday around noon. Tr. 211-12. This timeframe is implausible. The Kobe took about 13 hours to load and unload approximately 1,700 containers. *See* Jt. Stip. ¶¶ 4-5; Ex. 28. At this rate, NYCT would not have had enough time to make arrangements with nearby ships and cargo owners to transfer over 2,200 containers in the Terminal onto ships in the vicinity. In addition, this strategy depends on several unknown factors, such as whether ships in the area had available space and whether agreements could be quickly worked out between NYCT, the container vessels, cargo owners, and customs officials. Tr. 176, 307-09 (Knobloch's testimony discussing arrangements that would need to be worked out to utilize this strategy).[19]

(b) Provide Cargo Owners with the Option to Collect Laden Containers During the Weekend on October 27 and 28

Knobloch also suggested that cargo owners could have been offered the option of picking up their goods over the weekend. However, both parties agree that, as is customary, NYCT was closed for pickups on Saturday and Sunday, and Plaintiff made no request to retrieve the

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equipment on Terminal property, *see* Tr. 226, which suggests that the Port Authority would have had a strong incentive to provide adequate and current information about a hurricane in order to ensure that its property was properly protected.

[19] In addition, Knobloch had no personal knowledge of any other terminal employing this practice when faced with a flooding threat, and he cited only one vague example of this occurring in Asia. Tr. 209.

merchandise over the weekend. Jt. Stip. ¶¶ 8-9. The fact that neither party explored this option suggests that neither party expected the storm to be as severe as it was, and thus, this option was not reasonable in light of the information available to both parties. Moreover, as noted by Knobloch, cargo owners are routinely notified upon the arrival of their cargo in order to permit them to clear customs before being charged demurrage fees. Tr. 315-16. Although no evidence was presented indicating whether Plaintiff received such notice, the routine nature of this practice suggests that on Saturday, October 27, Plaintiff was likely aware that its cargo had arrived.

(c) Place Laden Containers Above Empty Containers or on Road Chassis

Knobloch also proposed placing laden containers onto road chassis, the wheeled trailers used to transport containers on roads, in order to keep the cargo above the flood waters. However, this strategy would have been ill-advised. First, there was insufficient time to unload containers directly from the Kobe onto road chassis. Containers are not regularly lowered onto road chassis because a crane operator sitting 140 feet above must align the corner castings to secure the container in the road chassis, a slower procedure compared to the standard practice of unloading a container onto a bomb cart. Tr. 554, 598-99.[20] Hamm testified that it would take twice as long to unload onto road chassis and that the operation could not have been completed until 4:00 p.m. on Sunday afternoon, after the Port of New York had closed. Tr. 604. Nixon stated that it would take 15 to 20 minutes to collect a road chassis, place a laden container on it, and move it to another location. Tr. 128. He believed that the cargo discharge rate, which was

[20] Knobloch stated that the total time difference between discharging cargo directly onto road chassis as opposed to bomb carts could be expressed in "seconds" because unloading laden containers directly onto road chassis would require only one "move," whereas discharging laden containers onto bomb carts and then rearranging them at their point of storage within the Terminal would require two "moves" and, therefore, take just as long or longer. Tr. 165-68. However, although unloading laden containers onto bomb carts would require two movements of the containers, these moves could happen simultaneously, *i.e.*, the container crane operator could continue unloading laden containers from a vessel while the discharged containers are concurrently rearranged by other workers within the Terminal. By contrast, a crane operator's discharge of a laden container directly onto road chassis would appear to take longer to complete because of the precision required to align and secure the laden container's corner castings.

27 to 30 containers per hour per crane at the Kobe, would have slowed to 24 to 25 containers per hour. Tr. 129. Nixon testified that, if he employed this option, he would have stored the laden containers on road chassis in the rail yard, but he noted that some of the rail yard property did not belong to NYCT and that driving the containers to this location would have increased the time required. Tr. 130-31. Nixon was uncertain whether the 826 containers discharged from the Kobe would fit in the rail yard, and he was also unsure whether the remaining 1,405 containers already in NYCT's possession could also have been relocated onto road chassis and to higher ground. Tr. 130-33. Thus, the Court concludes that unloading the laden containers onto road chassis would have required time and space that was—in the Court's assessment—not available to the Terminal once the storm surge threat became apparent.

