UNITED STATES COAST GUARD

REPORT OF THE INVESTIGATION INTO THE PRESIDENT EISENHOWER (IMO No. 9295220), MAIN ENGINE SPACE FIRE WHILE UNDERWAY IN THE SANTA BARBARA CHANNEL ON APRIL 28, 2021.

MISLE Activity Number: 7184564

U.S. Department of Homeland Security
United States Coast Guard

Commandant
United States Coast Guard

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16732/IIA #7184564
19 Feb 2025

MAIN ENGINE SPACE FIRE ON THE CONTAINER SHIP PRESIDENT EISENHOWER (IMO No. 9295220) IN THE SANTA BARBARA CHANNEL 14 NAUTICAL MILES OFF THE COAST OF CALIFORNIA ON APRIL 28, 2021

ACTION BY THE COMMANDANT

The record and the report of the investigation completed for the subject casualty have been reviewed. The record and the report, including the findings of fact, analysis, conclusions, and recommendations are approved subject to the following comments. This marine casualty investigation is closed.

ACTION ON RECOMMENDATIONS

Recommendation 1: Recommend the U.S. Coast Guard (USCG) Office of Marine Environmental Response Policy (CG-MER) and the Office of Waterways and Ocean Policy (CG-WWM) establish or amend USCG policy to address oversight and analysis of the procedures and operations related to having a tug at each deep-water port that is on standby with the appropriate size, horsepower, and towing equipment to assist a large commercial vessel in case of emergency. The first towing vessels on scene after the fire came from the Port of Hueneme. After arriving and providing station keeping for a short while, the vessels had to be recalled by the Port of Hueneme to resume their normal escort duties as the port was limited in its inventory of towing vessels.

> **Action:** I concur with the intent of this recommendation. The PRESIDENT EISENHOWER is a freight vessel required to have a Vessel Response Plan (VRP) per Title 33 Code of Federal Regulations Part 155, Subpart J – Non-tank Vessel Response Plans. In this incident the owner/operator acted in accordance with their approved response plan. The Qualified Individual (QI) and Federal On-Scene Coordinator (FOSC) were notified, and the plan was activated. A remote consultation was conducted. As a result, emergency towing resources identified in the plan arrived on scene within the required planning timeframes. The investigation did not identify a failure in the VRP requirements or a failure to comply with required planning standards.
>
> The establishment of additional prevention and mitigation measures can be established on a case-by-case basis via a Captain of the Port Order to a specific vessel or via a Regulated Navigation Area for particular waterways or vessel types.

Recommendation 2: Recommend classification societies recognized by the Secretary of Homeland Security that participate in the Maritime Security Program (MSP) or the Alternate Compliance Program (ACP) require video analytic oil mist detection systems to be outfitted on vessels approved for operation with an unattended machinery space. Research coordinated by the Fire Safety

Subcommittee of the International Maritime Organization (IMO) found that 70% of engine room fires are caused by leaks in the fuel oil or lubricating oil systems. Video analytic oil mist detection systems can be integrated into existing video monitoring equipment to detect unique signatures of oil mist, smoke, flame, and reflected flame. Had this technology been in use onboard the vessel, the 3rd Mate would have received early warning of a leak and could have slowed the main engine to reduce fuel flow and diminish the leak.

> **Action:** I do not concur with this recommendation. Recognized classification societies conduct compliance verification of United States and International regulations and standards on the behalf of the USCG. There are currently no United States or International regulations or standards requiring the use of video analytic oil mist detection systems on vessels with unattended machinery spaces, and therefore, the USCG cannot require recognized class societies to implement this recommendation. Although an oil mist detection system could potentially improve safety, I do not believe that this investigation provided compelling evidence that the additional system would have improved the crew's response time following failure of the fuel oil return line.

Recommendation 3: Recommend that APL implement additional training and oversight requirements within their Safety Management System (SMS) on the requirements for installing and testing fuel oil piping.

> **Action:** I do not concur with this recommendation. If the PRESIDENT EISENHOWER was in compliance with the International Safety Managment (ISM) Code as documented by their Safety Management Certificate, the defect would have been required to be reported to their Det Norske Veritas (DNV) per the relevant classification society rules. A DNV surveyor would have verified proper installation and testing of the replaced fuel oil piping had the notification been made. The operator's failure to report the defect to DNV constitutes a non-conformity in accordance with the Office of Commercial Vessel Compliance (CVC) work instruction CVC-WI-003. The cognizant Officer in Charge, Marine Inspection (OCMI) should utilize CVC-WI-003 for general procedures to evaluate non-conformities and corrective action options.

Recommendation 4: Recommend that APL install insulation and shielding for high temperature engine room components.

> **Action:** I do not concur with this recommendation. The primary cause of this fire was not due to improper insulation, but rather the incorrect installation of a fuel return line, which caused it to separate and leak significantly onto the exhaust system. Proper insulation and shielding of high temperature surfaces, as well as proper inspection of the condition of flammable liquid piping systems, should be areas of emphasis for shipboard engineers, class surveyors, marine inspectors, and port state control examiners.

[redacted]

Captain, U.S. Coast Guard
Director of Inspections and Compliance (CG-5PC)

U.S. Department of Homeland Security
United States Coast Guard

Commander
United States Coast Guard
Eleventh District

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16732

PRESIDENT EISENHOWER (IMO No. 9295220) MAIN ENGINE SPACE FIRE WHILE UNDERWAY IN THE SANTA BARBARA CHANNEL ON APRIL 28, 2021

ENDORSEMENT BY THE DISTRICT COMMANDER

The record and report of the investigation convened for the subject casualty have been reviewed. The record and report, including the findings of fact, analysis, conclusions, and recommendations are approved. It is recommended that this marine casualty investigation be closed.

ENDORSEMENT/ACTION ON RECOMMENDATIONS

Safety Recommendation: 11454 (Paragraph 8.1.1 of PRESIDENT EISENHOWER Main Engine Space Fire Investigating Officer's Report). Recommend the USCG Office of Marine Environmental Response Policy (CG-MER) and the Office of Waterways and Ocean Policy (CG-WWM) establish or amend USCG policy to address oversight and analysis of the procedures and operations related to having a tug at each deep-water port that is on standby with the appropriate size, horsepower, and towing equipment to assist a large commercial vessel in case of emergency. The first towing vessels on scene after the fire came from the Port of Hueneme. After arriving and providing station keeping for a short while, the vessels had to be recalled by the Port of Hueneme to resume their normal escort duties as the port was limited in its inventory of towing vessels.

> **Endorsement:** Concur. The Coast Guard Eleventh District concurs with the investigator's recommendation to CG-MER and CG-WWM.

Safety Recommendation: 11455 (Paragraph 8.1.2 of PRESIDENT EISENHOWER Main Engine Space Fire Investigating Officer's Report). Recommend classification societies recognized by the Secretary of Homeland Security that participate in MSP or the Alternate Compliance Program (ACP) require video analytic oil mist detection systems to be outfitted on vessels approved for operation with an unattended machinery space. Research coordinated by the Fire Safety Subcommittee of the International Maritime Organization (IMO) found that 70% of engine room fires are caused by leaks in the fuel oil or lubricating oil systems.5 Video analytic oil mist detection systems can be integrated into existing video monitoring equipment to detect unique signatures of oil mist, smoke, flame, and reflected flame. Had this technology been in use onboard the vessel, the 3rd Mate would have received early warning of a leak and could have slowed the main engine to reduce fuel flow and diminish the leak.

Endorsement: Concur. The Coast Guard Eleventh District concurs with this recommendation. Furthermore, the District submits that CG-CVC should consider requiring video analytic oil mist detection systems as a prerequisite for approving a vessel to operate with an unattended machinery space regardless of whether they are part of the ACP or not.

Safety Recommendation: 11456 (Paragraph 8.1.3 of PRESIDENT EISENHOWER Main Engine Space Fire Investigating Officer's Report). Recommend that APL implement additional training and oversight requirements within their SMS on the requirements for installing and testing fuel oil piping.

Endorsement: Concur. Additional training or minimum qualification standards should be implemented with regards to the instillation and testing of fuel oil piping.

Safety Recommendation: 11457 (Paragraph 8.1.4 of PRESIDENT EISENHOWER Main Engine Space Fire Investigating Officer's Report). Recommend that APL install insulation and shielding for high temperature engine room components..

