U.S. Coast Guard Marine Board Investigation ICO the sinking of SS El Faro held in Jacksonville, Florida held

20 May 2016

Volume 15

CAPT Neubauer: Good morning. This hearing will come to order. Today is May 20th, 2016 and the time is 9 O'clock. We are continuing at the Prime F. Osborn Convention Center, Jacksonville, Florida. I am Captain Jason Neubauer, of the United States Coast Guard, Chief of the Coast Guard Office of Investigations and analysis, Washington D.C. I'm the Chairman of the Coast Guard Marine Board of Investigation and the presiding officer over these proceedings. The Commandant of the Coast Guard has convened this board under the authority of Title 46, United States Code, Section 6301 and Title 46 Code of Federal Regulations Part IV to investigate the circumstances surrounding the sinking of the SS El Faro with the loss of 33 lives on October 1st, 2015 while transiting East of the Bahamas. I am conducting the investigation under the rules in 46 C.F.R. Part IV. The investigation will determine as closely as possible the factors that contributed to the incident so that proper recommendations for the prevention of similar casualties may be made. Whether there is evidence that any act of misconduct, inattention to duty, negligence or willful violation of the law on the part of any licensed or certificated person contributed to the casualty, and whether there is evidence that any Coast Guard personnel or any representative or employee of any other Government agency or any other person caused or contributed to the casualty. I have previously determined that the following organizations or individuals are parties in interest to the investigation. Tote Incorporated, ABS, Herbert Engineering Corporation and Mrs.

Teresa Davidson as next of kin for Captain Michael Davidson, Master of the SS El Faro. These parties have a direct interest in the investigation and have demonstrated the potential for contributing significantly to the completeness of the investigation or otherwise enhancing the safety of life and property at sea through participation as party in interest. All parties in interest have a statutory right to employ counsel to represent them, to cross-examine witnesses and have witnesses called on their behalf.

I will examine all witnesses at this formal hearing under oath or affirmation and witnesses will be subject to Federal laws and penalties governing false official statements. Witnesses who are not parties in interest may be advised by their counsel concerning their rights. However, such counsel may not examine or cross-examine other witnesses or otherwise participate.

These proceedings are open to the public and to the media. I ask for the cooperation of all persons present to minimize any disruptive influence on the proceedings in general and on the witnesses in particular. Please turn your cell phones or other electronic devices off or to silent or vibrate mode. Please do not enter or depart the hearing room except during periods of recess. Photography will be permitted during this opening statement and during recess periods. The members of the press are welcome and an area has been set aside for your use during the proceedings. The news media may question witnesses concerning the testimony that they have given after I have released them from these proceedings. I ask that such interviews be conducted outside of this room. Since the date of the casualty the NTSB and Coast Guard have conducted substantial evidence collection activities and some of that previously collected evidence will be considered during these hearings. Should any

person have or believe that he or she has information not brought forward, but which might be of direct significance, that person is urged to bring that information to my attention by emailing elfaro@uscg.mil. The Coast Guard relies on strong partnerships to execute its missions. And this Marine Board of Investigation is no exception. The NTSB has provided a representative for this hearing. Mr. Tom Roth-Roffy, also seated to my left is the Investigator in Charge for the NTSB investigation. Mr. Roth-Roffy, would you like to make a brief statement?

Mr. Roth-Roffy: Good morning Captain, thank you. Good morning, I'm Tomas Roth-Roffy, Investigator in Charge for the National Transportation Safety Board's investigation of this accident. The NTSB has joined this hearing to avoid duplicating the development of facts. Nevertheless, I do wish to point out that this does not preclude the NTSB from developing additional information separately from this proceeding if that becomes necessary. At the conclusion of these hearing the NTSB will analyze the facts of this accident and determine the probable cause independently of the Coast Guard, issue a separate report of the NTSB's findings, issue recommendations if appropriate to correct safety problems discovered during this investigation. Thank you.

CAPT Neubauer: Thank you. We will now resume our session with Mr. Thomas Gruber from ABS. Good morning Mr. Gruber.

WIT: Good morning, sir.

CAPT Neubauer: Sir, I just want to remind you that you remain under oath from yesterday.

WIT: Yes, sir.

CAPT Neubauer: Mr. Kucharski.

Mr. Kucharski: Thank you Captain. Mike Kucharski, National Transportation Safety Board. Good Morning Mr. Gruber, Mr. White.

WIT: Good morning.

ABS: Good morning.

Mr. Kucharski: Mr. Gruber I would like to continue along with the a couple topics we discussed yesterday. I would like to revisit them. Specifically it's Section 170.110 of 46 C.F.R. Chapter I, subchapter S, subpart D. Would you please look at – do you need to look at Exhibit 204? It's under Exhibit 204. And specifically it's section D which is entitled stability instructions for operating personnel.

ABS: Captain Kucharski the beginning of paragraph D states, the format of the stability booklet?

Mr. Kucharski: Correct, correct. The whole section though the subpart is for operating instructions, yes, that's correct.

ABS: We're at that section, thank you.

Mr. Kucharski: Okay, great. And the – back to the last full sentence it says, in developing the stability booklet consideration must be given to including the following information. Do you see that sentence please?

WIT: Yes, sir.

Mr. Kucharski: And there's a list of 15 items which could have been considered for inclusion in the trim and stability for the El Faro. I omitted item 16 because I think you'll agree it deals with hopper dredges, I don't believe the El Faro is hopper dredge, correct?

WIT: Correct.

Mr. Kucharski: Thank you. And I believe counsel for ABS stated and you agreed that the items were not mandatory items in the stability book, is that correct?

WIT: Yes, sir.

Mr. Kucharski: Please take your time, just a little time and looking at the items recommended for consideration, we believe 12 of those 15 items were included in the El Faro's trim and stability book. And the items omitted were 11, 13 and 15. We briefly discussed 11 and 15 yesterday. Can you take a look at those items please?

WIT: Okay.

Mr. Kucharski: Although item 11 states, the general precautions for preventing unintentional flooding, 15 any other necessary guidance for the safe operation of the vessel under normal and emergency conditions. And the one that we didn't discuss is item 13 which talks about if damage occurs. You see those 3 items?

WIT: Yes, sir.

Mr. Kucharski: Great. Can you educate us on the rationale behind including the 12 items and not including the other 3 items? Can you tell us what the rationale is when you evaluate that?

WIT: Item 13 talks about vessels subject to damage that require cross flooding devices. The El Faro was not fitted with cross flooding devices so it was not applicable. Item 15 is the – that's guidance for safe operations under normal and emergency conditions. Under normal conditions the guidance is there for the Master to evaluate the conditions of the booklet. Under emergency conditions did you have any specific emergency conditions that you thought would be applicable?

Mr. Kucharski: No, sir. I'm asking, sorry, I'm asking you for the rationale behind ABS's or your team not including them.

WIT: The number of possible emergency conditions is unlimited. But the vessel was supposed to have a damage control plan on board the vessel which would have given the same information to the Master. So it was – should have been readily available on the bridge for him.

Mr. Kucharski: And item 11, the rationale? General precautions for ----

WIT: The damage control plan does – is supposed to have all the openings onboard the vessel and their means of operations. So again that's already considered in the damage control plan.

Mr. Kucharski: And can you explain the process for evaluating each item and the inclusion and the remission in the T&S book? Was it a team approach that determined what should be included in the T&S book? How does the process actually work at ABS?

WIT: Just let me remind you ABS reviews the document, we don't develop the document. We are there just to check that it meets the requirement. Development of the document, the reason we're doing this is an independent review of what the Naval Architect does. The format of the booklet was actually set when the first booklet was approved. The changes and the updates to the booklet in 1993 and 2006 kept the basic format of the booklet the same and just updated it based on the changes that were made. That was considered a prudent way to go because the Masters that were using the booklet were already used to the format and used to the guidance that was in there. And changing that didn't seem the way to go. It didn't – we didn't want to change the

way what the Master was already used to. So we left the format as previously approved by the Coast Guard and then ABS in the previous reviews.

Mr. Kucharski: Excuse me for maybe asking this question, but did you not yesterday say that you weren't sure what the Masters or the Mates actually looked at the stability booklet or the instructions?

WIT: I don't recall saying that at all.

Mr. Kucharski: Okay. Did your team consider the, I think you termed it unusual design of the vessel in any of these or the, you know that PONCE, the PONCE Class vessels?

WIT: Could you repeat the question?

Mr. Kucharski: Yeah. I heard a term I think you used, it was unusual or it was a very different design that these vessels were.

WIT: Are you referring to the asymmetrical design of the ramp?

Mr. Kucharski: Yes, sir, yes, yes. And the overall design of the vessel too. Both of them. Would you consider it an unusual design for roll on, roll off vessel?

WIT: It's a design.

Mr. Kucharski: Fair enough. Did your team consider the raising of the draft marks where it sat deeper in the water when you looked at the rationale to be in any of the inclusion or not inclusion of the items in the instructions, trim and stability book?

WIT: The raising of the load line mark, increasing the draft was considered in with – we made sure it was documented in the booklet and the guidance for the Master. But with regard to the GM was extended up to that point. But the draft marks were not changed.

Mr. Kucharski: So at the load line. Was the load line changed on that vessel?

WIT: Yes, the load line in 2006 was increased by approximately 2 feet.

Mr. Kucharski: And you're saying there was guidance in the trim and stability book for the actual raising of the load line?

WIT: Are you talking about the physical raising of the marks?

Mr. Kucharski: Yes and the affect that it would have.

WIT: The physical raising of the marks is done in the shipyard in the presence of a surveyor. The surveyor witnesses the change of the marks and issues the load line certificate to the vessel. As far as the trim and stability booklet goes that had already been updated because of the changes made to the vessel, the change in light ship weight. The allowable K – the minimum required GM curves were updated and the references to the draft, the maximum draft in the booklet were updated in the trim and stability booklet as well. So that guidance was given to the Master.

Mr. Kucharski: I also believe that you stated operating personnel would use the stability manual would be the Captains and Deck Officers, is that correct?

WIT: I was, when I went to school I got a Third Assistant Engineer's license, I was not familiar with the Deck Officer side, but it is my understanding that it is the Captain and Mates that are responsible for stability.

Mr. Kucharski: Would a person with operating experience as a Master or Mate on a vessel of unlimited tonnage be part of your process or your team to determine what should be included in the trim and stability book?

ABS: Sir, when you say part of his team, part of the ABS team that reviews the stability requirements in accordance with rules and conventions?

Mr. Kucharski: Correct.

WIT: We do have people with sailing experience on staff. But if you're asking if, do we specifically require them to review the booklet in addition, no that's not the case.

Mr. Kucharski: Okay. And the on staff are, with operating experience are Masters and Mates?

