

S.S. EL FARO Marine Board of Investigation Daily Brief - Hearing Session 3

Date: 6 Feb 2017

Start Time: 0900

End Time: 1830

Prime F. Osborn Convention Center, Jacksonville, Florida

- **Flag Level Interest:** Capt. Thompson emphasized the importance of port mates, and he remembered them being regularly used up until the time he departed (shortly before the EL FARO accident voyage). Dr. Stettler, CG-MSC, provided a brief on the preliminary MSC report, including MSC's assessment of the intact and damage stability and structural strength of the EL FARO, and MSC's sinking analysis. He also testified that EL FARO met applicable intact and damage stability and strength requirements, but if built in 2016, would not meet current standards as operated. Tomorrow's scheduled witnesses are all CG members--Mr. Jaideep Sirkar, CG-ENG-2, CAPT David Flaherty, CG-5P-TI, and CDR Michael Crider, COMMCOM.
- **General Observations and Issues**
 - The hearing began on time. Technical difficulties with the livestream equipment resulted in poor video and audio quality for the internet feed, although those difficulties were resolved later in the day.
 - Total Attendance: 50, not including media.
 - The hearing is on schedule.
- **Summarized Daily Testimony**

Hearing Witness	Testimony Summary
Capt. Raymond Thompson, Prior C/M EL FARO	<p>Capt. Thompson was released in the middle of his testimony during the 2nd hearing for operational reasons, and returned to complete his questioning by the Board.</p> <p>He has no awareness of resignation/demotions having any impact on EL FARO operations. He does not believe that departures had an impact on the depth of nautical experience.</p> <p>Officers were evaluated despite not having anything in personnel file. Masters would conduct evaluations at the end of an underway period, signed by Master and evaluated individual. If you asked for a copy, they would give you a copy. He cannot explain why those records are not in the file. He does not know how he was evaluated for the position for the Master onboard MARLIN's. He was not formally interviewed. There were a lot of conversations, Phil Morrell asked Capt. Davidson about me.</p> <p>Every tour and every port mate trip, he filled out the Illness/Injury reports. There was only one in my personnel file, but a lot of the forms are kept onboard the vessels. He cannot speak to auditing/internal auditing</p>

S.S. EL FARO Marine Board of Investigation Daily Brief - Hearing Session 3

Date: 6 Feb 2017

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	<p>processes at TOTE.</p> <p>No specific STCW training provided by TOTE, as a union member, we have to get training. He believes that he has received ECDIS and other courses since 2013.</p> <p>He testified that crew cooperation was very good. No issues that he's aware of.</p> <p>At sea, there is access to e-mail via the laptop on the bridge, or the satellite phone. If you want to use the satellite phone, you would notify the master, and there are step-by-step procedures on how to make a call on the phone itself. If they wanted to, they could make a call on their watch, in privacy. A ship's officer and watch partner would be on the bridge.</p> <p>He believes you could read an outgoing e-mail, but he doesn't believe you can read an incoming e-mail. The mater could delete an e-mail before it was sent, but the sender would get a failure/recall notice.</p> <p>Incident in July, where a crewman violated a zero-tolerance policy with regard to alcohol. He received the call saying that there was a possibility of someone drunk at the gate from security. Capt. told me to go out and remind the crew member that they did not need to be back until call-back. There was a Spanish speaking security guard and taxi driver. No crew member, he relayed the message to the Capt. he don't believe that incident was logged. TOTE has a number of zero-tolerance policies. Drugs and alcohol. This incident, he believes that is a .04 level to return to the ship and no drinks within a certain number of hours. This was in San Juan. If you see someone stumbling up the gangway and you are on watch, you have to make a determination at that point if there was reasonable cause.</p> <p>Issue at the end of July with a verbal altercation between 2nd Mate and a crew member, it involved PPE and wearing PPE in port. He recalls that incident. It was late at night, the crew man was awoken for all hands for undocking. The 2nd reminded him to wear PPE, he didn't like to be told that, he still had some time. It was just a minor argument. He believes there were statements required for that argument. He does not recall any exact conversation with Capt. Axelsson.</p> <p>Ms. Randolph stood the mid watch. Officers are paid for 12-hour days. They work overtime. During 2015, there was a tightening up to ensure 12-hours were worked – he don't know if there was any difference between before he was on the ship until when he got on the ship. Do not agree that</p>
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S.S. EL FARO Marine Board of Investigation Daily Brief - Hearing Session 3