More importantly, it is doubtful that this approach would have prevented the flooding of the cargo. Knobloch testified that a laden container on top of a road chassis would sit about 4 feet 4 inches off the ground. Tr. 160-61. According to Grillo, flooding in many areas of the Terminal reached 4 to 5 feet. Tr. 473-74, 481-82, 484. Thus, containers on road chassis in the areas where the water exceeded 4 feet would have been flooded despite NYCT's efforts. Nixon also believed that at least one or two laden containers placed on road chassis fell over as a result of Hurricane Sandy. Tr. 52. Knobloch conceded that, based on Nixon's assessment of the stability of the road chassis during the storm, water and debris in the rushing water could damage the road chassis. Tr. 236; *see also* Tr. 322 ("[Knobloch:] I did testify there is a potential in the flood situation, a log carried by fast flowing flood waters hitting one of those extension legs may result in a structural failure of that chassis or for it to topple over."). Although Knobloch nonetheless believed that the strategy would have prevented flooding, the likelihood that at least some laden containers and road chassis would be dislodged by flood waters and, in turn, topple

other laden containers and road chassis, demonstrates the inefficacy of this approach.

In addition, as noted by Grillo and Hamm, the asphalt surface of NYCT is not level; it slopes in certain parts to allow for drainage. Tr. 490-91, 512, 564-65. Because laden containers on road chassis cannot be stacked, it is unclear whether NYCT would have had enough flat surface to accommodate all of the containers.

As an alternative to fixing laden containers on top of road chassis, Knobloch suggested that NYCT could have placed laden containers over empty containers, which would keep the laden containers elevated at least 8 feet above the flood waters. Knobloch admitted, however, that an empty container experiences flotation in about 10 to 11 inches of water. Tr. 161, 219. Despite this, he believed the buoyancy of an empty container would be reduced by the weight of a laden container on top. Tr. 219. Knobloch provided no specific data as to the degree that buoyancy would be reduced. Knobloch also noted that the buoyancy of an empty container could be further reduced by breaking its weather-proof seals and allowing water inside. Tr. 219-21.

This approach is also unfeasible. For starters, it is not clear that placing laden containers on top of empty containers is a stable and safe method of storage. Nixon, who was responsible for storage of laden containers, said that it was "not a practice that we have ever done before to my knowledge," that "[l]ogically it doesn't seem sensible to put loads on top of empties," and that it seemed "unsafe." Tr. 106-07. Hamm also testified that securely linking the corner castings of laden containers on top of empty containers would be difficult on an uneven surface and could prove unstable. Tr. 584. Although Knobloch proposed this option, he did not know how heavy a laden container needed to be in order to reduce the buoyancy of an empty container beneath it. In addition to the buoyancy issue, Knobloch noted that "obviously rushing water will have a friction impact on containers," yet he offered no data as to the extent of such impact. Tr.

221. However, he stated that because containers are typically stowed in a block formation, he was not aware of an instance when rushing water was able to dislodge such containers. Tr. 221. Given that key variables—namely whether the empty containers under laden containers would float or be moved by the rushing water—remain unknown, it was not unreasonable for NYCT to not employ an untested and potentially dangerous strategy.