WIT: I know we have people with sailing experience, I would not be able to define their titles.

Mr. Kucharski: On a different topic ----

ABS: Just as a clarification for the board and, we just want to emphasize your understanding, ABS doesn't create the book. It's reviewed based on the rules and the conventions in place.

Mr. Kucharski: Thank you. On a different topic but it was also discussed yesterday was the fact that the U.S. Coast Guard approved or reviewed earlier versions of the El Faro, ex-Northern Lights Puerto Rico trim and stability book?

WIT: Yes, sir.

Mr. Kucharski: Was the vessel part of the alternative compliance program in 2006, 2007 when a revision E of the trim and stability book was submitted to ABS for approval?

WIT: I believe it had applied sometime around that time, but it was not accepted into the program until 2010.

Mr. Kucharski: Okay, thank you. No further questions.

CAPT Neubauer: Thank you. At this time we would like to transition into the next line of questioning. Do you have a question Mr. White?

ABS: Mr. Gruber has indicated he would like to clarify something with regard to his testimony, sir, if that's alright?

CAPT Neubauer: Yes, sir.

WIT: Mr. Kucharski you mentioned before about the openings and why they weren't in the T&S booklet. I indicated that they were in the damage control plan. There is also another document that's required to be on board, it's the load line Record of Conditions of Assignment that the surveyor fills out and includes all of those openings. So it is another record that's on board the vessel. Thank you.

Mr. Kucharski: Okay, thank you. But the inclusion, there's nothing in the trim and stability book about those openings and the effect of down flooding or anything like that, is that correct?

WIT: Yes, sir.

Mr. Kucharski: Thank you.

CAPT Neubauer: Thank you for that clarification. We'll now go to the next line of questioning which is the CargoMax program. Doctor Stettler. Actually Lieutenant Commander Venturella is going to lead off with the questions. And just to give him some time prepare we'll take a 5 minute recess and reconvene at 9:25.

The hearing recessed at 0918, 20 May 2016

The hearing was called to order at 0925, 20 May 2016

CAPT Neubauer: The hearing is now back in session. Lieutenant Commander Venturella.

LCDR Venturella: Good morning Mr. Gruber.

WIT: Good morning, sir.

LCDR Venturella: Sir, as we've heard in previous testimony the El Faro utilized the stability and loading software CargoMax. CargoMax is one of several common on board stability software packages available for vessels and is the software selected for use by Tote for its cargo vessels including the El Faro. In the following questions I'm interested in ABS's role and their process for review and approval of the stability and loading software CargoMax. Sir, can you explain the purpose of on board stability and loading software such as CargoMax?

WIT: An on board stability program is there to enable the Master to evaluate loading conditions similar to the trim and stability booklet. There's several different types available so it all depends on which program, which type the owner wants to put on board the vessel.

LCDR Venturella: Can you explain some typical functions that the software provides?

WIT: Are you asking which functions we approved, or which functions the software provides?

LCDR Venturella: I would like you to discuss, in the case of the El Faro's CargoMax software what functions did it provide and then if you could just go ahead and say which part of it you reviewed as well.

WIT: The CargoMax software has several different options available to them, to the Master. Our review was limited to the stability portion of the program. So since ABS did not review the remainder of the program the other functions, I think that's more – should be directed to the Naval Architect that developed the program.

LCDR Venturella: Are you aware of the other modules or parts within the software though?

WIT: I'm aware there are some strength related options in the program. But like I said they were not reviewed by ABS.

LCDR Venturella: Are you aware of any cargo securing or lashing within the software?

WIT: Yes I believe that's included as well.

LCDR Venturella: Are you aware of any ability to input flooding into holds within the software?

WIT: I am not aware, I'm not certain if there is a damage stability portion provided to the ship.

LCDR Venturella: And you said you reviewed the stability aspect, but if there was a flooding module or a damage stability module you would not have reviewed that, is that correct?

WIT: The stability portion of the program as it relates to the trim and stability booklet evaluates the vessel for compliance with the required regulations. If there is a damage stability portion I believe that was something that the Master could use to determine if he had, he or she had flooding. What the effects were, that's not part of the regulatory requirements for the vessel so that would not have been reviewed. That's the difference between the two.

LCDR Venturella: What regulatory and Class requirements exist for the function and use of stability software?

WIT: Well in 46 C.F.R. 170.110 paragraph F refers to on board electronic stability computers being used as an adjunct to the required booklet. So it's – it starts off with the Code of Federal Regulations. The intact stability code issued by IMO also includes recommendations for intact stability and stability computers. According to the ACP

supplement all recommendory – recommendations in the ISO code are to be considered as requirements. So that's a requirement as well. IACS also has come up with the unified requirement. IACS is the International Association of Class Societies of which ABS is a member. And we have IACS, unified requirement L5 entitled Onboard Computers for Stability Calculations. And then there's guidance from the Coast Guard. There's plan review guidance, procedure number T1-2, Marine Safety Center Guidelines for the Review of Computerized Trim and Stability Booklets, revision dated December 2nd, 1999. And that's available on the Marine Safety Center website. Those are the documents that are available for that review.

LCDR Venturella: For the record that – the Marine Safety Center plan review guidance you mentioned, we recently learned that that's been cancelled. So it is still up but they're removing it. So can you tell me overall in terms of the requirements regulations and guidelines, are stability instruments required for vessels like the El Faro?

WIT: The stability instrument is not required for general cargo ships. Recently IMO passed new regulations requiring them for tankers, gas carriers and chemical carriers. But there's no requirement for the computerized T&S booklet to be on board other vessels.

LCDR Venturella: And if they do have a stability instrument like the El Faro did, am I to understand that the requirement is just for review of an already existing stability instrument, is that right? Let me rephrase. So if a vessel has a stability instrument is it required to be reviewed?

WIT: According to the verbal guidance I've received over the years from the Marine Safety Center, if the program is on board and being used by the Master it needs to be

reviewed. In accordance with IACS unified requirement L5 it's required if – it doesn't require the booklet – the program to be on board, but if it's on board for vessels built after 2005 it's required to be approved.

LCDR Venturella: Please turn to Marine Board Exhibit 212, 212 page 1. Exhibit 212 is the International Association of Class Society uniform requirement L5 for Onboard Computers for Stability Calculations. Okay. On page 1 under general the second bullet down reads, approved stability software is not a substitute for the approved stability information and is used a supplement to the approved stability information to facilitate stability calculations. And the third bullet says, the input/output information should be easily comparable with approved stability information so as to avoid confusion, possible misinterpretation by the operator relative to the approved stability information. I want to focus on this area first. My question is yesterday when we began the discussion on the software we talked about some differences between the software and the approved stability booklet. Specifically I recall one example for inputs would be the wind profile of the vessel. The trim and Stability booklet, if I recall does a simplified approach where it's a conservative approach to the container loading. The CargoMax software allows a different approach that allows a more exact wind profile on the container loading, is that correct?

WIT: Yes, sir.

LCDR Venturella: Okay. Also we also learned that there were some differences in output potential based on free surface criteria changes between the approved stability booklet and the CargoMax software. Based on that can you tell me how we're not in

conflict with the input/output information being easily comparable with the approved stability booklet that's the regulatory requirement?

WIT: Okay, sir. If you'll turn to page 2 of the same document under item 3, types of stability software. It discusses the three different types of stability software. Type 1 being it calculating intact stability only. That is just calculating intact stability. Type 2 software is calculating intact stability and checking damage stability on the basis of a limit curve. Again calculating intact stability. And type 3 is calculating intact stability and damage stability by direct application of pre-programed damage cases for each loading condition. And then parenthesis, for some tankers, etc. Okay. Again calculating intact stability. If you look at – if you read what type 3 is this is not possible in the trim and stability booklet. Would you agree?

LCDR Venturella: Yes.

WIT: Okay. So the document does state ----

CAPT Neubauer: I just want to make one point, sir. You can't ask the board questions.

WIT: [Laughing]. I apologize.

CAPT Neubauer: So Lieutenant Commander Venturella you just have to phrase the question for Mr. Gruber.

LCDR Venturella: Okay.

CAPT Neubauer: It can't be a discussion back and forth.

LCDR Venturella: Okay. So you're – what you asked I'll rephrase it back to you. The type 3 stability software, is that something that can be accomplished with the trim and stability booklet?

WIT: No, that's not – that was one of the main purposes that we have this document. If you just allow me a minute or two I can give you some history behind this. We, ABS first started working on a project like this with Herbert Engineering for some tankers, and I won't bring up the company's name, but they were U.S. Flagged tankers that wanted the added flexibility. The requirements in the trim and stability book was very restrictive. And we discussed this with the Coast Guard, the Naval Architecture branch at the time, it's undergone some different names and we approved programs for this company using very similar guidance on behalf of the Coast Guard. And this was back in late '90s when we started this. A lot of the guidance that was developed by the Naval Architect through ABS and in concert with Marine Safety Center were recommendations brought up in IACS that helped write UR L5 back in the early 2000's. And that's – so the work done with and on behalf of the Coast Guard actually went in a large part to developing this document.

LCDR Venturella: Would you say though that in the case of this one, this particular CargoMax software for the El Faro that the input/output information would match up?

WIT: In general depending on the option the Master used, if he used the conservative approach that is mirrored from the trim and stability booklet the required GM would be identical. If he's using the direct calculation of wind heel he would get a more exact number that's in compliance with the regulations. As far as the free surface that is also included – the free surface used in the program meets or exceeds the requirement, the free surface in the C.F.R.

LCDR Venturella: Can we turn to page 3 of the document? Page 3 includes the functional requirements within uniform requirement L5. And in 4.1, it's the 6th item

down, it says down flooding angle and corresponding down flooding opening, this is indicated as a parameter that shall be presented for a given loading condition. In our review of the CargoMax software we could not locate this particular requirement as being met. Is this something that ABS would normally expect to be in the software package?

WIT: Certain parameters based upon the required criteria that's being checked are not – would not have been included. In this case compliance with the Coast Guard weather criteria does not have a down flooding issue – or requirement. So I would expect in that case it was not included.

LCDR Venturella: But there are down flooding points documented under ABS review, is that correct?

WIT: There are down flooding points documented in the damage stability calculations for probabilistic damage stability. But the program in this case is checking the intact stability curves. There were no down flooding issues.

LCDR Venturella: Sir, wouldn't you say that the trim and stability booklet is responsible for checking the criteria for both intact and damage stability?

WIT: Yes, sir.

LCDR Venturella: So in that case down flooding points are required to check damage, is that correct?

WIT: They are. I cannot find the ----

LCDR Venturella: Your mic is not on.

WIT: I'm sorry. Yes they are. But if the controlling curve based upon the review of the time shows that the damage stability is not critical then they're just reviewing the actual curve for the intact criteria.