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	<p>fatigue is a part of the life of a sailor. No recollection of conversations about fatigue. No recollection of conversations about pace of work. EL YUNQUE had signs about shipmates trying to sleep – believe that EL FARO had similar signs. At times, it would be mentioned if there is an early call out for all hands, keep your radio low in the passage ways to ensure others are not awoken. He got enough rest.</p> <p>He did not feel the effects of fatigue while standing watch. When people took rest periods, you wanted them to get rest. Rest does not require sleep. Everybody rests different ways. If you are fatigued on a watch, you may not be as sharp as you normally are, you may miss something.</p> <p>They do bridge resource training on the vessel every quarter. He believes it is a bridge team management requirement, now and then. He believes that it was a part of the tracked training. Binders kept in the Chief Mate’s office as well as the onboard training log sheets that indicated who was at those trainings. He cannot speak to how fatigue would relate to the impairment of alcohol.</p> <p>TOTE policy for OTC medications – any medication, at all, you are supposed to fill out on the medical history form, and if you were taking anything, you are supposed to let the Capt. know. Medical history form would be filled out when you signed on in the Capt.’s office, any medication should be listed on that form. He would only know of crew members taking medication if they reported it to me. He does not recall medications being covered in a pre-accident TOTE policy. Unlicensed crew is required to go through a physical before reporting that says they are fit for duty. He believes that officers were going through physicals, but he doesn’t know how often. He cannot speak to how the crewing department medically vets crew members.</p> <p>Chief Mate falling asleep on watch multiple times – he was not onboard at the time, he do not know if there were conversations about preventing the situation. Transcript 3rd Mate discussion with AB – he did not see fatigue as being an issue. There were port mates in both ports. 2nd and 3rd would get some extra time off the deck. He did not see it being an issue. He does not know if there was an investigation into this situation, he was not onboard.</p> <p>STCW records were used to track crew work hours and rest hours to ensure that you were not in violation of the STCW rest requirements. These were always signed. These were probably copies kept on the ship’s computer. The hard copies were kept signed in a binder either in Chief</p>
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S.S. EL FARO Marine Board of Investigation Daily Brief - Hearing Session 3

Date: 6 Feb 2017

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Prime F. Osborn Convention Center, Jacksonville, Florida

	<p>Mate's office or bridge. Note 3, no crew member may have less than 77 rest hours, there must be master's comments. He doesn't recall if master's comments would have been typed or hand-written. Chief mates did their own rest hours, and the unlicensed members of deck department. Each other officer did their own rest hour sheets. They were submitted to the department head and then to the master to be signed. He doesn't recall if 2nd mate was typically in a cautionary status, he would have to review all of the records. The Capt. is responsible for checking STCW sheets and ensuring the crew got the proper rest. He does not know who at TOTE would conduct oversight of the process. He believes audits were conducted. As far as he understands, the watch officers were given adequate rest to comply with STCW requirements.</p> <p>He cannot speak to difficulty finding port mates. To the best of my recollection, we usually had a port mate in JAX and SJU, he cannot definitively say that there was one for every port call. Port mate duties, the mate would work with the 3rd mate for a few hours, then the 2nd mate would come out. They made sure people had their rest periods and an extra person on deck to help with cargo. We also had stand-by unlicensed crew to help with plugging in refers. With a 2000 departure, the 3rd officer would need to get rest while in port.</p> <p>Transcript discussion regarding JAX on-load, we used to have a port mate, we have a guy from PORTUS now. He doesn't recall anything like this when he was onboard. Finishing the reefers this way, is not typical, the ramp up is not typical.</p> <p>Any prescription that is brought on, needs to be looked up on the USCG banned substances list and if there is a problem, then we don't sign them on to the vessel. Narcotic pain killer would depend if it was on the list. He has never put a prescription medication in the ships safe. Turn-over of crew medical files would be included in the turn over.</p> <p>He is not aware of crewing the MARLIN's creating any problems aboard. Davidson may have mentioned to me that he was not going to the MARLIN's and he did not really specify why.</p> <p>HF – as far as a satellite radio? He believes EL FARO had an HF radio. He have seen the HF radio equipment onboard the ship. He doesn't know if the equipment was ever used or tested – “he don't know exactly.”</p> <p>Bridge team management, he usually has meetings with the crew, going through particular evolutions with particular assignments. He would</p>
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S.S. EL FARO Marine Board of Investigation Daily Brief - Hearing Session 3