Endorsement: Concur. Although not required by regulation, the instillation of insulation and shielding on high temperature engine room components is a low-cost measure to provide further protection from high-cost safety hazards such as fire or personnel injury.

Administrative Recommendation 1. Recommend this investigation be closed.

Endorsement: Concurs. The Coast Guard Eleventh District agrees with the analysis and conclusions of the Investigating Officer and the endorsement of the Officer in Charge, Marine Inspection. No further action is required by the Coast Guard.

[redacted]

R. J. CAPUTO
Captain, U.S. Coast Guard
Chief, Prevention Division
By Direction.

U.S. Department of Homeland Security

United States Coast Guard

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U.S. Coast Guard
Sector Los Angeles – Long Beach

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16732
October 11, 2023

PRESIDENT EISENHOWER (IMO No. 9295220), MAIN ENGINE SPACE FIRE WHILE UNDERWAY IN THE SANTA BARBARA CHANNEL ON APRIL 28, 2021.

ENDORSEMENT BY THE OFFICER IN CHARGE, MARINE INSPECTION

The record and the report of the investigation convened for the subject casualty have been reviewed. The record and the report, including the findings of fact, analysis, conclusions, and recommendations are approved. It is recommended that this marine casualty investigation be closed.

[redacted]
R. D. Manning
Captain, U.S. Coast Guard
Officer in Charge, Marine Inspection
Los Angeles – Long Beach

Enclosure: Report of Investigation

U.S. Department of Homeland Security
United States Coast Guard

Commander
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16732
October 2, 2023

PRESIDENT EISENHOWER (IMO No. 9295220), MAIN ENGINE SPACE FIRE WHILE UNDERWAY IN THE SANTA BARBARA CHANNEL ON APRIL 28, 2021.

INVESTIGATING OFFICER'S REPORT

Executive Summary

On the evening of April 27, 2021, the U.S. flag container ship PRESIDENT EISENHOWER departed the Port of Los Angeles bound for the Port of Oakland. At 0154 the following morning, the vessel was proceeding westbound in the Santa Barbara Traffic Separation Scheme (TSS) 14 miles from land when a fire broke out in the engine room. Shortly after the fire was discovered, the vessel lost propulsion and electrical power and began to drift towards two fixed oil platforms, HOLLY and HONDO. During the initial response, the crew fought the fire using fire hoses and a fixed water mist system. Upon realizing that the fire had grown out of control, the Master deployed the fixed CO2 fire suppression system which extinguished the fire. A towing vessel dispatched from the Port of Hueneme was able to push the PRESIDENT EISENHOWER back toward the TSS to avoid a grounding or collision. The vessel was eventually towed back to the Port of Los Angeles. No pollution or injuries were reported as a result of the fire. Damage to the vessel was estimated at $8.22 million.

As a result of its investigation, the Coast Guard determined that the initiating event for this casualty was the detachment of the No. 5 fuel oil return line. A subsequent event was a fire that ignited on the No. 5 cylinder cover and adjacent exhaust manifold surface. Causal factors leading to these two events were: (1) Improper installation of the No. 5 cylinder fuel oil return line, (2) Failure of vessel crew and APL shoreside support to report the material defect of the No. 5 fuel oil return line, (3) Insufficient insulation of the cylinder cover and exhaust system.

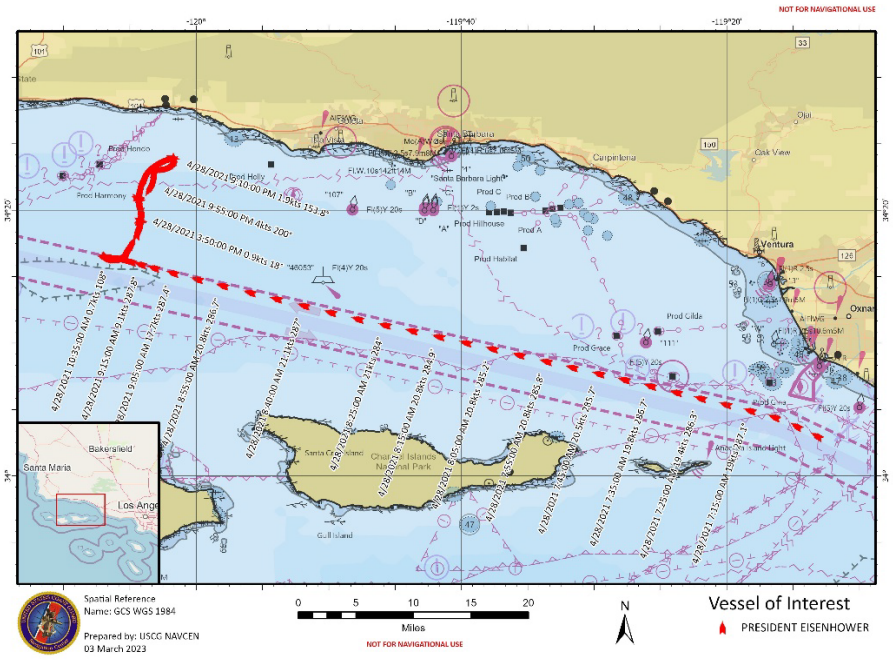

Figure 1. Automatic Identification System (AIS) track of PRESIDENT EISENHOWER during the incident timeframe. Times listed in GMT. (Source: U.S. Coast Guard)

1. Preliminary Statement

1.1. This marine casualty investigation was conducted, and this report was submitted, in accordance with Title 46, Code of Federal Regulations (CFR), Subpart 4.07, and under the authority of Title 46, United States Code (USC), Chapter 63.

1.2. One party-in-interest was designated on April 30, 2021: APL Marine Services, Ltd., the PRESIDENT EISENHOWER's charterer. The charterer was represented by the law firm of Collier Walsh Nakazawa.

1.3. The U.S. Coast Guard (USCG) was designated the lead federal investigative agency with the National Transportation Safety Board (NTSB) also participating in the investigation. The lead investigators from the USCG and NTSB were CDR John Davis and Mr. Bart Barnum respectively.

1.4. All times listed in this report are in Pacific Standard Time using 24-hour format and are approximate. The ship's camera shows time 4 hours ahead of Pacific Standard Time (PST).

1.5. The accounts of the events leading up to and including the casualty were provided by the vessel's crew, company shore side personnel, and shore side technicians.

2. Vessel Involved in the Incident

Figure 2. Photograph of the PRESIDENT EISNHOWER (Source: U.S. Coast Guard)

Official Name:	PRESIDENT EISENHOWER
IMO Number:	9295220
Flag:	United States
Vessel Class/Type/Sub-Type	General Dry Cargo Ship/Container Ship General Cargo/Container
Build Year:	2005
Gross Tonnage:	82,794
Length:	943 feet 5 inches
Beam/Width:	140 feet 5 inches
Draft/Depth:	47 feet 6 inches
Primary Propulsion: (Configuration/System Type, Ahead Horsepower)	Hyundai 12K 98 MC-C slow speed, direct drive diesel engine 93,120 Horsepower
Owner:	PRESIDENT EISENHOWER Trust
Operator:	APL Maritime Ltd (a subsidiary of American President Lines)

3. Deceased, Missing, and/or Injured Persons

There were no personal missing, deceased, or injured as a result of the incident.

4. Findings of Fact

4.1. The Incident:

4.1.1. At 1900 on April 27, 2021, after completing cargo operations at LA Pier 300 (Fenix Marine Services), the U. S. flag container vessel, PRESIDENT EISENHOWER departed San Pedro, CA, with 22 crew onboard, enroute to the Oakland, CA. While

underway, the vessel's navigational watch was broken up into three watch rotations of four hours each. Each watch rotation had one bridge watch officer and two lookouts. The bridge watch officer role was filled by the Chief Mate (0400-0800 and 1600-2000), 2nd Mate (0800-1200 and 2000-0000), and 3rd Mate (0000-0400 and 1600-2000). The lookout positions were filled by an Able Seamen (AB).

4.1.2. On April 27, 2021, the PRESIDENT EISENHOWER was underway in the northbound lane of the Santa Barbara Channel TSS with the main engine operating at 68 revolutions per minute (rpm). The Master's night orders included instructions to increase the main engine speed to 80 rpm by 4 rpm increments. The 2nd Mate began this process during his watch from 2000-0000. Upon reporting to the bridge for watch at 0000, the 3rd Mate continued the process.

