National Transportation Safety Board

Office of Marine Safety

Washington, D.C. 20594

Group Chairman's Factual Report

Human Factors Group

SS *El Faro*

DCA16MM001

July 26, 2017

Carrie Bell

1 Accident Information

Vessel:	SS *El Faro*
Accident Number:	DCA16MM001
Date:	October 1, 2015
Time:	0739 eastern daylight time (EDT)[1]
Location:	North Atlantic Ocean, 40 nautical miles northeast of Acklins and Crooked Islands, Bahamas 23.3925° N, 73.9029˚ W
Accident type:	Sinking
Complement:	27 crew, 6 supernumeraries

2 Human Performance Group

Chairman	Carrie Bell Office of Marine Safety National Transportation Safety Board Washington, DC 20594
Member – US Coast Guard	Keith Fawcett Marine Investigator for Coast Guard (civilian)
Member – TOTE Services, Inc.	Melissa Serridge Human Resources Manager
Member – American Bureau of Shipping	Louis O'Donnell (alternate, sitting in for Alvin Shepherd, who retired during the investigation) Assistant Chief Surveyor

3 Summary

On Thursday, October 1, 2015, about 0715 EDT, the US Coast Guard received distress alerts from the 790-foot-long roll-on/roll-off container ship *El Faro*. The US-flagged ship, owned by TOTE Maritime

[1] Times in this report are eastern daylight time according to the 24-hour clock.

Puerto Rico (formerly Sea Star Line, LLC), and operated by TOTE Services, Inc. (TOTE), was 40 nautical miles northeast of Acklins and Crooked Islands, Bahamas, and close to the eye of Hurricane Joaquin. The ship was en route from Jacksonville, Florida, to San Juan, Puerto Rico, with a cargo of containers and vehicles. Just minutes before the distress alerts, the *El Faro* master had called TOTE's designated person (DP) and reported that a scuttle had popped open on deck two and that there was free communication of water into the No. 3 hold. He said the crew had controlled the ingress of water but the ship was listing 15˚ and had lost propulsion. The Coast Guard and TOTE were unable to reestablish communication with the ship. Twenty-eight US crewmembers, including an off-duty engineering officer sailing as a supernumerary, and five Polish workers were on board.

The Coast Guard, US Navy, and US Air Force dispatched multiple assets to the ship's last known position, but the search was hampered by hurricane-force conditions on scene. On Saturday, October 3, two debris fields were discovered, and on Sunday, October 4, a damaged lifeboat and liferaft were located. The same day, the Coast Guard found a deceased crewmember wearing an immersion suit. The Coast Guard helicopter dropped a locator buoy near the body in the immersion suit and left to investigate reported signs of life elsewhere but then could not relocate the immersion suit. No signs of life were found, and on Monday, October 5, two oil slicks were discovered. The Coast Guard determined that *El Faro* was lost and declared the event a major marine casualty. The Coast Guard suspended the unsuccessful search for survivors at sundown on Wednesday, October 7.

4 Details of Investigation

4.1 Launch and On-Scene Investigation

The NTSB learned of the accident from the Coast Guard on the afternoon of October 1. A team of five investigators, a board member, and support staff launched from NTSB headquarters on October 6 and arrived on scene in Jacksonville later the same day. The investigation was led by the NTSB. Parties to the investigation were the Coast Guard, TOTE, the American Bureau of Shipping (ABS), the National Weather Service, Harding Safety USA (Palfinger), and Herbert Engineering. The on-scene portion of the investigation was completed on October 15. Additional interviews were conducted in Maine and in Jacksonville during November and December 2015. Further interviews were conducted in various locations and telephonically throughout the investigation. The Coast Guard convened three Marine Board of Investigation (MBI) hearings in Jacksonville after the accident: two in 2016 (February 16–26, May 16–27) and one in 2017 (February 6–17). The NTSB participated fully in the hearings.

4.2 Personnel

This section describes the experience and training of the officers on board *El Faro* at the time of the sinking. Records were provided by TOTE as well as the two unions represented on the ship: American Maritime Officers (AMO) and Seafarers International Union (SIU).

4.2.1 Training Requirements

To obtain or renew credentials, the Coast Guard requires seafarers to pass examinations after satisfying time-at-sea requirements. Title 46 *Code of Federal Regulations* (CFR), part 10, authorizes the Coast Guard to conduct professional examinations for mariners to obtain original credentials, receive a raise in grade or an increase in scope, or renew their endorsements. The examinations allow the Coast

Guard to determine that applicants have the appropriate training, that they can complete practical demonstrations, and that their experience meets Coast Guard requirements. According to 46 CFR, subpart I, "Subjects of Examination," the examination content is specific to either the deck or engine departments of a vessel. Deck examinations include information pertaining to lifesaving, search and rescue, vessel rules and regulations, shipboard management and training, navigation, plotting, meteorology, and ship maneuvering. Questions are multiple-choice, and the length of the examination varies depending on the endorsements needed for specific credentials. Similarly, engineering examinations test mariners' knowledge in both broad and specific areas. Questions relate to operations in the engine room, inspections and surveys, safety, emergency equipment, and other areas according to an applicant's intended credentials. Questions are based on generally accepted practice, published guidance, and Coast Guard regulations.

The credentials of the officers and crew on *El Faro* documented that their training complied with Coast Guard and International Maritime Organization (IMO) regulations. The Coast Guard did not require deck officers to take any specific, formal heavy-weather training courses; therefore, TOTE did not require such training. TOTE management stated, however, that mariners were given informal heavy-weather safety training on *El Faro* as part of the company's onboard training program. For example, heavy-weather safety training was among the five topics covered in the 30-minute quarterly onboard safety training conducted on January 29, 2015.[2] TOTE was not required to ensure that officers obtained additional training outside of what was required by the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW) and Coast Guard regulations. According to its director of marine services, TOTE did not have a "dedicated trainer" responsible for shipboard training

[2] Quarterly onboard safety training logsheet.

records or ship-specific training.[3] According to TOTE, vessel masters, individual mariners, and shoreside personnel had individual responsibilities for overseeing, carrying out, and documenting various aspects of training. TOTE's training program, and the maintenance of training records, were laid out in a training addendum as part of the company's safety management system (SMS).[4] According to the addendum, the company training program for mariners consisted of four parts: (1) indoctrination when a seaman comes aboard; (2) onboard safety training and drills; (3) onboard tracked training and safety meetings; and (4) certificated training ashore (STCW or license requirements). A manual for the training addendum provided guidance for the training to be conducted onboard. The captain submitted a quarterly training log and signed training sheets for the crew to the company. According to the director of marine services, the logs were reviewed and filed by the safety department.

Although there was no requirement for training in heavy weather, 46 CFR, subpart I, table 11.910, lists two related examination topics necessary for obtaining master and chief mate credentials: meteorology and oceanography, and ship maneuvering and handling. Listed under meteorology and oceanography are the following topics: characteristics of weather systems, ocean current systems, and weather charts and reports. Topics under ship maneuvering include heavy-weather operations and maneuvering for launching of lifeboats and liferafts in heavy weather. The requirements for assessing competency in heavy-weather operations did not go into effect until 2003. Masters who obtained their initial credentials before 2003, such as the *El Faro* captain, were therefore never required to undergo testing against those criteria.

Beginning in 2016, mariners were required to take training in advanced ship handling as part of the licensing process. According to their recent certificates, the *El Faro* captain and bridge officers had

[3] Interview, TOTE director of safety and marine services.

[4] TOTE training addendum (rev 8/15).

not attended those courses, nor were they required to. Neither advanced shiphandling nor advanced meteorology was required for mariners who were grandfathered and transitioning into the new requirements. The captain and the chief mate, both of whom had begun serving in their positions before March 24, 2014, would not have needed to complete the advanced courses until they renewed their credentials after December 31, 2016.[5] A review of courses offered by US maritime schools showed that training in both generic ship handling and type-specific ship handling is offered. According to a course instructor at the Maritime Institute of Technology and Graduate Studies, a shiphandling course generally includes maneuvering at slow speeds in the harbor for docking, anchoring, navigation rules, and channel-keeping. The theory of heavy-weather avoidance is routinely taught in a classroom as part of an advanced weather/meteorology course (reading weather charts and reports).

TOTE subscribed to a commercial weather forecast and analysis program, Bon Voyage System (BVS), that was installed on at least two of *El Faro*'s computers, on the bridge and in the captain's office. According to the conversations recorded on the ship's voyage data recorder (VDR),[6] the captain used BVS, as well as other tools, in weather-related decision-making on the accident voyage. Other sources of weather information on *El Faro* included Inmarsat-C SafetyNET (Sat-C)[7] and NAVTEX,[8] as well as

[5] Coast Guard Navigation and Inspection Circular 10-14 (NVIC 10-14), page 7, paragraph 3a states: "Until December 31, 2016, the training specified in 46 CFR 11.305(a)(3) and 11.307(a)(3) is not required for mariners who began their service or training for the Master or Chief Mate 3,000 GT or More endorsement before March 24, 2014, other than ARPA or GMDSS which is required for the endorsement to be valid for vessels with this equipment. A mariner will be considered to have started service on the first day of their service that meets the requirements for the endorsement they have applied for. Training is considered to have started on the first day of training that results in the issuance of a Master or Chief Mate endorsement valid for vessels of 3,000 GT or more." Paragraph b states: "Mariners may continue to qualify for their endorsement using previous model assessments until December 31, 2016."

[6] *El Faro*'s VDR was recovered from the wreckage in August 2016. Over 26 hours of parametric data and audio files were accessed from the VDR's memory module. In December 2016, the NTSB released a transcript of the audio recordings made on the vessel's bridge during the last 10 hours before the sinking. The transcript is more than 500 pages long.

[7] Sat-C provides text broadcasts of National Hurricane Center weather products. The information is printed on paper and can also be read on a Sat-C terminal monitor on a vessel's bridge.

[8] NAVTEX is an international automated, medium-frequency (518 kHz), direct-printing service for delivering navigational and meteorological warnings and forecasts to ships, as well as urgent marine safety information. http://www.nws.noaa.gov/om/marine/navtex.htm (DOI 3/1/17).

others when available, such as the Weather Channel and satellite radio.[9] All these sources of weather information were discussed among the crew as recorded on the VDR in the days preceding the accident, though investigators could not determine with certainty to what extent the captain used each source to make his decisions.

Investigators found no evidence that users of BVS on *El Faro* had any formal training with the system. Testimony from deck officers indicated that there was on-the-job training, and a BVS user's manual and quick reference guide were readily available for use on the vessel. The relief second mate indicated that he had called the company that supplied BVS (Applied Weather Technology) directly when he had questions, and the captain also assisted in teaching him to use BVS.[10]

4.2.2 Employment Contracts

El Faro's officers had employment contracts with TOTE through AMO. They were expected to work 12 hours a day while on the vessel under their contract. The typical work schedule on *El Faro* was a rotation of 10 weeks on duty, 10 weeks off. Actual work hours for the accident voyage were not available to investigators. However, during the 2-week period from August 24 to September 6, 2015, the average workday was approximately 13 hours for *El Faro*'s officers and 10.9 hours for SIU crewmembers.[11] For the next 2-week period leading up to the accident voyage, from September 7 through September 20, the work hours were similar for officers. The average workday during the period was 12.5 hours for officers and about 13 hours for SIU crewmembers[12].

[9] The VDR transcript indicates that mates listened to satellite radio intermittently throughout the accident voyage.

[10] Interview, off-duty second mate.

[11] From *El Faro* overtime logs.

[12] Generally, SIU crewmembers are entitled to overtime hours for all hours in excess of their normal 8-hour workday during the week and all hours worked on holidays and weekends. Licensed officers are generally entitled to overtime only for hours worked each day in excess of 12 hours (there is no overtime for weekends unless more than 12 hours are worked).

4.2.3 Evaluations

According to policy set out in its SMS, TOTE required senior officers to receive yearly performance evaluations, and other officers and crewmembers to receive evaluations at the end of each 10-week rotation or when they detached from the vessel.[13] The SMS described senior officers as captains and chief engineers.[14] Evaluations of the captains and chief engineers were to be initiated by the company's marine crewing department in September of each year. In addition, a completed original evaluation was required to be forwarded to the personnel department for entry into the individual's personal file.[15] The port engineer was responsible for completing evaluations of the captain and the chief engineer on an annual basis.[16, 17] The first engineer's performance evaluation was to be completed by the chief engineer, while the chief mate's evaluation was to be completed by the captain.

Investigators reviewed TOTE personnel files and found that officers' evaluations were not always completed on schedule. The last recorded performance evaluations for officers ranged from June 2015 (chief mate) to November 2011 (second mate). Draft evaluations of both the captain and the chief engineer were provided, though neither was complete. Each officer's latest evaluation is briefly described in section 4.2.4, below.

Performance evaluations for senior officers (captain, chief mate, chief engineer, and first assistant engineer) were based on the criteria shown in table 1. Scoring was numerical: (1) poor, (2) fair, (3) good,

[13] TOTE vessel operations manual (OMV)-2, rev. 20(17); section 12.6.7.1; 12.6.7.2.

[14] TOTE OMV-2, rev. 20(17); section 12.6.7.1.

[15] OMV-2; 20 (17), section 12.6.7.1.

[16] Interview, director of ship management–commercial.

[17] TOTE OMV-2, rev. 20(17); section 2.2.7.

(4) very good, and (5) exceptional. A space for comments allowed an evaluator to elaborate on the strengths and weaknesses of a crewmember. Table 2 show the criteria used to evaluate non-senior officers.

Table 1. Performance criteria for senior officers.[18]

Evaluation Criteria	Score (1-5)	Evaluation Criteria	Score (1-5)	Evaluation Criteria	Score (1-5)
Safety awareness and vessel safety record		Responsibility		Cooperation with technical manager	
Administration		Communication skills		Initiative	
Cargo familiarity or engine plant familiarity		Overall competence and decision making		Cooperation with customer and regulatory agencies	
Situational judgment		Leadership			

Table 2. Ship's officer evaluation criteria (non-senior).[19]

Evaluation Criteria (Evaluator to check box for each criterion)	Excellent	Very Good	Good	Fair	Poor
Cooperation					
Leadership–ability to work with others					
Attention to assigned duties					
Willingness to assume responsibility					
Watchstanding ability–at sea					
Watchstanding ability–in port					
Cargo-handling ability (deck officer)					
Cargo-handling ability (engineering officer)					
Knowledge of ship's equipment/automation					
Knowledge of TOTE policy and procedures					

[18] Evaluation criteria listed on TOTE official form TOTE-O-009 rev. 2/13.

[19] Evaluation criteria listed on TOTE official form TOTE-PERS-003 rev. 2/13.

Evaluation Criteria (Evaluator to check box for each criterion)	Excellent	Very Good	Good	Fair	Poor
Personal conduct and appearance					

4.2.4 Experience and Training of Officers

Captain. The captain of *El Faro*, age 53, graduated from Maine Maritime Academy in 1988, with a degree in nautical science and a minor in marine transportation management. His latest merchant mariner credential was issued on January 28, 2011, and was due to expire on January 28, 2016. The credential endorsed him as master of self-propelled vessels, not including auxiliary sail, of unlimited tonnage upon oceans; as radar observer (unlimited); and as first-class pilot of vessels of unlimited tonnage upon the inland waters of Prince William Sound, Alaska.

The captain spent about 14 years sailing on tankers and more than 10 years sailing on deep-draft cargo vessels. He spent 4 years as a motorboat operator with Casco Bay Lines in Portland, Maine, 1 year as able-bodied seaman for Texaco Marine, 14 years as third mate, second mate, or chief mate for Arco Marine/Polar Tankers, less than a year as captain on the Bermuda Biological Research Station[20] and as chief mate at Sabine Shipping before working at TOTE. He first obtained employment with TOTE (then known as Interocean American Shipping) in 2005, sailing as second mate, then chief mate, then captain before taking a position with another shipping company in 2010, where he sailed as captain until 2013. He then returned to TOTE in 2013, sailing as a third mate for one tour, then as captain on *El Morro* from

[20] The Bermuda Biological Station for Research is an independent, nonprofit science and education center located in Ferry Reach, St. George, Bermuda. The station hosts a full-time faculty of oceanographers, biologists, and environmental scientists. On September 5, 2006, the station changed its name to Bermuda Institute of Ocean Sciences.

November 2013 to April 2014.[21] In May 2014, he became captain on *El Faro* and remained in that position until the accident. He last joined *El Faro* on August 11**,** 2015.

From 2010 to 2015, the captain's training included the following courses: leadership and management (2015), vessel security officer (2010), electronic chart display and information system (ECDIS),[22] revised May 2011 (2011), antipiracy (2010), and radar recertification (2010, 2015). Other endorsements on his certificate relating to safety and survivability were basic firefighting and basic safety training (2001), personal survival techniques (2001), integrated bridge team training (2003), integrated tug/tanker bridge resource management (1998), bridge team management (1995), and a 72-hour course on the Global Maritime Distress and Safety System (GMDSS) in 1998.[23],[24]

Evaluations. The captain's most recent performance evaluation was partially completed (considered "draft" by TOTE) on October 2, 2014.[25] The TOTE port engineer scored the captain's performance as excellent (5 on a scale of 1 to 5) in all categories except one (cooperation with technical manager), which he left blank. In the comments section, he noted that the captain "handles all aspects of the master's position with professionalism" and "handles a diversified and unpredictable crew quite well." The evaluation had not been signed, as required, by the technical manager, or by the captain. Unlike performance evaluations completed for other crewmembers, the form was not stamped by TOTE's

[21] *El Morro* was scrapped in May 2014.