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	<p>usually have the CM, 2nd and 3rd mate there. Right before departure or pre-arrival. Capt. Axelsson – he don't know that he did it the same way as he did. He believes he would discuss things with everybody, he is not sure when he would talk to other mates. It would be the same for Davidson. He has never had a problem asking Davidson anything. As far as the other mates, he always had an open door policy, or gives him a call.</p> <p>He may have called Davidson while he was on watch, he doesn't know. He can only speak from my watch, and he doesn't recall having to ask him to come up for anything specifically.</p> <p>Transcript – 3rd mates and 2nd mate calls to the master during the night. Would the 3rd mate have been able to accurately give the wind speed, direction, and conditions observed when he made that call. He does not see any observations relayed to the master. He does not see any report of observed conditions on pages 310 and 311.</p> <p>He believes that the anemometer would have displayed 3-digit wind speed. He is not certain of the anemometer direction having an error. These GPS receivers look familiar. All GPS receivers would have worked. He believes they were all on the bridge. He believes that one GPS unit would feed track-line and waypoint information to the radar. He is not 100% certain that it was fed to the radars. Paper charting process, DR navigation. He don't know if every mate DR's positions, but he did. He believes they were all putting DR positions down when he was onboard. EL FARO did not have an ECDIS system. The ECDIS system is nice, if you have it in your office as Master, you can see it in your office. A lot of them are interfaced with other inputs, some of them, you have wind speed as well. Any time near land, you would do range and bearing observations to verify GPS position.</p> <p>Transcript – 2nd mate remember that whole JAX outbound incident. He is not aware of any incident like that. He believes that the officers were authorized to control rudder limits and course settings for autopilot.</p> <p>VDR Radar images – he doesn't recall which radar this is. He believes we had two radars onboard. He believes the radars have similar capabilities.</p> <p>The EL FARO had never taken the Rum Cay course to his knowledge. He would expect an officer to use all tools available to them to fix the position. He believes it would be part of his standing orders, he would have to re-read them. If you are going in a certain area, you would put notes in the night orders. If you are changing your passage plan, you</p>
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S.S. EL FARO Marine Board of Investigation Daily Brief - Hearing Session 3

Date: 6 Feb 2017

Start Time: 0900

End Time: 1830

Prime F. Osborn Convention Center, Jacksonville, Florida

	<p>would have to update it and make a new one. If he was making a major deviation, he would probably send an e-mail to shore side. He believes EL FARO would have had charts that would have more depth of detail onboard to make the transit between Rum Cay.</p> <p>Transcript - 3rd mate call to Master. He has never personally had to call the Master and wake him at night. He has been awoken by mates plenty of times. He can wake up pretty quickly. It would depend on the situation for me to go to the bridge.</p> <p>He attended safety meetings. He did not observe reluctance by the crew to bring up safety issues. Safety issues would be taken seriously, he would put it in the minutes and we would try to address it right away. One time, there was a mention of something, don't recall exactly what, the frame for the ladder under the life boat. It was immediately addressed, they welded the frame back to the deck, and it was addressed. There were other things like non-skid in certain areas.</p> <p>They can call the DPA with those issues. He does not know how a DPA would address those types of issues if they were brought up. He has not heard of any reluctance to bringing up safety issues by crew members.</p> <p>He doesn't recall, he believes there may have been times without a port mate, but almost every time there was a port mate in SJU and JAX.</p> <p>No primary source of weather information. Satellite radio you could listen to. BVS, Sat C, NavTex, weather fax, you could e-mail out for weather, you had satellite TV, in port you could use your cell phone.</p> <p>The way BVS worked on that ship, an e-mail would come to the master's computer and he would have to send it up to the bridge for them to upload it on their computer. He don't recall there being any issues at night. He was checking e-mails frequently when he was master.</p> <p>He believes the TOTE vessels had a permanent bosun. He has served as a chief mate on a number of tours. There was a permanent bosun, but at times there was a relief. He does not recall who the bosun was the last time he sailed on EL FARO.</p> <p>It would depend who would fill out the crew familiarization form. It would depend if they were in the deck, steward, or engineering department. If they were not in a department, then one of the officers would do the familiarization. The riding crew would be considered non-</p>
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S.S. EL FARO Marine Board of Investigation Daily Brief - Hearing Session 3