4.1.3. At 0000 on April 28, the 2nd Assistant Engineer (A/E) was the designated duty engineer and was responsible for the engine room watch. The 1st A/E and 2nd A/E were conducting rounds in the engine room while the vessel came up to operating speed. The vessel was approved by the USCG and its authorized classification society to operate with a periodically unattended machinery space. This approval allowed for the engine room to be left in an unattended status and to be monitored remotely via automated controls and alarms.

4.1.4. At 0042, after increasing speed to 80 rpm, the vessel was making approximately 17.5 knots and was six miles South of Port Hueneme.

4.1.5. At 0053 the 1st A/E and 2nd A/E completed their engine room rounds and noted all machinery operating normally. The 2nd A/E shifted engine room operations to unattended and the 1st A/E and 2nd A/E left the engine room.

4.1.6. At 0124, a leak of atomized fuel was captured on the ship's internal video recording device in the vicinity of the No. 4 and No. 5 main engine cylinders.

4.1.7. At 0154, when the vessel was approximately 17 miles southwest of Santa Barbara, CA; the main engine leak reached the engine exhaust lines and caused the fuel oil fumes to ignite on the flange of the exposed exhaust valve bellows. At the time the fire began, the machinery space was in an unattended status. The fire was then recorded spreading from the No. 5 cylinder head to two adjacent cylinder heads (No. 4 and 6). The flames from the fire on the main engine eventually reached the boiler flat more than 30 feet above. This caused nearby spare part boxes and ship stores to ignite.

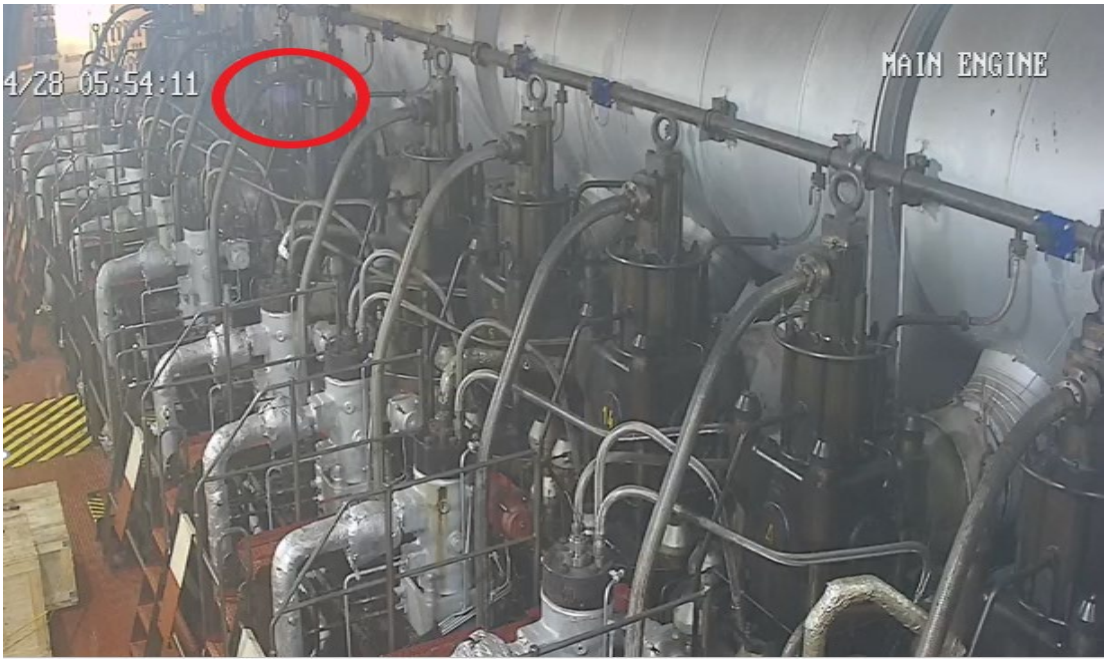

Figure 3. Screen shot of the main engine feed ships internal video recording device showing oil mist cloud accumulating near cylinder No. 5. (Source: APL)

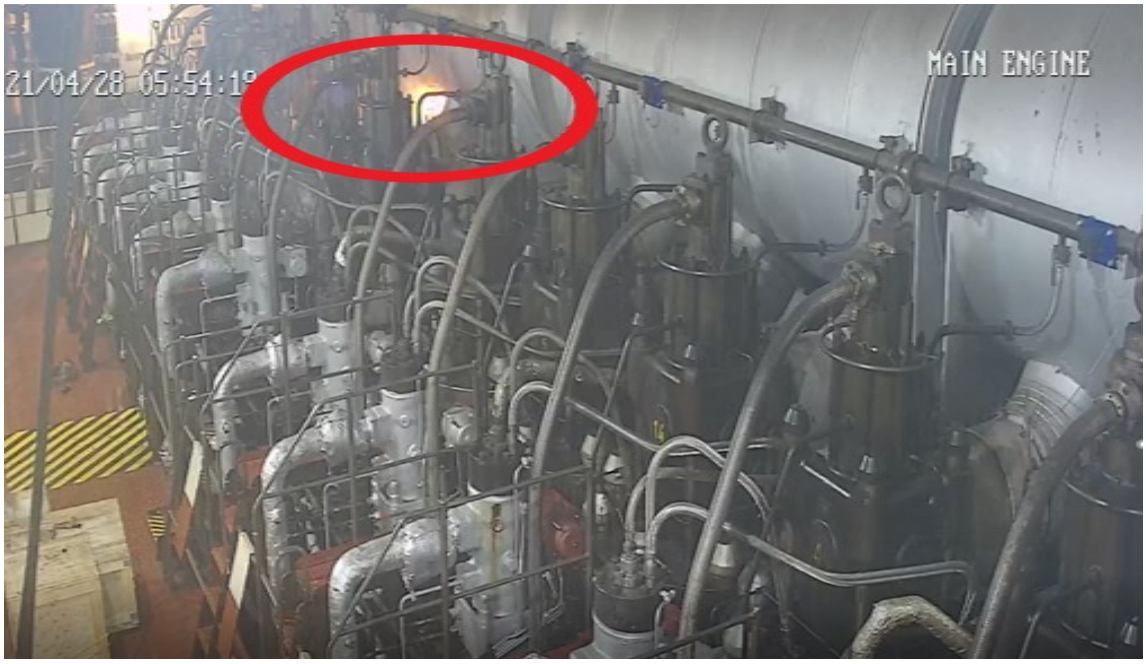

Figure 4. Screen shot of the main engine feed ships internal video recording device showing the moment the first explosion occurred at cylinder No. 5 exhaust bellows. (Source: APL)

Figure 5. Screen shot of the main engine feed ships internal video recording device showing the flames spreading to cylinders 4 and 6. (Source: APL)

Figure 6. Ships camera video showing the flames from the main engine reaching the boiler flat. (Source: APL)

4.1.8. At 0154 the AB on watch noticed smoke coming out of the exhaust stack while he was on the starboard bridge wing. He immediately reported the smoke to the 3rd Mate. The 3rd Mate called the Master via the ship's internal telephone to notify him of the smoke. Flame and smoke detector alarms on the bridge fire control panel began to alarm.

4.1.9. At 0156 the Master came to the bridge and took navigational command of the vessel. After multiple fire detectors alarmed, the fire control system automatically sounded the general alarm. The Master and 3rd Mate confirmed the presence of a fire in the engine room by viewing the ship's internal camera system. In response to the general alarm, crewmembers began to report to their assigned emergency stations.

4.1.10. At 0200 the crew mustered on the port aft main deck and the officers in charge of the muster stations took accountability. Firefighting teams were dispatched to emergency gear lockers and instructed to don firefighting gear.

4.1.11. At 0202, smoke from the fire started to collect inside the bridge and obscure visibility for the bridge team. The Master transferred steering and throttle control to the starboard bridge wing to maintain control of the vessel. The bridge wing doors were opened to promote ventilation. The Master also began reducing engine rpm to slow the vessel and decrease the amount of fuel flowing to the main engine.