LCDR Venturella: Also let's look at 4.3. It says a clear warning shall be given on screen and in hard copy printout if any of the loading limitations are not complied with. In my, once again my own review of the CargoMax just looking at it briefly recently, I am seeing some conflict on this particular item as well. For instance the trim and stability booklet includes operating restrictions for the tanks in terms of the number of slack tanks for both the consumables and the other tanks. Can you comment on how the software is warning the user if they're exceeding the number of slack tanks required by the trim and stability booklet providing that clear warning?

WIT: Actually I can. There's a cite I would like to bring up, but I have to find it first. I believe it's in NVIC 3-97. But if you can, when we take a break if I can bring that back up to you all I would appreciate that.

CAPT Neubauer: Yes, sir. I think it's an important point. The hearing will recess and reconvene at 9:50

The hearing recessed at 0942, 20 May 2016

The hearing was called to order at 0952, 20 May 2016

CAPT Neubauer: The hearing is now back in session. For the record we're going to be adding Coast Guard navigation inspection circular 3-89 as Exhibit 213. This is the guidelines for the presentation of stability information for operating personnel. Lieutenant Commander Venturella can you continue with the line at this time?

LCDR Venturella: Mr. Gruber when we left off we were discussing 4.3 in the uniform requirements about a clear warning given on screen and in hard copy printout if any of the loading limitations are not complied with. I specifically mentioned a slack tank, operating restrictions as an example and I'll give you two more examples to think on too. Bridge visibility is one that is indicated within the trim and stability booklet that I have seen no software warnings on. Also exceeding the capacity plan, the capacity plan within the trim and stability booklet for cargo loading within holds and on the container deck. Did you find anything that you could reference?

WIT: Yes, sir. In enclosure 1 to NVIC 3-89 section 6 is referred to as simplifying assumptions. And it refers to basic simplifying items that are done in the trim and stability booklet to make it easier for the Master. And it says simplifying assumptions which are often used include, and item A is limitations on free surface. And I won't read the entire document. But it does create a limitation based on that as a simplifying assumption. And then under item 7, methods to simplify calculations in the trim and stability booklet it states, under item C the free surface correction described in 6A above, parenthesis if used, closed parenthesis. So the Master is not required to use that, that was just put in there by the Naval Architect when the vessel was first – the document was first created. The stability program allows – gives the Master a lot more flexibility to load the vessel while still complying with the required regulations. And in no case are the slack – the slack tank requirements, while they are in the trim and stability booklet they're not a requirement, they're a recommendation. And the program does not force the Master or allow the Master to avoid meeting the requirements in the C.F.R. for free surface.

LCDR Venturella: Mr. Gruber could you comment on which regulation the trim and stability booklet free surface was reviewed to?

WIT: The, I believe its 46 C.F.R. 170.285 of the free surface requirements in the C.F.R. And those – those were the requirements in the T&S booklet were found to meet them. And the minimum free surface used in the program is also found to meet that requirement.

LCDR Venturella: Mr. Gruber would you agree that the operating restrictions in the forward part of the trim and stability for slack tanks have to do with that criteria being used and the limitations involved in the simplifying assumptions?

WIT: I believe they are used as simplified – it is a simplified method to comply with that criteria, yes.

LCDR Venturella: And it's your belief based on your review of the CargoMax software that using the software despite its differences on free surface still allows compliance with 170.285 free surface?

WIT: Yes, sir.

LCDR Venturella: Can you comment on bridge visibility requirements based on containers in forward bays? And if you load containers too high in the forward bays you would technically exceed bridge visibility requirements listed in the trim and stability booklet. You don't get a warning on that. Can you explain that to me and why that would be the case, or is that something that you think should be in there?

WIT: It was not included as part of the review of the program to evaluate the stability of the vessel. Bridge visibility is a completely separate issue and not covered under stability.

LCDR Venturella: Can you comment on whether the ABS load line and stability group would have reviewed everything in the trim and stability booklet and not just the trim – the stability criteria applicable? In other words if there is a bridge visibility or a capacity plan included within, do you review it?

WIT: As part of the stability documentation, no. There are portions of the trim and stability booklet that are reviewed by ABS and the Coast Guard. There are portions of the stability booklet that the owner includes that is responsible for the details that are not a part of review by either ABS or the Marine Safety Center.

LCDR Venturella: Can you comment on whether bridge visibility is a regulatory requirement?

WIT: I believe it is, but it's outside of my area of expertise.

LCDR Venturella: Is there any note on your approval of the trim and stability booklet that indicates that you did not review bridge visibility that's depicted within the booklet?

WIT: No I do not believe there is.

LCDR Venturella: During your review did you review the capacity plan that indicates the cargo limitations for the holds or the containers in the various bays on deck?

WIT: The capacity plan shows a loading of the vessel, but the Masters – there's no way – nothing that indicates that's the maximum load that can be carried in that cargo, in that cargo hold. So it's – it's up to the Master to – what they're going to fit in there is completely up to them as long as they meet the strength requirements. Which again is not a part of the stability portion of the review.

LCDR Venturella: Do you have any communication with the reviewers of the cargo securing manual to make sure that the guidance of the capacity plan within the trim and

stability booklet is consistent with the capacity plan indicated in the cargo securing manual? Is there an effort to communicate between the various groups within ABS's technical offices?

WIT: There's typically communication. Whether or not that booklet was done at the same time, I have no idea. I don't know when the cargo securing manual was approved.

LCDR Venturella: Would you agree that the trim and stability booklet includes loading limitations that affect bridge visibility and the capacity of the holds?

WIT: Can you clarify that please?

LCDR Venturella: If I tell you, you can only load two containers in the forward most bays to maintain proper regulatory bridge visibility, and that's within your approved trim and stability booklet is that a loading limitation?

WIT: It is not a loading limitation that would change the requirements for the stability, which is what we're looking at.

LCDR Venturella: And that's the ABS stance on the interpretation of this uniform requirement?

WIT: If loading limitations are what's, as far as the required GM curve and what specific items go into that.

LCDR Venturella: Are you aware that the capacity plan is different between this booklet and the cargo securing manual?

WIT: No, sir, I'm not.

LCDR Venturella: We talked earlier about the wind profile calculation differences between the CargoMax software and the trim and stability booklet. Would you agree

that the profile calculation performed within the trim and stability booklet is more conservative in terms of its calculation of GM?

WIT: More conservative than what?

LCDR Venturella: More conservative than the wind profile produced within the CargoMax software.

WIT: Well there are two different ways of doing in the CargoMax software. It should be equivalent to the one where it checks the KG curve and it's not – the direct calculation is not as conservative as the one in the trim and stability booklet.

LCDR Venturella: So to, I want to get this clear, when an operator uses the CargoMax software to load their vessel and check their GM it is possible to use the wind heel approach, auto wind heel to be less conservative than the approved regulatory trim and stability booklet, is that correct?

WIT: That's correct. But that doesn't mean it's less safe or doesn't meet the criteria.

LCDR Venturella: Alright I'm going to move away from this exhibit. Please explain the process at ABS for review and approval of the stability software. Specifically can you indicate whether you checked test cases of loading provided in the trim and stability booklet and how you do those checks?

WIT: The documents received from the submitter. There's several different ways of receiving the program. It could be on a disk, it could be on a download. It's loaded on our computer. Just I take it the administrative portion of the review you're not interested in, you're just looking at the technical review?

LCDR Venturella: If it's applicable to you understanding how this would work. I mean I'll leave it to you how you best think to describe it.

WIT: I mean we log in documents and track it pretty much similar, you know we have a similar approach as the Marine Safety Center. So I don't think that that's what you're looking for.

LCDR Venturella: Okay.

WIT: We load the program up. We start running it through its paces to evaluate how it works. We do load up conditions from the trim and stability booklet as well as other loading conditions. We force beyond the loading limits, you know of draft and KG and GM to make sure that there's alarms. Depending on the depth and the type of the program depends on – will dictate how much of our review and how in-depth our review goes to. If it's just checking the curve we'll check conditions along the length of the curve for the full range of drafts to make sure that the right KG and GM is being looked at. If it's a damage stability issue where a type 3 program, we'll start evaluating all the different cases of damage to make sure that the appropriate damage cases are done to comply with the criteria. Typically that's a tanker issue. Once we're satisfied that everything is meeting the requirements and we'll issue our approval letter. That will also include instructions for the installation on the vessel and we'll advise our surveyor that they, you know our surveyor has to witness the installation and check the program on board.

LCDR Venturella: And I know that survey is not your area, but just to see if you can answer this. Are surveyors provided any specific training to be able to do the installation check on the CargoMax that you approve?

WIT: They, when you say installation, they don't install the program on board. That's done in their presence, but that's – they get there to make sure it's up and running and they have the person on board run the conditions and run the check conditions.

LCDR Venturella: And the test cases that are used on board for the survey that are approved at your office, are they saved files or are they having to be inputted each time by the operator?

WIT: It depends on the operator. Most of the time we use the approved conditions that are in the manual, the manual for the program. Other times different submitters will send in a packet of check conditions that's placed on board the vessel.

LCDR Venturella: Would you say that you perform independent calculations outside of, when you're reviewing the software, is there any independent calculations done?

WIT: Yes.

LCDR Venturella: Is there any bench marking or validation process for the software either at ABS or provided by the software vendor to demonstrate valid calculation algorithms in all conditions and to ensure the software does not have any bugs or other problems?

WIT: We run the program and run the checks here. We're also in communication with the program manufacturer when it's submitted.

LCDR Venturella: So the responsibility is ABS's to ensure that there are no bugs, is that correct?

WIT: We run the program. I mean there's no way to determine whether or not you've gotten all the bugs out until you start using it and putting it through its paces. We do our

best in the office to put it through as much as possible to see what comes up. But there's always a possibility of unexpected bugs that crop up later.

LCDR Venturella: Is there a configuration control process either at ABS or provided by the software vendor to ensure the software for a particular vessel has been fully reviewed and approved?

WIT: Reviewed and approved by who?

LCDR Venturella: I guess what we're getting at here is, is there a process to make sure that the software in its entirety has been reviewed? Or is it only like as you discussed the stability instrument?

WIT: Okay. It's ABS's process to review the documents for the function that we're being requested to review it for. In the case of this vessel we were requested to review the stability portion of the program as a stability instrument and that's what we clearly stated in our approval that our review was limited to.

LCDR Venturella: And is there any expectation for ABS or the vendor to look over the other portions or just not look at them at all, or? What is the thought process on that?

WIT: As far as ABS goes we review and our letter clearly states what we review.

LCDR Venturella: ABS reviewed and approved CargoMax version 1.21.162 dated August 31st, 2007. This can be shown in Exhibit 16 if you would like to look at that.