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	<p>crew members and it would depend on who they were working for; deck officer for deck work. You would teach the junior officers how to open and close the watertight doors properly. It would be all watertight doors, accesses to foc'sle, steering gear room, scuttles on 2nd deck, anything watertight.</p> <p>Regular patrols to inspect lashings. He would inspect the lashings every day after the watch. He believes on the night watches, the AB was going and doing a round of the cargo decks with a radio. After 1930, there wouldn't have been any tightening. After that it would have just been an inspection. He believes that there would have been rounds. He believe it would have been done by the AB. He doesn't recall exactly how it was being done, if it was after watch, or exactly how it was being done. He would log my rounds that he did after watch, and as far as 4-8 in the morning, he doesn't recall any rounds being done. The day men were up at 6:00 and they would have seen anything that needed to be done.</p> <p>More sets of eyes are usually better. When he was onboard, the 2nd and 3rd mates would check lashings. 3rd mates would usually do safety inspections. The 2nd mate would check my rounds. It would depend on the situation if the 2nd would add or change lashing arrangements. If the 2nd mate had to, they would make the changes or add lashings. Deck department would check lashings after leaving port. That was a regular routine. You would go around the main deck and check container lashings for tightness, that they were proper in the right spot. You would check twist-locks by checking the direction of the lever, for the semi-automatic, you would look at the pull cord. You can sight them from the main deck. On the bays closer to the house, you can sight them from the bridge or bridge wing. He doesn't recall if the manual twist locks were left or right handed. He believes they all locked the same way. He doesn't think a manual twist lock would be on the top tier, it would have been a semi-automatic. Manual twist locks are only on the bottom of the first tier, everything else would be semi-automatic.</p> <p>E-mail from EL FARO chief mate with inventory of lashings. There should have been a more current inventory than the April inventory. He may have made it, we were doing inventories at the end of our 10 week tours. He knows we were doing inventories every 10 weeks.</p> <p>Chief Mate's standing orders, those are the cargo water tight doors. The lashings to the wheels could cause damage to the rims, bumper, and tailpipe of the car. Never saw any problems with the lashings on the roll lox boxes.</p>
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S.S. EL FARO Marine Board of Investigation Daily Brief - Hearing Session 3

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	<p>Corrected sailing CargoMax – fuel tanks, fresh water tanks, saltwater ballast tanks. He has seen a CargoMax print out like this before. Forepeak tank was filled with a hose from the fresh water supply on the dock and load the tank with fresh water. 1BS is listed as a fresh water tank, but we were filling it with salt water and we would have adjusted the number for salt vs. fresh water. he believe that for an ABS inspection at one time, we put salt water into a set of the double bottoms, did the inspection, and then filled them back up with fresh water. They were filled with fresh water for the preservation of the condition of the tanks. Normal operations would be to use fresh water to keep down on corrosion. SW is salt water ballast tanks. He believes it was the same practice. We had the same practice, we were trying to keep freshwater in all tanks that we were not ballasting regularly to preserve the condition of the tanks.</p> <p>DT 1A was for salt water ballast, the cow tank was fresh water for when were carrying livestock. He believes there was modification to the piping that he has heard of in discussion. He would use empty double bottom tanks to increase GM to compensate for fuel burn. If you had to increase stability, you would use the fresh water tanks. Not aware of a change in the Plimsoll mark. He was aware of what was in the stability book.</p> <p>He has heard of the onboard ISM safety committee. There was one onboard. The Capt, CM, CE, Bosun and Steward were on the committee. He was a part of the committee. Usually meetings would be held in conjunction with the monthly safety meeting. He believes those meeting minutes would be included in one set of minutes.</p> <p>No recollection of the scuttles being broken or dropping down.</p> <p>He believes a bilge alarm would sound in the engine room, they would contact the mate on watch and someone would go investigate. He doesn't remember if this was a company policy or something agreed to by the crew. He doesn't remember ever being informed of a bilge alarm going off in the cargo hold. He does not recall the exact location of the audible alarm.</p> <p>GMDSS was tested every pre-departure and every day at noon. Confirmed underway. 2nd mate would have done testing at noon.</p> <p>Satellite phone calls could be made from the Master's state room. You could make a call from the bridge as well. There was a handset in the CE's office, but he doesn't recall if it could make a satellite phone call. He</p>
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S.S. EL FARO Marine Board of Investigation Daily Brief - Hearing Session 3