[22] ECDIS is a computer-based navigation system that complies with IMO regulations and can be used as an alternative to paper navigation charts.

[23] GMDSS is an international system that uses improved terrestrial and satellite technology and shipboard radio systems. It ensures rapid alerting of shore-based rescue and communications authorities in the event of an emergency.

[24] TOTE personnel records–captain.

[25] Draft performance evaluation for captain.

crewing department for formal receipt, nor was it in the captain's personnel file provided to investigators. It was provided by TOTE management on request from investigators.

Medical. The captain completed a Coast Guard–required medical examination for his most recent credential renewal in March 2015. The records indicate that the captain was not taking any medications and was deemed physically competent to hold a credential, in accordance with Coast Guard requirements.[26]

Chief Mate. The chief mate, age 54, graduated from the US Merchant Marine Academy in 1984. At the time of the accident, he held a master's credential for steam and motor vessels of unlimited gross tonnage. He sailed with TOTE/Interocean American Shipping from 2004 until 2015, serving intermittently as third mate, second mate, and chief mate. In 2011, he started sailing as third mate on the TOTE vessel *El Yunque*. He sailed as second mate and chief mate on *El Yunque* until May 2015, when he was assigned to *El Faro*. The October voyage was his second rotation as chief mate on *El Faro*.

Before his employment with TOTE, he sailed as chief mate for Sealift, Inc., from 2001 to 2003. He spent the 2 years before that sailing for Osprey Ship Management, Inc., as both second mate and chief mate. He was employed by Crowley American Transport from 1989 to 1997, where he also sailed as both second mate and chief mate. He started his last rotation on *El Faro* on September 18, 2015.

From 2010 to 2015, the chief mate's training included bridge resource management, 5-day advanced course (2013), and ECDIS (2013). Other training related to safety and survivability or specific to on-the-job duties included vessel-company security officer training (2004), radar recertification (2012),

[26] The completion of the Coast Guard 719K form, in accordance with NVIC 4-08, is required by the Coast Guard and, if approved by the Coast Guard, serves as "documentary evidence that regulatory physical requirements have been satisfied and that the applicant is physically competent to hold a credential".

basic safety training refresher, 4 days (2001), ship stability (1984), GMDSS radio operator's license (2001, 2006), and personal competency standards for personal survival techniques (2001).[27]

Evaluations. The chief mate's most recent evaluation was dated June 2015. It was completed by the captain of another TOTE vessel where he had previously served as both third and second mate. He received "excellent" ratings in 8 of 10 categories and "very good" on the remaining two criteria. The evaluator stated that the chief mate was "passionate" about his work and "an excellent instructor for the inexperienced." Previous evaluations yielded similar scores and comments.[28]

Medical. The chief mate completed a Coast Guard–required medical examination for his most recent credential renewal in June 2015. The records indicate that the chief mate had a medical condition, which required a medical waiver, but at the time of renewal, he was no longer taking medication for that condition. No related limitations were placed on his credential. The records indicate that the chief mate was deemed physically competent to hold a credential, in accordance with Coast Guard requirements.

Second Mate. The second mate, age 34, graduated from Maine Maritime Academy in 2004. At the time of the accident, she held credentials as a second mate and began sailing with TOTE (then Interocean American Shipping) in 2005. She sailed as a third mate on *El Morro* from 2004 until 2013, when she was promoted to second mate. In July 2014, she began sailing as second mate on *El Faro*. She started her last tour on *El Faro* on September 22, 2015.

From 2010 to 2015, the second mate's training included the following courses: ECDIS (2013), bridge resource management, 5-day advanced course (2013), and radar recertification (2015). Other relevant training before 2010 included vessel security officer training (2008). She also completed a ship

[27] TOTE personnel records–chief mate.

[28] *El Faro* chief mate credentials and evaluations.

and company security officer course in 2009. Other training related to safety and survivability or specific to on-the-job duties included GMDSS radio operator, basic safety training, and proficiency in the use of survival craft, rescue boats, and fast rescue boats.[29],[30]

Evaluations. The most recent performance evaluation in the second mate's personnel file was dated November 2011. At that time, she was a third mate. She received scores of "very good" in all but cooperation, in which she received a score of "excellent." The evaluator, a previous captain working with the second mate on *El Yunque*, stated that she "continues to improve" and that she "is the type of long term employee that SSL [Sea Star Line] should want to keep employed with the company." Though she started sailing with TOTE as second mate in 2013, no performance evaluation as second mate was found in her personnel file.

Medical. The second mate completed a Coast Guard–required medical examination for her most recent credential renewal in February 2015. The records indicate that she was not taking any medications and was deemed physically competent to hold a credential, in accordance with Coast Guard requirements. She wore corrective lenses and was required to keep a spare pair on board.

Third Mate. The third mate was 46 years old. At the time of the accident, he held credentials as a third officer. He began his sailing career in 1993 as an unlicensed mariner (ordinary seaman, wiper, steward's department), working his way up to officer. He obtained his third mate's credentials in December 1998, and his latest renewal was completed in 2013. The third mate was employed consistently with TOTE (and Interocean American Shipping) from 1999 to 2015. He sailed on *El Morro* from 2010 to

[29] *El Faro* second mate credentials and most recent evaluation.

[30] TOTE personnel records–second mate.

2013. He took the third mate position on *El Faro* in May 2014. He started his last *El Faro* rotation on July 28, 2015.

From 2010 to 2015, the third mate's training included the following courses: leadership and management (2015), fast rescue boats (2015), ECDIS (2014), radar recertification (2013), and bridge resource management, 5-day advanced course (2013). Other training related to safety and survivability or specific to on-the-job duties included GMDSS (2000), medical person in charge (2009), basic safety training (1999), and advanced firefighting (1998).[31]

Evaluations. The most current performance evaluation in the third mate's personnel file was dated February 2014. He received scores of "excellent" in cooperation, watchstanding at sea, and in all other deck-related areas. His evaluation was completed and signed by the *El Faro* captain of the accident voyage. In his remarks, the captain stated that the third mate had "solid bridge watchstanding skills" and "excellent two way communications." He also commented that he had "the knowledge and skills to sail as second mate if he chooses to do so."[32]

Medical. The third mate completed a Coast Guard–required medical examination for his most recent credential renewal in June 2013. The records indicate that the third mate was not taking any medications and was deemed physically competent to hold a credential, in accordance with Coast Guard requirements.

Chief Engineer. The chief engineer, age 34, graduated from the State University of New York Maritime College in 2003. His credentials were issued on November 4, 2014. He was qualified as a chief engineer of steam, motor and gas turbine propelled vessels of any rating. The chief engineer began his

[31] TOTE personnel records–third mate.

[32] *El Faro* third mate credentials and evaluations.

career in 2003, sailing as third and second assistant engineer on a variety of steam-propelled cargo ships. He joined TOTE (then Interocean American Services) in 2008. He sailed on *El Morro* as first assistant engineer in 2011–2012. In 2013, he served briefly as first assistant engineer on *El Yunque* before rejoining *El Morro* as chief engineer. He began working as chief engineer on *El Faro* in April 2014. He joined the ship on August 18, 2015, before the accident.

Between 2010 and 2015, the chief engineer's training included the following courses: gas turbine (2012), diesel endorsement course (2013), shipboard automated maintenance management (2010), Military Sealift Command (MSC) marine environmental program (2010), MSC shipboard damage control (2010), MSC helo firefighting (2010), MSC chemical biological and radiological defense orientation (2010), MSC small arms training and qualification (2010), and MSC warning shot phase (2010). Other training related to safety and survivability or specific to on-the-job duties included electrical, electronic, and control engineering (2009) and high-voltage safety (2009). He also completed lifeboat examinations (2002) and basic safety training (2003).[33],[34]

Evaluations. The most current shipboard performance evaluation in the chief engineer's personnel file was dated July 2013, when he was first assistant engineer on *El Yunque*. He received scores of "excellent" in leadership, willingness to assume responsibility, mechanical ability, and personal conduct and appearance. He scored "very good" in all other applicable areas. In his remarks, the chief engineer completing the evaluation stated that he was "intelligent, hardworking" and had a "good attitude." TOTE provided one draft evaluation for the chief engineer, dated October 2, 2014, that stated that the chief engineer was "driven to do the best job possible. The ship and crew reflect that." Ratings for each

[33] TOTE personnel records–chief engineer.

[34] *El Faro* chief engineer credentials and evaluations.

evaluation criteria were 5 out of 5, meaning "exceptional."[35] Another performance evaluation, dated 2014, was provided, partially completed by the port engineer.[36] Similar to the captain's most recent performance evaluation, this draft evaluation was not stamped by the crewing department for formal receipt and was not found in the personnel file provided to investigators.

Medical. The chief engineer completed a Coast Guard–required medical examination for his most recent credential renewal in March 2013. The records indicate that he was not taking any medications and was deemed physically competent to hold a credential, in accordance with Coast Guard requirements.

First Assistant Engineer. The first assistant engineer aboard *El Faro* at the time of the accident was 33 years old and had graduated from Massachusetts Maritime Academy in 2005. According to Coast Guard records, the first assistant engineer's credentials were renewed on May 8, 2015. TOTE personnel files had not been updated to reflect the new credentials. He held credentials as first assistant engineer of steam, motor, and gas turbine propelled vessels of any rating. The first TOTE vessel he sailed on was *El Morro*, which he joined as a third assistant engineer in January 2010. He joined *El Faro* on August 4, 2015.[37]

From 2010 to 2015, the first engineer's training included the following courses: refrigeration, management level (2012), refrigeration, operational level (2012), gas turbine (2011), MSC civilian marine engineering office—junior engineers (2013), upgrade engine (2013, 2015), MSC small arms training and qualification (2012, 2013), and MSC warning-shot phase 1 (2012, 2013). Other training related to safety

[35] *El Faro* chief engineer credentials and evaluations.

[36] Draft performance evaluation 2014-chief engineer.

[37] *El Faro* credentials and evaluations first assistant engineer.

and survivability or specific to on-the-job duties included proficiency in survival craft, rescue boats, and fast rescue boats, and basic safety training.[38],[39]

Evaluations. The most recent shipboard performance evaluation in the first assistant engineer's personnel file was dated January 2015. His evaluation was completed by the chief engineer of *El Faro* and signed by the captain of the accident voyage. He received one score of "very good" in knowledge of ship's equipment and automation, one score of "fair" in attention to assigned duties, and a score of "good" in all other applicable areas. In his remarks, the chief engineer stated that this was his first trip as a first assistant engineer and that "a learning curve is expected, but he needed to lead by example." He also stated that he "needs to have a better focus of the jobs and management of people and time."

In January 2015, before his assignment as first assistant engineer, an evaluation was completed by the same chief engineer, who gave scores of "excellent" in all applicable categories. He also stated in this performance report that the engineer "has shown he is ready and capable to sail at a higher position and take on more responsibility."

Medical. The first assistant engineer completed a Coast Guard–required medical examination for his most recent credential renewal in March 2015. The records indicate that he was not taking any medications and was deemed physically competent to hold a credential, in accordance with Coast Guard requirements.

Second Assistant Engineer. The second assistant engineer was 50 years old. His credentials were issued on March 30, 2012, and expired on March 30, 2017. He held credentials as a second engineer

[38] *El Faro* credentials and evaluations first assistant engineer. Dates were not given for basic safety training and rescue boat training in the first assistant engineer's personnel file, but the training was listed on his 2015 updated credential.

[39] TOTE personnel records–first assistant engineer.

of steam, motor, and gas turbine propelled vessels of any horsepower. He began his sailing career in 1990 as an unlicensed mariner, working his way up to third assistant engineer in 1996 and second in 1998. He had worked as a second assistant engineer on other TOTE vessels (and for the preceding companies Sea Star Line and Interocean American Shipping) since 2003. He started his last rotation on *El Faro* on August 11, 2015.

Between 2010 and 2015, the second assistant engineer's training included engine resource management operational level (2015), liquefied natural gas (LNG) 8-day person-in-charge (PIC) (2013). Other relevant training included fast rescue boat, 40 hours (2001), 5-day basic safety training (2001), and lifeboatman study guide (2001).[40],[41]

Evaluations. The most current performance evaluation in the second assistant engineer's personnel file was dated May 2015. The evaluation was completed by the chief engineer of the accident voyage and signed by the captain of the accident voyage. He received scores of "excellent" in all applicable areas. In his remarks, the chief engineer stated the second engineer "is one of the most dependable and hardest working men" he had worked with and "continually stepped up and helped in every possible way." He had been assigned as second assistant engineer on *El Faro* since May 2014.

Medical. The second assistant engineer completed a Coast Guard–required medical examination for his most recent credential renewal in January 2015. The records indicate that he was not taking any medications and was deemed physically competent to hold a credential, in accordance with Coast Guard requirements.

[40] *El Faro* credentials and evaluations second assistant engineer.

[41] TOTE personnel records–second assistant engineer.

Third Assistant Engineer No. 1. One third assistant engineer, age 26, graduated from Maine Maritime Academy in 2012. His credentials were issued on September 11, 2013, and expired on September 11, 2018. He held credentials as a third engineer of steam and motor vessels of any rating. He spent 120 days aboard the training ship (TS) *State of Maine*[42] (diesel electric), and 72 days aboard the Navy ship *Rappahannock* (diesel) as a cadet to fulfill his seagoing requirements toward obtaining his third engineer's credentials. His training included proficiency in survival craft and rescue boats other than fast rescue boats, basic safety training, and vessel security officer.[43] He joined the ship on September 22, 2015, in Jacksonville.

Evaluations. The most current performance evaluation in the third assistant engineer's personnel file was dated January 2015. His evaluation was completed by the chief engineer of the accident voyage and signed by the captain of the accident voyage. He received scores of "excellent" in all but three applicable areas. He received a score of "very good" in willingness to assume responsibility, knowledge of ship's equipment/automation, and knowledge of TOTE policy and procedures. In his remarks, the chief engineer stated that he was "a valuable asset to the vessel . . . quick to learn . . . and highly reliable."[44]

Medical. The third assistant engineer completed a Coast Guard–required medical examination for his most recent credential renewal in May 2015. The records indicate that he was not taking any medications and was deemed physically competent to hold a credential, in accordance with Coast Guard requirements. He wore corrective lenses and was required to keep a spare pair on board.

[42] Maine Maritime Academy replaced its steam ship "TS *State of Maine*" in 1997 with a diesel electric training ship that was built in 1990.

[43] *El Faro* credentials third assistant engineer (1).

[44] TOTE personnel records–third assistant engineer (1).

Third Assistant Engineer No. 2. Another third engineer, age 25, graduated from Maine Maritime Academy in 2012. His credential was issued on July 9, 2012, and expired on July 9, 2017. He was qualified as a third engineer of steam, motor, or gas turbine vessels of any horsepower. He spent 121 days aboard TS *State of Maine* (diesel electric), and 60 days aboard the Navy ship *Flint* (steam) as a cadet to fulfill his seagoing requirements toward obtaining his third engineer's credentials. He had been employed by TOTE since May 2014. He had previously worked for Crowley Liner Services and Maersk Line, Ltd. Before beginning work on *El Faro*, the third assistant engineer completed tours on other TOTE vessels as third assistant engineer, including the SS *Bellatrix* for one tour, *El Yunque* for two tours, and the M/V *Liberty Bay* for one tour. His training included basic safety training, proficiency in the use of survival craft, rescue boats, and fast rescue boats, and vessel security officer training. He began work as a third assistant engineer on *El Faro* in April 2015. He started his last rotation on *El Faro* on September 15, 2015.[45]

Evaluations. The most current performance evaluation in the third assistant engineer's personnel file was dated November 2014. His evaluation was completed by a chief engineer who was not on the accident voyage. He received scores of "very good" in four applicable areas (cooperation, leadership, knowledge of TOTE policy and procedures, and personal conduct and performance). He received a score of "good" in the remaining evaluation categories. In his remarks, the chief engineer stated that he "shows up on time . . . [and] has done everything I have asked him to do." However, he "needs to pay attention to detail" and "become more familiar with ship's equipment and automation."[46]

Medical. The third assistant engineer completed a Coast Guard–required medical examination for his most recent credential renewal in May 2014. The records indicate that he was not taking any

[45] TOTE personnel records–third assistant engineer (2).

[46] El Faro credentials and evaluations third assistant engineer (2).

medications and was deemed physically competent to hold a credential, in accordance with Coast Guard requirements. He wore corrective lenses and was required to keep a spare pair on board.

Third Assistant Engineer No. 3. The most recently hired third engineer, age 23, graduated from Maine Maritime Academy in 2014. His credentials were issued on May 3, 2014, with an expiration date of May 3, 2019. He was qualified as a third assistant engineer of steam and motor propelled vessels. He spent 121 days aboard TS *State of Maine* (diesel electric) and 69 days aboard the Navy ship *Robert E. Peary* (diesel electric) as a cadet to fulfill his seagoing requirements toward obtaining his third engineer's credentials. His training included basic safety training, proficiency in survival craft and rescue boats other than fast rescue boats, and vessel security officer. He signed on to *El Faro* in Jacksonville on September 29, the evening the vessel departed on the accident voyage.[47],[48]

Evaluations. Because he was new to the company, no evaluations had been completed for this third assistant engineer.