WIT: Is that the approval letter?

LCDR Venturella: Yes, CargoMax review letter. And this is a letter from ABS Americas to Herbert Software Solutions International for the S.S El Faro. And it's dated 8 February 2008. So the version listed on here is 1.21.0162 dated 31 August 2007. However, a CargoMax version 1.21.203 dated June 1st, 2010 was installed on the El

Faro and was used by shore side personnel on the date that it departed Jacksonville on September 30th. Do you know if ABS ----

CAPT Neubauer: I just wanted for the record, it departed on September 29th.

LCDR Venturella: Oh, sorry. Okay. Do you know if ABS reviewed and approved this updated version for use on El Faro?

WIT: No we did not review the one that was currently on board. Nor did we ever review the portion that was put on the shore side. That, just for the record, that was never witnessed by an ABS surveyor or never went through the annual checks that the program on board has to go through. So that, as far as the shore side goes that was not a part of the ABS approval.

LCDR Venturella: Why would the stability instrument supplement, in this case CargoMax be more up to date than the primary reference trim and stability booklet? Are you – is that something that would normally occur?

WIT: What do you mean more up to date?

LCDR Venturella: In this case, and I know you just said you didn't review it, but in the case of CargoMax version dated 2010 versus a trim and stability booklet dated back to, I think it was 2007. Why would the supplement or the software be more up to date in terms of more recently revised?

WIT: Normally the program is done after the trim and stability is approved. That's just the way it's done, it's been done in the past. As far as the 2010 issuance ABS had no involvement in that. I cannot answer that question.

LCDR Venturella: Is it typical to have software such as CargoMax updated several times including different methods of calculation after the trim and stability booklet is reviewed to different criteria?

WIT: To begin with this program is reviewed to the same criteria as the trim and stability booklet with regards to stability. So it's not a different criteria. This program was submitted and reviewed by ABS in 2008 and has not been submitted to ABS since then. So you're asking something that ABS has had no involvement in.

LCDR Venturella: Other than the stability features of the software what is the process for review and approval of the other features included in the software including strength, cargo container loading and lashing? Any review at all?

WIT: The owner never requested ABS to review those portions of the program. So they weren't reviewed. If they wanted that done they would have made a separate submission to us.

LCDR Venturella: Have there been any recent regulatory changes or policy or guidance changes that would require some of the other features such as strength, bending or cargo container loading or lashing to be reviewed within the software?

WIT: You mean by ABS?

LCDR Venturella: By ABS or just in terms of any IACS Class society.

WIT: I believe we have upcoming witnesses from the ABS structures department and I think those questions should be directed towards them.

CAPT Neubauer: Doctor Stettler.

Mr. Stettler: Good morning Mr. Gruber.

WIT: Good morning Doctor Stettler.

Mr. Stettler: I have just a few questions in some miscellaneous topics related to stability and load line. And then we'll turn it over to the board and the NTSB for some follow up questions. Could you explain what is the purpose of a lines drawing?

WIT: A lines drawing depicts the shape of the hull, the hull form up to the main deck.

Mr. Stettler: When is it created and what is it used for?

WIT: It's created by the shipyard or the Naval Architect during the design phase of the vessel.

Mr. Stettler: Okay. And what is it used for?

WIT: We use, ABS uses that for the development of a hull model when we do stability.

Mr. Stettler: And what does the shipyard use it for?

WIT: You would have to ask the shipyard.

Mr. Stettler: Okay. What's the purpose of a general arrangement drawing?

WIT: General arrangement is set up to show the configuration of the vessel. It should show the deck plans, profile, doorways, hatch ways, typically watertight doors are indicated.

Mr. Stettler: Would that include compartment arrangements, tank arrangements, bulkheads, decks and the like?

WIT: Yes.

Mr. Stettler: Is a general arrangement drawing also used to create the computer models for the trim and stability book and CargoMax or any other software used to evaluate the stability?

WIT: It typically is used as reference document to see the arrangements.

Mr. Stettler: Does ABS review and or approve either the lines drawing or the general arrangement at any point in the vessel's life?

WIT: If we're doing a stability review on behalf of the Coast Guard we do examine the lines plan under the appropriate NVIC that's – we look to make sure that the lines plan contains the information recommended. But we don't go out and do a ship check to make sure that the lines plan is completely accurate.

Mr. Stettler: And how about the general arrangement drawing?

WIT: There is a process to do the general arrangement and that unfortunately that's not part of the stability – that's not the responsibility of the stability group. I believe the structures group might be able to provide better answer to that question.

Mr. Stettler: Okay. So you believe that, just to summarize you believe the structures group evaluates the general arrangement drawing, is that correct?

WIT: It's my understanding, yes.

Mr. Stettler: Thank you. So for the lines drawings is there any point in the lifetime of a vessel that the as built condition of a vessel is validated or checked against those lines which are used as the basis for the construction of the vessel?

WIT: How would you validate? Are you talking -----

Mr. Stettler: Is there any survey work done, to your knowledge, is there any notation that there's those lines represent the as built condition of the vessel?

WIT: Our surveyors verify construction to the structural drawings. Not necessarily a lines plan.

Mr. Stettler: Thank you. Separate topic. How does ABS track weight changes on a vessel over a vessel's lifetime? Just the El Faro as an example, but any general vessel.

WIT: We have a process in place where the weight changes are submitted to ABS. We evaluate the impact of that in accordance with Coast Guard Marine Technical Note 04-95 to determine whether or not a stability test or dead weight survey is necessary. If not we – if it's below 2 percent the calculations are acceptable as is. Between 2 and 10 percent of dead weight survey is acceptable. Over 10 percent weight change, aggregate weight change is an inclining experiment. If we don't – if we do a dead weight inclining experiment then the weight is approved at that point. If it's a dead weight survey, as far as ABS – if it's a detailed weight calculation ABS will approve the detailed weight calculation and then we have a tracking form in our system that we note what the changes were and a new light ship, based on the detailed weight calculation and that's updated into our system. And then as future detailed weight calculations come in we can check that and make sure that we're tracking everything that's been done since the last inclining experiment to make sure that when we reach those, that 2 percent or 10 percent critical point the appropriate testing can be done.

Mr. Stettler: Is that 2 percent accumulative or a net?

WIT: That aggregate weight change. Whereas if you put 10 tons on and take 10 tons off it's a 20 ton weight change.

Mr. Stettler: And during that time say a vessel is, the vessel's owner is making changes to a vessel over a period of years and that weight changes is there any process that ABS is responsible for where they can ensure that the light ship weight, if appropriate is updated and reflected in the trim and stability and the stability instrument, the software?

WIT: When we're given these weight changes, like I said if it's a detailed weight change and that's all we have to go, then it would be approved and updated in the trim and stability booklet and then the stability software would follow. Same thing with a dead weight survey or an inclining experiment.

Mr. Stettler: Okay. So who's actually responsible for keeping track of the weight changes to a vessel over its lifetime?

WIT: Well primarily the owner's responsible for it. We are responsible for tracking the changes that are submitted to us for approval. Since, now since the owner has the option of going to ABS or the Coast Guard it's very difficult to track all the changes that have been made. Typically in a case like that if we get a submittal we'll go back to the owner or the Naval Architect and request an update to the detailed weight change to ensure that it reflects all of the changes since the last stability test, not just the ones that are currently being made.

Mr. Stettler: In 2014 several or a number of fructose tanks were installed on the El Faro and these takes were ISO, ISO sized framed tanks that were welded to the tank top deck in the forward holds. And however the extent – or those weight changes that were submitted, the vessel were not reflected directly in the trim and stability book. They – nor in the CargoMax stability loading software directly. Could you comment on how a weight change such as that should have been handled?

WIT: The, first off the weight change should have been submitted to ABS for our evaluation on behalf of the Coast Guard. If that would have been done as I understand it the weights of the containers themselves were known weights, so they would have been backed out of that aggregate calculation. And more than likely we would have

accepted a detailed weight calculation based on those changes. We would have required the trim and stability booklet to be updated and the CargoMax program.

Mr. Stettler: I believe you just stated this, but just to clarify. To your knowledge a weight change of that type was not submitted to the stability load line group, is that correct?

WIT: That is correct.

Mr. Stettler: Thank you. Previous testimony in hearing session 1 stated that during 2015 calendar year a number of weight changes were being made to the El Faro related to some conversion items, some modification for – in preparation for the West Coast trade to go to the West Coast. It included some winch foundations and winches and related, electrical and other. Do you know if ABS load line stability group or anywhere in ABS for that matter was aware of those weight changes that were being made to the vessel?

WIT: I know that the load line stability department was not aware of the changes.

Mr. Stettler: Would – is that something that would normally occur prior to a weight change such as that being made regardless of the amount of that weight change?

WIT: The weight changes need to be submitted to ABS whether or not the owner is doing that ahead of time we have no control over that until we're notified that these changes are being added to the vessel, we can't take action.

Mr. Stettler: Thank you. Captain Neubauer I have no further questions. I turn it over to the board and the NTSB for further questions. I think we could open it up for any topic related to stability and load line.

CAPT Neubauer: Thank you. We're doing our final line of questioning. Are there any questions at this time from the NTSB? To allow some time for a transition I'm going to go to the parties in interest and then come back to the NTSB. Tote do you have any questions at this time?

Tote Inc: No questions, Captain.

CAPT Neubauer: ABS?

ABS: Can we take a 5 minute break, sir?

CAPT Neubauer: Yes, sir. The hearing will now recess and reconvene at 1030.

The hearing recessed at 1025, 20 May 2016

The hearing was called to order at 1035, 20 May 2016

CAPT Neubauer: The hearing is now back in session. Mr. Stoltzenberg.

Mr. Stoltzenberg: Thank you for your continued testimony Mr. Gruber. Earlier today you mentioned the openings and the down flooding points would be found in the vessel's damage control plan, is that correct?

WIT: Yes, sir.

Mr. Stoltzenberg: Did ABS review the damage control plan or would they be required to review the damage control plan for the El Faro?

WIT: No. The SOLAS requirement says it has to be placed on board the vessel. It does not say that it has to be approved. Therefore, it falls under the OCMI going on board to require the document to be there. So it's at their discretion.

Mr. Stoltzenberg: Are you aware if there is a damage control plan for the El Faro?

WIT: I do not know that.

Mr. Stoltzenberg: Thank you. Also following up on your testimony earlier today where can we find the load line condition of assignment you mentioned? Has it been provided to the investigation, Coast Guard or NTSB?

WIT: The LL-11-D is maintained on board the vessel for the surveyor to verify each time he goes on board.

Mr. Stoltzenberg: And the term is LL-11-D?

WIT: It's the load line record of conditions of assignment, that's how it's documented in the load line convention. ABS uses a document number LL-11-D. It's typically referred to as an LL-11-D.