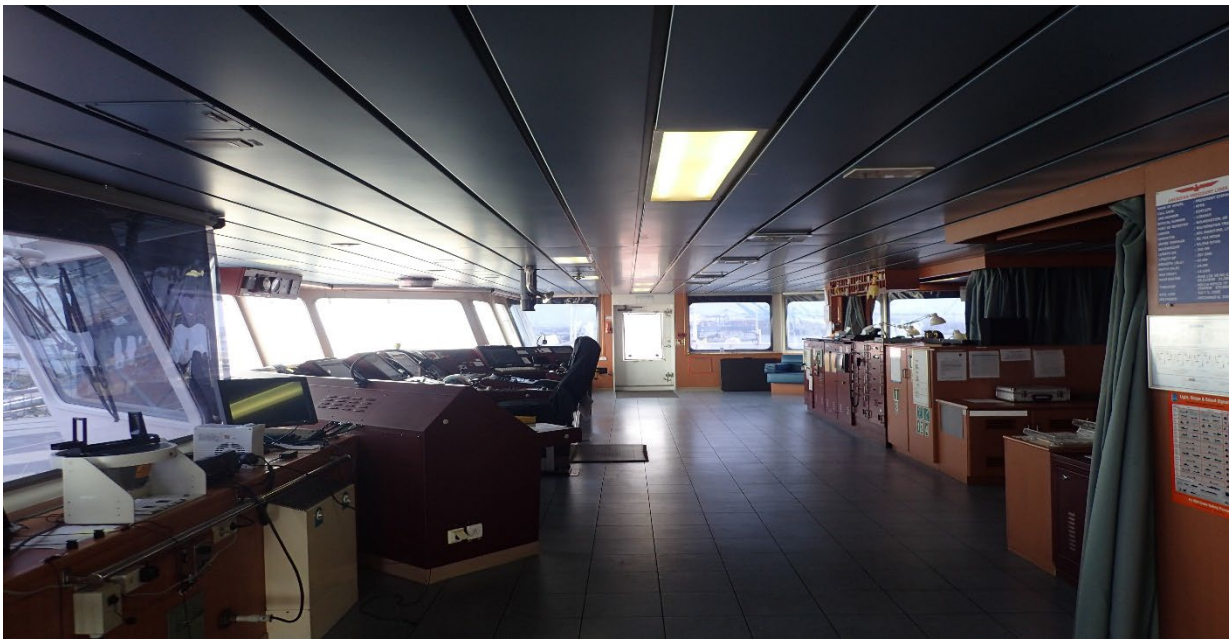

Figure 7. Photograph of the bridge as seen from the port bridge wing door (Source: U.S. Coast Guard)

4.1.12. At 0202 the 1st A/E and 2nd A/E entered the engine room space to survey the fire. They entered through the boiler flat and were quickly overcome by heat and smoke. They exited the boiler flat and donned firefighting turnout gear and a self-contained breathing apparatus (SCBA) at the emergency gear locker. They then re-entered the boiler flat and used portable fire extinguishers in an attempt to suppress the fire. After realizing the portable fire extinguishers were inadequate, the 1st A/E and 2nd A/E returned to the emergency gear locker.

4.1.13. At 0204 firefighting squads 1 and 2 entered the boiler flat to begin suppressing the fire. Both squads were wearing firefighting turnout gear and SCBAs. Squads 1 and 2 were able to extinguish an ancillary crate fire on the boiler flat. After extinguishing the crate fire, the squads realized that the fire was much larger than first anticipated and exited the space. Simultaneously, additional squads began boundary cooling the engine casing by spraying it with water.

4.1.14. At 0212 the Master determined that the fixed CO2 fire suppression system would need to be deployed. The Master, Chief Mate, and Chief Engineer conferred to discuss the situation. The Master instructed the Chief Mate and Chief Engineer to ensure all ventilation dampers for the engine room and accommodation spaces were closed prior to deployment of the fixed CO2 fire suppression system.

4.1.15. At 0216 the Chief Engineer started the emergency generator to ensure power was not lost during deployment of the fixed CO2 fire suppression system.

4.1.16. At 0218 the ventilation dampers for the accommodation spaces were closed.

4.1.17. At 0223 the ship's main engine was secured and the vessel began drifting. The Chief Engineer closed the ventilation dampers for the engine room and activated the remote quick closing fuel valves. The Master then ordered the Chief Engineer to release CO2 into the main machinery space. A total of 294 CO2 cylinders (enough to extinguish the fire in the engine room) were deployed and 50 cylinders were left in reserve. The crew continued boundary cooling engine room bulkheads for the remainder of the morning.

4.1.18. At 0329, the Master notified USCG Sector Los Angeles – Long Beach (Sector LA-LB) Command Center about the fire onboard the vessel.

4.1.19. At 0336 the vessel's Qualified Individual (QI) from Gallagher Marine Systems[1] was notified by the Master that there was a fire onboard the vessel. The QI was responsible for implementing the non-tank vessel response plan[2] (VRP) and liaising with government entities.

4.1.20. At 0341 T&T[3] Salvage was called by the QI and asked to conduct a remote assessment and source salvage tugs.

4.1.21. At 0345 the USCG Station Channel Islands was notified about the drifting vessel and launched CG-45643, a response boat-medium, to respond to the drifting vessel.

4.1.22. At 0450 the Sector LA-LB Duty Marine Investigator contacted the Master and instructed him to initiate drug and alcohol testing for all crew members. Results of the alcohol and drug tests were negative.

4.1.23. Given the vessel's location and weather at 0452, Sector LA-LB Command Center estimated that the vessel could drift for nine hours before it was in danger of running aground or striking an offshore oil platform.

4.1.24. CG-45643 arrived on scene at 0551 to evaluate and monitor the situation of the drifting vessel. CG-45643 remained on scene until 0927.

4.1.25. At 0630 the SHIRLEY C, a tug equipped for long distance ocean towing, was dispatched from the port of Long Beach.

4.1.26. At 0730 the ELIZABETH C, another tug equipped for long distance ocean towing, was dispatched from the Port of Long Beach.

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[1] Gallagher Marine System is a company headquartered in Moorestown, NJ and was the on scene representative for APL Maritime during the initial response to the incident. A 24-hour watch stander was notified immediately following the fire.
[2] A VRP is a document required by 33 CFR 155. It outlines what a vessel will do in case of an oil spill or other hazardous condition. A VRP includes information about the vessel and nearby assets which may be used to aid in oil recovery or vessel salvage.
[3] T&T marine is a company headquartered in Galveston, TX that offers assistance with marine salvage and firefighting.

4.1.27. At 0830 the TERESA BRUSCO, a harbor tug based in the Port of Hueneme, was dispatched to assist PRESIDENT EISENHOWER.

4.1.28. At 0900 a seven-person marine firefighting response team from T&T Salvage departed Houston, TX bound for Santa Barbara via airplane.

4.1.29. At 0900 the 87' Coastal Patrol Boat BLACKTIP (WPB 87326) arrived on scene to evaluate and monitor the drifting vessel.

4.1.30. At 0912 the USCG and APL's representative initiated communications regarding the vessel's return to port. The USCG requested a tow plan to be submitted for review.

4.1.31. At 0952 operators on Platform HONDO reached out to Sector LA-LB Command Center indicating they were concerned about the position and drift rate of PRESIDENT EISENHOWER, which was in position 34.21.0 N 120.4.9 W.

4.1.32. At 0955 the Master of PRESIDENT EISENHOWER noted the vessel was drifting near the fixed platforms HOLLY and HONDO.

4.1.33. At 1402, after the PRESIDENT EISENHOWER had drifted approximately 10 miles outside the Santa Barbara TSS when the TERESA BRUSCO arrived on scene. The tug was not equipped for long distance ocean towing, but it was able to push the vessel back toward the TSS and prevent it from drifting closer to shore or the nearby oil platforms.

4.1.34. At 1658 the T&T response team arrived on board PRESIDENT EISENHOWER. The team was shuttled to the vessel via boat.

4.1.35. At 1700, the SHIRLEY C arrived alongside PRESIDENT EISENHOWER and attached a towing hawser. By that time, the TERESA BRUSCO was able to push the vessel approximately 4 miles closer to the Santa Barbara TSS.

4.1.36. At 1853 the dead ship tow plan was submitted by Gallagher Marine and received by the USCG.

4.1.37. At 1908 a T&T response team member and the 1st A/E dressed out in SCBA's entered the engine room. The team proceeded to take temperature readings throughout the engine room and determined that the fire was out.