Medical. The third engineer completed a Coast Guard–required medical examination for his credential and was issued a medical certificate in April 2014. The records indicate that he was not taking any medications and was deemed physically competent to hold a credential, in accordance with Coast Guard requirements. He wore corrective lenses and was required to keep a spare pair on board.

4.2.5 Crewmembers

In addition to the 10 officers, *El Faro* had on board 17 crewmembers and 6 supernumeraries at the time of the accident. Of the 6 supernumeraries, 5 were Polish citizens and one was an off-duty chief

[47] TOTE personnel records–third assistant engineer (3).

[48] *El Faro* credentials and evaluations third assistant engineer (3).

engineer. The off-duty chief engineer was supervising the Polish workers, who were completing conversion tasks to prepare *El Faro* for the Alaskan trade. The 17 crewmembers were all properly credentialed mariners.[49]

4.3 Corporate Organization

According to the TOTE website, at the time of the accident, the company employed more than 500 seamen and crews and operated a fleet of over 30 vessels. *El Faro*, managed by TOTE, was an asset of TOTE Maritime Puerto Rico, which provided services to move cargo to and from Jacksonville to San Juan on a domestic route under the Jones Act.[50] TOTE Maritime Puerto Rico operated under the umbrella of the TOTE, Inc., family of companies. TOTE Shipholdings[51] was also the owner of two new LNG vessels under construction, the *Isla Bella* and the *Perla Del Caribe*.

TOTE Services (referred to as TOTE in this report) managed *El Faro* and *El Yunque* and provided ship-management services, including crewing. See **figure 1** for an organizational chart.

Sea Star Line was the previous company name for TOTE Maritime Puerto Rico (the name was changed on September 17, 2015). Sea Star Line owned and operated both *El Faro* and *El Yunque*.

[49] Credentials of crewmembers.

[50] The Jones Act refers to the Merchant Marine Act of 1920, a US federal statute that provides for the promotion and maintenance of the American Merchant Marine. Among other purposes, the law regulates maritime commerce in US waters and between US ports.

[51] Owner of Marlin vessels chartered to TOTE Maritime Puerto Rico.

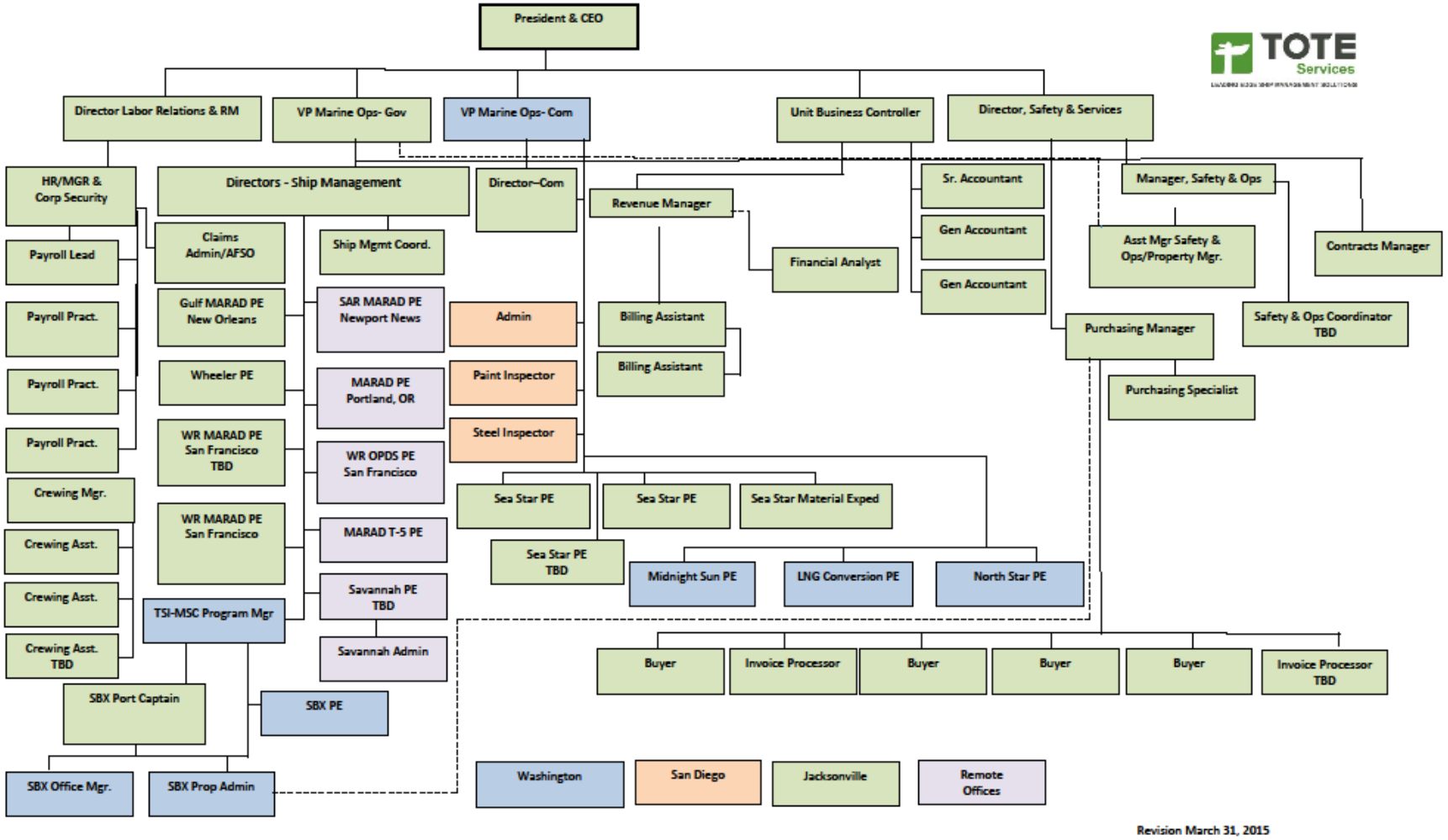

Figure 1.TOTE organizational chart (current as of March 31, 2015).

4.3.1 Shoreside Support

When TOTE Maritime Puerto Rico was still operating as Sea Star Line, it employed marine operations managers to facilitate and bridge ship-to-shore operations and provide voyage support. During a company reorganization in 2012–2013, some positions were not replaced with employees who had marine engineering and operational backgrounds. For example, before the reorganization, TOTE had both port captains and port engineers to oversee vessel operations. After the reorganization, only port engineer positions were filled, and no port captains were listed in the organizational structure for the commercial fleet.

TOTE management stated during MBI testimony that the reorganization did not negatively impact shoreside support; in fact, that the relocation of personnel from New Jersey to Jacksonville enhanced shoreside support and oversight. There were, however, conflicting statements on this topic. A former chief engineer, who worked on *El Faro* during the reorganization, described his interfaces with the company as follows: "The biggest change would have been the fact that [port captain] was basically the only guy had contact with in Jacksonville, whereas everybody else would have been West Coast . . ." He stated that before the reorganization, "They were all there, right there, so you could deal with multiple guys from Jacksonville, which was a whole lot easier, because they were right there, than when it was just [port captain] and dealing with people from the West Coast."[52] A former captain on *El Faro* testified that the reorganization did not change the availability of someone ashore with whom he could discuss vessel operations. He stated that before the reorganization, he spoke with the former DP, located in New Jersey, and afterwards he spoke

[52] Interview, Ponce-class engineer.

with the current DP, located in Jacksonville. He was asked if he recalled anybody in the Jacksonville area who was involved with marine operations. His response was, "No, sir."[53]

According to TOTE, the captain was the primary nautical expert. There were other captains in the TOTE organization, such as the DP, but the captains at sea themselves were the nautical experts. According to the director of marine safety and services, "There is no one in the company that formally provides oversight for nautical. We depend on the captains to take on that role."[54]

TOTE port engineers were assigned to each vessel and reported on a day-to-day basis to the director of ship management.[55] The director of ship management worked as a port engineer for TOTE before becoming part of company management in January 2015. He reported to the vice-president of marine operations–commercial,[56] who reported to the company president.[57]

The manager of safety and operations (also DP) for *El Faro* was responsible for overseeing TOTE's safety, environmental, and other regulatory compliance programs. [58] According to statements from the president of TOTE, the DP was responsible for 24 vessels and was expected to be available 24 hours a day, 7 days a week. He had an assistant manager who would assist with SMS-related duties on a part-time basis. TOTE management stated that the ship management coordinator, whose specific functions related to the safety department and the SMS, assisted the DP on a part time basis.

[53] MBI transcript, May 16, 2016, testimony of former *El Faro* captain.

[54] Interview, director of marine safety and services.

[55] Interview, director of marine safety and services.

[56] Interview, vice president of marine operations.

[57] Interview, TOTE president.

[58] Interview, DP.

Of the 24 vessels under management, 14 were in active operation and 10 were inactive. The DP testified that his "span of control" with this number of vessels was adequate, and that at the last company where he served as DP he had approximately 78 vessels under management."[59] In his role as DP, he reported directly to the president. In his role as manager of safety and operations, he reported to the director of marine safety and services. The director of marine safety and services joined Sea Star Line as a port engineer in 2010 and was promoted to director in January 2014.[60]

TOTE had considered hiring an additional employee to assist the manager of safety and operations/DP with his extensive duties, but the company ultimately determined that a reallocation of duties was the best alternative at the time. The DP stated in an interview in October 2015 that TOTE had not hired an assistant and that he continued to fill both roles with no additional assistance. He stated at the third MBI hearing that the related tasks had been distributed across the company's safety department. TOTE management later provided additional detail about the task reallocation, stating that some of the manager's duties had been distributed and reassigned to other TOTE office staff, negating the need to bring on another person.[61],[62] The director of safety and services assisted in the DP role.

The port engineers were the first point of contact ashore for the captains and the crews of the vessels, although according to TOTE management, they had direct access to the DP or any other company personnel, as required.[63] Port engineers helped vessels with maintenance, ordering

[59] MBI transcript, February 17, 2016, testimony of DP.

[60] Interview, director of marine safety and services.

[61] TOTE email–safety and vessel task allocation.

[62] TOTE safety and ops task distribution.

[63] MBI transcript, May 26, 2016, testimony of TOTE vice president.

spare parts and other supplies, monitored inspections and surveys, monitored vessel certificates, arranged for vendors to make repairs, and provided other shore support. For the Jacksonville-to-Puerto Rico run, each vessel had one dedicated port engineer. The two port engineers would back each other up, as needed.

The assigned port engineer for *El Faro* told investigators that he boarded the vessel every Monday and Tuesday when it was in Jacksonville, and occasionally in San Juan. [64]

NOTE: According to TOTE, some of the following job descriptions, which were in place at the time of the accident, were outdated. Certain aspects of the job descriptions may not have been updated as a result of a reallocation of responsibilities.

4.3.2 Vice President of Marine Operations

As stated in the company-supplied job description, the vice president of marine operations "directs and coordinates activities of engineering, operations, contracts and purchasing departments in the organization, and aids the president-CEO in formulating and administering organization policies by performing the following duties personally or through subordinate managers."[65] Responsibilities included the following:

- Participates in formulating and developing long-range goals, objectives and budgets; member of the executive committee.
- Maintains a sound plan of corporate organization, establishing policies to ensure adequate management development and to provide for capable management succession.

[64] Interview, port engineer.

[65] TOTE job description, vice president of marine operations.

- Develops and installs procedures and controls to promote communication and adequate information flow.
- Establishes operating policies consistent with the president's broad policies and objectives and ensures their execution.
- Evaluates the results of overall operations regularly and systematically and reports these results to the president.
- Maintains close contact with customer representatives to identify and respond to customer requests; ensures that potential sources of difficulty are made known to the president.
- Ensures that the responsibilities, authorities, and accountability of all direct subordinates are defined and understood.
- Ensures that all organization activities and operations are carried out in compliance with local, state, and federal regulations and laws governing business operations.
- Directs and coordinates activities of all departments for which responsibility is delegated to attain goals and objectives, ensuring safe, efficient, and economical administration of company operation.
- Directs operation of managed government fleet, and recommends new procedures or corrective measures to be implemented by each department to accomplish corporate and customer goals and objectives. Provides technical direction and guidance to lower-level managerial, professional, and technical personnel.
- Reviews analyses of activities, costs, operations, and forecast data to determine department or division progress toward stated goals and objectives.

- Confers with the president-CEO to review achievements and discuss required changes in goals or objectives resulting from current status and conditions.
- Directs bidding processes and establishes pricing for all new solicitations. Compiles all customer contracts, negotiates terms and conditions and reviews annual updates. Insures company compliance with operating contracts.
- Serves as member of compensation committee for promotions, raises, and bonus.
- Acts as quality system executive representative.

Supervisory duties for the vice president of marine services included managing a team of technical personnel overseeing existing commercial operations in Jacksonville and Tacoma and new construction in San Diego. The vice president was responsible for the overall direction, coordination, and evaluation of these operations. The position was also in charge of interviewing, hiring, and training employees; planning, assigning, and directing work; appraising performance; rewarding and disciplining employees; and addressing complaints and resolving problems. The vice president was a member of the emergency response team and would receive alerts via text message as well as phone calls when an emergency arose. When asked by investigators if he was aware of the specific duties of the members of the emergency response team, he stated that he did not know.[66] He stated that he was on the call list, but was unsure of how the call list was structured and was unaware of a document that described the functions and duties of the team. The vice president reported directly to the president and CEO of TOTE in Jacksonville and worked from the Tacoma office.

[66] Interview, vice president, marine operations-commercial.

4.3.3 Director of Marine Safety and Services

As stated in the company-supplied job description, the director of marine safety and services was to assist in the supervision and operation of both the active and the deactivated fleet, with specific attention to purchasing and procurement, safety, performance, and adherence to the laws and regulations of the countries in areas where its vessels traded.[67] The director of marine safety and services referred to his position as "director of marine services." Through the manager of safety and operations, the director was responsible for the following:

- Ensures that services are provided to commercial and government vessel operations as needed.
- Ensures that TOTE vessels are compliant with company standards and policies.
- Ensures that compliance and certification is maintained by the manager of marine safety and operations, who directly reports to the director of marine safety and services.
- Responsible for purchasing and procurement in support of vessel operation.
- Responsible for ensuring, through the purchasing manager, that all purchasing, requisitions, and claims are handled consistent with quality standards and corporate policies.
- Manages special operations projects as directed by director of ship management and vice president of marine operations.

[67] TOTE job description, director of marine safety and services.

- Regularly reviews the MARAD (US Maritime Administration) ship manager contract and oversees performance of Interocean American Shipping office personnel, port engineers, and ships' crews to ensure compliance with contractual requirements.
- Develops MARAD–required plans.
- Assists with maintaining the currency of all vessel plans and documents, including quality system documentation. Issues revisions as required.
- Conducts internal audits as required by the quality system and prepares associated audit reports.
- Monitors vessels' safety performance and ensures their compliance with regulatory requirements. Conducts routine safety meetings and produces safety newsletters.
- Conducts vessel visits and safety inspections and prepares associated reports.
- Assists with the scheduling and ordering of vessel bunkers.
- Assists port engineers in supervising and coordinating repairing, crewing, and storing of the vessel.
- Assists the operations manager in ensuring that all vessels have proper certificates on board and assists in the timely arrangement of vessel surveys.
- Assigns vessel agents worldwide as required. Reviews and approves agent advance requests and agent invoices.

Supervisory duties included managing officers who supervised 250 or more seagoing personnel on active vessels in the fleet. The director was also responsible for the overall direction, coordination, and evaluation of the marine safety and services department. Other responsibilities included interviewing, hiring, and training employees; assigning work; addressing complaints and

resolving problems; and conducting special operational projects involving TOTE assets, such as sea trials for new-built or converted vessels.

Though not listed in his position description, the director of marine safety and services stated that he was also the alternate designated person when the DP was not available.[68] (According to the DP, there was no schedule for when the alternate DP took over DP duties.[69]) He was hired as director in January 2014. Before that, he was a TOTE port engineer. He stated that beginning in January 2015, his "main focus" had been on the new LNG ships, specifically, devising a solution for bunkering the ships. That took up approximately 85 percent of his time, he stated.[70] Before January 2015, he had been working on the project about 50 percent of the time. According to the director, no one backfilled his responsibilities as director of marine safety and services while he was working on the LNG project.

The director of marine safety and services reported directly to the president and CEO of TOTE. The purchasing manager and the manager of safety and operations (DP) both reported to the director of marine safety and services.

4.3.4 Director of Ship Management–Commercial

As stated in the company-supplied job description, the director of ship management for commercial operations was "responsible for ensuring all commercial vessels are in compliance with all regulatory requirements. Designs and oversees installation and repair of marine power plants, propulsion systems, heating and ventilating systems, and other mechanical and electrical

[68] Interview, director of marine safety and services.

[69] Interview, manager of safety and operations.