(d) Place Laden Containers on Rail Cars in the Intermodal Facility Area

In addition to placing laden containers on road chassis or empty containers, Knobloch proposed placing the laden containers on rail cars in the intermodal facility. The intermodal facility is the highest point in NYCT, Tr. 132, and placing the laden containers there would add an additional 2 feet of distance between the ground and the floor of a container, Tr. 183. However, there are several reasons why this strategy was unworkable. First, Nixon stated that NYCT was not leasing the land around the rail yard at the time Sandy struck, Tr. 64-65, and he did not recall whether any railcars were available at the time, Tr. 59, 104. A container would need to be unloaded on a road chassis, driven to the rail yard, and then placed onto the rail car, which Knobloch estimated would take around 5 minutes per container. Tr. 185-86. Furthermore, Nixon testified that U.S. Customs would have been required to supervise the process, and it is unclear to what extent this would have delayed the operation. Tr. 138-39. As with the placement of laden containers on road chassis or empty containers, the placement of containers on rail cars could not have been completed within the 11-hour timeframe when NYCT learned that the Arthur Kill might breach the bulkhead and the closure of the Port of New York. Moreover, it is not clear to what extent the intermodal facility suffered flooding and whether the laden containers would have stayed dry. *See* Tr. 489 (Grillo's testimony discussing flooding of the intermodal facility: "Q. When we go across the creek into the intermodal yard, was there

flooding there as well? A. I would say this Western Avenue to the security booth is about 500, 400 feet. It got flood. Q. It got flooded? A. Yes."); *see also* Tr. 509 (Additional Grillo testimony discussing intermodal facility flooding: "Q. Over by [the] rail yard over here, how far up did the water come? A. From me in the yard there is a booth there, security booth. Security booth was there. Q. The security booth is? A. Around there someplace. Q. All this area was dry? A. Right. Well, not quite.").

(e) Constructing Temporary Flood Barriers

Knobloch also proposed erecting flood barriers comprised of concrete road barricades that are 2 to 3 feet high and supported with sandbags. Tr. 223. Knobloch stated that these "could have been staged at an elevated position along the terminal and prevented floodwater from reaching containers in those areas." Tr. 223. Implementing this strategy, Knobloch suggested, would only have taken "a matter of a few hours." Tr. 223. The Court finds this suggestion implausible. Flood waters reached 4 to 5 feet in some areas and 2 to 3 feet in most areas of the Terminal. It is likely that storm surge would have overtaken the flood barriers, a point which Knobloch appeared to concede. Tr. 318 ("[Knobloch:] Is it water proof or not? It's possible that some water will seep by. It's possible. Or if the -- even if the flood waters are higher -- I mean, if I positioned them incorrectly at the wrong spot -- I mean there's multiple options. I mean there is potential even flood waters will get over, you know."). Based on Grillo's testimony, the storm surge inundated the Terminal within a matter of minutes and subsided over the course of hours. The Court is not persuaded that flood barriers could have withstood the force of the rushing waters. More likely, the flood barriers would have become dislodged and created loose debris that might further damage cargo and equipment at the Terminal.

(f) The Timing of Knobloch's Options

Although each option recommended by Knobloch is, for different reasons, unworkable under the circumstances, the common weakness underlying all of these strategies is timing. The crucial forecasts that signaled Sandy's storm surge might breach the bulkhead and flood the Terminal did not arrive until early Sunday morning—only a half day before the Terminal and the Port of New York were to close. None of these options, alone or in tandem, could have been implemented in such a short timeframe. Knobloch testified that NYCT should have begun to prepare for storm surge on Friday, October 26, by 10:00 a.m., Tr. 170-72, but this prescription is based on a Monday-morning-quarterback assessment of how long it would take to fortify the Terminal utilizing these strategies, not on the information known to NYCT as of Friday, October 26, at 10:00 a.m. In sum, the Court finds that none of Knobloch's proposed options constitute a reasonable exercise of care sufficient to have prevented the damage from Sandy or demonstrate that NYCT or Zim was negligent in preparing for the storm.

3. "Preparing" for an Act of God

To be clear, the burden rests with Zim to prove that there were no reasonable precautions available to prevent the wetting damage to Plaintiff's sweaters. Plaintiff is not responsible for finding a solution to save its cargo from Sandy's storm surge, and Plaintiff cannot be faulted for failing to demonstrate that reasonable preparations were available to NYCT or Zim. Nevertheless, the weaknesses present in all of Plaintiff's proposed options shows how severe and sudden Hurricane Sandy was and how it could not have been planned or prepared for.