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	<p>believes that the policy was that all satellite phone calls had to be authorized by the master.</p> <p>100% bag search, they had hired security guards in SJU and JAX that would perform the searches. He believes he began on the EL MORRO in 2013. There was no procedure at the terminal for inspecting bags in SJU or JAX that he recalls.</p> <p>Instructions in the cargo standing orders restricting where lashings were placed on cars. Ensure no lashing to any part of the wheels, bumpers, or tail pipes. Cars were lashed through the wheels - that was permissible. You would want the lashing to go through the wheel and back, not just to the wheel.</p> <p>Cargo buttons, reviewed stowage plan on the last voyage, reviewed the cargo securing manual – almost all trailers would have been on button. He believes that 4 would have been off button. There was one in hold 2A, forward of the forward ramp. That button was removed. 2D, there were two on outboard sides, and one in 3B, if he recall correctly.</p> <p>Tracked training was done every quarter, it included bridge resource management, and training log sheets were kept. February 15, 2015 EL FARO onboard training log sheet – reflects bridge team management training. There was a bunch of quarterly training, drills that needed to be done. This is an example that would have been signed by everyone that took part in the training. Master, CM, 2nd M, 3rd M all participated in the example.</p> <p>Onboard training log sheets from July 2014, January, May, and February 2015. Log sheet indicating who was at the drill/training and includes the topics that were addressed at the training. Exposure suits and heavy weather safety. Exposure suit would be donned quarterly, everyone would bring them down to the mess, put them on, and the 3rd mate would inspect them and make sure they were in good condition. Heavy WX would include water tight integrity, securing items inside the ship, storing mooring lines below deck; conducted in July 2014, and February 2015. Jeremy Reihm was a participant.</p> <p>SMS has a section on heavy weather procedures. As a master he would have standing orders that included discussion of heavy weather. No additional heavy weather plan.</p> <p>May 21, 2015 safety training, Davidson and Thompson were present –</p>
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S.S. EL FARO Marine Board of Investigation Daily Brief - Hearing Session 3

Date: 6 Feb 2017

Start Time: 0900

End Time: 1830

Prime F. Osborn Convention Center, Jacksonville, Florida

	<p>there were a bunch of things discussed, but watertight integrity would have been mentioned for sure.</p> <p>Davidson would take over mate's watches to allow for rest, he never did it for me, but he never asked.</p> <p>Do not recall if striking mooring lines below was a ship policy or a company policy.</p> <p>Bridge management training – cannot recall the last time he took the training, he would have to refer to my training record.</p> <p>Heavy weather training was more focused on safety onboard the vessel itself, as far as securing items and onboard safety.</p> <p>Unsigned training logs, how Mr. Lawrence would know that training is being completed. Signed copies were sent to Mr. Bray. STCW – he cannot speak to how compliance is ensured.</p> <p>Track-line. He could have slowed the vessel when the 100 knot report was received from EL YUNQUE. He could have diverted to the OBC. Could have diverted to New Providence Channel. He was not onboard, he doesn't know what they were seeing, but he could have made the decision to turn back – possibly. EL FARO could have used Crooked Island passage. He believes we had charts for most everywhere (that would have allowed use of the Crooked Island Passage). The chart does not take into consideration everything, e.g., weather and everything going on the ship.</p> <p>He never experienced 15-20 foot following seas, so he cannot speak to how the vessel would handle. Expertise would come from years of sailing experience. He does not recall operating in those conditions. He would be using more than just the GPS to pilot through Rum Cay, more of a coastal piloting situation.</p> <p>Passage plan hangs on the bulkhead and has a dock to sea buoy, sea buoy to sea buoy, and sea buoy back to the dock. It would have courses on it for review. He has not seen a passage plan for heavy weather situations. He does not recall it having weather. There were additional things you could add, to include contacting the port on the radio channels.</p> <p>Lifejackets on the bridge. He do not recall there being lifejackets on the EL FARO. He remember them on the EL MORRO, he believe it was a requirement to have them. He doesn't remember on the EL FARO. When</p>
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S.S. EL FARO Marine Board of Investigation Daily Brief - Hearing Session 3