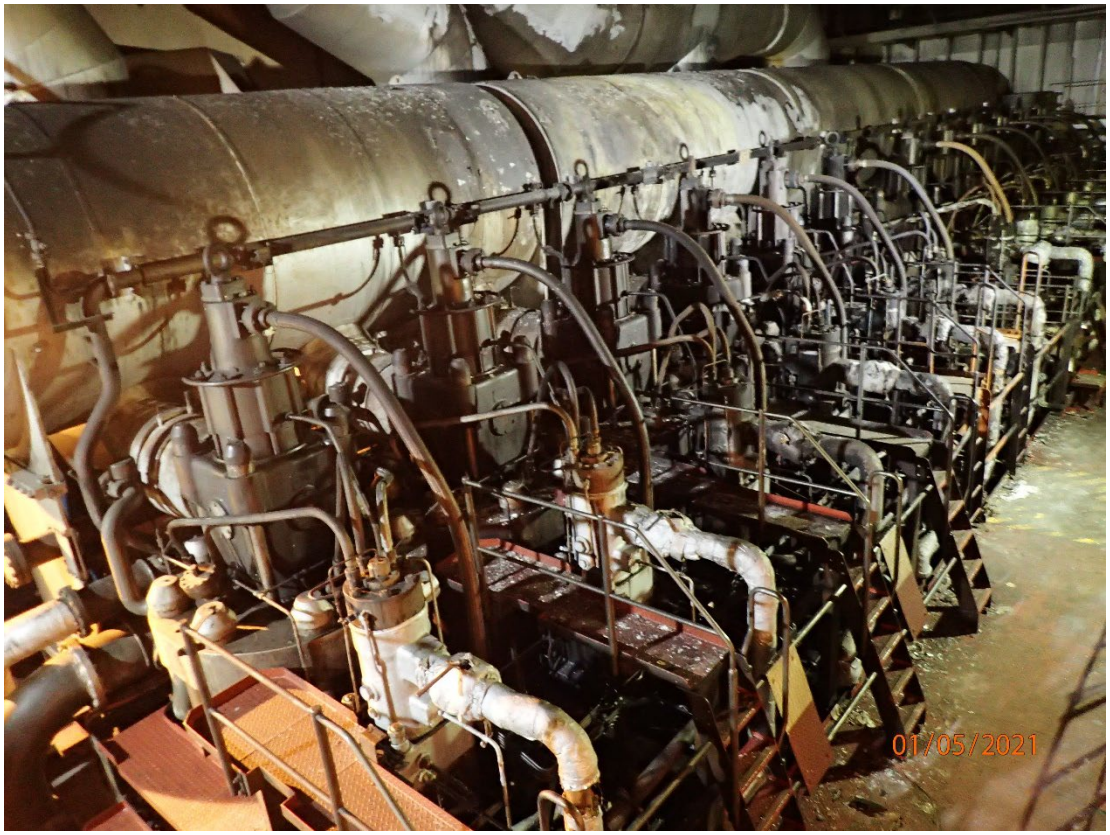

Figure 8. Photo taken on April 30, 2021 showing the fire damage to the port side of the main engine. (Source: U.S. Coast Guard)

4.1.38. At 1914 the SHIRLEY C began towing PRESIDENT EISENHOWER back to Los Angeles, a distance of over 100 miles. TERESA BRUSCO continued to stand by.

4.1.39. While under tow, the T&T response team advised the crew to begin slowly ventilating the engine room by opening ventilation dampers.

4.1.40. At 2121 the USCG completed its review of the submitted tow plan without comment.

4.1.41. At 2200 the ELIZABETH C arrived alongside the PRESIDENT EISENHOWER to replace TERESA BRUSCO.

4.1.42. On April 29, 2021, at 0005 the TERESA BRUSCO was released from tow service.

4.1.43. By approximately 1000, the engine room was deemed safe for entry. The crew was able to start two of the vessel's main diesel generators to restore power and lighting to undamaged areas.

4.1.44. At 2000, the vessel arrived at the Port of Los Angeles. Three pilots boarded the vessel to assist with the inbound transit.

4.1.45. At 2358, the tow was completed. All mooring lines were made fast at LA Berth 46.

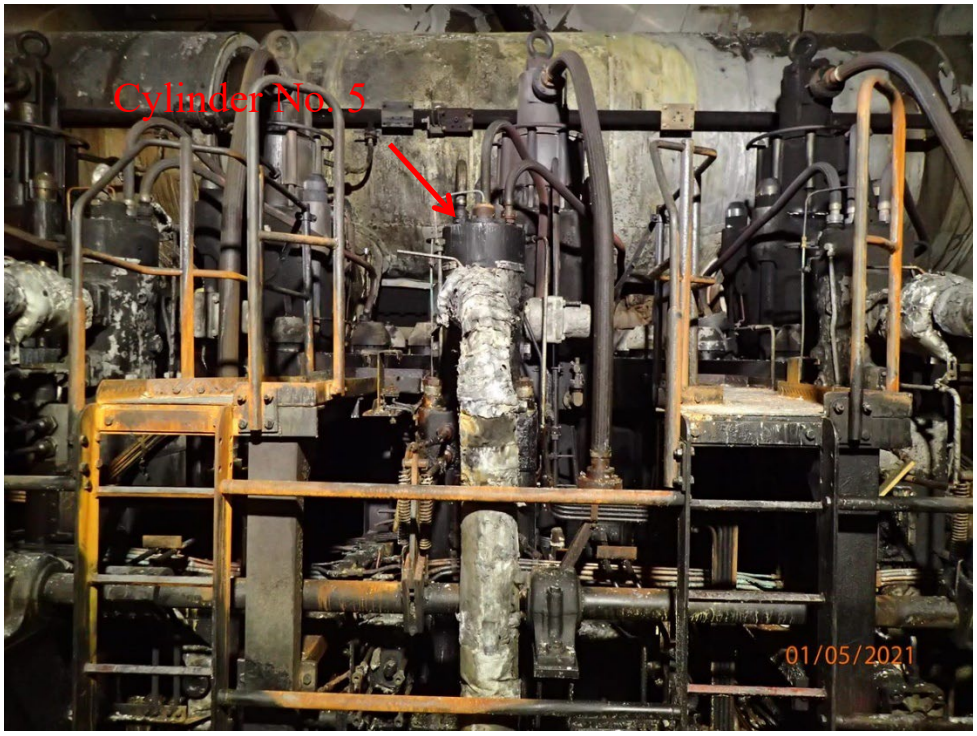

Figure 9. Side view of main engine and the initial location of the fire. (Source: U.S. Coast Guard)

Additional/Supporting Information:

4.1.46. The air and water temperatures at the time of the fire were 56° F and 66° F respectively. The vessel recorded fair weather conditions with light wind, calm seas, and good visibility.

4.1.47. At the time of the incident, the PRESIDENT EISENHOWER was enrolled in the Maritime Security Program (MSP). The MSP is a financial incentive program for U.S.-flag vessels and is funded by successive National Defense Authorization Acts (NDAA). The purpose of the program is to maintain a fleet of commercially viable, militarily useful merchant ships active in international trade. The MSP fleet is available to support U.S. Department of Defense (DOD) sustainment sealift requirements during times of conflict or in other national emergencies. Owners or operators apply for a vessel's admission to the MSP and are enrolled based on availability of congressionally funded operating agreements. There were 60 funded agreements in the 2020 NDAA. After successful enrollment in the MSP and an initial inspection by the USCG, a foreign built vessel will obtain U.S. registry and a COI while continuing to comply with certain design and construction standards of their previous flag registry. The USCG conducts annual inspections of MSP vessels and maintains full oversight of vessel repairs or alterations to ensure compliance with domestic and international standards.

4.1.48. The PRESIDENT EISENHOWER is classed by DNV, an international accredited registrar and classification society headquartered in Norway. DNV surveyors conduct inspections and issue statutory certificates on behalf of the USCG. The vessel completed its last class renewal survey on January 8, 2021. The last USCG inspection prior to the incident was completed October 5, 2020.