[70] Interview, director of marine safety and services.

equipment in ships, docks, and marine facilities by performing the following duties."[71] The duties are summarized below:

- Develops annual business plans for all commercial vessels, based on input from vessel port engineers.
- Coordinates day-to-day activities between office and vessels. Notifies or distributes pertinent vessel information to all involved employees.
- Manages special technical engineering projects as directed by vice president marine operations–commercial.
- Assists port engineer in supervising and coordinating repairing, crewing, and storing of the vessel.
- Attends vessels concerning engineering condition and performance, as assigned. To include, but not limited to, conducting walkovers to inspect for technical condition and report[ing] status.
- Prepares repair, activation, and deactivation specifications, as required.
- Studies drawings and specifications and performs complex calculations to conceive equipment and systems designed to meet requirements of vessels.
- Supervises and approves voyage repairs and maintenance.
- Evaluates performance and operation of equipment.
- Maintains records of annual, biannual, midterm, etc., inspections and surveys required by the customer. Ensures that vessels have proper certificates on board and assists in the timely arrangement of vessel surveys.

[71] TOTE job description, director of ship management–commercial.

- Assures that ABS, Coast Guard certification items, and other regulatory body items are completed. Interfaces with local regulatory bodies to implement compliance with customer regulations.
- Oversees repairs to equipment such as boilers, diesels, steam-driven turbine engines, heat exchangers, fire control and communication systems, electric power systems, or piping and related fittings and valves.
- Coordinates proper layup of critical equipment and systems.
- Conducts tests on marine equipment to see if testing standards are met.
- Prepares reports that describe inspection procedures and findings.
- Prepares or reviews recommendations for repair work to ships.
- Identifies outstanding repairs and coordinates completion.
- Keeps records of engineering costs for vessels.
- Assures that ship security services are properly provided.
- Manages and participates in the development and implementation of goals, objectives, policies, and priorities for assigned projects, services, and functional areas within the department; recommends, develops, and administers policies and procedures.
- Plans, directs, coordinates, and reviews the work plan for assigned staff or groups; assigns work activities, projects, and programs; reviews and evaluates work products, methods, and procedures; meets with staff to identify and resolve problems.
- Performs other duties as assigned.

Duties included directly supervising port engineers and vessel engineering staff of vessels under his responsibility; interviewing, hiring, and training employees; planning, assigning, and

directing work; evaluating performance; addressing complaints and resolving problems. The director of ship management–commercial reported to TOTE's vice president of marine operations–commercial. He was hired as director on January 1, 2015.

4.3.5 Director of Labor Relations and Risk Management

As stated in the company-supplied job description, the director of labor relations and risk management "maintains labor relation engagement and performs labor negotiation on behalf of company management. Directs and coordinates human resources activities including shoreside and seagoing employment, payroll and reporting functions, insurance risk assessment, facilities and security management, administration of employee training programs, and administration of insurance claims, by performing the duties listed below personally or through subordinate supervisors. Serves as the company's compliance officer, overseeing the compliance program, functioning as an independent and objective body that reviews and evaluates compliance issues/concerns within the organization."[72] Some of the responsibilities of the position included:

- Represents management in negotiating collective bargaining agreements with AFL/CIO– affiliated maritime unions.
- Analyzes collective bargaining agreement and develops interpretation of terms of contract as needed.
- Ensures a competent and qualified seagoing workforce and ensures that all assigned personnel possess the proper licenses, training, and certificates prior to joining vessels, in accordance with regulatory rules and regulations.

[72] TOTE job description, director of labor relations and risk management.

- Represents management with unions and vessel officers to investigate and resolve grievances.
- Maintains a sound plan of corporate organization, establishing policies to ensure adequate management development and to provide for capable management succession.
- Evaluates the results of overall operations regularly and systematically and reports the results to the president.
- Participates and provides input in the bidding process for new contracts. Prepares seagoing personnel forecast to project employment needs for new business.
- Develops, recommends, and implements personnel policies as needed with respect to seagoing personnel. Writes directives advising vessel officers of owner and company policy.
- Consults legal counsel as needed to ensure that policies comply with federal and state law.
- Oversees the analysis, maintenance, and communication of seagoing personnel records required by law or local governing bodies, or other departments in the organization.
- Administers the company's Equal Employment Opportunity (EEO) and Affirmative Action programs. Studies EEO complaints to clarify issues.
- Supervises payroll manager and human resources manager in administration of benefits.
- Analyzes injury claims and determines most effective and economical approach to use to expedite a claim. Negotiates settlements with seamen and/or attorneys.

Supervisory duties included management of subordinate supervisors and nonsupervisory staff in the industrial relations, human resources, and payroll departments. The director of labor relations was also responsible for the overall direction, coordination, and evaluation of the human resources department. The director was responsible for interviewing, hiring, and training employees; planning, assigning, and directing work; appraising performance; rewarding and disciplining employees; addressing complaints and resolving problems. The director of labor relations and risk management reported directly to the president and CEO of TOTE.

4.3.6 Crewing Manager

As stated in the company-supplied job description, the crewing manager "manages seagoing recruitment and job placement activities of organization by performing the following duties personally or through subordinates."[73] Duties were as follows:

- Responsible for obtaining and transporting vessel personnel to fill vessel requirements.
- Ensures orderly turnover of licensed personnel to maintain a satisfactory degree of experience onboard consistent with the vessel's operating requirements.
- Primary contact with various union offices to fill vessel manning requirements. Maintains records of promotable officers to ensure all opportunities are given to promote from within. Places job orders with officers' union for vacancies in licensed crew, and oversees job placements of unlicensed crewmembers.
- Fields inquiries regarding shipboard employment and reviews resumes as necessary.
- Maintains contact with potential employees.

[73] TOTE job description, crewing manager.

- Ensures that all new crewmembers provide proper licensing or credentials.
- Ensures that long-term employees, who fall under the random drug program, are drug tested at least once every 5 years and files the results in their personnel file. Provides drug-free letters to Coast Guard regional exam centers as requested.
- Checks prior medical background and employment references.
- Coordinates travel plans of seagoing employees with port agent to meet vessel itinerary and ensures sufficient time for a proper turnover.
- Maintains accurate records of seagoing hires, transfers, license upgrades, status/rank changes, and terminations. Updates employment records of seagoing personnel. Reviews shipboard evaluations, and notes performance deficiencies or recommendations for promotion, if any. Reviews all warning or discharge letters and determines whether charges should be brought with appropriate union. If required, submits grievance in writing to union and participates in disciplinary hearing.
- Participates in third-party disciplinary hearings as requested by union.
- Responsible for cadet shipping program with maritime academies.
- Coordinates licensed officer conferences and training. Obtains location, lodging, and travel arrangements. Processes expense reports submitted for reimbursement of expenses for travel and training.
- Processes and codes all invoices for crew travel and lodging and submits to accounting.
- Assists the vice president–human resources in insurance and special projects as directed.

Supervisory duties of the crewing manager included assisting the vice president of human relations in supervising full-time and temporary employees in the marine personnel department, when assigned. Additional supervisory duties included training clerical employees; planning, assigning, and directing work; rewarding and disciplining employees; addressing complaints and resolving problems; and evaluating performance as directed by vice president of human relations. The crewing manager reported directly to the vice president of human relations. The crewing manager had been working in this position for TOTE since 2005.

4.3.7 Manager of Safety and Operations/Designated Person

As stated in the company-supplied job description, the manager of safety and operations "assists in the supervision and operation of both the active and deactivated fleet with specific attention to safety, performance, and adherence to the laws and regulations of the countries where its vessels trade."[74] The manager of safety and operations performed duties as assigned by the director of marine safety and services and ensures vessel compliance with company standards and policies. When necessary, the manager presented policy changes or additions for review by management. Other duties included:

- Monitors and enforces drug and alcohol policy for shipboard personnel.
- Formulates general safety policies and procedures to be followed by company and vessel personnel in compliance with local, state, and federal Occupational Safety and Health Administration (OSHA) rules and regulations, and in the implementation of preventive safety measures and the development of the TOTE safety program.

[74] TOTE job description, manager of safety and operations.

- Implements and administers the shipboard quality system program. Conducts shipboard ISM (International Safety Management Code) training and internal audits. [75] Recommends revisions to quality system documentation pertaining to shipboard operations, as appropriate. Issues revisions to vessel personnel.
- Conducts shipboard security and safety assessments as necessary to meet SMS and regulatory obligations. Identifies risks to personnel, the environment, and ships and recommends corrective actions to senior management.
- Reviews hot work permits and enclosed-space-entry permits as necessary to ensure that the ships are adhering to prescribed safety practices.
- Develops and implements various company policies and security and response plans.
- Monitors safety meetings held aboard vessels. Implements suggestions promulgated by the safety meeting. Chairs the corporate quarterly safety meeting to review vessel safety standards, new equipment, regulations, etc.
- Participates in the investigation of accidents and injuries and cooperates in the preparation of material and evidence for organization use in hearings, lawsuits, and insurance investigations.
- Compiles and submits accident reports required by regulatory agencies.
- Acts as "emergency response coordinator" for oil spill and emergency response in the absence of the director, marine safety and services.
- Insures that periodic emergency response drills are conducted.

[75] The ISM Code is incorporated into US law at 46 *United States Code*, chapter 32 ("Management of Vessels"), and in Coast Guard regulations at 33 CFR, part 96 ("Rules for the Safe Operation of Vessels and Safety Management Systems"). The stated purpose of the ISM Code is "to provide an international standard for the safe management and operation of ships and for pollution prevention." For additional information, see website: http://www.imo.org/en/OurWork/humanelement/safetymanagement/pages/ismcode.aspx

- Coordinates with crewing department on training program for all seagoing officers.
- Represents company on various industry committees or safety groups and programs as required.

The manager of safety and operations had supervisory duties, which included interviewing, hiring, and training employees; assigning work; addressing complaints and resolving problems. The position was also responsible for conducting special operational projects involving TOTE assets, such as sea trials for new-built or converted vessels. The manager of safety and operations reported directly to the director of marine safety and services.

In addition to the above duties, the manager of safety and operations also performed the role of DP. The DP role is set out in the ISM Code as follows: [76]

> To ensure the safe operation of each ship and to provide a link between the Company and those on board, every Company, as appropriate, should designate a person or persons ashore having direct access to the highest level of management. The responsibility and authority of the designated person or persons should include monitoring the safety and pollution-prevention aspects of the operation of each ship and ensuring that adequate resources and shore-based support are applied, as required.

The DP, as described in the company's SMS documents, is required to report any issues and concerns from the fleet directly to the president of TOTE. As noted earlier, part of his role as DP was to be available 24 hours a day to respond to calls. If unavailable, an emergency call center was set up to respond to calls. When the DP was on vacation or otherwise occupied, it was customary for the backup DP (director of marine safety and services) to act as the point of contact

[76] ISM Code, section 4.

in emergencies.[77] There was an established protocol for emergency call center operators to follow if they received a call from a person or vessel related to the safety of operations (see section 4.7.1).[78] The DP was hired by TOTE in February 2014.

4.4 Policies and Procedures

4.4.1 Safety Management System

As required by the International Convention on Safety of Life at Sea (SOLAS) 1974, as amended, TOTE had an SMS that defined the roles and responsibilities of all personnel, outlined safe practices in ship operation and navigation, and established safeguards against certain identified risks.[79] The ISM Code called for the company to provide a copy of the SMS to the ship's personnel in a working language or a language understood by them. The SMS was to clearly define and document the captain's responsibility regarding implementation of safety of the vessel and policies set forth by the company. The captain was responsible for implementing the SMS on board, for motivating the crew in the observation of that policy, and for verifying that applicable procedures and requirements were adhered to. In accordance with the ISM Code, the captain was also responsible for periodically reviewing the SMS for areas of improvement, and for reporting deficiencies to shore-based management.[80]

Riding Gang. SMS policy as it related to the company's responsibility for contractors, riding gangs, and surveyors stated the following: [81]

[77] Interview, director of marine safety and services.

[78] Tunstall Americas incident report and emergency instructions for on-call providers.

[79] SOLAS 1974, as amended, chapter IX, "Management for the Safe Operation of Ships," regulation 2.1.2.

[80] ISM Code, section 5.1.

[81] OMV, section 3.4.1.

> All members of a riding gang shall be given an indoctrination tour of the vessel before or as soon after sailing as possible. Form TSI-V-SAF-023 has been prepared to assist the crew with indoctrination of on board contractors. The indoctrination/orientation shall be noted on the log sheet [TSI-V-ADM-038] before work is started. All riders, embarked guests and contractor supervisors must receive this training and sign the log sheet.

Investigators received records of completed indoctrinations up to May 19, 2015. The Polish workers came on board *El Faro* in the third quarter of 2015, but the familiarization and training logs that would be associated with them were retained on the ship, not at company headquarters.[82]

At the third MBI hearings, a Polish worker who had been on *El Faro* in the days and weeks before the sinking (from August 18 through September 29) stated that he and his Polish coworkers went to the captain's office immediately on boarding the ship to fill out forms. He recalled that they were medical in nature. He could not recall having a safety briefing, and stated that he was not taken to the lifeboats or liferafts and shown what to do in an emergency. He did state, however, that their supervisor, an off-duty chief engineer, showed them the entire ship when they came aboard. He was aware of where the lifeboats and immersion suits were located, though he never put on a lifejacket or immersion suit in the time he was on board.[83] When investigators asked if he knew the various emergency signals on *El Faro* (general alarm, fire, abandon ship), he said that he did not.

When queried about emergency drill participation, the Polish worker stated, "We did not participate in those drills because they did not apply to us." When asked where they would go during those safety drills, he said they "were doing their work."[84] Others testified about whether

[82] Cadet onboard training indoctrination logs.

[83] MBI 3 transcript, February 15, 2017, vol. 8, rev. 1 (draft).

[84] MBI 3 transcript, February 15, 2017, vol. 8, rev. 1 (draft).

and where the riding gang mustered for drills. An off-duty chief engineer said the riding crew participated in the lifeboat drills. An off-duty third mate stated that the riding gang would muster on the bridge during abandon-ship drills, though he said he did not personally observe them on the bridge because his muster station during the drills was lifeboat No. 2. He said that he did not recall seeing any of the riding crew muster at his station, but that he might not have seen them because he was usually busy with lifeboat operations during the drills.[85]

Several spouses of the Polish workers stated in written interviews that their husbands had been working on *El Faro* since the spring of 2015 and that they spoke highly of their supervisor (the off-duty chief engineer).[86] One, for example, reported of her husband: "He was very happy, especially about his relations with the chief who was assigning and supervising the work of the Polish crewmembers." Another said: "My husband liked his work and his relations with his crewmates. He often praised the Chief who was supervising his work." When asked about their husband's safety concerns and working conditions on the ship, one spouse reported: "He didn't go through any training about boat safety, such as an evacuation drill." Another quoted her husband as saying, ". . .you can't even imagine this old rust bucket I have to board." She also reported: "In general, my husband was happy with his job." Still another spouse reported: "Early during his contract, my husband told me that the boat was old and rusted throughout." She also said: "My husband liked his job."

Off-duty crewmembers and TOTE management stated that the safety signage on the vessel was not written in Polish, nor were documents related to emergency operations or orientation documentation for shipboard duties available in the Polish language. It is not clear whether the

[85] Interview off-duty third mate, December 6, 2015.

[86] Statements from Polish spouses. The spouses' interviews were translated from the original Polish.

Polish riding gang understood the safety procedures. Training records for the riding gang were requested from TOTE via the manning company, Intec Maritime Offshore Services. According to statements from two of the Polish riders' wives, their husbands had supplied their job history documents and certificates to Intec (their employer). Intec stated in response to an investigator's request for documentation that the company had not sent TOTE any employee resumes for the project, and that their workers are instructed to "follow the vessel rules and regulations while they are onboard."[87]

The off-duty chief engineer supervising the Polish workers had been temporarily assigned the responsibility. *El Faro* relief crew and officers who had contact with the Polish crew told investigators that the Polish workers did not speak English fluently. One was known to the crew as the group's unofficial "interpreter" and, according to interviews with crew and management, helped relay directions to his fellow Polish workers. According to witness testimony by a Polish worker who had left the ship the day before it departed on the accident voyage, the riding gang supervisor would tell the unofficial interpreter what they needed to do, and he would translate the directions to the rest of the riding gang.[88] For the accident voyage, each individual worker's ability to speak English could not be determined. Additional information regarding safety and survival training for the supernumeraries is found in the Survival Group chairman's factual report.[89]

Safety Concerns. The SMS contained a policy directing crewmembers to contact the DP if they had safety concerns.[90] The DP's phone number was posted throughout the ship. However,

[87] Email from Intec to TOTE management.

[88] MBI 3 transcript, February 15, 2017, vol. 8, rev.1 (draft).

[89] Factual information gathered during the investigation of the *El Faro* accident can be found online at http://dms.ntsb.gov/pubdms/search/hitlist.cfm?docketID=58116.

[90] OMV-20 (17), section 2.2.2.

the only shipboard or company-provided phone the crew could access was on the bridge. Permission to use that phone was at the captain's discretion, according to a former captain.[91] Crewmembers were not prohibited from having their own cell phones or satellite phones.

TOTE management stated that, in addition to the DP's phone number, a Speak Up website was posted on a flyer and placed on board all TOTE vessels, including *El Faro.* The flyer included a link to a company hotline where crewmembers could access the online reporting tool. The page included a toll-free number as well as instructions for placing a collect call. TOTE provided examples of three different flyers as evidence at MBI 3, including the most up--to--date version, which, according to TOTE, was functional at the time of the accident.[92] To use the online reporting tool required an internet connection.

