

Title of Investigation: MV Spirit of Norfolk - Fire Investigation (Assist: USCG & NTSB)	Investigation Number: 768026-22-0024	Report Number: 2
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**SUMMARY OF EVENT**

Fire Scene Examination: Origin and Cause Investigation of a fire that damaged the Spirit of Norfolk, a cruising vessel based in Norfolk, Virginia.

**NARRATIVE:**

On June 7, 2022, the Spirit of Norfolk, a vessel that conducts day cruises out of Norfolk, Virginia, was making a two-hour trip with students from local schools on board. At approximately 12:03 PM, an engine fire was reported requiring the evacuation of the vessel using nearby ships. The Spirit of Norfolk was towed by tugboats to a pier at the Norfolk Naval Base. The fire spread from the engine room and throughout the entire vessel before it was extinguished days later.

On June 9, 2022, the United States Coast Guard requested ATF conduct an Origin and Cause investigation of the fire. Agents, in conjunction with the Coast Guard and National Transportation Safety Board conducted the investigation. The fire was found to have originated on, in or about the Port Side engine in the engine room. **The fire has been classified by the ATF as ACCIDENTAL and non-criminal in nature.**

The detailed Origin and Cause Report is attached.

Prepared by: [Redacted]	Title: Special Agent, Falls Church I Field Office	Signature: [Redacted]	[Redacted]
Authorized by: [Redacted]	Title: Resident Agent in Charge NN, Newport News Satellite Office	Signature: [Redacted]	Date: [Redacted]
Second level reviewer (optional): [Redacted]	Title: Special Agent in Charge, Washington Field Division	[Redacted]	[Redacted]

**U.S. Department of Justice**

**Bureau of Alcohol, Tobacco, Firearms and Explosives**

**Statement of Certified Fire Investigator**

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**To:** Resident Agent in Charge, Falls Church I (Arson)

**From:** Senior Special Agent / CFI [REDACTED]

**Type of Exam:** ORIGIN and CAUSE REPORT

**Date of Incident:** June 7, 2022

**Dates of Scene Examination:** June 14, 2022 & June 22, 2022

**SUMMARY:**

On June 7, 2022, the Spirit of Norfolk, a vessel that conducts day cruises out of Norfolk, Virginia, was making a two-hour trip with students from local schools on board. At approximately 12:03 PM, an engine fire was reported requiring the evacuation of the vessel using nearby ships. The Spirit of Norfolk was towed by tugboats to a pier at the Norfolk Naval Base. The fire spread from the engine room and throughout the entire vessel before it was extinguished days later.

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**ATF PARTICIPATING FIRE INVESTIGATORS:**

- ATF Special Agent/Certified Fire Investigator [REDACTED], Falls Church I
- ATF Special Agent [REDACTED] Newport News Satellite Office

**FIRE UNITS PRESENT:**

**Norfolk Fire Department**

- Battalion Chiefs 3, 8
- Boat 1
- Fire Boat 13
- Engines 1, 2, 7, 12,
- Ladder 7, 13
- Rescue Squad 1

**Navy Fire Department**

- Engine 4, 11

## SCOPE OF THE INVESTIGATION:

1. This report relates to an origin and cause determination of the fire that occurred onboard the Spirit of Norfolk on June 7, 2022. The Scientific Method was utilized during this fire investigation, as recommended by the 2021 edition of NFPA 921 Guide for Fire & Explosion Investigations, which defines the Scientific Method as:

*“The systematic pursuit of knowledge involving the recognition and definition of a problem; the collection of data through observation and experimentation; analysis of the data; the formulation, evaluation and testing of a hypothesis; and, when possible, the selection of a final hypothesis.”*

2. Specifically, investigators gathered available information (*data*) related to the fire event; and based on that data, investigators attempted to develop and test all reasonable theories as to where and how the fire could have started. When all reasonable theories had been vetted against known data, a conclusion was drawn.