DNV·GL

DNV GL Id No:
G130175
Job Id:
1548073
Revision No:
3 (2021-01-08)
Narrative annex not applicable

SURVEY STATEMENT

Particulars of vessel

Name of vessel:	**PRESIDENT EISENHOWER**
Owner:	**President Eisenhower Trust**
IMO Number:	**9295220**

Particulars of survey

Survey station:	**Long Beach**
Place of survey:	**Los Angeles(USA)**
Survey started:	**2020-12-31**
Survey completed:	**2021-01-08**
Lead surveyor:	**Jun, Joon Cheol**
Surveyor:	

Renewal completion

This is to confirm:

That the following have been carried out:

Certificates

Certificate Name	Endorsed	Issued/ Extended	New expiry date	UTN
Classification Certificate		Full Term	2025-12-31	n1548073-pen n1548073-lll
Cargo Ship Safety Construction Certificate		Full Term	2025-12-31	n1548073-udq
International Sewage Pollution Prevention Certificate		Full Term	2025-12-31	n1548073-gvb
Ballast Water Management Certificate - Treatment Method		Full Term	2025-12-31	n1548073-nto

Surveys

Survey Code	Survey Name	Result
MC.R	Main class renewal	**Complete**
MC.A	Main class annual	**Complete**
HS.Sa	Hull items	**Complete**
MS.Sa	Machinery items	**Complete**
CCC.R	Safety construction renewal	**Complete**
CCC.A	Safety construction annual	**Complete**
SPP.R	Sewage pollution prevention renewal survey	**Complete**
BWMC-T.R	Ballast water management certificate - treatment method renewal	**Complete**

Figure 10. Survey Report for PRESIDENT EISENHOWER from August 1, 2021. (Source: DNV-GL)

4.1.49. As required by international convention and domestic regulation, PRESIDENT EISENHOWER carried a voyage data recorder onboard (VDR). The VDR, also known as the "black box," records factual navigation and vessel system information which can be downloaded following an incident which enables the analysis of potential causes. Mackay Communications completed the last annual VDR inspection and survey on April 26, 2021. Following the engine room fire, casualty investigators unsuccessfully attempted to extract data from two memory cards pulled from the VDR capsule. The memory cards were then sent to the manufacturer in Germany for further analysis. Upon examination by the manufacturer, it was determined that no data could be retrieved from either memory card. It is unknown whether the memory cards were reinstalled incorrectly by a Mackay Communications technician or if a subsequent event corrupted them. After deployment of the fixed CO_2 fire suppression system, the crew attempted to store the VDR voyage data on a USB drive. This attempt also failed due to improper data management.

4.1.50. Platforms HONDO and HOLLY are located at Latitude 34.23.6 N and Longitude 120.7.13 W (HONDO) and Latitude 34.38.99 N and Longitude 119.90.64 W (HOLLY),

north of the Santa Barbara TSS. At the time of the incident, HONDO was in active production and HOLLY was inactive and in the process of being decommissioned. PRESIDENT EISENHOWER came within 3.5 miles of land and within 4 miles of HONDO before TERESA BRUSCO arrived on scene.

4.1.51. The firefighting equipment and CO2 systems on board the PRESIDENT EISENHOWER underwent annual servicing in Busan, South Korea on October 27, 2020. Servicing was completed by The Safety JISA CO., Ltd. The last cylinder pressure test for the CO2 system was completed in March 2016. At the time of the incident, the fixed CO2 fire suppression system operated satisfactorily.

4.1.52. The PRESIDENT EISENHOWER had a valid USCG issued COI at the time of the fire. The COI was issued on July 25, 2018, and the last annual inspection was conducted on October 5, 2020. During the annual inspection on October 5, 2020, the following items were noted as deficiencies and corrected on the spot:

a) Multiple oxygen and acetylene cylinders were resting on the deck and lacked proper cylinder caps.

b) The stairway door leading to the upper deck level was not self-closing and needed adjustment.

4.1.53. On Feb 13, 2021, while enroute to Los Angeles and approximately two months prior to the fire, the crew noted the No. 5 cylinder fuel oil return line had developed a pinhole leak. The ship stopped its main engine to complete a temporary welded repair of the fuel oil return line. The repair was documented in the ship's log and NS5 maintenance system. Neither the USCG nor the class society was notified of the repair.

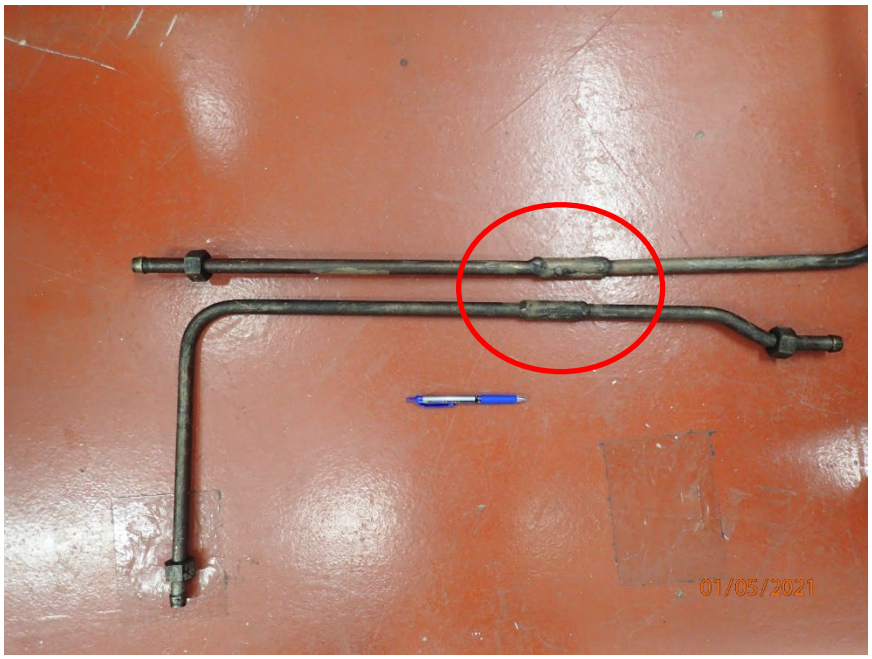

Figure 11. Picture of the tubing repaired by the crew with an emergency weld. (Source: U.S. Coast Guard)

4.1.54. On Feb 19, 2021, while the vessel was docked in Los Angeles, a replacement fuel oil return line was fabricated by Dockside Machine and Ship Repair in Wilmington, CA.

4.1.55. On Feb 22, 2021, when the newly fabricated fuel oil return line was brought on board the vessel, the Chief Engineer and 2nd A/E noted that it had been fabricated by joining smaller sections of tubing together with a weld. The fuel oil line needed to be continuous from fitting to fitting. A new fuel oil return line was ordered while the incorrectly fabricated fuel line was installed by the Chief Engineer and 2nd A/E. The incorrectly fabricated fuel oil line was utilized for the vessel's Pacific crossing until its arrival back in Los Angeles on April 23, 2021.

4.1.56. On April 23, 2021, the 2nd A/E was instructed to replace the fuel oil return line. This was his second time performing such a task and he stated he was unfamiliar with a key step in the process which involved crimping or "swaging" the fuel line ferrule. A properly swaged ferrule provides increased strength and leak resistance for compression fittings. Swaging is a procedure by which the end of a ferrule is deformed to fit around a connection point. While conducting the task, the 2nd A/E failed to properly swage the ferrule at the T-joint between the fuel oil return line and the No. 5 cylinder. Failure to properly crimp the ferrule reduced the connection point's strength and ability to prevent leakage. A post fire inspection revealed that the fuel line had separated from the T-joint.

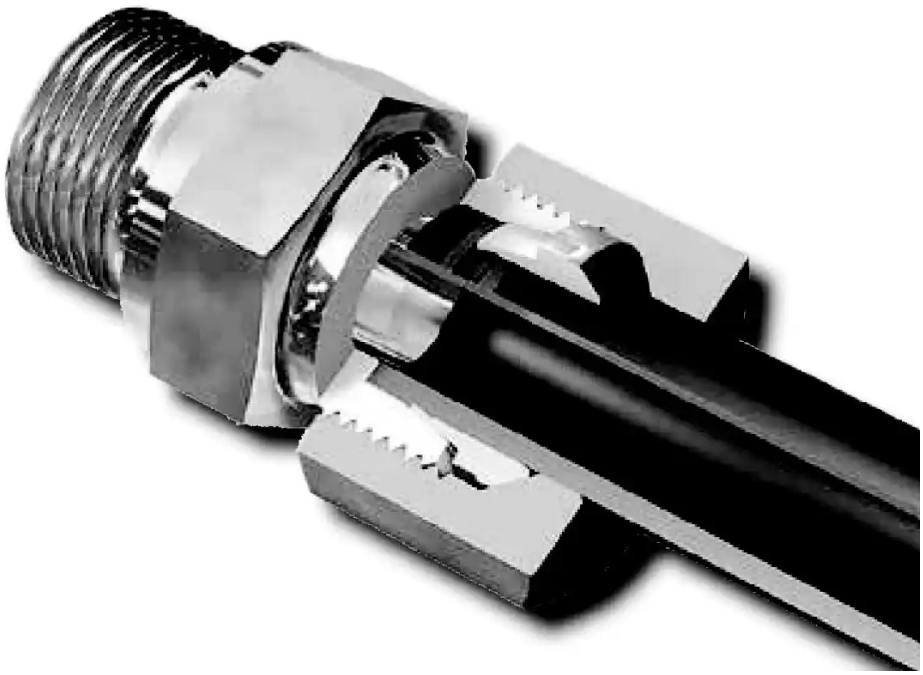

Figure 12. Cross section of a single ferrule compression fitting. (Source: Sarum Hydraulics)