Compliance and Audits. The captain of *El Faro* was required to report to management biannually regarding SMS/ISM compliance. Investigators obtained the previous year of quarterly reports. They included reports on the following: ISM surveys, nonconformity status, review of operations, analysis of accidents, training and drills, review of critical practices, necessary updates to ISM, chief engineer comments, and other items related to SMS/ISM compliance. The captain's latest ISM review was submitted to TOTE management on June 30, 2015.

Section 2 of the vessel operations manual listed requirements for internal and external audits. Internal audits were required at least every 12 months, with the objective of ensuring that

[91] MBI 3 transcript, February 16, 2017, vol. 9 (draft).

[92] TOTE Speak Up anonymous reporting flyers (updated).

TOTE's ISM quality management system was working effectively. Internal audits were to be completed by the DP.[93] External audits were typically conducted by ABS.

The DP stated that it usually took him 5 to 6 hours to complete an internal audit.[94] The most recent *El Faro* audit was completed by the DP on March 3, 2015, and submitted to management on June 4, 2015. The DP said that he interviewed various crewmembers and officers to "test" their knowledge of the company's SMS and was satisfied with their responses.[95] He stated that the SMS appeared to be well implemented on the ship and that records and logbooks, as well as required manuals, met company inspection criteria. No corrective action requests or nonconformities were reported.

Safety Briefings. The company's SMS system required regular monthly safety/security meetings to be held on the ship. Meeting minutes were submitted to TOTE monthly by the captain, indicating topics discussed and attendees. The minutes included information about safety alerts and topics in TOTE's quarterly safety/security/environmental newsletters.[96] Investigators obtained copies of the safety meeting minutes from January through September 2015. The latest submittal from the captain was dated September 24, 2015.

4.4.2 Heavy-Weather Guidance

TOTE's SMS addressed adverse weather in the navigation section of the vessel operations manual (OMV 10.8.1-4). It stated that "the master was responsible for the monitoring and analysis of the weather along the vessel's intended track." During adverse weather, the captain was

[93] Interview, manager of safety and operations.

[94] Interview, manager of safety and operations (No. 3).

[95] Interview, manager of safety and operations (No. 3).

[96] Monthly safety, security, and ISM meeting minutes.

instructed to "ensure that the vessel was properly handled" and to "take proper precautions to safely stow and secure all the vessel's equipment to prevent any damage to the equipment or vessel." The captain was to "advise the HQ Office of speed reductions and/or course changes due to adverse weather" and "should consider taking on additional ballast in adverse weather conditions."[97]

According to interviews and documentation, the company did not have specific procedures for heavy weather, aside from the general guidance given in the SMS. Section 10.13.7.3 of the SMS stated that the master was responsible for ensuring that the vessel was safe for sea before departing and that the chief mate was responsible for ensuring that all watertight doors and hatches were secure. This section of the SMS, however, did not provide details regarding the verification of those tasks. A prearrival/departure checklist was included in the SMS (OMV checklist 16A), [98] but the 41 items on that checklist do not include securing watertight doors, hatches, or external openings below the main deck. Testimony from off-duty officers indicated that this pre-departure checklist was used on *El Faro*. A specific heavy-weather checklist was not found in the SMS.

Company officials and crewmembers told investigators that favorable weather conditions prevailed on the run between Jacksonville and San Juan. They did not typically have to deal with hurricane conditions, although the vessel made the transit regularly during hurricane season (June through November). According to interviews with current crewmembers and employees of TOTE, safety meetings rarely included a discussion of hurricane preparedness. Company officials recalled two other weather events that affected *El Faro*'s route: Hurricane Danny and Tropical Storm Erika

[97] OMV, section 10.8.2.

[98] OMV checklist 16A prearrival/departure checklist.

in August 2015. Investigators reviewed company emails and safety alerts issued during those events.

On August 20, 2015, the DP sent out a safety alert for Hurricane Danny. The alert included the location of the hurricane and its forecast track and stated, as a reminder, that "all our vessels, in all oceans, should review their general and vessel specific heavy weather procedures and be prepared for the unexpected occurrence."[99] According to TOTE management, the DP issued the safety alert for Hurricane Danny to notify the fleet that hurricane season was beginning for the year, and to remind them that they needed to take preventive measures and be ready for the season. A safety alert was not issued for Tropical Storm Erika.

The company issued no alerts or email communications about Hurricane Joaquin before or during the accident voyage. Joaquin became a tropical depression at 2000 on September 27 while centered about 360 miles northeast of San Salvador Island in the Bahamas. The system became Tropical Storm Joaquin at 2000 on September 28. Though the system became a hurricane at 0200 on September 30, while it was centered 170 miles east-northeast of San Salvador Island, the National Hurricane Center (NHC) did not publicly identify the storm as a hurricane until 0739 that same day. [100]

According to TOTE management, the company's concern was vessels in port. Danny and Erika were forecast, long in advance, to affect TOTE's terminals and its vessels' routes. Joaquin, by contrast, was not predicted to affect the terminals, but rather only the area where the vessels

[99] Hurricane Danny safety alert issued by TOTE.

[100] See the Meteorology Group chairman's factual report for additional weather details.

would normally transit. In his testimony during MBI 1, the director of ship management explained:[101]

> In reference to Erika and Danny, those were both bearing down on our ports of call. Erika was bearing down on San Juan and Danny was bearing down on San Juan. And then bearing down on Jacksonville. So those [storms] would have directly affected not only our port operations, but our ships if we had scheduled a ship to be in port those days. Those hurricanes were forecasted to be out as much of a week bearing down on our two ports. And so obviously they had a significant amount of attention in the ports, significant amount of attention in the news media, and obviously we had to pay close attention to what we were planning for bringing our ships in….[a]nd obviously what's going to be happening if there's a hurricane bearing down on that port. Because you have nowhere to run. A port is – you can't run from a hurricane. And in contrast, since we're talking about hurricanes, you know Joaquin was – as recently as several days before the incident a tropical depression heading to the North Atlantic.

4.4.3 Captain's Decision-Making and Company Support

The *El Faro* captain reported to the TOTE port engineer,[102] who was assigned to support the operations of *El Faro*. During interviews, TOTE managers repeatedly stressed that the captain could make any and all decisions related to the vessel's operation. They also stated that the captain would approve the voyage plan unilaterally and make all voyage-related decisions without the concurrence of shoreside management. The captain stated twice on the VDR recording and in company emails that he was notifying the company about course changes and deviations as a

[101] MBI transcript for director of ship management (February 19, 2016).

[102] The port engineer evaluated the captain but was not his supervisor.

"professional courtesy."[103, 104] In his final phone call to the DP, he said, "I wanna push that S-S-A-S button . . . I just wanted to give you that courtesy so you wouldn't be blindsided by it . . .[105]"

According to TOTE, the captain was required to notify terminals of route changes or delays so that shoreside operations could arrange for coverage to unload the vessel on arrival.[106] As stated by TOTE management,[107] and in the OMV, the captain had full discretion to alter the vessel's route because of adverse weather. No one at TOTE, according to management, formally provided direct, real-time oversight of the captain's navigational decisions at sea. According to the director of marine operations–commercial, TOTE gives "broad discretion to the masters for weather routing and he can certainly reach out to the designated person, but they're not giving, the masters are given broad discretion on their own for weather routing."[108]

General voyage information was provided to shoreside management in noon reports, submitted by the captain each day while at sea.[109] The noon reports, required by the company's SMS, paragraph 11.5.3.1, were to contain the information listed in table 3.

Table 3. Information relayed to company in noon reports.

To: TOTE Ops.
From: (Vessel)
Subj: Noon Position Report (Date)
Geographic Position
Course

[103] VDR transcript: September 30, 14:05:50; 16:15:30.
[104] TOTE emails.
[105] VDR transcript: October 1, 07:12:16.
[106] MBI transcript for TOTE president (February 17, 2016).
[107] MBI transcript for TOTE president (February 17, 2016).
[108] Interview, director of ship management–commercial.
[109] Noon reports.

Distance to go
ETA (date, time and location)
Speed(observed)
Wind (direction and force)
Sea condition (direction and height(ft)) Swell (direction and height(ft))
Length of day
Observed miles
Engine Miles
Slip%
Average RPM
Shaft (brake) Horsepower
o Bunkers – Diesel consumed (LT)
o Bunkers- Diesel ROB (LIT)
o Remarks

Investigators reviewed the captain's email records for the period immediately preceding the accident. In his messages to the company, the captain indicated that he had been watching Joaquin for the better part of the week. The port engineer, when asked if he had discussed any weather-related factors with the captain, who had dinner with him on September 29, testified: "I think we discussed the tropical storm that was brewing but, at that time, that was all it was, was a tropical storm, so there was no concern about major weather."[110]

On September 29, the captain sent a departure message to TOTE. The message contained information such as time of departure, drafts, estimated time of arrival to next port, cargo information (number of containers, trailers, automobiles, etc.), and a comment that the captain (master) had reviewed and signed the voyage plan. The only other communications between the company and the vessel during the accident voyage was an email from the captain indicating that

[110] MBI transcript for port engineer (February 26, 2016).

he would like to change his return route because of the oncoming storm. The email is described in detail below.

In a series of text messages to an off-duty second mate who was on leave at the time of the accident, the captain reiterated his awareness of the storm. The text message exchanges that took place during the day on September 29 between the captain and relief second mate (2M) were as follows: [111]

10:03am 2M:	*Storm forming north of bahamas*
10:21am Capt:	*yup… thx for the heads up.*
6:31pm 2M:	*Whats your plan ?*
6:53pm Capt:	*we'll steam our normal direct route to SJP. No real weather to speak of until the evening of the 30th. all forecasted information indicates Joaquin will remain north of us and by the morning of the 01 st we will be on the backside of her. we are on schedule to depart the dock at 2000 tonight so everything is shaping up in our favor.*
7:09pm 2M:	*Cool if u have to we have routrs thru mauagiez crooked isle or ne prov chnl.*

In an email to the DP and director of marine safety and services, dated September 30, the day after they got under way, the captain reported that he had been monitoring Hurricane Joaquin's track for the better part of a week.[112] In the email, he stated that he had previously adjusted his course to a more southeasterly direction to account for Joaquin, and that he anticipated passing approximately 65 nautical miles to the south of the eye of the storm. The captain included in the

[111] Spelling errors are left as originally transmitted.

[112] Evidence emails, DP.

email a caption that read, "***QUESTION***," further detailing that he would like to take an alternate route for the return voyage from San Juan to Jacksonville. He said that he would await a response before taking this route. His full email is shown below:

Subject Line: SB El Faro / Vessel Update / Hurricane Joaquin

Good Afternoon,

Per the latest BVS weather file and NWS Hurricane Center Miami, FL.

Center of Hurricane Joaquin: 24.7n 72.6w.

Direction and Speed: South Westerly at 5k.

Barometric Pressure: 971mb.

Winds: 50k with gusts up to 70k.

Seas: 12' - 14' throughout tonight and into tomorrow morning are expected.

I have monitored Hurricane Joaquin tracking erratically for the better part of a week. Sometime after 9/30/0200 she began a southwesterly track early this morning. I adjusted our direct normal route in a more southeasterly direction towards San Juan, Puerto Rico, which will put us 65, plus or minus, nautical miles south of the eye. Joaquin appears to be tracking now as forecasted, and I anticipate us being on the back side of her by 10/01/0800. Present conditions are favorable and we are making good speed. All departments have been duly notified as before. I have indicated a later than normal arrival time in San Juan, Puerto Rico, anticipating some loss in speed throughout the night. I will update the ETA tomorrow morning during our regular pre-arrival report to SJP, etc.

****QUESTION****

I would like to transit the Ol' Bahama Channel on our return northbound leg to Jacksonville, FL. This route adds approximately 160 nm [nautical miles] to the route, for a total of 1,261 nm [nautical miles]. We'll need to make around 21k [knots] for our scheduled 10/05/1045 arrival time at Jacksonville Pilot Station.

This precaution will take the uncertainty of Joaquin's forecasted track and as you can see, she really develops into formidable weather pattern on 10/03-05/15. I am confident that Joaquin will track in a northerly direction once reaching the gulf stream current.

I will wait for your reply before transiting the Ol' Bahama Channel on our return leg to Jacksonville, FL.

Should you have any questions or concerns, kindly contact this vessel.

The captain also reiterated his intention to sail within 65 miles of the hurricane in an email to the captain of *El Yunque,* which was northbound from San Juan. [113] The *El Yunque* captain had asked about *El Faro*'s route and the weather related to Hurricane Joaquin.

El Faro's second mate was responsible for developing a voyage plan that would take the ship to its destination. On a typical run, both *El Faro* and *El Yunque* would normally follow the Atlantic route, which would take them on a straight line from the sea buoy at Jacksonville to San Juan. Diversion routes had been used by both *El Faro* and *El Yunque*, notably the Old Bahamas Channel route. In late August 2015, when Tropical Storm Erika and Hurricane Danny both hit the eastern Bahamas, *El Faro* took the Old Bahamas Channel to San Juan. That route was longer but afforded the protection of the Bahama Islands in reducing the hazardous weather associated with a tropical storm or hurricane.

On the VDR transcript, on September 30, at 21:20.35, the third mate and the AB discussed the Old Bahamas Channel and the hurricane: [114]

AB-3: yeah I remember when I came on here back in February– I was asking– well you know– you know about the hurricane history (of/on) these things and he said– everybody's like– just shrugging like– "nuhhhh– whatever"– you know. "we never see anything ever."

AB-3: short memories. yeah– I mean...

CM: well some captain would have taken one look at that and (went) "we're gunna go the Old Bahama Channel." "we're not we're not takin' any chances (here)."

[113] Evidence emails, *El Yunque* captain.

[114] VDR transcript: 21:20:35.7.

AB-3: that's what I thought we– we were gunna do.

3M: "...and we'll go well south of it and we'll be gettin' in a little bit late.– we'll be off schedule though– but we'll catch up".……

3M: I don't know. I'm not gunna second guess somebody.– the guy's been through a lot worse than this. he's been sailing for a long– long time– he did it up in Alaska.

4.4.4 Monitoring Vessels at Sea

The ISM Code states that a company should establish in its SMS that the master has the overriding authority and responsibility to make decisions with respect to safety and pollution prevention and to request the company's assistance as may be necessary.[115] TOTE's SMS stated the master's overriding authority regarding safe navigation of the vessel. Under TOTE's SMS, the captain was responsible for the monitoring and analysis of the weather along the vessel's intended track, and to take whatever action necessary to prevent excessive damage to the vessel from heavy weather. Also under the SMS, the captain was required to advise shoreside management of speed reductions and/or course changes due to adverse weather.[116]

In the case of Tropical Storm Erika, the following series of communications took place between the captain of *El Faro* and shoreside staff[117]:

At approximately 1039 on August 25, a Tote Maritime Puerto Rico employee at the Jacksonville terminal sent an email to 13 shoreside personnel in Jacksonville and San Juan (as well as 3 vessel captains), with the subject "Tropical Storm Erika update for SJU this week."[118] The email provided information about actions the Coast Guard was taking to implement an indefinite

[115] ISM Code, chapter 5, section 5.2 (2014).

[116] OMV section 10.8.2, "Adverse weather."

[117] Email excerpts from MBI Exhibit 4, Weather and Operations, TS Erika, pp. 41-59, 80-81. Note that this single footnote includes all emails referenced in Section 4.4 of this report related to Tropical Storm Erika.

[118] SJU refers to the San Juan Terminal.

port closure because of Erika. No information was requested from the vessels' masters. At approximately 1046 on August 25, the president of Tote Maritime Puerto Rico responded: "Thanks for the update . . . and lets make sure we stay in communication. Stay safe to everyone at sea!"

About 1210 on August 25, the captain replied (not in response to any question) and advised (a) that he had reviewed the weather and planned to avoid the storm by taking the Old Bahama channel; (b) that the new route would add approximately 160 miles to the voyage, but that it was a safer route that allowed options if Erika's track changed; and (c) that they were making weather preparation plans, including plans to secure cargo. At approximately 1424 on August 25, the director of ship management responded to the *El Faro* captain: "Thanks Capt. . . Good plan. Stay safe." At approximately 1526 on August 25, the vice president of marine operations–commercial responded to the captain of *El Faro*: "Voyage plan noted and concur with your assessment. Please keep all updated as the situation changes."

At approximately 1706 on August 26, during Tropical Storm Erika, the DP sent the following in an email to the captain and other shoreside personnel: "to ensure we are all on the same page and nothing is missed in the risk assessments and action area, please send me a detailed email with your preparedness/avoidance plans and update daily until all clear." About 1949 on August 26, the captain of *El Faro* responded to the DP, copying other shoreside personnel, reiterating his plans to use the Old Bahama Channel to avoid Erika, as he had stated the previous day, and the benefits to doing so. He also sent updated information on the vessel's speed and his assessment and intentions with regard to the potential port closure in San Juan.

At approximately 1225 on August 27, the captain sent another email to company management that included updated storm information and preparation plans for the vessel and

crew. He also informed the DP that he would address a number of items with the crew at the safety meeting later in the day. Based on emails, interviews, and the VDR transcript, there is no evidence that the company requested a similar risk assessment during the accident voyage.

At 1109 and 1306 on August 28, the captain provided additional reports to the DP (and other shoreside management), updating the status of the weather reports they had received, the weather they were experiencing, the status of the port closure, information about pilots, and expected docking time in San Juan[119].