Mr. Stoltzenberg: Okay, thank you. And obviously we're jumping around back to yesterday's testimony. I was looking for some clarification. You stated the vessel, the El Faro was weather criteria limited. Is that correct during that intact stability or stability?

WIT: Yes.

Mr. Stoltzenberg: In laymen's term what does that mean? Because I also understand it that it had a damage stability assessment, in this case it's limited by weather criteria. If you could?

WIT: When you say a vessel is intact stability limited it means you've calculated the required GM curves for both intact and damage stability and in all cases the intact criteria, the GM curve for the intact criteria is higher than the damage criteria. That's what would mean by intact stability limited.

Mr. Stoltzenberg: Okay. Is it typical to have intact stability weather criteria limited versus damaged stability limited for a vessel?

WIT: Could you repeat that please?

Mr. Stoltzenberg: Is it more typical for large ocean going vessels to be limited by their intact criteria, weather criteria versus the damage stability criteria?

WIT: It depends on the vessel and the specific arrangement type.

Mr. Stoltzenberg: Okay. And then I'll follow that up with in your experience as the load line group head for a number of years, can any meaningfully conclusions be drawn from the fact that the El Faro was weather criteria limited?

WIT: As the calculations that I've done recently and submitted it and as part of an exhibit in the marine board it turns out that for the lower curves that are in the booklet the damage was more restrictive.

Mr. Stoltzenberg: This is the more recent May 6th assessment?

WIT: Yes.

Mr. Stoltzenberg: Thank you. I'll move on from there. Also regarding yesterday's testimony are you aware of the scuttle at frame 165, the manhole in the 2nd deck, the free board deck? That would be Exhibit 007, that's the general arrangement drawing. And I would just ask first if Mr. Gruber is aware of the scuttle I'm referring to on the 2nd deck?

ABS: Just forward of the house?

Mr. Stoltzenberg: It's on the 2nd deck, the free board deck where the RO-RO's are stored, some discussion at this hearing and other interviews that discuss this of a potentially an open hatch or not open hatch where flooding may have occurred.

WIT: Did you say on the port or starboard side?

Mr. Stoltzenberg: It would be on the starboard side, frame 165.

WIT: I am aware that there is a hatch there. I believe there is a similar hatch on that side on the El Yunque that I saw when I was on board the vessel.

Mr. Stoltzenberg: Correct that would be the hatch that I'm referring to. Regarding load line assignments would that hatch be required to be weather tight or watertight, and if you're aware for the El Faro could you tell me which it is required to be?

WIT: According to the load line convention hatches on the free board are to be weather tight.

Mr. Stoltzenberg: Weather tight. Would they require a certain combing height?

WIT: Yes. Typically a 24 inch, 24 ½ inch sill on the free board deck.

Mr. Stoltzenberg: Okay. So when in much of the discussion whether the water tightness of that hatch is discussed and hearing testimony from various persons, in fact as far as the load line convention is concerned it only would be required to be weather tight?

WIT: That's correct.

Mr. Stoltzenberg: Thank you. Moving on again to yesterday's testimony. Are you aware of the supply and exhaust ventilation openings that are strung along the – each side of the vessel that services the cargo holds?

WIT: Yes, sir.

Mr. Stoltzenberg: These vents are on the side shell about 4 or 5 feet above the free board deck, they can also be seen on the same exhibit 203 here. And they do face the sea. What I'm trying to understand is if I go to Exhibit 202, which is the load line technical manual there's a section, the closing appliances for ventilators. We can bring that up, I'm not sure if you're familiar with it. I would like to quote from it.

WIT: Sure.

Mr. Stoltzenberg: It says generally the ventilators openings more than 4.5 meters above the free board deck do not need closing appliances. But then there is a, right below that is a relaxation of the requirement. And that relaxation states that ventilator openings in the exterior bulkheads of the superstructure if your deck house is situated on the weather deck are also generally required to have weather tight closures even in cases where the weather deck is the second or higher deck above the deck in which the minimum free board could be assigned. The rationale of this interpretation is to protect the ventilator opening from quote run up, end quote of water due to waves on the vessel's sides or green water on the deck so that the water will not penetrate into the vessel under any sea condition. Beneath that it states that fire dampers are of a normal type are not considered as meeting the requirement unless they're constructed gasketed and capable of being secured weather tight. And per your statement yesterday there's also below that steel louvers are acceptable where it can be shown they are capable of being close weather tight and remain tight under all sea conditions. What I want to know is the process for the El Faro for that relaxation of fixed vent closures was how that's obtained or how that process occurs?

WIT: To begin with there was no relaxation on the opening on a closure device. When the vessel was built in 1975 these openings were deemed to be weather tight and accepted as such. They also met this required sill height of 35 ½ inches. And that's not to the opening on the side shell that's the baffle plate inside. That opening of the side shell is not part of the ventilator itself. The load line tech manual was written, as we stated yesterday in 1989 and published by the Coast Guard in 1990. So that was well

after the vessel was constructed and the decision was made to accept the ventilators at construction. So it meets the – it meets both – it was deemed to meet both the sill height and the closure requirements in the load line convention.

Mr. Stoltzenberg: I guess I would refer specifically to the supply vents where I believe yesterday in testimony it was described that the weather tightness of the fire dampers was what did not make them the down flooding point, rather the exhaust side was the down flooding point due to not having the weather tight fire dampers. So am I correct that these are relaxed because they're allowed to have fire dampers instead of closure on the supply side?

WIT: The supply side has fire dampers with gaskets. The drawing shows that they're watertight, we've considered them to be weather tight for the load line convention. There's no relaxation. What are you considering to be a relaxation?

Mr. Stoltzenberg: Well in fact under the – in the exhibit relaxation requirement is what allows for fire dampers the way I read the load line technical manual. There's general requirements that they all be provided with weather tight closing appliances and then beneath that, the next paragraph the relaxation requirements which I take to be the general requirement relaxation.

ABS: Can you just direct us to the exhibit for the load line technical manual?

Mr. Stoltzenberg: Yeah, this is page 37 of the PDF, page 146 of the manual.

ABS: What's the exhibit number?

Mr. Stoltzenberg: 202.

ABS: 202.

HEC: I'm sorry, what page number please?

Mr. Stoltzenberg: Page 37 of the PDF of Exhibit 202, 146 the page number.

HEC: Thank you.

WIT: Okay. The relaxation of requirement for the omission of the closure device. And that's what's described in the 3 paragraphs below that title. Okay, the other closures below that is a separate topic. So it's not related to the relaxation. The relaxation is for certain ventilators where they're more than a certain distance above the deck. In the case of the free board deck is 14 feet 9 inches above the deck you can omit the closure device if it's not adjacent to the side shell. Okay, that relaxation doesn't come into play here because it is adjacent to the side shell and it does have a closure.

Mr. Stoltzenberg: Thank you. Move on to the last topic. Yesterday during testimony we discussed Coast Guard oversight of the ABS stability and load line reviews. I was wondering if you had a knowledge of a historical tracking of the Coast Guard oversight and outcomes of ABS in stability and load line reviews? Have you ever seen anything like that?

WIT: I have seen the oversight letters as they come in. And I know that the head of the, the current head of the load line department is keeping track of them and adjusting the training to ensure that the observations and other issues that come up are addressed to prevent them from reoccurring.

Mr. Stoltzenberg: So if the investigation was looking for the records we would contact the current head of the ABS load line group?

WIT: I believe you should contact the head of the Marine Safety Center for their documentation on that.

Mr. Stoltzenberg: Thank you. Thank you very much, Mr. Gruber.

CAPT Neubauer: Mr. Kucharski.

Mr. Kucharski: Thank you Captain. Mike Kucharski, NTSB. Mr. Gruber. Just some quick follow on questions on the Exhibits 16, your approval letter that you signed and Exhibit 137, which is the CargoMax approval. I'm sorry, CargoMax vessel information booklet. Kindly let me know when you're ready to go and I'll ask my questions.

WIT: Go ahead.

Mr. Kucharski: Is there any approval of the actual hardware for the running of the CargoMax program? Is there an approval process or?

WIT: No we do not approve the hardware that's on board the vessel.

Mr. Kucharski: At page 4 of Exhibit 137, which is the manual if you will, the vessel information manual, do you see that where it talks about reference documents?

WIT: Yes.

Mr. Kucharski: Do you see item number 3 where it talks about the cargo securing manual as a reference document?

WIT: Yes.

Mr. Kucharski: Okay. Then if we go back to just page 1 of the CargoMax for windows information, it has a stamp of approval on here of the ABS, correct?

WIT: Yes, sir.

Mr. Kucharski: Okay. So how would an operator, the person actually using this program looking at this understand that the cargo securing manual then is really not reviewed, it's not part of the review, am I correct in that?

WIT: If you look on the cover page there's a watermark imprinted that says see ABS Houston letter reference 314297 dated 8 February 2008.

Mr. Kucharski: Great, okay. So let's now go to the letter which is Exhibit 16. And just point to me in there where it says that the cargo securing is not part of the review.

WIT: If you look at the letter it says we've received the following documents, CargoMax for Windows version 1.21, Direct Calculation of Required GM for U.S. Coast Guard Wind Criteria and CargoMax for Windows. Those are the documents that were submitted and it states for our stability review.

Mr. Kucharski: Okay. So even though they said it's a reference document you would have to infer that it was not reviewed by looking at it because it's not referenced in your letter? Do you understand what I'm saying?

ABS: I think our confusion is on what's the reference document here.

Mr. Kucharski: The reference document is mentioned in the vessel information booklet. It says it's a reference document for this – the CargoMax software is the cargo securing manual. Going back to 137, Exhibit 137 page 4.

WIT: The approval for the document itself, it's not for all the references that are attached that are mentioned in it.

Mr. Kucharski: Okay, thank you. Would you look at page 2 of your letter? And item number 6.

WIT: Yes.

Mr. Kucharski: We note the submittal item 1 was reviewed for the stability aspect only?

WIT: Yes.

Mr. Kucharski: Okay. Is damage stability part of the broad umbrella of stability?

WIT: Yes.

Mr. Kucharski: Yet it was not, if I'm correct, the CargoMax program has a damage stability function in it, that was not reviewed by ABS?

WIT: The damage stability function – can you describe the function?

Mr. Kucharski: Let's go to the, yeah I can point it right out to you in the user's manual if you would like to. It's on page 7, it talks about damage stability and then the actual function ----

WIT: Are you talking about page 7 of the document or page 7 of the PDF?

Mr. Kucharski: No of the actual document, it talks about damage stability. And then the CargoMax program which I don't actually have the program opened up here. It has a damage stability function in it.

ABS: Does someone have the page of the actual exhibit once more, it might be referenced.