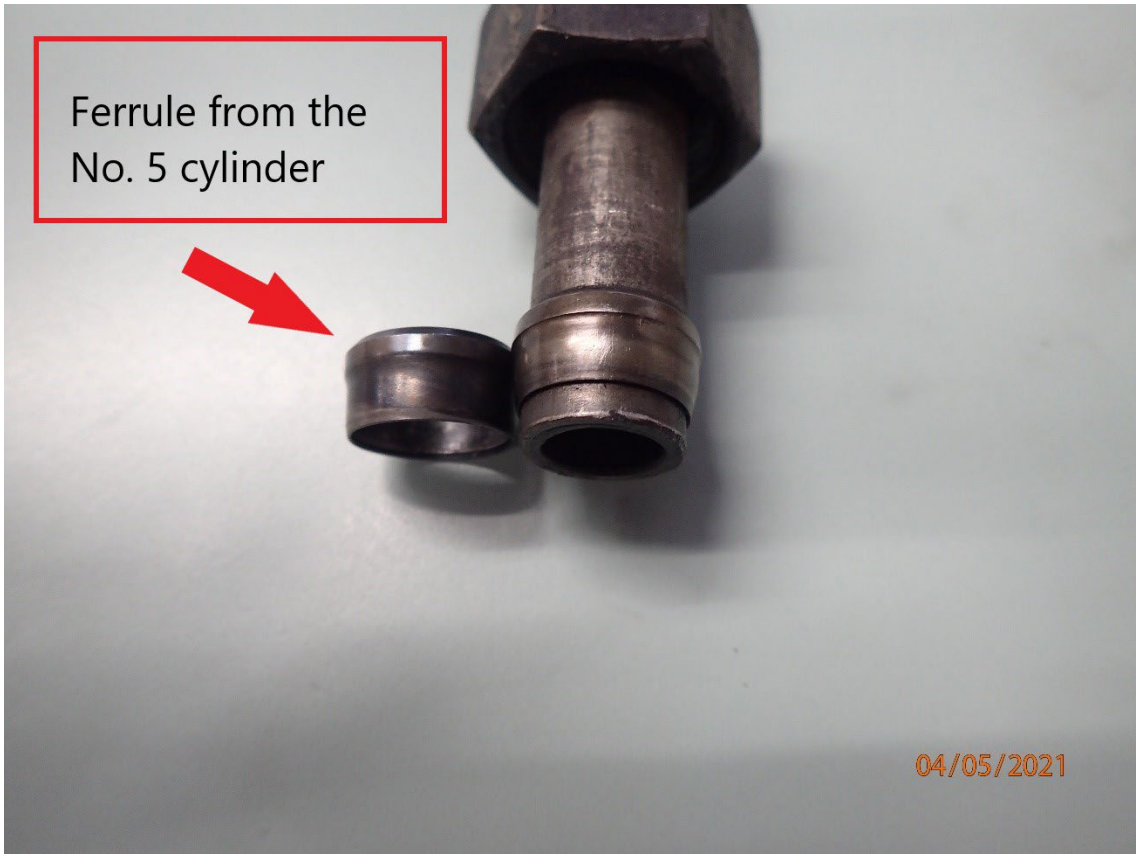

Figure 13. Left is the improperly swaged ferrule installed on the main engine cylinder No. 5 fuel oil return line. On the right is a properly swaged ferrule. (Source: U.S. Coast Guard)

Figure 14. The fuel oil return line found separated from the T-joint. (Source: U.S. Coast Guard)

5. Analysis

5.1. *Improper installation of the No. 5 cylinder fuel oil return line.* The fuel oil return line on cylinder No. 5 was installed one day before the fire. The 2nd A/E did not properly swage the ferrule connecting the fuel oil line and No. 5 cylinder. Improper swaging created a weak point and left the connection vulnerable to separation. A post casualty inspection revealed that the fuel oil return separated from the T-joint and sprayed fuel oil onto the cylinder cover and exhaust valve.

5.2. *Failure to report the material defect of the No. 5 fuel oil return line.* The pinhole leak in the No. 5 cylinder fuel oil return line was not reported to the vessel's classification society, DNV. DNV Rules state that this type of material defect is required to be reported in accordance with the Rules for Classification: Ships Pt. 1 Ch. 1 Section 3 Paragraph 1.2.2: The rule states: "

> *If the hull structure, machinery, systems of equipment covered by classification sustain damage to such an extent that it may be presumed to lead to a condition of class, see (2.3)[4], the Society shall immediately be informed. The vessel shall be surveyed in the first port of call or according to instructions from the Society. The survey shall be of an extent considered necessary by the attending surveyor for ascertaining the extent of the damage.*

Had the defect been reported to DNV, a classification society surveyor would have overseen the subsequent repair. Surveyors are uniquely trained individuals who have extensive knowledge and experience with vessel machinery repair and post-repair testing. A properly trained and diligent surveyor would have verified swaging, tightening, and pressure testing of the renewed fuel oil line.

5.3. *Insufficient insulation of the cylinder cover and exhaust system surfaces.* After the fuel oil return line detached from the fuel system, oil droplets began spraying onto the cylinder covers and exhaust system. Under normal operating conditions, the surface temperature of an uninsulated cylinder cover and/or exhaust piping can reach 600° F. Fuel spraying onto these surfaces quickly ignited and allowed the fire to spread rapidly. Had the surfaces been insulated or shielded, the spraying oil droplets may not have ignited so quickly.

5.4. *Crew's swift and decisive firefighting efforts.* A watchful bridge team made early notification to the Master and crew about the fire. Once the general alarm sounded, the vessel's crew quickly mustered and mounted a response to investigate the extent of the fire and attempt to put it out. When the Master realized how large the fire had grown, he took decisive action to take accountability of the firefighting teams and prepare the main engine space for deployment of the fixed CO2 fire extinguishing system. The vessel's senior officers expeditiously shut down machinery and closed ventilation dampers and fuel delivery valves saving valuable time. The crew's exemplary response prevented loss of life and limited damage to property and the environment.

[4] DNV Rules require the imposition of a condition of class for "repairs and/or renewals related to damage, defect or breakdown that are considered by the Society to be sufficiently serious to affect the assigned class (e.g. grounding, structural damages, machinery damages, wastage over the allowable limits etc.)"

6. Conclusions

6.1. Determination of Cause:

6.1.1. The initiating event (or first unwanted outcome) for this casualty was the detachment of the No. 5 fuel oil return line from the fuel system. Causal Factors contributing to fuel line detachment were:

6.1.1.1. Improper installation of the No. 5 cylinder fuel oil return line.

6.1.1.2. Failure of vessel crew and APL shoreside support to report the material defect of the No. 5 fuel oil return line.

6.1.2. After detachment of the No. 5 fuel oil return line, a fire ignited on the No. 5 cylinder cover and exhaust system. The Causal Factor contributing to the fire was:

6.1.2.1. Insufficient insulation of the cylinder cover and exhaust system.

6.2. Evidence of Act(s) or Violation(s) of Law by Any USCG Credentialed Mariner Subject to Action Under 46 USC Chapter 77:

6.2.1. This investigation did not identify evidence that would support referral of any USCG Credentialed Mariner to action under 46 USC Chapter 77.

6.3. Evidence of Act(s) or Violation(s) of Law by U.S. Coast Guard Personnel, or any other person:

6.3.1. This investigation did not identify evidence that would support referral of any USCG person to action under U.S.C. Title 18 or 10 U.S.C. Chapter 47, the Uniform Code of Military Justice.