## VESSEL DETAILS:

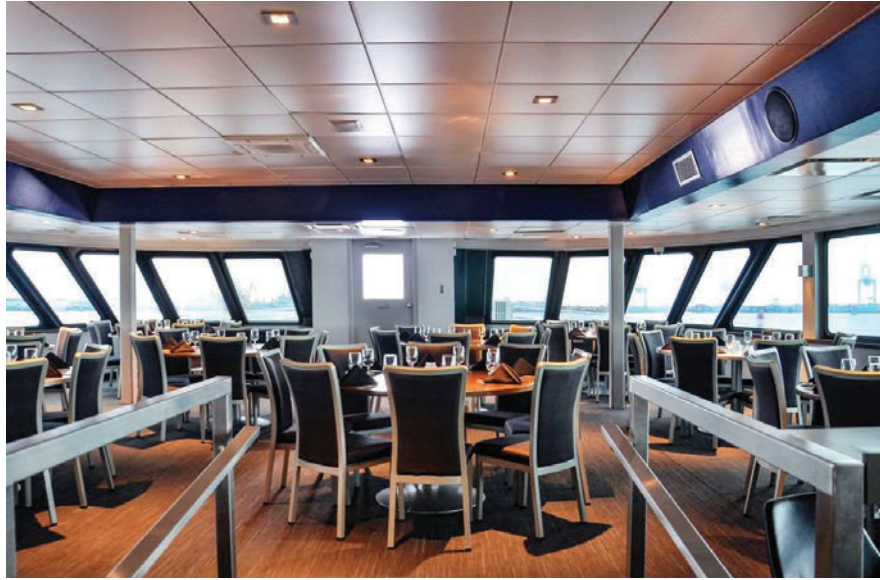
3. The Spirit of Norfolk was a passenger ship owned and operated by Entertainment Cruises Incorporated, a company based in Chicago, Illinois. The ship was originally launched in March 1992. The vessel was originally owned by Spirit Cruises LLC, before merging with Premier Yachts Incorporated to become Entertainment Cruises. The ship had an overall length from Bow to Stern of 167 feet, 4 inches (51 meters). The width at its center beam was 38 feet 1 inch (11.6 meters). The vessel had three decks above the waterline with a top capacity of 400 passengers.



4. Below deck housed bathrooms near the front, a galley area in the center and the engine room on the rear. The engine room housed the port and starboard engines as well as two generators that provided the power for the vessel. This ship utilized diesel fuel.
5. The Main/first deck consisted of a large function room, with a bar, kitchen area, seating area and dance floor. The Port side of this floor had some windows, stairs to below deck where the bathrooms were housed, a room with storage and an elevator to other floors, as well as stairs to the second floor. The main exit was also on the

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port side through a sliding, partially glassed door. The starboard side of the ship was all windows. A small area on the rear of the ship was open air, with a seating area for smoking and stairs to the second floor of the ship. Two doors on the floor of this area opened into below deck. The front of this floor was larger with some seating.



6. The second deck was like the first. It was slightly smaller with no seating on the exterior of the front. Bathrooms were housed on this floor near the rear and behind the kitchen and bar of the floor. A second exit point existed on the Port side of this floor as well. Adjacent to this exit point, were staircases to the first and top floors of the vessel.



7. The top deck consisted of an open-air deck at the rear of the ship. The center of the floor had a bar area. In front of the bar was the Wheelhouse for the ship. Access to the wheelhouse was limited to crew.



#### **WITNESS INTERVIEWS:**

##### Captain Ryan Nadeau<sup>1</sup>

8. Along with his role as Captain, Captain Nadeau is also the “Director of Marine Operations” for Entertainment Cruises in the Norfolk region. In the role of Director of Marine Operations, Captain Nadeau was responsible for ensuring the vessels operate safely both as a vessel and as a restaurant, as well as maintaining the companies drydocks and vessels. Captain Nadeau has been in this position since approximately June 2016.
9. Captain Nadeau reported that the company does regular training with its crews on the vessels’ fire systems. Crews receive “hands-on” training with fire extinguishers, fire hoses, and fire pump systems.
10. In his roles with the company, Captain Nadeau is also involved in the hiring of the crews along with input from the Human Resources for the company.
11. General maintenance on the Spirit of Norfolk was the responsibility of Bob Enloe who has the title of “Chief Mate”. Mr. Enloe would perform such tasks as oil changes, check fluid levels, switch and run pumps and change grease fittings. When there were major issues with engines Captain Nadeau would have Bay Diesel fix them.