(a) The Severity of Sandy

Hurricane Sandy was an Act of God, and the evidence indicates that Sandy was unprecedented and exceeded worst-case expectations. First, post-Sandy reports prepared by

various government agencies describe the challenges that arose in forecasting Sandy's powerful storm surge and the severity of its impact. For example, a December 7, 2012 Port Authority PowerPoint presentation titled "Superstorm Sandy: The Experience of The Port Authority of New York and New Jersey," notes that "[u]ntil Sunday, Oct. 28th, there was a false sense of security," and that an "Oct. 28 [NWS] briefing indicated surge of 6-11' above normal high tide." Ex. 14. The report contains an array of photographs illustrating the extent of the damage caused by Sandy such as containers scattered across other terminals, destruction of chassis, and a barge beached over a berth in Red Hook. *Id.* It also describes damage such as flooding of up to 5 feet in Port Authority buildings, "[t]oppled container stacks," "[l]ost containers," and "[a]utos destroyed by flooding and fire." *Id.* And, the report includes recommendations for improvement such as "[c]onsider increasing elevations of port facilities under development" and "[r]e-evaluate design criteria using latest storm recurrence intervals, storm surge levels, wind and wave data." *Id.*

A NHC tropical cyclone report summarizing the history of Hurricane Sandy and NHC's forecasts of the storm further elaborates on the difficulty of predicting Sandy due to its unusual size and strength. *See* Ex. 44; Tr. 406. The report observes that "[i]n the mid-Atlantic and northeastern United States, Sandy posed unprecedented forecast and warning challenges." Ex. 44, at 21. The report states that "[n]ot only was [Sandy] a massive hurricane expected to affect a large portion of those states with a wide variety of hazards, it was also forecast to lose its tropical characteristics and evolve into a post-tropical cyclone at some point prior to making landfall." *Id.* As a result of this transition, the NWS was faced with difficult choices in determining what forecast and advisory procedures to use during and after Sandy's transition. *Id.* at 22. The NHC report also addresses the difficulty in forecasting storm surge. The report concludes,

> [i]t was the storm surge hazard that caused numerous fatalities and most of the damage with Sandy, as well as the extensive evacuations necessary to prevent an even larger loss of life. Despite this history, multiple studies have shown significant confusion on the part of the public regarding their storm surge risk, and highlighted the need for improved communication of this hazard. With the implementation of a storm surge warning, the NWS will warn explicitly for the phenomenon that presents the greatest weather-related threat for a massive loss of life in a single day.

Id. at 23.

A Department of Commerce report, which assessed NOAA's forecasting performance, also addressees the shortcomings of Sandy's storm surge forecasts. Specifically, it notes that although NOAA "performed well in forecasting the impacts of this extremely large storm" and "surge forecasts were consistent with the observed conditions as the storm approach landfall," "the amount of lead time for surge and the way it was communicated represent two areas the Sandy Assessment Team found to be most in need of improvement." Ex. 46, at 2; *see also id.* at 35 ("Storm surge from Sandy was the most damaging aspect of the storm and the most difficult to predict."). With respect to storm surge awareness, the report notes that "there is a crucial need for storm surge graphical inundation guidance," and "[s]eventy-nine percent of coastal residents surveyed in March 2013 said the impact of Sandy's surge in their area was 'more than they expected.'" *Id.* at 3.

Reports that predated Hurricane Sandy also failed to adequately predict the severity of a future hurricane's storm surge. At trial, the parties repeatedly referenced a 1995 U.S. Army Corps of Engineers report that evaluated the vulnerabilities of the New York City area transportation system in the event of a hurricane, *see* Tr. 381-84, 821-22, 825-26, but this report did not foresee the extent of Sandy's storm surge flooding. *See* Ex. 39. Table 13 of the report provides a vulnerability assessment for New York area marine terminals facing hurricanes of different strengths. Ex. 39, at 46. The table predicts an 8.8-foot storm surge for a Category 1

hurricane, and it lists Howland Hook Terminal (now NYCT) as having a facility low point/critical elevation of 9.9 feet.[21] Because the estimated storm surge is lower than the facility low point, the table predicts that NYCT would not face a storm surge hazard in the event of a Category 1 hurricane.[22] *Id.*; *see also* Ex. 39A, at 1.