6.4. Evidence of Act(s) Subject to Civil Penalty:

6.4.1. This investigation did not identify evidence that would subject any person or entity to a civil penalty.

6.5. Evidence of Criminal Acts:

6.5.1. This investigation did not identify evidence that would support referral of criminal acts under United States laws to the U.S. Attorney or other entity.

6.6. Need for New or Amended U.S. Law or Regulation:

6.6.1. This investigation did not identify evidence that would support amendment of U.S. law or regulation.

6.7. Unsafe Actions or Conditions that Were not Causal Factors:

6.7.1. *Proximity of the drifting vessel to fixed platforms HOLLY and HONDO.* Assist tugs from the Port of Los Angeles were faced with a transit of more than 10 hours to the disabled PRESIDENT EISENHOWER. At its closest point of approach, the vessel drifted within 4 miles of HONDO, an active production platform. A tug dispatched from

the Port of Hueneme was able to push the vessel back toward the TSS and avoided a potential grounding or collision with HONDO. A collision with HONDO would have resulted in a pollution event and additional property damage.

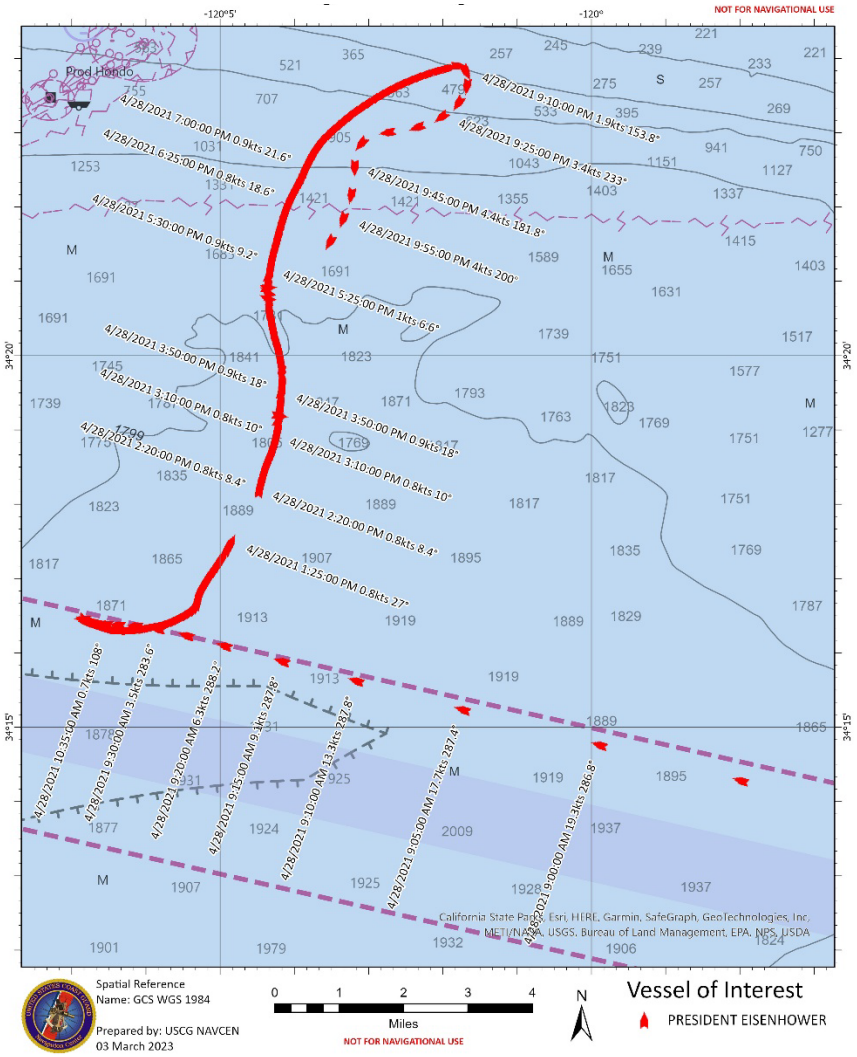

Figure 15. Zoomed in AIS track of PRESIDENT EISENHOWER during the incident timeframe. Times listed in GMT. (Source: U.S. Coast Guard)

7. Actions Taken Since the Incident

7.1. The PRESIDENT EISENHOWER sustained more than $8 million in damage. Following the casualty, the vessel returned to service in October 2021. Extensive repairs were carried out including the following:

7.1.1. Overhaul of the main engine with repair or replacement of all components affected by the fire.

7.1.2. Replacement of damaged electrical wiring throughout the machinery space.

7.1.3. Replacement of two class A60 fire doors at the engine room entrance on the upper deck and engine control entrance.

7.1.4. Repair or replacement of auxiliary boiler components.

7.1.5. Replenishment of the fixed CO2 fire extinguishing system.

7.2. In response to the PRESIDENT EISENHOWER's near miss with the HONDO and similar incidents within USCG District Eleven, which oversees Coast Guard operations in California, the District Eleven Response Advisory Team (DRAT) acquired an Emergency Vessel Attachment and Towing System (EVATS) in November of 2022. The EVATS is designed for large deep draft ocean-going vessels and is universally compatible with different ships' mooring gear arrangements. The EVATS is stored at USCG Air Station Sacramento in California and is capable of being moved by USCG C-27 Cargo Aircraft or by truck to a location near the incident. This allows the EVATS to then be airlifted offshore by a USCG H-60 Helicopter. With its acquisition, the EVATS provides a safer and more efficient method of arresting large adrift vessels in some of the harshest environmental conditions.

7.3. On July 13, 2022, APL Maritime Ltd, applied for MSP-select status for PRESIDENT EISENHOWER in the MSP program. As allowed by Navigation and Vessel Inspection Circular (NVIC) 01-13 CH-1, after a trial period of three years, a vessel enrolled in the MSP may apply for select status. The USCG takes a risk-based vessel examination approach to MSP-select vessels. A risk-based approach reduces the oversight burden on the USCG and shifts more responsibility to the classification society. It minimizes duplication of effort and avoids interruption of vessel schedules. Upon successful completion of a hand-over survey with the vessel's classification society, PRESIDENT EISENHOWER was approved for enrollment in MSP-select on January 3, 2023. This investigation revealed no evidence suggesting PRESIDENT EISENHOWER's enrollment in MSP or MSP-select had an influence on the casualty.

8. Recommendations

8.1. Safety Recommendation:

8.1.1. M-23-01: Recommend the USCG Office of Marine Environmental Response Policy (CG-MER) and the Office of Waterways and Ocean Policy (CG-WWM) establish or amend USCG policy to address oversight and analysis of the procedures and operations related to having a tug at each deep-water port that is on standby with the appropriate size, horsepower, and towing equipment to assist a large commercial vessel in case of emergency. The first towing vessels on scene after the fire came from the Port of Hueneme. After arriving and providing station keeping for a short while, the vessels had to be recalled by the Port of Hueneme to resume their normal escort duties as the port was limited in its inventory of towing vessels.

8.1.2. M-23-02: Recommend classification societies recognized by the Secretary of Homeland Security that participate in MSP or the Alternate Compliance Program (ACP) require video analytic oil mist detection systems to be outfitted on vessels approved for operation with an unattended machinery space. Research coordinated by the Fire Safety Subcommittee of the International Maritime Organization (IMO) found that 70% of

engine room fires are caused by leaks in the fuel oil or lubricating oil systems.[5] Video analytic oil mist detection systems can be integrated into existing video monitoring equipment to detect unique signatures of oil mist, smoke, flame, and reflected flame. Had this technology been in use onboard the vessel, the 3rd Mate would have received early warning of a leak and could have slowed the main engine to reduce fuel flow and diminish the leak.

8.1.3. M-24-03: Recommend that APL implement additional training and oversight requirements within their SMS on the requirements for installing and testing fuel oil piping.

8.1.4. M-25-04: Recommend that APL install insulation and shielding for high temperature engine room components.

8.2. Administrative Recommendations:

8.2.1. Recommend this investigation be closed.

[redacted]

John P. Davis
Commander, U.S. Coast Guard
Investigating Officer

[5] Charchalis, Adam, and Stefan Czyz. "ANALYSIS OF FIRE HAZARD AND SAFETY REQUIREMENTSOF A SEA VESSEL ENGINE ROOMS." *Journal of KONES Powertrain and Transport*, vol. 18, no. 2, 2011.