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<sup>1</sup> This is a summary of three interviews conducted with Captain Nadeau. The dates of those interviews were June 7, 2022, June 8, 2022, and August 12, 2022.

12. On May 13, 2022, the Spirit of Norfolk was operating a cruise with another captain. Captain Nadeau received a phone call from the captain on board stating there may be a fire with the Port side engine. Captain Nadeau notified the Coast Guard of the incident and responded to the vessel which had been brought to the dock using only the Starboard side engine. Captain Nadeau also notified Bay Diesel, and a representative met Captain Nadeau at the vessel to investigate the issue with the engine. What was discovered was a hole in the engine that leaked the anti-freeze, causing it to overheat. Dry Chemical had been released into the engine room to suppress a fire that turned out only to be an overheating of the engine. This event in May led to a rebuild of the engine.
13. Initially, Bay Diesel changed the water pump housing, a turbocharger, and the turbo feed lines. It was evident that the water pump housing was the failure point during the May cruise according to Captain Nadeau. After these changes were made, the vessel was inspected by the Coast Guard and cleared to resume operations. Prior to the first cruise after these changes were made, the engine began smoking with a white colored smoke. Captain Nadeau ordered the Port side engine be shut down and the cruise was operated with the Starboard engine only, with the assist of a tugboat. This contingency was approved by the Coast Guard. After this cruise, Bay Diesel reinspected the engine and identified anti-freeze in with the engine oil. Bay Diesel then recommended a complete engine rebuild. For the next several days, the Spirit of Norfolk operated with a single engine and a tug assist. While at dock, Bay Diesel worked to rebuild the Port side engine. The work was completed on May 26, 2022. Following the rebuild, the Spirit of Norfolk completed 18 cruises before the June 7, 2022, fire event. After some of these cruises, oil was observed at the base of the turbocharger<sup>2</sup> on the Port side engine. Captain Nadeau and Bay Diesel agreed to replace this turbocharger on the Port side engine. A new turbo charger had been ordered but was not installed by the time of the June 7 fire.
14. On June 7, 2022, the “SPIRIT OF NORFOLK” was scheduled for an 11 AM to 1 PM cruise, hosting a local elementary school. The vessel left for the trip at approximately 11:05 AM with 101 passengers and seven crew members. Captain Nadeau reported that at approximately 12 Noon, the vessel was in the area of pier 2 or 3 at the Norfolk Navy Base, when he received via the bridge’s alarm panel the vessel had “lost communication with the Port Main Engine”. Other systems remained in contact with the Port Side Engine at that time. Captain Nadeau attempted to re-engage the Port side engine. While doing so, the Starboard engine shut down. At this point, Captain Nadeau observed smoke coming from the Port side vent intake. Captain Nadeau ordered the crew members to report to the engine room and identify the issue. Members reported smoke coming from the engine room. Captain Nadeau ordered the members to close the remote fuel shut off valves and Captain Nadeau closed the power ventilation from the bridge.
15. Captain Nadeau reported the crew moved the passengers to the third deck that Captain Nadeau had designated as the muster area for passengers. At this same time, Captain Nadeau notified the Coast Guard of the situation. In response, the Victory Rover reported they were in the area and able to assist. Captain Nadeau accepted the assistance and the Victory Rover proceeded to the Port side of the Spirit of Norfolk and pressed alongside the vessel. As the Victory Rover moved into position, the Rosemary McAllister, a towing vessel, and other tugboats moved into position to assist as well. The crew offloaded passengers to the Victory Rover through the Port side cargo door. Captain Nadeau left the bridge and conducted a sweep of the Spirit of Norfolk to ensure all passengers were off. When the passengers were off, Captain Nadeau ordered five crew members to board