Date: 6 Feb 2017

Start Time: 0900

End Time: 1830

Prime F. Osborn Convention Center, Jacksonville, Florida

	<p>he is master of the vessel, life jackets should be donned on the bridge during drills. He would not have been on the bridge serving under Capt. Davidson for abandon ship drills. He cannot explain why the 2nd mate would not know where the life jackets were.</p> <p>EPIRB would have been brought to the boat by a mate on the bridge. He doesn't recall if the PA system reached all of the manned spaces. He does not recall hearing the PA system on deck.</p> <p>3rd mate is responsible for safety equipment maintenance and inspection. We are required to fill out an evaluation on each crew member every time they sign off the vessel. He does not know why TOTE would not have all evaluations in personnel binders.</p> <p>No rough weather on EL MORRO. He does not recall cargo damage on any voyage. He does not recall any damage that would require reporting to insurance.</p> <p>Mates would send in weather observations from the bridge laptop. They would send it in via e-mail. No assessment of how the mates did the job of sending in voluntary weather reports to NWS – he don't know.</p> <p>We would log weather force 5 or higher every hour. He has never heard a CG aircraft giving weather warnings. He would take all precautions necessary to avoid the storm if he heard such a broadcast.</p> <p>Lashing inventory – he don't recall if there were enough spares, he would have to see the inventory. He doesn't know what the 3rd mate is speaking to, but it is not what he experienced. Generally, the gear was in good condition. Never heard anything like "you'll get them in Tacoma." Damaged equipment would be marked, there was a bin with plywood – damaged do not used. It would be landed ashore and repaired or new equipment would be ordered. Damaged gear was not supposed to be used, he do not recall a particular policy.</p> <p>He has occasionally observed PORTUS longshoreman lash things improperly. It was not often that there were errors with the lashing. He does not recall lashings being attached to the wheel coverings or hub caps.</p> <p>Occasionally, they would put the chain and the hook right to the d-ring rather than going through the d-ring and back to the chain itself. Sometimes they would have temporary workers. You would go to the foreman, point it out to him, and it would be addressed right then.</p>
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S.S. EL FARO Marine Board of Investigation Daily Brief - Hearing Session 3

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End Time: 1830

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	<p>Occasionally, they may put something in the wrong place, and you would have them fix it. It wouldn't be every week. There were voyages with no mistakes.</p> <p>He used the load plan for the final voyage, looked at the size of the trailers, the location of the buttons in the cargo loading manual, and made my analysis based upon that. The plan has the positions, they write the description of the box in the position, weight and some of the specifics. It's the same boxes leaving JAX, it's a regular run. They are put in the same spots.</p> <p>The lead needed to be close, but not too close. If you had a long lead, the lashing would loosen up on you. Cargo securing manual v. CM's standing orders on cargo – athwart ship lead v. fore and aft lead – he believe the mates understood the difference, standing orders are just for guidance and they refer to the cargo securing manual.</p> <p>Sustained winds depicted on BVS products. No semi-circles on one side of the storm could indicate that side is safer to navigate.</p> <p>Limitation on VDR capabilities, no conversations captured off of the bridge. VDR is not the bible. Discussion of Capt. and CM discussion weather. Discussion of Capt. going to discuss WX with steward. Recommending checking lashings. Hourly logging of weather. E-mail to shore about course deviation. Sat-C weather data. Number of times on the bridge. Crooked Island Passage. Comparison of the actual Joaquin track v. the predicted Joaquin track.</p>
Dr. Jeff Stettler, CG-MSC	<p>Dr. Stettler provided a briefing of the preliminary MSC report of the EL FARO's stability and structures. He described the creation of detailed computer models of the ship. The most recent stability test documentation, and estimate the uncertainty in the height of the center of gravity (or KG) for the lightship condition, and in the met centric height (or GM) for the accident voyage. MSC also reviewed T&S Booklet and the CargoMax stability and loading software. MSC conducted an independent assessment of the intact and damage stability of the EL FARO, based on the available vessel documentation.</p> <p>Dr. Stettler provided a brief explanation of surface ship stability, including the righting arm, vanishing ship stability, and met centric height.</p> <p>Dr. Stettler testified regarding potential sources of flooding on EL FARO,</p>