In the case of Joaquin, the *El Faro* captain sent a report to shoreside staff (including the DP) regarding the storm at 1022 on September 30, approximately 12 hours after the vessel left Jacksonville. The captain's report included forecast details of the hurricane (location, projected wind speed, direction the system was tracking) and his intended strategy to avoid the storm. The report was acknowledged by the director of marine operations –commercial at approximately 1545.

TOTE did not have a policy for monitoring its vessels while they were at sea. However, as noted earlier, a review of company emails revealed that TOTE sent both emails and a safety alert to its vessels during Hurricane Danny and Tropical Storm Erika earlier in 2015. Investigators found no company emails related to Joaquin, as either a tropical storm or a hurricane. Noon reports of the ship's position and current weather were sent by *El Faro* as required by the company's SMS. However, according to interviews with the director, the manager of the safety and services department, and upper management, no one at the company was aware of the ship's position in

[119] Emails between captain and management, TS Erika weather and port updates.

relation to the storm or other risks during the accident voyage. The DP stated in an interview that nobody was assigned to monitor ships at sea.[120]

The email the captain sent at 1322 on September 30 to management (described above) said, "I will wait for your reply before transiting the Ol' Bahama Channel on our return leg to Jacksonville, FL." At 1405, the captain was heard on the VDR discussing taking the Old Bahama Channel on the return trip north. He told the second mate (as recorded on the VDR) that they were awaiting confirmation from the company to change the return route: [121]

> *Capt: so there's a possibility you're gunna take the Old Bahama Channel comin' home– on the northbound.*
>
> *2M: the charts already on the second drawer down.*
>
> *Capt: perfect– thank you. I have to wait for confirmation from the office but I put it out there.*[122]

The second mate asked the captain about company permission and how it used to be that "we're just doing it." He replied that he was extending a "professional courtesy" because it added 160 miles to the route. At 1546, the director of ship management replied to the captain, "Diversion request through Ol'Bahamas Channel understood and authorized. Thank you for the heads up." The director of ship management stated that, although the captain did not need permission from the company, he responded with an approval message only because the DP had not yet responded.[123]

[120] Interview, manager of safety and operations.

[121] VDR transcript, 13:20:10 on September 30.

[122] VDR transcript, 13:20:10.8–13:20:17.

[123] Interview, director of ship management–commercial.

4.4.5 Hiring and Position Assignment

The captain of *El Faro* on the accident voyage had worked for TOTE from 2005 to 2010 before leaving to work for another company. In 2013, the captain contacted the TOTE crewing manager to request a position at the company. The crewing manager provided him with a third mate position on the SS *Pacific Tracker*, which he continued for two contracts before becoming master on *El Morro*. The crewing manager stated that the captain's suitability for reemployment was determined on the basis of his experience and previous employment with TOTE. She said he had sailed for TOTE "with no prior disciplinary issues."[124] She stated that the circumstances behind his resignation from the previous company were not explored. She also explained to the MBI that it was not typical for her, when bringing in new captains or crewmembers, to check with previous employers and ask for references and background information about how they did their job.

Investigators requested from the captain's previous employer a copy of his performance evaluations (and related material) for the last 2 years of employment, any disciplinary reports, and his letter of resignation. Although the company provided no performance evaluations, investigators found documentation related to his performance, including two letters of warning and a letter describing a meeting between the captain and management in which they discussed the following four areas: overtime for cargo operations; concern of unprofessional or disparaging remarks to nonvessel personnel by vessel officers; perception of master disassociating himself from daily activities; and perception of disharmony between master and senior officers. During this meeting, management advised the captain that he was to be conscious of his "interactions with his senior

[124] MBI 3, February 16, 2017, vol. 9 (draft).

officers and to exert efforts to dispel any perceptions of disharmony—this is not to say that the master is to be everybody's best friend, but to manage a safe and healthy working environment."

In one letter of warning, two violations were listed in relation to the reporting of an accident. The company warned that "any further incidents of policy infractions or poor job performance would cause us to have a loss of confidence in you as master within our fleet of vessels," resulting in further disciplinary action, up to and including termination.[125] A second letter of warning indicated a failure to notify management of actual or suspected cargo damage. The letter stated: "Previously you have been warned that any further incidents of policy infractions or poor job performance would cause us to have a loss of confidence in you as master within our fleet of vessels, and more severe disciplinary action, up to and including, your termination would occur." The captain submitted his resignation letter during the month of the second warning letter.

A review of TOTE company emails indicated that the director of ship management, as well as the crewing manager, had concerns about the captain's performance on the ship.[126] The crewing manager was asked by the company's director of labor relations to provide information related to the captain's performance. In an email dated May 26, 2015, the crewing manager expressed her "dwindling confidence" in the captain.[127] When asked about her concerns at the MBI hearings, she stated, "I felt that there was better candidates available for the Marlins."[128] She also stated that her dealings with the captain were "regarding crewing, and so I would not have judged his suitability as a master." She explained that the reason she was expressing her concern was that the director

[125] Letters of warning from captain's previous employer.

[126] Investigators reviewed company email records for the 10 months preceding the accident voyage.

[127] TOTE emails between crewing manager and director of labor and risk management.

[128] MBI 3 transcript, February 2, 2017, vol. 9 (draft). Marlin-class vessels are the world's first container ships powered by LNG.

of labor relations asked her to provide some history and a summary of the interview selection committee's discussions about the new LNG ships.

The director of ship management, in an email to the vice president of TOTE on July 8, 2015, stated: "He's stateroom Captain, I'm not sure he knows what a deck looks like period. Least engaged of all four Captains in the deck operation." When questioned about this statement during the first MBI hearing, the director of ship management explained that this was "a matter of style" and that the captain "had a different style than I prefer as a Ship Manager. But he was a very effective captain."[129] He stated that this characterization of the captain was based on input he had received from a chief engineer.[130] No letters of warning or reprimand were found in the captain's TOTE personnel file. However, email records confirmed that a verbal warning was issued to the captain regarding welding repairs not being carried out.[131]

In early 2015, TOTE management assigned the captain positions for the new LNG ships, the *Perla Del Caribe* and the *Isla Bella*. None of the captains who were employed by TOTE at that time were selected. Those assignments were slated for former chief mates and new TOTE employees.[132] According to the testimony of off-duty crew and spouses of officers, the selection of personnel and uncertainty about who would be assigned to the new vessels caused discord on *El Faro*. According to MBI testimony, the captain was advised around May 12 by the director of labor relations that he was not selected to work on TOTE's new LNG ships. According to the director of labor relations, when he started in his position in March 2015, "the parameters had kind

[129] MBI 1 transcript, day 4, pages 71-72.

[130] MBI 1 transcript, day 4, page 74.

[131] MBI 3 transcript, February 16, 2017, vol. 9 (draft).

[132] Crewing lists for *Isla Bella* and *Perla Del Caribe*.

of already been set that we weren't really considering the current PONCE class masters".[133] He stated that around July, senior management decided to bring the captain in for an interview and be reconsidered.

The captain was interviewed on August 4, when management decided to offer him the job. However, before the company president could notify him, an issue was brought to senior management's attention regarding the company's zero-tolerance alcohol policy and the captain not ensuring that his crew was following that policy. According to testimony from the director of labor relations, this was an "alleged" incident and "was not documented, it was all verbal second-hand information." Management delayed its discussion with the captain about the job indefinitely. The following is an excerpt from an email the captain sent to a family member, dated September 24, 2015, indicating that he still did not know if he was going to get a position on one of the new ships:

> *It's looking like I won't be home until 03 Dec. They have no one to relieve me and now I am actually on my scheduled rotation, which has me home for Xmas. Again, I feel taken advantage of . . . But, they pay really good. Who knows how long this good fortune will last. I have no idea if I am even going on the Marlin Class vessels yet.*[134]

The director of labor relations stated in an interview that the company planned to have the captain sail on *El Faro* in the Alaskan trade.[135] However, this testimony conflicted with a statement by the vice president of TOTE, who stated when asked if they were considering keeping the captain's appointment aboard *El Faro*: "I do not believe [he would remain] in the master role, but

[133] MBI 1 transcript, February 17, 2016

[134] TOTE emails.

[135] Interview, director of labor relations and risk management.

there was certainly opportunity for him. He could sail on the vessel, say, possibly as chief mate or second mate."[136]

Selection criteria for hiring captains on the LNG ships were not provided to investigators. Interviews with TOTE management indicated that there were no specific criteria by which they selected officers.[137] When asked if interview questions were standardized to ensure that candidates who were not selected could not file a union grievance against TOTE, the director of marine services indicated that they did not standardize interview questions, stating, "That's not anything we discussed as a group."[138] A former chief mate on *El Faro* was selected as captain on one of the LNG ships. He stated that he was not formally interviewed and that he was unaware of how he was evaluated for the captain's position.[139]

There were no documented issues in the captain's personnel file and no evidence indicating a specific skill or quality he lacked. According to a July 2015 email from the captain to the director of AMO, the captain was displeased with TOTE's decision not to place him on one of the new ships:[140],[141]

> *As per our recent cell phone conversation on 26 June 15 and email below...*
>
> *Are there any further developments regarding the answers to my questions?*
>
> *After being informed that I was not a candidate for the Marlin Class Vessel's, I asked the following questions.*

[136] Interview, vice president of marine operations.

[137] Interviews: TOTE director of labor relations and risk management; director of marine safety and services; vice president of marine operations.

[138] Interview, director of marine safety and services.

[139] MBI 3 transcript, February 6, 2017, vol. 1 (draft).

[140] AMO refers to the American Maritime Officers, the largest union of U.S. merchant marine officers.

[141] Spelling errors in the original message have been retained.

Q1. Is there any particular reason or reasons why I was not considered as a candidate for the marlin class vessels?

A1. "No, Tote is going in a different direction."

Q2. Are there any qualities and/or qualifications that you (Tote) where looking for in the candidates, so that in the future I might be better prepared, should an opportunity present itself?

A2. "Yes, and I am not going to discuss that with you."

As a recap:

Tote asked me to assume command on the El Morro after CBP [Customs and Border Patrol] was threatening to seize the vessel for its contraband violations. I excepted the assignment and established a professional culture on her and transferred that same culture over here to the El Faro. To my knowledge, I have maintained a very high standard of operating procedures, of the likes these ships have not seen in the past. For the past two years, I have received nothing but praise from Tote on both the west and east coasts and Sea Star Lines. [142]

The company tried to ensure that crewmembers who were slated for the new LNG vessels were discreet about their new roles by having them sign nondisclosure agreements (NDAs), indicating that they would not speak about their new roles to anyone, including other crewmembers. According to a former boatswain and an AB, both interviewed at the third MBI, crewmembers were upset about not being selected for the new LNG ship positions. The boatswain stated that "all the fellows after being on that run for 5 years to 13 years, sure they wanted a shot at the new ship and were upset that they weren't picked, or they hadn't been talked to at least to go to the LNG, the new LNG class." [143]

When the AB was asked if the selection of the crew and officers for the new ships caused any problems on board, he replied, "Oh, it caused a big deal . . . normally, when you go on ships, you never hear the mates talking in front of the, talking in front of the unlicensed. But I guess it

[142] Emails between captain and AMO representative.

[143] MBI 3 transcript, February 14, 2017, vol. 7 (draft).

hit them so hard 'till you couldn't, they couldn't hold it back, so I heard their conversations . . . [a former captain], it was told to him that they trying to go a different route . . . I seen him quit on the bridge and he's a captain. But he couldn't take it no more, so it was just a lot going on. Then you got the, now you got the guys who are going to the new ship, they having problems with the guys who are not going with the ship."[144]

4.5 Bridge Team

4.5.1 Duties and Responsibilities

Captain. The company's SMS explains the role of the captain as follows: [145]

> The captain of the vessel has the overriding responsibility for the safe operation of the vessel, and the authority and discretion to take whatever action he considers in the best interests of the crew, vessel, and marine environment. The overall responsibility for supervision, budgetary control, technical and supportive services is with the Company and to establish, implement and review (semi-annually) the Quality Management System (QMS), safety and environmental protection programs contained therein. The Captain has the primary responsibility to ensure that the crew is motivated in the observation and accomplishment of policies laid out in the quality management documentation.

In addition, the SMS states that the captain is

> completely responsible for the safety, seaworthiness, maintenance and habitability of the vessel, the crew and its cargo. He/she must ascertain that shipboard practices meet the criteria for safe operations and comply with all applicable laws, rules and regulations. It is the Master's responsibility to maintain

[144] MBI 3 transcript, February 14, 2017, vol. 7 (draft).

[145] OMV, rev. 21, August 2015.

> familiarity with and comply with all company policies and motivate the crew towards the observance of these policies.[146]

Chief Mate. According to TOTE's SMS policy, the chief mate was head of the deck department and should "be familiar with the Company's 'Operation Manual–Vessel (OMV),' Emergency Preparedness Manual–Vessel (EPMV) related manuals, and carry out his duties in strict accordance with this manual."[147] Other duties, as stated in the SMS policy, included:

- Responsible to the master for supervising the operations of the deck department.
- Responsible to manage deck machinery, equipment and systems and shall discuss and coordinate all intended maintenance work with the ships master and chief engineer.
- Considered a key component of the vessel's management and maintenance.
- Responsible for the safe and efficient loading, discharging, and care of the vessel's cargo.
- Familiar with the entire cargo-handling system on board the vessel and ensures that timely inspections of cargo gear or systems (in conjunction with regulatory requirements and modified for frequency of use) are performed and shall also make the appropriate logbook entries.
- Must be completely familiar with the vessel's stability/cargo computation system.
- Shall be completely familiar with the safety and firefighting equipment, including use and effective deployment. As head safety officer, is responsible for the maintenance and operation of all on board safety equipment. He/she shall ensure that personnel

[146] OMV, section 5.1.1.

[147] OMV, section 5.1.2.

protective equipment is available and utilized in accordance with company policies and as working conditions dictate.

- Considered, by the company, to be master-in-training and must, therefore, always conduct himself accordingly. Should familiarize himself thoroughly with all of the master's duties in addition to his own. Shall be familiar with company policies and manuals. In the absence of the master, will assume command of the ship.
- May be assigned to a watch by the master. Must have a good working knowledge and be thoroughly familiar with all navigational equipment.

Second Mate. The second mate was the navigation officer and was responsible for "bridge navigational equipment, general bridge maintenance, and the inventory of associated supplies." [148] Other duties included "keeping of the vessel's charts and publications" and preparation of the voyage passage plan. The second mate also checked cargo, as directed by the chief officer. When the ship was in port, the second mate stood watch on a 6-hour on/6-hour off rotation and assisted the chief mate in the general oversight of cargo loading and discharge operations.

Third Mate. In addition to watch duty, the third mate was responsible for ensuring that lifesaving and emergency equipment aboard the vessel complied with regulations and company standards. When in port, the third mate stood a 6-hour cargo watch and then had 6 hours off. The third mate rotated with the second mate. His duties in port were essentially the same as the second mate's—overseeing the safe loading and securing of cargo.

[148] OMV, section 5.1.3.

4.5.2 Bridge Resource Management

Bridge resource management (BRM) is described by ABS as "a method of performing bridge watch keeping tasks in which crews behave in an efficient and team oriented manner to maintain overall situational awareness and use all available resources including information, equipment, communication, procedures, and people to achieve safe operation."[149] According to TOTE's SMS policy, bridge team management means "the cooperation and sharing of responsibility that exists between Master, deck watch officers, helmsman and lookout. The Master and all deck officers must do their utmost to preserve a businesslike atmosphere on the bridge. At all times an efficient, clear and precise manner of internal and external communications must be used." The SMS policy also states: "The formation and leadership of the bridge team is the primary responsibility of the Master and is just as important as his/her primary duty to the safety of the vessel. Teams do not just happen. They have to be formed and trained to work as teams. It is important therefore that Masters look at their leadership and management styles objectively and put into practice the lessons learned at various management courses and seminars as well as the lessons covered in the TSI [TOTE Services, Inc.]: Casualty Analyses, Safety Alerts and Safety Newsletters." [150]

The bridge team, aside from the captain, had completed BRM training between 2013 and 2015. The captain received BRM training in 2008, though it was not required until the amendments made to STCW in 2010 came into force on January 1, 2017. STCW regulation I/15 contains a

[149] *The implementation of bridge resource management.* Guidance notes. ABS June 2005.

[150] OMV, section 10.2.

grandfathering clause that allowed the captain to forgo additional BRM training until he renewed his credentials after January 2017.[151]

As described in a publication for marine navigational officers,[152] when implemented properly, a bridge team has the following characteristics:

- Maintains its situational awareness, avoiding becoming preoccupied with minor issues, which might cause them to lose sight of the big picture.
- Continuously monitors the progress of the vessel, making adjustments and corrections as necessary to maintain a safe voyage.
- Acquires relevant information early.
- Appropriately delegates workload and authority.
- Anticipates dangerous situations.
- Undertakes appropriate contingency plans when necessary.

Teamwork and Communication. BRM training encourages junior officers to be an integral part of a team, putting forth their opinions and, when safety is of concern, challenging their superior officers. Senior officers, in turn, would effectively be more open to gathering feedback from the bridge team. The bridge team on *El Faro* had worked together before and carried on conversations on various topics while on the bridge during their watch rotations. The captain worked with the chief mate to plot the new route after they started seeing the weather change the morning before the accident.