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<sup>2</sup> Per National Fire Protection Association (NFPA) 921 – Guide for Fire and Explosion Investigations 2021 Chapter 29 – Marine Fire Investigations, Section 29.4.3 “**Turbochargers/Super Chargers.** Diesel and gasoline inboard and I/O powered boats can be fitted with turbochargers/super chargers. These units often use engine lubrication oil for lubrication and cooling purposes. The units are fitted with heat blankets, water jackets, or a combination of both as their operating temperatures exceed the ignition temperature of surrounding engine room materials. Turbochargers are powered by hot exhaust gases and send pressurized air into the combustion intake. Super chargers, powered by an engine drive belt, inject compressed air into the combustion intake.”

the Victory Rover. Captain Nadeau and his relief Captain remained on board the Spirit of Norfolk until they boarded a “red crew boat” and were taken to Pier 4 where the Spirit of Norfolk was towed.

16. Captain Nadeau reported that attempts to fight the fire by the crew were unsuccessful. A fire extinguisher was obtained but conditions were too dangerous to enter the engine room. Fire hoses had also been laid on the deck, but the fire pump did not charge due to loss of power to the vessel.

### Brian Bracey, Deckhand Spirit of Norfolk<sup>3</sup>

17. On June 7, 2022, Mr. Bracey arrived for work at approximately 7:40 AM and began his regular duties of cleaning and stocking of the vessel. The passengers for the days trip were elementary students and staff from two local schools. At approximately 10:15 AM, students and adults began to board the ship. At approximately 11:10 AM, the Spirit of Norfolk began its two-hour trip. Once the ship was on its way, Mr. Bracey began food service for the crew below deck when he was alerted over the radio by Captain Nadeau of a problem. Captain Nadeau stated, “I’m getting an alarm, a smoke alarm from the engine room, can somebody check it out?” Mr. Bracey was a few feet from the engine room so went to check it. As he approached the door to the engine room, he observed a gray smoke coming from the door. Mr. Bracey opened the door and observed smoke with orange flames in the area of the Port main engine. He then closed the door immediately.
18. Mr. Bracey notified Captain Nadeau of the fire and asked for another crew member to grab a fire extinguisher. He opened the door a second time with the second crew member behind him with the fire extinguisher ready. This second time the smoke was black. Knowing he could not make entry to the engine room he immediately closed the door and attempted to contact the captain. The next thing he heard was Captain Nadeau stating, “turn the fire pumps on”. To the right of the engine room door, Mr. Bracey located the fire hose and began to unravel it preparing for water. As he was doing this, Captain Nadeau told the crew to “turn the fuel off”. Mr. Bracey responded to the main deck where he observed another crew member turn off the fuel. Mr. Bracey then went to the bow of the ship where he assisted a tugboat in securing the Spirit of Norfolk via a tug line. Mr. Bracey then assisted the passengers off the Spirit of Norfolk through the Port side door and onto the Victory Rover that had come along side to assist with the evacuation.
19. Mr. Bracey then went to the second and third decks to check for more passengers. When he was on the second deck, a second tugboat was pulling along on the Starboard side with a fire hose. Mr. Bracey told the tug to put the water through the vents on the starboard side that ventilated the engine room, and it did.

### Norfolk Fire Department Fire Report Summary

20. On June 7, 2022, at approximately 12:13 PM, an alarm was sounded for a fire on the Spirit of Norfolk. Fire Units from City of Norfolk responded to Pier 4 where the Spirit of Norfolk was being towed. Upon arrival, two Coast Guard tugs were guiding the vessel to the pier. As it approached the pier, units attempted to extinguish the fire through the vents at the rear of the vessel. Units were notified that the vessel was fueled with 5300 gallons of diesel fuel. Units reported “heavy smoke conditions” that were worsening upon arrival at the pier. Units from Norfolk, the Navy and the Coast Guard were able to improve conditions by supplying water to the stern of the ship. A RECON team of four firefighters entered the Spirit of Norfolk in an attempt to locate a vent hatch and retrieve the fire/floor plan. The RECON team was unable to locate the ventilation hatch but made it to the kitchen/galley adjacent to the engine room. The RECON reported the kitchen dark but open for foot traffic. The RECON opened the kitchen door and reported “rollover, pre-flashover conditions” in the engine room. The door was resecured, and the RECON exited the vessel.