Second, testimony from both meteorologists supports the conclusion that Hurricane Sandy was unusual in both power and path. Plaintiff's meteorology expert, Branscome, stated that Hurricane Sandy was not unprecedented in the amount of storm surge it generated in New York City, but the only storm he cited with a surge greater than Hurricane Sandy was the 1821 Hurricane, which generated a 13-foot storm surge and occurred over 191 years prior to Sandy. Tr. 344-45. In more recent history, New York City experienced a storm surge of 5.5 feet during Hurricane Donna in 1960 and 4.6 feet during Hurricane Irene in 2012. Tr. 345-46; *see also* Ex. 40 (Bergen Point West Reach tide gage indicating storm surge during Hurricane Irene). By comparison, Hurricane Sandy's storm surge reached about 9.4 feet at Bergen Point West Reach, almost twice as high as the two largest storm surges of the more recent hurricanes. Ex. 41.[23]

According to the meteorology experts, Sandy's storm surge resulted, in part, from Sandy's unusual path. Branscome conceded that Sandy's nearly perpendicular northwest track into New Jersey was "atypical," Tr. 414,[24] and that along the northeast coast, a direct landfall is

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[21] Branscome testified that the facility low point was located in the northeast corner of NYCT near Bridge Creek based on his assessment of topographic charts of the area. Tr. 427. Knobloch did not know where this point was. Tr. 334-35.

[22] At trial, Branscome stated that the SLOSH model typically underestimates storm surge by 20 percent, *see* Tr. 394, but there is no evidence that a party or non-meteorologist could have known of this purported underestimation. Contrary to Branscome's assertion, a notation in the column titled, "Potential Hurricane Surge (ft) Above Normal Tide" in Table 13 of Exhibit 39 indicates that the storm surge values provided represent "SLOSH Model Worst-Case Surge Height." *See* Ex. 39, at 49.

[23] Because NYCT is located deeper into the Arthur Kill than Bergen Point West Reach, the storm surge at NYCT was likely greater than what was observed at the Bergen Point West Reach tide gage. Tr. 690.

[24] Branscome noted that Hurricane Agnes and the 1903 Hurricane took similar northwest paths into the Northeast coast, Tr. 414, but there was no testimony or other evidence provided regarding their storm surges. Although Hurricane Agnes made a similar northwest turn into the East Coast, Hurricane Agnes was also considered "atypical" by Branscome. Tr. 421-22.

"uncommon" and happens once every 20 to 30 years because hurricanes usually travel parallel to the East Coast and then go out to sea, Tr. 417-18. New York City, in particular, faces a higher threat from storm surge due to its location at the juncture between the north-south New Jersey coastline and the east-west coastline of Long Island, Connecticut, and Rhode Island, which together create a funnel that drives the storm surge into the New York City area. Tr. 375-76; *see also* Ex. 42A, at 81 (2009 New York City Natural Hazard Mitigation Plan describing the "New York Bight" as "a curve in the shoreline of an open coast that funnels and increases the speed and intensity of storm surge"). Branscome also testified that Sandy "was the biggest hurricane ever, basically, in terms of the area covered by the winds," Tr. 377, and had the largest fetch when compared to previous hurricanes such as Irene, Gloria, and Donna, which contributed to the build-up of its massive storm surge, Tr. 433-34. Thus, Sandy's atypical path combined with its immense size made for a particularly severe storm surge that was made even more destructive by New York City's unique geography.