S.S. EL FARO Marine Board of Investigation Daily Brief - Hearing Session 3

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	<p>including the unsecured scuttle, fire pumping, and cargo hold ventilation openings. He described the effect of flooding and free surface effect on the vessel, and the concepts of permeability and pocketing.</p> <p>MSC conclude from the VDR audio transcript that the EL FARO experienced flooding of Hold 3 and was experiencing significant wind heel resulting in a mean heel angle of approximately 15 degrees.</p> <p>Following the loss of propulsion around 0600, the vessel would have been drifting with beam to the wind and waves, and it could be expected that the vessel would also have been rolling around the mean wind heel due to wave action.</p> <p>In this condition, eventually the Hold 2A ventilation supply and exhaust openings would have immersed, allowing additional floodwater into Hold 2A. This was suggested by the bilge alarm as reported at 07:16.</p> <p>As demonstrated by the MSC analysis, the free surface associated with the additional floodwater would likely have been sufficient to cause the vessel to partially capsize.</p> <p>However, the capsizing may have been slowed or arrested as containers on deck began to go overboard, providing a stabilizing effect.</p> <p>As the vessel slowly rolled onto its side, floodwater would have entered through the ventilation openings of all of the cargo holds and the engine room, resulting in the sinking.</p> <p>Due to the 6700 tons of iron ore fixed ballast in the double bottom tanks, the vessel would have returned to an upright condition as the vessel sank.</p> <p>Based on review of the available technical documents and the independent analyses, the MSC determined that the EL FARO met applicable intact and damage stability and structural strength requirements, as loaded for the accident voyage.</p> <p>However, it is noted that the vessel was operated very close to the maximum load line drafts, with minimal stability margin compared to the required met centric height (GM), and with limited available ballast capacity and freeboard, leaving little flexibility for improving stability at sea if necessary.</p> <p>The results of the sinking analyses were highly sensitive to estimated cargo hold permeability, including overall fraction and uniformity due to</p>
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S.S. EL FARO Marine Board of Investigation Daily Brief - Hearing Session 3

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	<p>the distribution of cargo. The results were also highly sensitive to variation in wind speed, especially in combination with floodwater free surface and permeability.</p> <p>Given the sea conditions and reported initial flooding through the Hold 3 scuttle, the ventilation openings would have allowed at least intermittent flooding into the cargo holds, as the vessel was subject to variable wave height on the side shell and rolled about an estimated mean wind heel angle of approximately 15 degrees.</p> <p>Single-compartment flooding of Hold 3 with combined wind heel due to 70-90 knot beam winds resulted in very small residual righting arms and little residual righting energy (or area under the righting arm curve). This would suggest that it would be highly unlikely that the EL FARO could have survived even single compartment flooding of Hold 3, given the sea conditions with estimated 70-90 knot winds and 25-30 foot seas; but free surface associated with flooding of additional cargo holds would likely result in capsizing.</p> <p>As requested by the board, the MSC also compared the stability of the EL FARO against criteria which would apply if she were constructed in 2016. Based on the MSC analyses, the EL FARO, as operated, would not have met the required righting arm criteria due to limited available area under the righting arm curve and range of stability. Additionally, based on the MSC analyses, the EL FARO, as operated, would not have met the current damage stability standards.</p>
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- **Public Affairs**

- Credentialed media representatives in attendance: TBD
- CAPT Neubauer total interviews conducted since 2nd Hearing: 1 live interview.
- Livestream audience: TBD.
- Total Audience Size: TBD
- Total publicity value: TBD

S.S. EL FARO Marine Board of Investigation Daily Brief - Hearing Session 3

Date: 6 Feb 2017

Start Time: 0900

End Time: 1830

Prime F. Osborn Convention Center, Jacksonville, Florida

- Twitter analytics: 31,807 twitter impressions on Coast Guard twitter page.
- **Plan for Next Hearing Day**
 - Witnesses: Mr. Jaideep Sirkar, CG-ENG-2; CAPT David Flaherty, CG-5P-TI; CDR Michael Crider, CO, USCG, COMMCOM.