<sup>3</sup> Summary of Interview conducted on June 9, 2022, by the NTSB and the Coast Guard.

21. Sometime later, a decision was made to have the RECON team re-enter the area and attempt to put a “foam line” into the engine room and then evacuate the vessel. The RECON team entered through the galley and turned the door wheel for the engine room a quarter turn. Pressure from behind the door forced the door open “causing what appeared to be a minor backdraft/ flashover”. The water rushing from the engine room “went up in flames” and separated the members of the RECON team. Two “MAYDAYs” were initially called, one by a Norfolk Officer, the other by a Navy firefighter. The four members of the RECON team were able to self-extricate from the vessel. The members of the RECON team were saturated with diesel fuel and went into rehab.
22. Following the explosion, after the opening of the engine room door, units reported the vessel “appeared to have been capsizing”. The ship was ordered to be evacuated and fire units went into defensive operations utilizing foam from the Coast Guard and from lines on the pier. Units reported the diesel fuel burned “hotter and hotter” worsening conditions on the ship.

## **FIRE SCENE EXAMINATION:**

23. Investigators began their examination of the vessel on the exterior. The investigation began on the bow/front side moving in a clockwise direction around the vessel. The interior investigation went from the area least damaged (top deck) to the area most damaged (below deck).

### **EXTERIOR**

#### *Bow/Front Side*

24. The freeboard<sup>4</sup> on the Bow of the ship was intact. The paint was undamaged by fire and/or smoke and the words “SPIRIT OF NORFOLK” were clearly visible from the exterior of the vessel. Significant damage was observed from the main/first deck to the top of the vessel. The windows had failed during the fire and fire had vented from these windows to the exterior, causing both heat and smoke damage to the front of the vessel. The top deck of the front side was the most damaged with most of the paint burned away and heat damaged to the exterior shell. The damage observed is from fire spread within the interior and not from the fire originating on the exterior of the bow.

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<sup>4</sup> Freeboard – The vertical distance between the water line and the gunwale. (NFPA 29.2(19) – Powerboat and Sailboat Terminology)  
Gunwale – The upper edge or surface of a boat’s side. (NFPA 29.2(22) – Powerboat and Sailboat Terminology)





Starboard/Right Side

25. There was extensive heat damage on the starboard side of the vessel. All of the windows on this side failed during the event, venting fire to the exterior. The paint had burned away leaving an orange-like color consistent with oxidation of the metal shell of the vessel. This orange-like color is present through most of the center of the vessel and is observed from the main deck to the top deck. Closer to the rear on the starboard side, there were no windows, but vents were present. There was evidence of intense heat and black smoke venting from these vents. The damage observed on the Starboard side is consistent with fire on the interior, venting to the exterior.



Stern/Rear Side

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26. The exterior of the Stern of the vessel was largely intact. Items that would have been consumed in a fire were undamaged. The paint remained in place. This fire did not originate on the exterior of the Stern.



Port/Left Side

27. The damage to the port side was most prominent from the main deck to the top deck near the exit doors. These doors were utilized by the crew and passengers to exit onto other vessels during the rescue. The windows on this side also failed causing heat damage to the areas above the windows. The damage observed was consistent with a fire on the interior venting to the exterior.



*Below the Freeboard to the Waterline*

28. There was minimal damage below the Freeboard. The paint was mostly intact below the Freeboard with only minor heat damage observed in some areas.



29. The damage observed on the exterior of the vessel is consistent with a fire on the interior. This event did not originate on the exterior of the vessel.

**INTERIOR**

*Top Deck/Third Deck*

30. This deck had three distinct areas:

- a. Rear - The rear of this deck contained an open-air seating area, metal boxes containing flotation devices, and a staircase to the second deck below. This area was largely undamaged. The heat from other areas of this deck dissipated due to the open air. Where damage was observed, it was minor to some of the wicker style furniture on the deck close to the middle section of the deck or to the sides of the vessel where heat was rising from below.