CAPT Neubauer: I believe it is damage stability of referenced on page 7. It's page 5 of the actual document.

WIT: I believe that damage stability capability is the capability for the Master to inflict damage on the side of the vessel and look at the results. That's not a regulatory requirement and was not part of the review of ABS. ABS's review was in compliance with the applicable stability regulations.

Mr. Kucharski: So even though damage stability is part of the broad umbrella of stability it wasn't reviewed by ABS for that program, is that correct?

WIT: That function of the program was not reviewed.

Mr. Kucharski: Thank you Mr. Gruber. I do have some just very, very broad questions if you would. What's the difference between a loading manual and trim and stability booklet?

WIT: A trim and stability booklet enables the Master to load the vessel in accordance with the required GM or KG curve for compliance with the stability criteria. The loading manual enables the vessel to eval – it aids the Master to evaluate the vessel in conditions with regards to longitudinal strength and bending moments.

Mr. Kucharski: So if a vessel, it's a vessel requirement to have the trim and stability booklet, most all large ocean going vessels?

WIT: Regulation 10 of the load line convention requires a trim and stability booklet.

Mr. Kucharski: And when would a loading manual be required?

WIT: I believe the loading manual requirement is a Class issue and further questions on that should be directed to the structures people that are going to be interviewed later today.

Mr. Kucharski: The CargoMax, we've talked a lot about that. Is that considered a loading instrument?

WIT: It can be. The one that's on board the vessel is a stability instrument.

Mr. Kucharski: No further questions, thank you. Thank you Mr. Gruber.

CAPT Neubauer: At this time I'd like to go to the parties in interest. And this will be the final line of questioning. Tote?

Tote Inc: No questions, Captain.

CAPT Neubauer: ABS?

ABS: Yes, Captain. Mr. Gruber over the past two days we discussed GM requirements and the calculation of metacentric height or KG. Assuming the vessel the El Faro sailed from Jacksonville with adequate GM or GM or, withdrawn. Assuming the El Faro sailed from Jacksonville on its last voyage with GM that met the requirements for the course of the voyage would that be in compliance with the stability requirements?

WIT: Yes it would.

ABS: There was further mention of the fire dampers on the vessel. Assume the vessel sailed with adequate GM and with the fire dampers in an open positon during the course of a voyage would that be in compliance with the statutory regulations and Class rules?

WIT: The statutory requirements say that the opening has to be fitted with a means of closure. They do not state that the vessel has to sail with them closed.

ABS: So if it sailed with them open it would be in compliance?

WIT: Yes, sir.

ABS: You described the GM curves for both intact and damage stability. Were the GM curves in the trim and stability book accurate and in compliance with stability requirements?

WIT: The curves for two tiers of containers and higher met both the intact and damage stability requirements. Based on my latest calculations the curve for 1 tier did not comply with the probabilistic damage stability requirements.

ABS: For the family members here today, sir, and for the members of the MBI could you explain in a general sense the development of the Class rules and regulations for stability and the applicable conventions?

WIT: As far as Class rules go we typically invoke the IMO criteria that's published into – brought them into our Class rules. For areas outside of that we use experience to determine what would be an adequate level of stability and fill in the blanks where the IMO criteria does not apply or does not cover. As far as IMO criteria that's developed through, at this point what's known as the Ship Design and Construction Committee, subcommittee of Maritime Safety Committee. Information is brought up to that group, that's where the stability regulations are actually developed over a period of years. And that's based on the input and experience of all the member states of IMO which are countries around the world. Changes are frequently brought up at IMO. And many times such as the Estonia casualty where a RO-RO vessel sank with a great loss of life regulations are created in to account for such tragedies. That kind of experience is brought up into IMO and the regulations are revised as necessary. These are brought up to the Maritime Safety Committee and enacted in different IMO instruments. So experience plays a big factor in the regulations – the development of the regulations themselves.

ABS: Sitting here today, sir, is there any way to know whether the conditions that may have been experienced by the El Faro exceeded the assumptions and experience that were incorporated into the rules and conventions?

WIT: Unfortunately not knowing those conditions we can't make that determination at this time.

ABS: We had a discussion concerning weight changes and there – some of the questions were directed towards the placement of weight on the vessel by way of fructose tanks or winches or foundations in connection with the expected conversion of

the vessel for Alaskan service. Can you describe in a general sense when the weight changes that are placed aboard the vessel are significant from the stability and inclining or dead weight requirement under the rule?

WIT: Under the guidelines of Marine Technical Note 04-95 when the aggregate weight change exceeds 2 percent a detail weight calculation is not accepted, we have to do a dead weight survey. Further if it's over 10 percent an inclining experiment has to be done. Additionally if the longitudinal center of gravity changes by a certain amount that also kicks in the requirement for further testing.

ABS: Assuming that the weight of the vessel or it's light ship is the relevant criteria in determining whether the changes are significant. Do you know what the light ship of the El Faro was?

WIT: The light ship of the El Faro was 19,940 feet long tons.

ABS: And that 2 percent, when the 2 percent of the light would require a dead weight or an inclining experiment based on what additional weight?

WIT: The aggregate weight change would have to exceed approximately 400 tons to require a dead weight survey.

ABS: And sitting here today, sir, do you know what the weight of the fructose tanks would have been in a loaded condition aboard the vessel?

WIT: The weight of the fructose tanks was approximately 100 tons. It's the empty weight that would be used to determine the light ship change. And that was approximately ½ of 1 percent of the light ship weight.

ABS: So from the perspective of a weight change was the addition of the fructose tanks significant for stability reasons?

WIT: For the requirement of the stability test it was not a deciding factor. It would not have required a new stability test or a dead weight survey.

ABS: And to the extent that any winches or foundations or butterworth heaters or other equipment was brought aboard the vessel at some point, is it fair to say that relevant criteria would be whether those weight changes exceeded 2 percent of the light ship?

WIT: These – the changes according – the changes dealing with the winches and the butterworth's were minimal at most and would not have in any way shape or form required a dead weight survey or a change to the light ship in that regard.

ABS: We discussed the used of the CargoMax computer program. Based on your review or subsequent review in accordance with your attendance here today, the CargoMax program, do you have an understanding as to how the loaded fructose tanks were incorporated into the outbound stability report for the El Faro?

WIT: Based on review since the incident I have learned that the shore side person that developed the loading condition included them as point loads in the, as cargo, the loaded tanks as cargo and the Mates on board accepted that and followed that same practice. So they were accounted for in the loading condition.

ABS: And the incorporation of that weight into the CargoMax program, based on your explanation would that be in compliance with the trim and stability booklet?

WIT: It would have been handled the same way in the trim and stability booklet had they been using that in lieu of the CargoMax program.

ABS: Nothing further Captain.

CAPT Neubauer: Thank you. I have a couple follow up questions on that thread, sir. Do you know the last time that the dead weight survey was conducted on the El Faro?

WIT: 2006, sir.

CAPT Neubauer: And it's my understanding that over time that 2 percent figure would be aggregate since 2007 to the time that the vessel sank?

WIT: Yes, sir.

CAPT Neubauer: So I think you just testified that the 100 ton fructose change out would not have triggered a dead weight survey.

WIT: That is correct.

CAPT Neubauer: Were you saying that from the standpoint that you know the aggregate had not reached 400 tons at that point, or just a point review of that installation?

WIT: The changes that we had been made aware of up to that point would not have required a dead weight survey to be conducted.

CAPT Neubauer: And do you have a log of those changes and do you know what the tonnage change out at that point was?

WIT: I am not aware of any other changes that were submitted to ABS to review on since the inclining experiment.

CAPT Neubauer: And you were never made aware of the weight changes due to the winches, the butterworth heater that you just mentioned were – could not be a factor or were negligible. Have you seen the weights of those objects?

WIT: I have not seen the weights of those objects. When I said they haven't been submitted we weren't aware of them, they were not submitted to the load line and stability department.

CAPT Neubauer: Are you just going by experience that you do not feel that that type of installation would be significant?

WIT: Even with the assumption of conservative assumptive of 1 ton for each item we're not looking at anything close to something that would change that – add to the current ½ of a percent from the fructose tanks that would approach the 2 percent.

CAPT Neubauer: Thank you. Does Mrs. Davidson have any questions?

Ms. Davidson: No, sir.

CAPT Neubauer: Does Herbert Engineering have any questions?

HEC: No questions.

CAPT Neubauer: Tote?

Tote Inc: Yes, thank you Captain. Mr. Gruber one follow up question. You said that the load line group was not aware of any submission by Tote regarding the additional weights or the fructose tanks, correct?

WIT: That's correct.

Tote Inc: Can you say, do you know whether any other part of ABS was made aware of those changes?

WIT: I believe the foundations for the fructose tanks were submitted to ABS for review.

Tote Inc: Thank you.

CAPT Neubauer: At this time are there any final questions for Mr. Gruber? Mr. Kucharski.

Mr. Kucharski: Thank you Captain. Mr. Gruber, Mike Kucharski, NTSB. You mentioned earlier that the fructose tanks were not part of the light ship calculations, is that correct?

WIT: They were not submitted as a light ship change.

Mr. Kucharski: So were they considered cargo then?

WIT: That is how the shore side and the on board people were using – were accounting for those weights.

Mr. Kucharski: Thank you. No further questions.

CAPT Neubauer: At this time are there any final questions for Mr. Gruber? Mr. Gruber you are now released as a witness at this Marine Board of Investigation. Thank you for your testimony and cooperation. If I later determine that this board needs additional information from you I will contact you through your counsel. If you have any questions about this investigation you may contact the Marine Board Recorder, Lieutenant Commander Damian Yemma. The hearing will now recess and reconvene at, I'm sorry, one point. Do any of the PII's have any issues with the testimony we just received?

Ms. Davidson: No issues.

ABS: No issues.

Tote Inc: No issues.

HEC: No issues.

CAPT Neubauer: Hearing none the hearing will recess and reconvene at 11:20.

The hearing recessed at 1111, 20 May 2016

The hearing was called to order at 1123, 20 May 2016

CAPT Neubauer: The hearing is now back in session. We will now hear testimony from Captain Raymond Thompson, a former Chief Mate on the El Faro.

LCDR Yemma: Sir, would you please stand and raise your right hand? A false statement given to an agency of the United States is punishable by a fine and or

imprisonment under 18 United State Code Section 1001, knowing this do you solemnly swear that the testimony you're about to give will be the truth, the whole truth and nothing but the truth, so help you God?

WIT: Yes, sir.

LCDR Yemma: Thank you. Please be seated. Sir, could you please state your full name and spell your last name for the record?

WIT: Raymond Thomas Thompson III, T-H-O-M-P-S-O-N.

LCDR Yemma: Thank you. And counsel can you also state your name and spell your last for the record?