Defendant's weather expert, Dooley, agreed with Branscome that these aspects of Sandy made its path and severity unusual, *see* Tr. 738-39, and he noted several other features of Sandy that made it unexpectedly destructive. For example, Hurricane Sandy was originally predicted to arrive around 2:00 a.m. on Tuesday morning, during low tide, but it increased in speed and arrived in the early evening on Monday during high tide. Tr. 733-35. Because of the high tide during Sandy's landfall, the storm surge was 2 to 3 feet higher than if the storm had arrived between high tide and low tide, and 4 to 5 feet higher than if it had arrived during low tide. *See* Ex. 41 (Bergen Point West Reach tide gage on October 29 indicating both predicted tide levels and actual tide levels during Sandy's landfall). Moreover, the high tide was particularly high due to the full moon on the night of Sandy's arrival, which generated an even higher high tide than

would be expected at any other time of the month. *See* Tr. 799-800.

Third, the testimony of NYCT employees Robert Nixon and Salvatore Grillo described the significant damage suffered by NYCT, illustrating Hurricane Sandy's extreme severity as it struck the New York area. *See supra* Section III.G. Nixon testified that Terminal buildings and equipment were damaged by flooding. *See, e.g.*, Tr. 72-73, 144. Grillo stated that he had previously experienced hurricanes at NYCT, but the main concern during past hurricanes was wind. Tr. 457-58. He said that Hurricane Irene was not serious and caused no damage to the facility, and that prior to Hurricane Sandy, he had never observed flooding at the Terminal. Tr. 457-58. Grillo's photographs depict the extent of the inundation on the night Sandy struck and the significant damage suffered by the Terminal. The photographs show containers scattered across the Terminal, Ex. 77, road chassis knocked over onto their side, Ex. 76M, and flooded trucks and other vehicles, Ex. 76E.

(b) NYCT's Preparations for Sandy

In its briefing and at trial, Plaintiff highlighted NYCT's failure to prepare for the "worst." However, as with "historic," the boundaries of the "worst" case scenario were difficult, if not impossible, to define prior to the storm. In any event, regardless of whether Hurricane Sandy met or exceeded worst case expectations, as a matter of law, NYCT was not required to prepare for the worst possible scenario. Rather, the Act of God defense only requires "an exercise of reasonable care" under the circumstances. *Mamiye Bros.*, 241 F. Supp. at 107; *see also Fischer v. S/Y NERAIDA*, 508 F.3d 586, 594 (11th Cir. 2007) ("Although what 'reasonable care' requires changes with the circumstances, that standard recognizes the existence in every case of something more that could be done—and perhaps would be legally required under a 'highest

degree of caution' standard—but that reasonable care does not demand.").[25] Accordingly, the issue is whether any exercise of *reasonable* care could have prevented the damage.

Because Sandy was unusually destructive and because the relevant forecasts predicting this destruction did not arrive until late in the weekend when nothing more could have been done, neither NYCT nor Zim was negligent in its attempts to prepare for Sandy. In its nearly 50-year history, NYCT had never experienced flooding from storm surge breaching the bulkhead, and during Grillo's 40-year career at NYCT, he had never experienced flooding on Sandy's scale.[26] Unlike many of the cases cited by Plaintiff, NYCT had no frame of reference for Hurricane Sandy.[27] *Compare In re Signal Int'l, LLC*, 1:05 Civ. 477, 2008 WL 8113118, at *5-7 (S.D. Miss. July 15, 2008) (holding that a vessel owner failed to support an Act of God defense because the owner did not show that the vessel experienced the full force of Hurricane Katrina and that the conditions the vessel experienced were not foreseeable), *aff'd in part, vacated in part*, 579 F.3d 478 (5th Cir. 2009), *with Royal Beach Hotel, LLC v. Crowley Liner Servs., Inc.*, No. 1:06-CV-129, 2007 WL 1499815, at *2 (S.D. Miss. Mar. 14, 2007) (holding that defendant container terminal was not liable for negligence because defendant was not required to take additional preventative measures when the "enormously destructive force of [Hurricane] Katrina was unprecedented and defendant could not reasonably have foreseen that its containers, trailers

[25] By contrast, Knobloch's options were admittedly not designed for a particular set of weather forecasts but for a hypothetical worst case scenario. Knobloch stated, "I'm -- in a risk assessment point of view I'm less focused at this point in time at a particular weather forecast, but as the wors[t] case scenario. That is what preparation for an incident is all about." Tr. 319.