**Rear of Third Deck**

- b. Center – The center was a bar area, that was covered by a metal roof. This area was connected to a staircase on the Port side and a hallway that led to the wheelhouse on the Starboard side. This area was significantly damaged. All consumable products in this area were burned. What remained were the metal components from the chairs and tables and the portions of the bar equipment behind the bar. The fire in this area was from fire spread from below that reached this area via the Port side staircase.



**Third Deck Damage**

- c. Front – The front contained the wheelhouse that connected to a staircase on the Port side and to the bar on the starboard side through doors. The wheelhouse had been destroyed by fire, with fire burning for a significant period of time in this area. All that remained were metal components to the wheelhouse. The equipment utilized to monitor the systems of the vessel were extremely damaged. Retrieval of data from any of these systems was not possible. The windows to the wheelhouse failed during the event releasing heat and smoke to the exterior.



### Wheelhouse Damage

31. The damage on this third deck is consistent with fire spread from below via the Port side staircase and from heat exposure from fire on decks below. This event did not originate on the top/third deck.

### Second Deck

32. This deck had three distinct areas:

- a. Rear Exterior – This was a small open-air area with two small tables with seating and some storage. Staircases to and from the top and first deck were also present in this area. This area was largely undamaged by fire. The area adjacent to the door to the interior was damaged by internal heat. The door to the interior was largely damaged on the interior side with little to no damage on the exterior side. The damage observed is consistent with this door being closed during most of the fire event limiting damage to this area.



**Second Deck Rear Seating Area**

- b. Rear Interior – The rear deck entered into a hallway with a bathroom on each side. There was a large amount of smoke on the walls of the starboard side bathroom. The port side bathroom was damaged in a similar fashion with some collapse in and around the door limiting access to it. A small service area and bar were adjacent to these bathrooms. These areas sustained significant fire damage and collapse from the ceiling.



**Second Deck Bar Area Damage**

- c. Main Section and Front – This was a large, mostly open area with seating. The Port side contained a service area with an elevator and doors to the staircase, a supply room and an exit point utilized by passengers to exit the vessel during the event. The main room sustained significant fire damage consistent with fire burning for a long period of time.



**Second Deck Interior Damage**

- d. Investigators photographed the elevator shaft that serviced this deck, the deck below and down into the galley. The damage in this elevator shaft is consistent with fire spread from below. The elevator shaft sustained significant heat damage during the event and contributed to the fire spreading to this deck of the vessel.



**Inside of the Elevator Shaft**

- e. The staircase on the Port side of this level was significantly damaged by fire spread. The handrails had largely been consumed by fire and the walls sustained a high level of heat damage. The patterns present in this area are consistent with a fire spreading from the lower floors, into this deck, and continuing to the top deck.



**Port Side Stairs**

- f. The windows on this level failed during the event releasing heat to the exterior. This likely contributed to the damage on the deck above.

33. The damage to the second deck is from fire spread from below. This event did not originate on the second deck of the vessel.

Main Deck

34. The main deck had the following four areas:

- a. Rear Exterior – This area was undamaged by fire. The double doors that enter into the interior were likely closed during the event, protecting this area. The equipment and material stored in this area were undamaged.



**Storage Area Undamaged on the Rear of Main Deck**

- b. Rear Interior – This area sustained fire damage but not as much as areas closer to the front. There were areas of collapse and burn patterns present, but much of the consumable items, such as chairs, tables, and portions of the walls, remained only partially damaged.





**Rear Interior Damage**

- c. Main Area – This area was significantly damaged by heat and fire. The doorways on the Port side leading to the elevator shaft and staircase to the galley were damaged by fire spread from below. The area between these doorways was the most damaged portion of the deck. From this area, the patterns observed showed fire movement to the Port side stairs and to the decks above. The windows in this area failed releasing heat to the exterior and contributed to the damage to the decks above.



**Main/First Deck Cabin Damage**

- d. The staircase closer to the bow of the vessel was less damaged by fire but a large amount of smoke was present coming from the area of the below deck bathrooms and supply areas.