Counsel: Jewells Massee, Hamilton, Miller and Birthisel, M-A-S-S-E-E.

LCDR Yemma: Thank you. Captain can you please state where you are currently employed and what your position is?

WIT: I am currently on the Isla Bella.

LCDR Yemma: And can you describe some of your general responsibilities in that position please?

WIT: As Captain you're responsible for everything. The stability of the vessel, the cargo loading of the vessel, and overseeing it and making sure that the Chief Mates are making sure it's being done properly. Payroll, there's a variety of things. But as Captain you're generally responsible for everything that happens on board the vessel including the safety of the vessel and the crew.

LCDR Yemma: Can you describe some of your prior relevant work experience please?

WIT: Umm I got out of school n '96. I worked on a casino boat for a few years. I believe in '99 I joined the union. From there I started as Third Mate on some container

ships with a company called Osprey Ship Management. They were later taken over by APL. I sailed in various positons for various APL ships. I've done Government break outs on the LMSR's and also activations on some of the other Government ships like Flickertail State, Cornhusker State. Then after that I went – I did a trip on the Great Land which was with Tote Services. I think back then it was called IAS, or IUM, I don't recall exactly. And then I went back to APL. We ended up eventually losing those contracts to the other union. And then I continued sailing through AMO and I ended up on the El Morro. I worked on the BBC Seattle before that as Chief Mate. I was on the El Morro then the El Faro and now the Isla Bella.

LCDR Yemma: And what's your highest level education completed?

WIT: I have a four year degree from SUNY Maritime College, Bachelors of Science and Marine Transportation.

LCDR Yemma: Thank you Captain Thompson. Mr. Fawcett will have questions for you now.

Mr. Fawcett: Good morning Captain Thompson.

WIT: Good morning, sir.

Mr. Fawcett: All of my questions will relate to the time frame prior to the day of the accident, October 1st, 2015 unless I ask you otherwise. We'll talk about your background and experience aboard the El Faro as Chief Mate and your brief stint as Master in a general overview. But we're going to take a, in the course of the testimony we will also discuss cargo loading lashing, moving back into the general discourse on your background and experience. And then finishing up specifically with information

related to stability. So if you would like to take a break at any time in the testimony please let us know.

WIT: Understood.

Mr. Fawcett: So you now serve with Tote, but prior to the accident you filled in as Master of the El Faro for one week, is that correct?

WIT: I believe it was more than one week, sir.

Mr. Fawcett: Okay, but approximately one week. And that would be in the August time frame of 2015?

WIT: Yes, sir.

Mr. Fawcett: During that time you when you were Master of the vessel who did you understand provided oversight of the operations that you performed on Tote Services' behalf as Master of the El Faro?

WIT: Oversight in what regards?

Mr. Fawcett: Who did you report to?

WIT: Well my boss is Phil Greene who's the President of Tote Services Incorporated. You would report through the Port Engineer and then depending on what was going on, on board the vessel there was different parties you would report to. There was a Vice President of Marine Operations. There was a Director of Safety. And depending on what was going on you would report to those people.

Mr. Fawcett: So there was no single person that provided oversight responsibility for your functions as Master of the El Faro? Is that correct?

WIT: Not that I'm aware of.

Mr. Fawcett: I have a couple of questions that relate directly to the United States Coast Guard's credentialing process for mariners. And in hearing 1 we asked Admiral Greene about the – how Tote relies on credentialed mariners. And what I would like to ask you is you have an upper level license with the United States Coast Guard as Chief Mate and Master, correct?

WIT: Yes, sir.

Mr. Fawcett: Is that vessel specific? In other words with that credential in hand can you be a Master of a tank ship?

WIT: Yes, sir.

Mr. Fawcett: A larger passenger crew vessel?

WIT: Yes, sir.

Mr. Fawcett: A vessel such as the El Faro?

WIT: Yes, sir.

Mr. Fawcett: And there's no specific endorsement to be Master, let's function on Chief Mate. There's no specific endorsement that means you perform – you can perform as a Chief Mate on that particular type of ship, is that correct?

WIT: Your license is for unlimited tonnage oceans. So if you're a Chief Mate you can be on any, I believe it's any vessel and same thing with Master. It depends on what your license says.

Mr. Fawcett: In your present position if you left employment with Tote and you went to another employer could you step aboard a large passenger vessel with thousands of passengers and be Master of Chief Mate of that vessel?

WIT: Yes, sir.

Mr. Fawcett: Do you need any additional endorsement to your license for being on a LNG powered ship or a steam ship like the El Faro?

WIT: I believe the engineers had a steam license. But as far as the LNG go we have to take training. We have to have a one week course to be able to be on board the vessel and be part of firefighting teams.

Mr. Fawcett: Okay. And I was referring specifically, for the record for Chief Mate or Master, so.

WIT: Well each crew member on board an LNG ship has to have the training including the unlicensed. If they don't have the training they can still be put on board the vessel, the way I understand it, but they cannot be part or have anything to do with any of the firefighting duties itself or be part of the fire team. Does that answer your question?

Mr. Fawcett: Right. So that would be safety related training, correct?

WIT: Yes it's a course.

Mr. Fawcett: Moving from ship type to ship type as Chief Mate the duties are vastly different. On a tank ship you're unloading and loading liquid cargo. And on a passenger liner you're looking at the operations of the vessel for carriage of passengers. So where do you get the unique skills and experience to be a Chief Mate on a ship? You hold the credential, the minimum credential for the duties that the Coast Guard provides. And then you go aboard the El Faro. Where do you get the training and experience to perform that function safely and efficiently?

WIT: Well you get it through your four years at college where they're training you on various things and you have various courses. You go out on summer sea terms where you go out to sea. And you're learning other things. You also then are attending

courses and when you move up to the Chief Mate/Master's level you have a set of courses, it might be three months' worth of courses that you have to take that have stability, leadership courses. And once that's accomplished and all of your sea time is accomplished you can apply for your next license and continue to move up in rank.

Mr. Fawcett: Okay. Speaking about the El Faro in particular. It's a RO-Con ship or a Con-RO ship, there's been different descriptions of its designation. Cargo rolls on and off and cargo boxes are loading on the upper deck. Where do you gain the specific experience and knowledge to perform that particular function safely and efficiently?

WIT: I don't know what you're looking for, sir.

Mr. Fawcett: In other words when you report aboard the ship is there a familiarization process so that you understand how to perform the functions unique to that vessel?

WIT: There's a turnover with the person that you're relieving. There's a familiarization tour. They usually will walk you through the vessel, explain the operations of the vessel to you, go through their turnover notes, explain those to you. You'll, you know if you're going to be doing the Chief Mates position you have the CargoMax program and manuals that you would refer to, the trim and stability manuals that you would refer to. The tank manuals so if had to sound ballast tanks and things like that. There's usually diagrams on board showing you the location of where the sounding tubes are for the tanks. Is that?

Mr. Fawcett: How long would it take you to gather that knowledge to perform the duties of the Chief Mate for the El Faro effectively?

WIT: It's something you're doing your whole career. When you're Second Mate, Third Mate you're learning from the Chief Mates on other vessels. Whether it's any ship or a

specific ship when you get on the ship you're learning continually every day. And then you know when you step onto a new ship most ships are similar in the fact that they have some sort of cargo loading program and you pretty much enter data in most of them the same way.

Mr. Fawcett: Is there any – are there any challenges that you would face as Chief Mate in coming aboard a particularly unique vessel considering that no two vessels, even of similar design and construction are alike. There are differences. There's difference in the operating scheme of the companies, procedures at terminals, different CargoMax systems. So how do you accommodate those challenges and become effective as Chief Mate aboard one of those ship?

WIT: You read the manuals and learn as much as you can. You talk to people shore side about how the ship has been loaded. You can look in the ship's office, Chief Mate's office, you had all the previous data from all the voyages. You can go back and reference all of that.

Mr. Fawcett: In general could you perform those functions based on a typical mariner's background where you have a Chief Mates license without an endorsement, could you do that, be ready to go fully engaged in protecting the safety and integrity of the ship in a week?

WIT: I believe every Chief Mate that steps on board a vessel should be able to handle what that vessel entails.

Mr. Fawcett: Within a week?

WIT: Within a week.

Mr. Fawcett: So how many years have you spent with Tote in your capacity as Chief Mate?

WIT: I don't recall exactly. I would have to go back and look at my discharges.

Mr. Fawcett: Could you give me an approximate?

WIT: I think 2014 to recently when I then was moved up to Master on the Isla Bella.

Mr. Fawcett: And would you be regarded as a permanent Chief Mate on the El Faro during your time on board?

WIT: I don't know the distinction if there was permanent or temporary.

Mr. Fawcett: Well I'm not talking about an employment classification. I'm talking about a regular schedule and relief where another Chief Mate and you covered the ship during your time aboard.

WIT: Yes, sir.

Mr. Fawcett: So on August 4th you completed, according to the records I have, you completed your Chief Mate stint, moved up to Master of the El Faro, would that be correct?

WIT: I believe so.

Mr. Fawcett: So now in position as Master had you served as Master of the El Faro, the El Yunque, or the El Morro in your employment span with Tote?

WIT: I was Master on the El Faro for a few weeks previous to that. One of the Captains, I believe wanted an extended time home in the summer so I was moved up to Master for a couple of weeks.

Mr. Fawcett: Do you know the time frame?

WIT: Not exactly, sir. I know it was – I believe it was in July.

CAPT Neubauer: Is that July of 2015, sir?

WIT: I believe so.

Mr. Fawcett: So Mr. Shultz the accident voyage Chief Mate came aboard on August 4th, is that correct?

WIT: Yes, sir.

Mr. Fawcett: So how did you provide oversight as his direct supervisor for the operations he conducted? In other words he is joining, he was an experienced Chief Mate, he was joining the El Faro and what was your interaction with Mr. Shultz to make sure you were satisfied that he was able to conduct his duties as Chief Mate effectively and safely?

WIT: Well I know Mr. Schultz from the past. He was Chief Mate on the Great Land which was s similar vessel. And he had a knowledge of the CargoMax, the stability. He had been on the El Yunque I believe which is also a similar vessel. We did a turnover, I gave him turnover notes. I was with him there that week to oversee anything he needed help on. As Master of the vessel there was a common folder on the ship's computer where all the CargoMax load cases would be put. You can then open those load cases from the Master's computer. There was a CargoMax on the Captain's computer. So you can then look and verify and double check things.

Mr. Fawcett: So would you say that you validated the quality of the work performed by Chief Mate Shultz in your role as Master of the ship?

WIT: Yes, sir, I think he was very thorough.

Mr. Fawcett: Okay. And you validated it by looking at the work he performed?