[151] STCW regulation I/15 ("transitional provisions") states: "Until 1 January 2017, a Party may continue to issue, recognize and endorse certificates in accordance with the provisions of the Convention which applied immediately prior to 1 January 2012 in respect of those seafarers who commenced approved seagoing service, an approved education and training programme or an approved training course before 1 July 2013."

[152] *The Navigator*, issue 7, October 2014 (London: The Nautical Institute).

The mates and ABs discussed their concerns about the weather and the ship's route on the bridge, where they were recorded by the VDR. The conversations were not repeated in the captain's presence. After the captain went to his stateroom about 2000 on September 29, the following discussion took place between the third mate and the AB on watch:[153]

*3M:... * * and hurricane is right there.*

CM: and this is it's track line right there?

*3M: this red– yeah. goes (from/through) here and goes back see how it follows the track up * *. for us– this is oh [zero] three hundred– another– (four) hours. so this is here– this is early in the morning here– this is (my plot) here the * * *. the other thing that concerns me is that this says the wind is fifty-three (knots) and * * * at the eye– about the highest speed over here has it at forty-three– ten miles less. I listened to the Weather Channel and they were talkin' about it being more powerful than that. so I am wondering if it's– from what I remember I heard numbers like seventy or eighty (miles per hour). if this is off by forty knots then (we're back) and (we're gunna be here) * sixty here. you know I don't know– that's– so this is the (second) diversion (you know/from hell). * first we were gunna do this. (gunna/then) come down here and do this. this our original course line– we just moved it to the south– you know. and then we just adjust(ed) it again to the south.*

3M: I guess if it doesn't get too crazy (we'll just) get down here. it's just I don't I don't like being so close to something here mhmm. mhmm.

AB: what time we gunna get through it? this right here is going to be uhh… that'll be in the daylight.

*3M: no this is umm– this is gunna– there's midnight. * like uh– one or two in the morning which will be right (about/past) here. right after that turn so maybe three o'clock in the morning– maybe three– four o'clock in the morning. it's very *.*

AB: mmm.

3M: (let's) see how this thing goes. we can't outrun it you know.

*3M: it's more powerful than we thought. * this is this is supposed to hook right here. it's supposed to make this stop– getting any closer it's gunna turn toward the north– what if it doesn't.*

[153] VDR transcript, 20:22:00.1 through 20:24:47.3.

AB: what if we get close– we get jammed in those islands there and it starts comin' at us. I don't know

3M: that's what I'm thinking. maybe I'm just being a chicken little. I don't know.

AB: turn around and go back.

About 19:59 on September 30, the captain and chief mate had a brief conversation that was unintelligible on the VDR.[154] The captain's voice was not detected again on the bridge until 04:09:49 the next morning. The following are communications regarding the storm and the vessel's track from the time the captain told the crew he was going to his stateroom to the time he returned:

(1) The captain told the third mate as he left the bridge for the evening at 1954, "*I will definitely be up for the better part of your watch. so if you see anything you don't like don't (hesitate to change) course and give me a shout . . . .*" [The third mate was on watch from 2000 to 0000.][155]

(2) The third mate called the captain's stateroom at 2305 and said, "*hey captain sorry to wake ya…just lookin' at the forecast and lookin' at our trackline. which way it's goin' and uhhh– thought you might wanna take a look at it….. uhh well it's– the– the– the current forecast has it uhh– max winds um a hundred miles– an hour. at the center.– umm and if I'm lookin' at this right– um– and it's moving at– at two-three-zero at uh five knots. so I assume it stays on that same– moves that same direction for say the next five hours. and uh so it's advancing toward our trackline– and uhh– puts us real close to it. umm you know like– I could be more specific– I could um– plot that out. but it's*

[154] VDR transcript, 19:57:19.3.

[155] VDR transcript, 19:43:55.1.

gunna be like real close (and). and uh– don't know. uh– uh I can give ya a better number and call ya back. we're lookin' a meet it at say like four o'clock in the morning. (you know)."[156]

(3) The third mate again called the captain at 2313, stating: "*so– at oh–four hundred we'll be twenty-two miles from the center. with uh max one hundred with gusts to one-twenty and strengthening so– the option that we do have– umm from what I can see– is at oh-two hundred we could head south. and that would open it up some– so I mean of course I'd want you to verify what I'm seeing. I do understand you expect us not get into the quadrant dead ahead and (expose) us. just so you know that– that's how that's how close we'll be.– your welcome.*"[157]

(4) The third mate then told the AB that the captain "*seems to think that we'll be south of it by then—so the winds won't be an issue.*" [158] "w*hat he's saying is 'well– we'll be in the southwest quadrant. wind will be comin' from the north.'— so.*" He then said to the AB, "*I trust what he's saying– it's just being twenty miles away from hundred knot winds– this doesn't even sound right.*[159]"

(5) When the second mate was on watch, she plotted a new route, based on weather information she obtained from Sat-C and NAVTEX. She explained her planned alternate route to the AB around 0041. About 15 minutes later, the AB asked if they were going to change course at 0200, to which she said, "*I don't know. gosh. I might call the captain*

[156] VDR transcript, 23:05:08.7 through 23:06:43.4.
[157] VDR transcript, 23:13:38.3.
[158] VDR transcript, 23:26:03.6.
[159] VDR transcript, 23:26:47.7.

here shortly if he doesn't come up.– see if he can.[160] *. . . I don't know if he can sleep knowing all of this.*"

(6) About 30 minutes later, at 0120, the second mate called the captain, stating, "(*uh) I just wanted * * * (runs) south (of the) (island) * * * (old Bahama/weather) channel * * * we'll be meeting the storm. umm fox news just said it's up to category*[161] ** * *. yeah– yes (that's what I heard) * **. it isn't lookin' good right now .– right now my uh– trackline I have zero-two hundred– alter course straight south and then (we'll) * go through all these * shallow areas. umm (and the next) course change (will/gunna) be (through the Bahamas) and then (just gunna) turn * * *.*" A few seconds later, she says to the captain on the phone, "*alright I'm gunna adjust course (that) @3M (had/planned) * * *. he wants to (run) * * *. * * *. * ** one-one-six.*"[162] She then says to the AB, "*hooold on to your ** @AB-2.*" [spoken very loud and dramatically and then the sound of laughter.][163]

(7) The next time the captain was heard on the bridge was at 0409 on October 1.

The third mate, during his handover to the second mate, mentioned that earlier on the Weather Channel he had heard discussions about the strength of the storm. He told the second mate at 2357 on September 29, "*what's concerning me is that the umm– is that– the information we're getting from other sources is so much different from this. * *. the information we've got here*

[160] VDR transcript, 00:58:58.0.

[161] VDR transcript indicated that about 5 minutes before the phone call, the satellite radio reported the storm as a Category 3 hurricane.

[162] VDR transcript, 01:22:01.6.

[163] VDR transcript, 01:22:23.1. The transcript indicates when personal names are used by abbreviations such as @3M and @AB2. The transcript contains no actual names.

*also * * (wants to intense) * * *.*"[164] This was the longest turnover (16 minutes) recorded on the VDR.

Turnovers at the end of each watch varied in length and detail. The captain had requested that barometric readings be logged every hour, starting around 1315 on September 30.[165] Several discussions about the barometer readings were heard on the VDR, but not during the turnovers. Investigators did not hear any discussion on the VDR between the bridge team and the engine room regarding the storm during the hours before the sinking. The SMS states the following: [166]

> TSI [TOTE Services, Inc.] attaches great importance to correct and careful taking over of watches and instructions for watch relief, therefore, the policies defined in this manual shall be strictly followed. The ICS [International Chamber of Shipping] Bridge Procedures Guide, Part II Section 7 and Part I Section 2.4 covers procedures for changing the watch that are in addition to any special instructions stated in the Master's standing orders. At the change of each bridge watch a check off list shall be completed as found in OMV Section 16.2.

A former third mate stated that a checklist was always used during his watch turnovers on *El Faro*. According to the VDR data, turnover times varied. It is unclear from the recordings whether a checklist was used.

Situational Awareness. Maintaining situational awareness is important for a properly functioning bridge team. Situational awareness can be defined as "comprehension or understanding of a *dynamic* environment." [167] That means obtaining the current information

[164] VDR transcript, 23:57:04.4.

[165] VDR transcript, 13:17:04.8.

[166] OMV, section 10.13.3.

[167] F. Durso, K. Rawson, and S. Girotto (2007). "Comprehension and situation awareness." In F. Durso, R. Nickerson, S. Dumais, S. Lewandowsky, and T. Perfect (eds.), *Handbook of applied cognition*, 2nd ed. (Hoboken, New Jersey: Wiley), pp. 163-194.

available, what information has been received, accurate comprehension of that information, and the ability to predict, to some extent, the future status of the information.

The crew of *El Faro* received weather information from different sources: BVS, Inmarsat-C (SAT-C), and NAVTEX, as well as the Weather Channel and Coast Guard securité warnings. The captain did not download the BVS data issued at 2300 on September 30 until 0445 on October 1. However, the vessel received SAT-C data around 2255 (not shown below on figure 2). That was around the time the third mate called the captain and requested that he come to the bridge to look at the weather data. (See section 4.5.2 for more detail about that phone call from the bridge to the captain's office.)

Figure 2 plots the information available to the bridge team around 0500 on the morning of the accident, after the captain downloaded (at 0445) the previous evening's 2300 BVS file, and right after the new Sat-C was available on the bridge (at 0446). At that point, the BVS information (blue) was almost 12 hours old (6-hour latency, plus additional time between receiving the email and downloading the data). The Inmarsat-C information was current as of 0446.

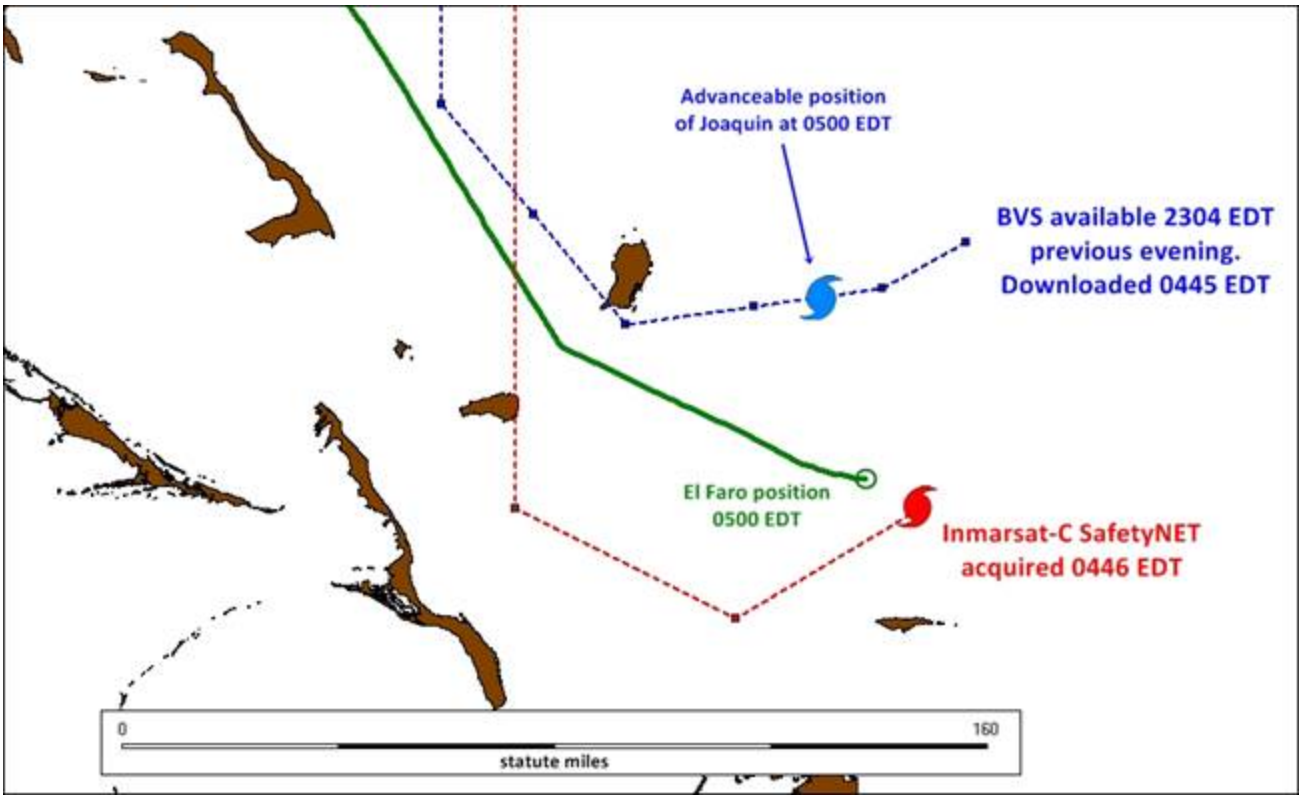

Figure 2. Position of hurricane vs. conflicting weather data obtained by *El Faro* and available on bridge at 0500 on October 1 (plotted by NTSB).

At 0503:30 on October 1, the captain stated on the VDR recording that he had conflicting information:

> *… but here's the thing– you got two G-P-Ss– you got five G-P-Ss– you gunna get five different positions. you got one weather program (and I use/and use) B-V-S and that's what I (sent) up here * we're gettin' conflicting reports as to where the center of the storm is.*

The captain made statements indicating that he did not think the storm was going to be very bad. When discussing various route options and waypoints with the chief mate, the captain said, "*it's a good little diversion are you feelin' comfortable with that chief mate*" to which the chief mate said, "*better. yes sir…the other option is drastic.*" The captain responded, "*ya. It doesn't warrant it…you can't run…every single weather pattern…now that would be the action for some*

guy that's never been anywhere else…(for now) we'll just sit on the bank and fish for trout."[168] The second mate told the third mate, "**** he's tellin' everybody down there– "ohhh it's not a bad storm. it's not so bad. * * it's not even that windy out * * seen worse.*"[169] The captain called the storm a "*front*" and stated, *"there's nothing bad about this ride,"* to which the chief mate made a comment about sleeping.[170] The captain informed the chief mate that he was *"sleepin like a baby"* [171] during the night of September 30, to which the chief mate responded, *"not me"* and the captain asked, *"what? Who's not sleepin' good? (how) how come?"*

The captain repeatedly stated that they were "*on the back side*" of the storm or would be soon.[172] For instance, at 05:18:37 the captain said to the chief mate: *"only gunna get better from here. Yup we're on the back side of it."*

> *Captain, 05:21:45: right now I'm just (waitin' for wind shift)….*
>
> *(I) figured it would be really # between two and eight o'clock. right on the money.*
>
> *that's what's forecast on B-V-S that's (our) weather system so we're goin' * * * . (get on the other side/be around the south side).*[173]

At least six emails related to the hurricane were sent from crewmembers to friends and family. Emails were sent by the first assistant engineer to his wife; by the *El Faro* captain to the *El Yunque* captain; by the second mate to her mother and her friends; and by three other crewmembers to their family or friends.

[168] VDR transcript, 07:02:22.8-07:02:52.7.
[169] VDR transcript, 11:47:05.8-11:47.15.0
[170] VDR transcript, 04:10:24.4—CM quote, "*(not) sleepin'**".
[171] VDR transcript, 04:10:22.2-04:10:31.3.
[172] VDR transcript, 05:06:42.2 (October 1); 05:18:39.4 (October 1); 06:55:20.0 (October 1).
[173] VDR transcript, 05:22:07.3.

On September 30 at 0959, the second mate sent an email related to Hurricane Joaquin to a friend:

> *So not sure if youve been following the news....but we are heading straight into a hurricane. WEEEEEEEEEE!!!!!*"

She sent two other emails early on the morning of the accident. The first was sent at 0352:

> *So we are heading into the hurricane right now full force. Tried to alter our course to avoid it but he's on the war path. Bad seas and really bad winds. Hope to talk to you Friday . . . Love to everyone.*

She also sent an email to her mother at 0353 (original spelling retained):

> *Not sure if you have been following the weather at all but there is a hurrican out here and we are heading straight into it. Catagory 3 last we checked. Winds are super bad and seas are not great. Love to everyone.*

4.5.3 Use of Bon Voyage System

BVS from Applied Weather Technology, Inc. (AWT), provided *El Faro* with weather information. AWT sent BVS weather information by email every 6 hours (at 0500, 1100, 1700, and 2300). The information went directly to the captain's email address, which was accessed solely from his office. The bridge computer did not receive the email from AWT. Rather, the captain had to download the data and send it to the bridge himself. Once an email was opened, the BVS data could be downloaded and reviewed. The process was different on *El Yunque* (*El Faro*'s "sister ship"), where BVS data were emailed from AWT to both the *El Yunque* captain and the bridge

computer. For detailed information about BVS, see the Meteorology Group chairman's factual report for the *El Faro* accident.[174]

Interviews with captains and mates who had previously sailed on *El Faro* or *El Yunque* testified to a varying degree of knowledge about BVS. Some knew how to change settings to reduce clutter, but most could not remember how they had learned to use the system. No formal training was provided by the company or by AWT. BVS had options for custom settings that would allow the operator to obtain updated information more frequently (such as tropical cyclone updates). However, those settings were not activated on *El Faro*'s BVS. According to testimony of relief crew on *El Faro* and crew on *El Yunque*, it was customary to combine information from different programs and products—BVS, Sat-C, and the NHC—to come up with "expected" sea state and wind conditions.[175]

Sat-C text broadcasts of NHC weather products were delivered to the vessel's bridge.[176] The NHC product from Sat-C that delivered (with limited delay) the most current information on Joaquin's position and forecast track and intensity was the forecast/advisory.[177] The NHC issues that advisory four times a day for active tropical cyclones.[178] The NTSB's VDR group identified five instances during the group listening sessions when the Sat-C terminal on the vessel's bridge received a forecast/advisory.[179]

[174] Section 5.9.3 of the Meteorology Group chairman's factual report gives a detailed description of BVS.