**Stairs to the Below Deck Bathroom**

- e. Bow Exterior – The Bow was largely undamaged during the event. What damage did exist was from the windows failing on the front of the vessel and emitting heat to the exterior from those windows.



**Bow and Damage from Failing Window**

- 35. The damage to this main deck was sustained from the elevator shaft and staircase from the area below deck in the area of the galley. The fire did not originate on the Main deck of the vessel.

*Below Deck*

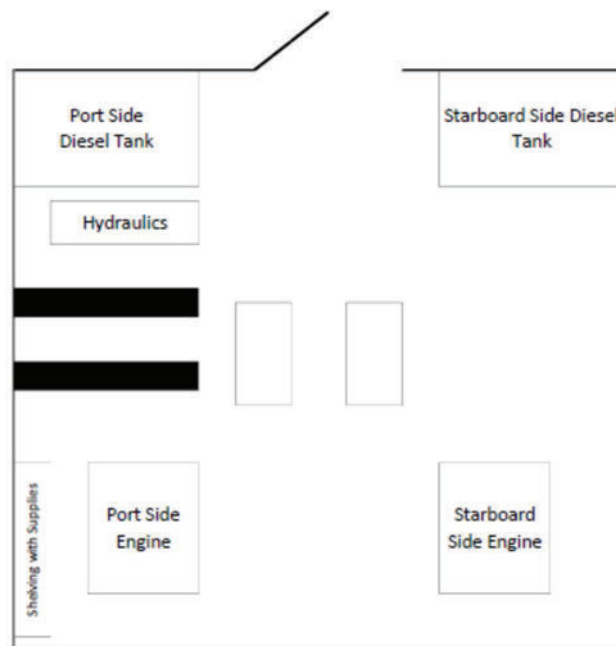
- 36. Front - This area contained bathrooms and storage area. There was a significant amount of smoke and water damage in this area below deck. There was no fire damage observed. This area was separate from the galley and engine rooms and access by a separate staircase from the main deck. This event did not originate in this area below deck.
- 37. Galley – The galley is in the center below deck and is accessed from the center staircase on the main deck and a service elevator that runs from the galley to the second deck. This area had a strong odor of diesel fuel present. The fire damage appeared to be mostly at the chest level and higher in the galley area, as the below deck flooded during the suppression operation. The diesel fuel, floating in the water burned, and spread the fire to the decks above.



**360° of the Galley Area**

38. Cooking equipment and other items stored in the galley were all over the floor once the water was pumped from the area. Photography was extremely difficult due to the darkness and hazardous conditions in the area. The damage in the galley is consistent with statements of the firefighters who were in the area when the engine room door opened releasing water and fire into the galley. This event did not originate in the galley area.

39. Engine Room – The engine room was accessed by a door on the stern side of the galley and adjacent to dishwashing equipment. The engine room had the following layout:



**General Layout (Not to Scale)**

40. The engine room was extensively damaged. The damage was more pronounced high in the room as water build up protected the lower portion of the engine room during the suppression operation. In the early stages of this event, the fire burned and quickly filled the engine room with smoke. Due to limited ventilation to from the intake and outtake ventilation on the Starboard and Port sides of the vessel, the oxygen level was limited, but significant enough to allow the fire to continue to burn and to build up heat in this room. At some point during the event, enough heat was produced to cause the starboard side fuel tank to split open, releasing diesel fuel through the engine room.



**Opening in Starboard Tank**

41. Diesel fuel is lighter than water and will separate from and float on top of the water. The patterns observed in the engine room point toward a water level at approximately waist high when the tank split, as the area below the waist in the room was less damaged, including the paint on portions of the generators and other equipment present in the room. The water protected the lower portions of the room from the burning diesel fuel.
42. Investigators examined the generators in the engine room, and they appeared in working order. The damage to them appears to be from fire spread from the area of the Port side engine. Witness statements from the crew reported that power to the vessel failed sometime after the Port side engine failed. The generators did not cause this event.
43. There was some mechanical damage to the hydraulics on the Port side of the engine room. Portions of this system are currently undergoing testing by the NTSB. It is the belief of the fire investigators this damage was likely caused later in the event, possibly when the water rushed from the engine room into the galley area when the door was breached.