[26] NYCT was not alone in its lack of experience with major flooding. Hamm, who was familiar with Port Newark Container Terminal's hurricane preparedness plan and was involved in its creation, stated that the Port Newark plan does not include a contingency for water breaching the bulkhead because such a situation had never occurred, and the main focus was on wind. Tr. 592-93.

[27] At trial, Hamm testified regarding the preparations taken by other terminals in the area, which Plaintiff's counsel objected to as hearsay. Tr. 566-69. Although this information could have been easily obtained, neither party attempted to do so. Regardless, the Court sustains Plaintiff's objection to this portion of Hamm's testimony and has not considered Hamm's testimony concerning Hurricane Sandy-specific preparations made by other container terminals in the Port of New York.

and chassis might wash and blow away and cause damage to neighboring property").

Although Sandy was expected to be severe, the parameters of the worst case scenario did not begin to crystallize until Saturday morning, and, even then, the worst case did not predict the inundation of the Terminal. NYCT lacked specific estimates about the possible height of Sandy's storm surge until Saturday morning at 11:00 a.m., when the first NWS storm surge estimate indicated a range of 4 to 8 feet. If forecasts and advisories are intended to have any bearing on hurricane preparedness, then NYCT's worst case scenario involved an 8-foot storm surge, meaning minimal flooding over the bulkhead and some flooding around the northeast portion of the Terminal near Bridge Creek. The mere possibility of a hurricane cannot, by itself, warrant preparations on the massive scale proposed by Plaintiff. *See Mamiye Bros.*, 241 F. Supp. at 118 ("Libelants then conclude that reasonable care required the pier operators to protect the cargo against the *possibility* of Donna hitting New York. This conclusion cannot be accepted. The conclusion would require protective efforts whenever any tropical storm or hurricane developed . . . . This not only seems an unreasonable standard; its application would result in economic waste.") (emphasis added). As discussed above, it was not until 2:00 a.m. on Sunday, October 28 that a 5 to 10-foot storm surge—one capable of breaching the bulkhead—was first forecast. *See* Ex. 93, at 147-48. Thus, approximately 12 hours before the Terminal and the Port of New York would close, the worst case scenario for Sandy's storm surge was adjusted to a range that exceeded the height of the Terminal's bulkhead. Given the time between the adjusted forecast and when preparations had to be completed due to safety concerns, NYCT had no reasonable or practical way to move or protect over 2,200 containers located on the Terminal in the hours before landfall. Hurricane Sandy ultimately generated a storm surge of 9.4 feet at Bergen Point West Reach, *see* Ex. 41, and likely higher at NYCT, *see* Tr. 690. This surge

exceeded the 4 to 8-foot estimate forecasted during the early weekend when preparations were being completed at NYCT. Earlier in the week, weather reports did not suggest a storm surge of Sandy's eventual magnitude. The notable lack of clear and accurate storm surge information is confirmed by federal government post-Sandy reports assessing the performance of the weather agencies. To the extent that Plaintiff contends that NYCT should be faulted for taking measures to protect its own equipment rather than protecting Plaintiff's containers, the Court finds this argument wholly unsupported. Much of NYCT's equipment and other property was ruined due to the storm, further illustrating how unexpected the storm was and how the damage from Sandy could not have been prevented. In sum, the Court concludes that Hurricane Sandy was an Act of God, that its severity and—in particular—its storm surge, were not reasonably foreseeable, and that no exercise of reasonable care could have prevented the loss.[28]

V. Conclusion

Accordingly, Zim is not liable for the damage to Plaintiff's cargo. The Clerk of Court is directed to enter judgment in favor of Zim and to close the case.

SO ORDERED.

Dated: June 8, 2015
New York, New York

ANALISA TORRES
United States District Judge

[28] Zim also raises the Perils of the Sea and Clause Q defenses. However, because the Court finds that the Act of God defense applies, it need not reach Zim's remaining defenses.