[175] Interviews, relief second mate *El Faro*; previous *El Faro* captain.

[176] Further discussion of the Inmarsat-C SafetyNET service and the specific products and times of their availability during *El Faro*'s final voyage are found in the Meteorology Group chairman's factual report.

[177] Although a high seas forecast is available from Sat-C and carries some of the NHC's most recently issued tropical cyclone information, it is expected to be received via Sat-C roughly 90 minutes after a forecast/advisory.

[178] The NHC nominally issues its forecast/advisories at 0500, 1100, 1700, and 2300.

[179] At 0638, 1057, 1654, and 2253 on September 30 and 0447 on October 1.

BVS weather forecast products were emailed to *El Faro* every 6 hours. GlobeArchive email records[180] were used to determine when BVS emails were transmitted to *El Faro*. Review of previous downloads indicates that the captain routinely downloaded and sent the BVS weather package to the bridge within about 1 hour of receiving it. However, the 2300 BVS email on September 30, the evening before the sinking, was downloaded on October 1 at 0445, 5 hours and 41 minutes after it was sent. The final BVS weather package received was the 0500 data, sent at 0502 on October 1. Table 4, adapted from a table in the Electronic Group chairman's factual report, lists the time each of the BVS forecast emails was sent from BVS, available for download to *El Faro*, and then downloaded to *El Faro*.

Table 3. BVS transmissions to *El Faro* on final voyage.

Date (2015)	Time (EDT)		
	BVS Email Sent from Applied Weather Technologies	**BVS Email Available for Download from Inmarsat Globe Email System**	**BVS Email Downloaded to *El Faro***
September 29	1702	1704	1837
September 29	2302	2304	2329
September 30	0502	0504	0608
September 30	1102	1103	1124
September 30	1702	1703	1747
September 30	2302	2304	0445
October 1	0502	0503	0609

Investigators received and reviewed satellite communications to and from the ship. Internal emails between the ship's computers were not captured, however, so investigators could not determine if and when the BVS emails downloaded by the captain were sent to (or received by)

[180] Server that organizes and queues up the emails and then connects to the satellite connection.

the bridge computer. BVS weather files could not have been viewed onboard *El Faro* before the download time.

4.5.4 Work and Rest Schedules

According to company records, officers on *El Faro* had the following watch schedules, which were validated by the VDR:[181]

- Captain: dayworker, does not stand a watch
- Chief mate: 0400–0800; 1600–2000 at sea
- Second mate :0000–0400; 1200–1600 at sea
- Third mate: 0800–1200; 2000–0000 at sea
- Chief engineer: dayworker
- First assistant engineer: dayworker
- Second assistant engineer: 0400–0800; 1600–2000
- Third assistant engineers: could not be determined

The STCW states that, for crewmembers on vessels subject to US manning requirements, officers in charge of a navigational watch and any rated person forming part of this watch must receive a minimum of 10 hours of rest in any 24-hour period. The 10-hour rest can be divided into no more than two periods, of which one must be at least 6 hours long (46 CFR 15.1111). The captain was required to track crew work hours and rest hours to ensure that they did not violate the STCW rest requirements. According to a relief chief mate, the records were always reviewed by the designated department heads (captain, chief engineer, and boatswain) and signed.[182] The DP

[181] VDR transcript.

[182] MBI 3 daily notes, February 6, 2017.

stated that managers reviewed the timesheets if an issue was reported to them. However, it was unclear who at TOTE (shoreside) was in charge of STCW compliance. The DP stated that it was the "responsibility of the captain to monitor that aboard the vessel and the responsibility obviously of every crewmember on the vessel to monitor their own."[183]

Port mates were sometimes employed to facilitate cargo loading in Jacksonville when the vessel was in port. In the weeks leading to the accident, port mates were not always available. Based on the *El Faro* personnel spreadsheet provided by TOTE, the last port mate scheduled to work in Jacksonville was on September 1, 2015. Email evidence shows that the captain, via the chief mate, had requested a port mate before the final cargo-loading operations. A former chief mate on *El Faro* wrote the following in an email to shoreside management on September 12, 2015:[184]

> As you can see below the vessel and the company have been searching for a port mate who can assist the mates loading the vessel in Jacksonville. It is safe to say that having a port mate during the loading of the vessel on Tuesday is essential.

El Faro unloaded and loaded on Monday and Tuesday in Jacksonville, then unloaded after arriving in San Juan on Friday. At sea, the officers stood regular 4-hour watches but shifted to a different watch schedule when the vessel was in port. Other than the captain, the ship's deck officers stood 6-hour on and 6-hour off watch schedules when in port, supervising cargo operations to ensure that cargo was loaded and secured properly. Safety and security rounds were also completed in port: checking lines, gangways, etc. The chief mate was responsible for ensuring that the cargo was safely loaded. In a typical situation, a port mate would have been brought aboard *El*

[183] MBI 3 transcript, February 14, 2017, vol. 7 (draft).

[184] TOTE emails-*El Faro* former chief mate request for port mates.

Faro to assist the mates in the loading and unloading operations so the ship's mates could rest in port. A port mate was not employed during the vessel's final days in port, or during the previous Jacksonville ports of call after September 1, 2015. Port mates were used in San Juan for the 1-day port call on September 25. A review of the third mate's August–September STCW work/rest logs showed four violations of 46 CFR 15.1111, according to which one rest period must be at least 6 hours long. The violations occurred on August 5, 8, and 22 and on September 5, each incident following a scheduled day in port.[185]

The chief engineer told his wife that he was exhausted from all the maintenance and issues he had in the weeks leading to the accident, stating that it was the worst tour he had been on in terms of maintenance issues.[186] His wife told investigators that, because of her husband's workload on this particular tour, she rarely spoke to him, and when she did, their phone conversations were brief.

Two friends of the second mate told investigators that she complained about fatigue as a result of her watch schedule, coupled with relieving other officers during mealtimes when she was not on watch and the additional work required at sea under TOTE procedures and the union contract (12-hour days). [187] Another friend of the second mate told interviewers that the mate used over-the-counter medication to help her rest.[188] Evidence of the second mate's use of ZzzQuil is found on the VDR. She said to her AB on watch, "*Slept pretty good last night up until nine*

[185] STCW work hours log July–September 2015.

[186] Interview, chief engineer's wife.

[187] Interview, friends of second mate.

[188] Interview, friend of second mate.

o'clock." [The first portion of the sentence was spoken through a yawning sound.] *I guess that's when my Zzzquil wears out. It's just like bing! I'm awake.*"[189]

ZzzQuil is a non-habit-forming sleep aid whose active ingredient is diphenhydramine HCl, an antihistamine.[190] Several factors could influence how long the effects of the medication last if a full recommended dose is taken, according to the manufacturer's website. The manufacturer recommends that ZzzQuil be taken only when the consumer has adequate time to get a full night's sleep (about 8 hours).

The third mate and AB discussed a former chief mate who had fallen asleep on watch. The third mate said, ". . . *he got caught and nothing happened. Then he got caught again and nothing happened . . . how 'bout that. Got away with it and nobody noticed. Nobody cared.*"[191] During the third MBI, the matter was discussed at length. It was reported that when details of the chief mate sleeping on watch were brought to the DP's attention by an anonymous crewmember, he stated that this was a human resources/labor issue, and he did not see it as a safety issue.[192] An internal company investigation followed (by the director of labor relations), according to testimony by the TOTE managers. No evidence of the investigation was found in personnel files or any of the documentation initially provided to investigators. At MBI 3, TOTE produced a letter of warning, dated July 21, 2015 stating that the chief mate was put on notice after it had come to their attention that he was found to be asleep on watch. The chief mate was later demoted to second mate on a different TOTE vessel.[193] An interview with a Coast Guard observer who had been aboard *El Faro*

[189] VDR transcript, 01:04:20.1.

[190] http://vicks.com/en-us/safety-and-faqs/faqs/vicks-zzzquil-faq.

[191] VDR transcript, p. 255, 20:50.37.9-20.50.59.7.

[192] MBI 3, February 13, 2017, vols. 6 and 7 (draft).

[193] MBI 3, February 16, 2017, vol. 9 (draft).

in May 2015 confirmed that the officer fell asleep on his watch. A medical evaluation was not completed at the time of the officer's demotion.

Investigators identified instances in the VDR transcript where bridge personnel discussed fatigue. On September 30, the second mate was heard yawning at 1528, while on the 1200–1600 watch. At 1531, she stated, "*I didn't get much sleep yesterday because I was on the phone with everyone*."[194] At 1541, the AB on watch asked the second mate, "*Are you awake?*" [195] to which she immediately responded. About 3 minutes later she mentioned having put up a flag to block the sun, indicating that the sun was in her eyes. On her 0000–0400 watch on October 1, the second mate can be heard yawning midsentence (at 0105 and 0223). At 0332:49, the VDR transcript indicates that the AB on watch with the second mate is yawning.[196]

The captain, similar to the other officers, normally worked a 10-week rotation, having 10 weeks off after working for 10 weeks on the ship. He started a work rotation on May 5, 2015, and left the ship, as scheduled, on July 14. His relief resigned just 3 weeks later, and the captain was asked to return to *El Faro* earlier than anticipated. On August 11, 4 weeks into his vacation, he returned to work on *El Faro*. According to TOTE management, the captain was scheduled to work until December.

4.6 Delivery Schedule

Investigators interviewed four of TOTE's largest customers. They stated that TOTE was responsive if there were any delays in cargo deliveries. Customers told investigators that when

[194] VDR transcript, p.139, 15:31:02.2.

[195] VDR transcript, p. 140, 15:41:17.

[196] VDR transcript, p. 354, 03:32:49.4.

cargo was delivered late, they were notified by TOTE, and they considered these "one-offs." TOTE's customer contracts did not include financial penalties for late deliveries.

After its competitor Horizon Lines removed two ships from its Puerto Rico service in 2012, then ceased operations in December 2014, TOTE's business increased, both in revenue and in cargo. The size of TOTE's fleet remained the same, however. To keep up with the demand, TOTE used barges to supplement cargo deliveries. If all cargo would not fit on TOTE's ships, barges would be used for lower-priority items.

As peak season approached, according to the director of marine safety and services, a cargo backlog was not unusual. Turnover notes from a crewmember, dated August 11, 2015, stated: "Cargo has continually been heavy. Each week southbound we have been down to our marks. Last week departing JAX [Jacksonville], total of 10,810 LT [long tons] of cargo."[197] Table 5 shows the number of total 40-foot-equivalent units (FEUs) of cargo the company moved from 2010 to 2015.[198]

Table 4. Total FEUs for 2010–2015, TOTE Maritime Puerto Rico.

Year	Total FEUs
2011	76,851
2012	71,124
2013	74,798
2014	72,812
2015	97,227
2016 budget	96,390

[197] Master turnover notes, August 11, 2015.

[198] An FEU is containerized cargo equal to one 40-foot (40 x 8 x 8 feet) or two 20-foot (20 x 8 x 8 feet) containers. Information in table 4 was provided by TOTE Maritime Puerto Rico.

Investigators examined the company's website in the days following the accident. The banner on the main page read, "On time, every time." Delivering cargo on time was one of TOTE's stated goals. TOTE provided investigators with a record of expected versus actual delivery times. If arrivals were within a 2-hour window of the expected arrival time, they were considered "100% on time." If arrivals were over 2 hours late, they were considered "0% on time." If a vessel was expected to arrive late, management was to be notified as soon as possible so it could, if appropriate, provide that information to customers. Deviation from the routine voyage plan could increase the time required to reach the destination.

The "2015 Actual vs Scheduled Delivery Data Sheet" provided to investigators by TOTE Maritime Puerto Rico shows that the captain made his arrival time in San Juan within a 2-hour window 90 percent of the time, often making up time at sea when he was late departing port. The data reveal that, in his 10-week rotations, the captain averaged nine out of ten "on time" arrivals. There were no comments in his performance evaluations related to timeliness of departures or arrivals. Witnesses also did not raise any issues with the captain's ability to maintain a schedule. TOTE told investigators that the ship's personnel did not know or were not aware that timeliness was being tracked.

Through interviews with shoreside personnel, investigators found that *El Faro* was routinely more heavily loaded with cargo on the southbound trip than on the return northbound voyage. When Horizon Lines went out of business in 2014, TOTE's business in the Puerto Rican trade increased by 10 percent, though its northbound business decreased.[199] On the return route northbound, the crew had additional time built into the schedule due to the scheduled arrival time

[199] Interview, vice president, strategic planning and yield, TOTE Maritime Puerto Rico.

at Jacksonville. Drills were often carried out on the northbound trip because, as a chief engineer said, "We can go slow and [don't have to] meet schedules."[200] Similarly, routine maintenance to the boilers was usually done on the northbound voyage because the ship was running on one generator, as opposed to two on the southbound leg. "We've had a lot more cargo on the ship lately . . . you push, you know . . . you're doing 118 rpm. You're putting a strong load on the boilers."[201] An off-duty engineer stated that on the northbound trip, they would clean one boiler at sea, because their speed was slower than on the southbound voyage.

During the MBI hearings, several TOTE employees were asked about time pressure. Off-duty crewmembers and shoreside personnel stated that the company did not put pressure on the crew to make arrival times and neither individual employees nor the company were penalized if the vessel arrived late to port. Investigators found ten instances in the VDR transcript of bridge personnel talking about the estimated time of arrival in San Juan. The comments began at 0604 on September 30, with the last instance at 1951 the same day. One was a discussion between the captain and the chief mate regarding the estimated time of arrival on October 5, when they were scheduled to return to Jacksonville. At 0742 on September 30, the chief mate and the AB were discussing arrival time into San Juan when the chief mate stated, *"it is what it is. Get there when we get there."* At 1153 the captain said to the second mate, *". . . we're getting killed with this speed*," to which the second mate replied, *"Oh yeah. I think now its not a matter of speed it's when we get there we get there as long as we arrive in one piece."*[202]

[200] Interview, off-duty chief engineer.

[201] Interview, off-duty first assistant engineer.

[202] VDR transcript, 11:53:03.2.

4.7 Other Information

4.7.1 Emergency Response

TOTE had a dedicated emergency response phone number that a service manned 24 hours a day. According to company protocol, once the service was contacted, an emergency response team would be notified and respond as a team to the incident. Training included running scenarios with vessels and any follow-up when scenarios did not go as planned.[203] The ship security alert system was tested quarterly on all vessels. The tests were conducted on *El Faro* in March, June, and September 2015.[204]

According to interviews with emergency response team members, no scenarios specific to heavy weather were ever included in training.[205] In addition, none of the drills conducted with the emergency response team included fire at sea or vessel grounding.[206] Emergency response team logs for 2015 show that *El Faro* had two emergencies, one on September 1, where 5 gallons of diesel oil overflowed into the sea from a refrigerated container; and one on September 2, where 50 gallons of diesel oil spilled, with approximately 5 gallons entering the water. After those incidents, a drill on contacting the qualified individual in case of emergency was conducted on September 3.

TOTE provided Tunstall Americas (the contracting company for the call center) with information to aid its employees in taking emergency calls. The information included prompts on the operator's screen, indicating specific actions that should be taken. For example, when a call came in for the TOTE emergency response team, operators were instructed to remain on the line

[203] Interview, SBX port captain.

[204] Emergency response team log.

[205] Interviews, SBX port captain; manager of safety and marine operations.

[206] Interview, director of marine safety and services.

until they were sure the call was taken by a TOTE representative before disconnecting. Specific instructions for baseline questions were listed on the operator's computer screen, similar to a checklist.

4.7.2 Phone Records

Investigators reviewed phone records for *El Faro*'s Fleet Broadband service, by which Inmarsat connects ships to satellites. Company cell phones of the captain, chief engineer, and DP were also examined to determine whether external phone calls were made during the hours before the accident, or if distraction from the use of personal electronic devices could have contributed to the accident.

Call logs for *El Faro*'s Fleet Broadband voice phoneline, which had handsets in the captain's stateroom, the chief engineer's stateroom, and on the bridge, were examined. That was the only telephone line on *El Faro* that investigators found to have been used for voice communications to or from the ship on the day of sinking.[207]

Mobile phone activities were examined for October 1 from 0300 until 1000 (except for the captain's phone, which was examined from 0001 until 1000 on September 29). An addendum to the Electronic Data Group chairman's factual report contains details of the cell phone data.[208] Cell phone records indicate that no calls were made in the hours before the accident. The accident occurred out of cell phone range.

[207] TOTE's records indicate that other satellite phones were previously associated with *El Faro*. TOTE's emergency response manual and the registration information for the vessel's emergency position indicating radio beacon filed with the National Oceanic and Atmospheric Administration each lists a different phone number for *El Faro*.

[208] Electronic Data Group chairman's factual report, addendum 1, "Mobile Cell Phones."