**Hydraulics**



**Hydraulics Damage**

44. Investigators examined the Starboard side engine and it appeared to be in working order and mostly undamaged by this fire event. It is likely this engine failed later in the event when water flooded the engine room. The Starboard engine did not cause this event.
45. The most damaged portion of the room was on and around the Port side engine. The top of this engine was significantly damaged, with some mass loss and melting to some metal components. The shelves adjacent to this engine and the items on these shelves were also significantly damaged and acted as an early fuel during this event. This Port side engine was the origination point of this fire event.



**Damage to the Top of the Port Side Engine**

46. This engine had recently undergone a rebuild and witnesses spoke of continued issues with the engine after the rebuild. A leak in the area of the turbocharger of the Port side engine had been observed by the engine mechanic. This required the turbocharger to be replaced. The part had been ordered but the repair was still pending the day of this event. A turbocharger can generate temperatures in excess of 1800° Fahrenheit. This temperature is capable of igniting combustible items stored in the area of the Port side engine.

**FIRE PROGRESSION:**

47. This fire was largely contained in the engine room of the vessel. An attempt was made by fire units to enter the engine room and introduce foam to suppress the fire. Water, built up in the engine room from exterior fire suppression operations, forced the door to the engine room open, releasing smoke, heat, fire, and diesel fuel into the galley/kitchen area of the vessel. From the galley, fire traveled up the stairs and simultaneously into the elevator shaft extending the fire to the main deck of the vessel. The fire continued to travel up the stairs on the Port side of the vessel to the second and third decks. Fire breached the second deck and wheelhouse and bar area on the third deck.

**EVIDENCE COLECTED:**

48. All evidence collected from the scene was collected and maintained by other investigative agencies.

49. Photographs: The location was photographed by Special Agents [REDACTED] and [REDACTED]

**FIRE PROGRESSION TO OTHER STRUCTURES:**

50. There was no damaged to other vessels or structures

**NUMBER OF FATALITIES AND/OR INJURIES:**

51. There were no fatalities or serious injuries.

**ESTIMATED VALUE OF LOSS:**

52. The estimated damage per insurance records is in excess of \$4 million. The vessel is a complete loss.

**WEATHER:**

53. Temperature at the time of the event was approximately 82° Fahrenheit with 13 MPH from SSE

54. Weather was not a factor in this event.

**HYPOTHESIS AREA OF ORIGIN, FIRST FUELS IGNITED & IGNITION SOURCES:**

55. This fire originated in the engine room of the Spirit of Norfolk. Investigators examined the generators, the hydraulics, and the engines in the room as possible causes of this event.

- a. The generators and Starboard engine appeared to be in working order during the event. These items did not cause the event.
- b. The hydraulic system suffered some mechanical failure during the event, likely from rushing water and diesel fuel when the engine room door was opened. The hydraulics did not cause the event.
- c. The Port side engine was significantly damaged, as were items on the shelving adjacent to the engine. This engine had recently undergone a rebuild following an over-heating in May 2022. Despite that rebuild, there were still leaks coming from the turbocharger on this engine. When the event originated, the wheelhouse was alerted to a loss of power in Port side engine. The first eyewitness who opened the engine room door early in the event at the request of the vessel's captain reported seeing smoke and flames coming from the Port side engine and nowhere else.

**CONCLUSION:**

56. Based upon the fire scene examination and a review of witness statements, photographs, video, and documents provided by other investigators, it is the opinion of the fire investigators this event originated in, on, or about the Port side engine of the vessel. Fire spread from this engine to adjacent shelving where combustible material was present.

57. Therefore, based on the information currently available to the investigators, the event has been ruled **ACCIDENTAL. There is no evidence of criminal activity associated with this fire event.**

**Tech Review:**

Special Agent [REDACTED] ATF, CFIC  
Investigator [REDACTED] IAAI, ATF TFO, Detective MPD