WIT: I would look over the cargo paperwork. I would look over the input he put into the CargoMax and then I would sign and verify the stability document.

Mr. Fawcett: I just have two more questions before we shift focus to the cargo securing and lashing. You served with Captain Davidson for an extended period of time over the last couple of years and shared tours with him so to speak, is that correct?

WIT: Yes, sir.

Mr. Fawcett: Can you briefly describe, or I don't want to limit you, you're more than welcome to use as much detail as possible. Captain Davidson's interaction with the, and the familiarity with the cargo lashing and security of the vessel.

WIT: I believe he was familiar with everything.

Mr. Fawcett: But could you describe the interaction? In other words did he – did he go into the cargo holds? Did he go on the weather decks, watertight decks, take a look at the lashing of the cargo and the condition of the vessel?

WIT: I did not see him doing many rounds of the vessel. But that's not a Master's job so to speak. If he had a Chief Mate he trusted then he could focus on other things on board the vessel.

Mr. Fawcett: What's your normal watch as Chief Mate on the ship?

WIT: 04 to 08 then 1600 to 2000.

Mr. Fawcett: And during that time you have ability to have direct observation if necessary of the decks of a vessel, the upper decks of the vessel?

WIT: When you're on the bridge are you speaking?

Mr. Fawcett: Correct, on watch.

WIT: Yes.

Mr. Fawcett: Okay. We've had a description that I believe it was daily from 6 to 8 Captain Davidson was on the deck of the vessel making rounds. Was that your experience?

WIT: No, sir.

Mr. Fawcett: How often at sea would you see Captain Davidson on deck?

WIT: I did not see him on deck often. Maybe twice, sir.

Mr. Fawcett: Twice?

WIT: Twice in my time with him. One time he came up to the bridge. He would come up every morning at 6 O'clock for coffee and we would usually talk up there and then we would go have breakfast together after I got off watch. One morning he went down on deck to see what the guys were doing. A couple times he would, when he was on the bridge relieve me so I could go down and see what the guys were doing as far as working on deck during the 6 in the morning to 8 in the morning overtime. And the other time that I can recall him being on deck we were doing a sprinkler test with ABS and I was letting him know that the sprinkler test was going to happen and the Chief Engineer and he came out for that and we all witnessed the sprinkler testing on the 2nd deck.

Mr. Fawcett: In framing my final question directly with regards to you, you know you're moving about the ship as Chief Mate in addition your sea going watch duties you have an incredible amount of affairs going on when the ship is loading and unloading in port, would that be a correct characterization?

WIT: Yes.

Mr. Fawcett: So you're watching the vessel be loaded, you're trying to calculate the loads, you're trying to oversee the operations in terms of lashing, you're trying to make

sure that the Stevedores do things that meet your expectation, you're getting the stick for the CargoMax, all those complex operations. How often was Captain Davidson involved with that to support the work you're doing?

WIT: I knew if I needed anything I can go to Captain Davidson and he would be there for me and help me if necessary.

Mr. Fawcett: Was he ever there while you were doing this on his own without you calling him?

WIT: As far as what?

Mr. Fawcett: As far as the loading operations, you know you're in port for two days. And during that whole time activities are going on. Relief Mates might have been brought aboard to assist with fatigue issues.

WIT: Port Mates.

Mr. Fawcett: What about yourself? I mean what kind of workload are you under?

WIT: Well when the Port Mate came aboard the vessel that's when you would take your rest period. And you know there was nothing that I couldn't handle. If I ever had an issue, if there was ever something as far as rest hours, say sailing the next day, you could ask Captain Davidson, hey would you come up to the bridge from 6 to 7 so we can meet our rest hour requirements and he would say no problem.

Mr. Fawcett: We – how about in loading operations? In other words you speak about him coming up to assume assistance with navigational watches. Would he assist you in – let's say for an example at the last minute there was issues related to loading. We've heard about issue where the loading wasn't properly conducted or there were, let me retract part of that. Where there were issued uncovered in the terminal when the ship's

out, you know heading down the channel and those kind of complex loading issues might be resolved and they're communicating them with you, you're checking the CargoMax, was he engaged with that to assist you?

WIT: Sir, I don't recall any issues as far as CargoMax leaving Jacksonville or anything like that. One time I believe we got a stow plan from San Juan and it was inaccurate, but we were still at the dock and he was – he came down to the office to see how I was doing going through the numbers and verifying everything.

Mr. Fawcett: And just to follow on to that, did Captain Davidson verify the accuracy of your comparisons for the loading of the vessel before the ship hit the sea buoy?

WIT: That day it was verified before we left the dock. And in what way are you talking about verify? Did he go box by box?

Mr. Fawcett: No, no. I'm saying that you get the information, it's been described as 30 minutes before sailing and by the time you access the information, you validate the information from your perspective as Chief Mate, then the ship is already in the stream and heading down the channel on a usual basis. How do you report that to Captain Davidson?

WIT: Well first if you're referring to Jacksonville we would get the plan anywhere from 5 to 30 minutes prior to leaving the dock. You would always take it up to your office, plug it in, you would either do a quick review of the stability, call the Captain and let him know of the GM margin and anything he was interested in knowing. And then you would sometimes undock the vessel and as you're heading out the river go back to your office and then you continue going container by container thoroughly through the entire thing and then you would print it out and bring it up to him. If there was ever an issue

found with that it was our understanding that we would just turn the ship around and go back. That was always done prior to even the pilots getting off the vessel. So it was well – it was before the sea buoy and before departure.

Mr. Fawcett: Thank you very much, sir. I'll turn it over to my colleagues, Commander Denning. And then we'll return to the general topics of your experiences.

WIT: Yes, sir.

CDR Denning: Good morning Captain Thompson.

WIT: Morning.

CDR Denning: So I'm going talk about, talk with you about some primarily about cargo securing and then a few other things. But policies, procedures and your experiences related to cargo securing. I'm going to start by reading a section from the Safety Management System. We've been talking a lot about that through these hearings. You don't have to turn to it. I'm just going to read one sentence actually. But for the record and for those that wish to follow along it's Exhibit 198 section 13.6 which starts on page 287, 287. The sentence I'm going to read to you says, each vessel is supplied with a Class society approved cargo securing manual that details the securing arrangements for the particular vessel. And then from there I'm going to ask a few specific questions about the cargo securing manual. And I would like you to look at Exhibit 40 and 42 for me.

WIT: 40 and 42.

CDR Denning: Exhibit, and while you're flipping to that Exhibit 40 is the ABS approved cargo securing manual dated in 2005. It's a 159 page document. I'm not going to have you read it in its entirety right now. Exhibit 42 is a very similar document, its 139 pages.

And it's been provided to us as well and we're told that that is a copy of the excerpts from the cargo securing manual that was kept shore side. And after I give you a few moments just to – just to take a quick look at these two documents I'm going to ask you a few questions about them.

CAPT Neubauer: Captain would you like a couple minutes to familiarize yourself with them?

Counsel: I think that would very helpful, thank you.

CAPT Neubauer: The hearing will recess and reconvene at 11:55.

The hearing recessed at 1150, 20 May 2016

The hearing was called to order at 1156, 20 May 2016

CAPT Neubauer: The hearing is now back in session. Captain are you ready to talk about those manuals?

WIT: Yes, sir.

Counsel: Yes, and Mr. Chairman I'm sorry, I just want to clarify one thing that one of the questions asked I think suggested that the ship was in port for two days. It's actually a one day turnaround and I just wanted to clarify that.

CAPT Neubauer: Thank you. Was that for the Jacksonville turnaround or both?

Counsel: It's for both.

CAPT Neubauer: Thank you, sir. Commander Denning.

CDR Denning: So Captain now that you've had a chance just re-familiarize yourself with those two documents, thank you for taking the time to do that. My first question is how often – how did you use these documents during your typical Chief Mate duties?

WIT: Well when I joined the vessel I reviewed the cargo securing manual and we – I typed up some notes for the Mates that would be out there doing their 6 hour watches. We would put them on 6 and 6 in port so that we could kind of be available all day. And then you would also have the Port Mate come in to assist with the rest hours. So I had typed up some notes, also my relief had added some things to the notes, but in the notes referenced the cargo securing manual, things out of the cargo securing manual, other things such as making sure everybody's got their PPE on. And I do have that document.

CDR Denning: You do have that document? And is that – would that be considered Chief Mate standing orders or -----

WIT: Yes, sir.

CDR Denning: Or some other type of notes?

WIT: It was standing orders that we typed up.

CAPT Neubauer: Sir, can we get that document from you after the testimony?

WIT: Yes, sir.

CDR Denning: And when did you type up that particular document?

WIT: I want to say – I want to say February '14, but I cannot recall 100 percent.

CDR Denning: And when you came on board for the first time as Chief Mate had the prior Chief Mate had similar standing orders?

WIT: I believe there was standing orders, yes. On the El Faro that ship if I recall correctly was coming out of being laid up.

CDR Denning: So did you receive standing orders from your predecessor and revise them or did you create these standing orders yourself?

WIT: I believe it was something that we created when we were on the El Morro. And then we revised them for the El Faro.

CDR Denning: Once these notes were created did you have a chance, or did you have a need to refer back to the actual cargo securing manual frequently or were the key points included in your standing orders?

WIT: I believe most of the key points were in the standing orders. But there was a note in there that the cargo securing manual was in the Chief Mate office if it ever needed to be referenced.

CDR Denning: And how did the Stevedores specifically use these documents or did they use a different reference?

WIT: The way I understood it was they had a copy of the securing manual shore side and that they referenced it for doing the lashing on board the vessel.

CDR Denning: We've heard language during previous testimony about different lashing profiles. Did – and I don't see language specific to lashing profiles, storm profiles, hurricane profiles, that sort of thing in the cargo securing manual itself. Did your notes include language about different storm profiles?

WIT: I don't recall.

CDR Denning: Several of my – I'm getting through several of my questions that had to do with the standing orders I was going to ask you about, but since you already brought that up you've already answered a lot of these questions. So I'm just skipping ahead.

WIT: And standing orders weren't the only thing we had, sir. I would type up a document every time we would pull into port of what the plan was for that port call as far as what tanks you would be ballasting or de-ballasting. As far as if the engineer's

needed something when say a cargo hold was empty they needed to get something into or out of a cargo hold. All that information was typed up in an email and I believe I would send it to the bridge and I would give it to the Mates and the Port Mate.

CDR Denning: So these standing orders and those particular notes, where are those stored, where are those kept electronically?

WIT: The standing orders were behind the Master's orders, behind the Master's standing orders in a binder located on the bridge. And all the watch standers would sign it, all the watch standing officers. And the other ones were electronic and or printed out.

CDR Denning: And were electronic forms of – were these either – were these sent to the office either in electronic or a hard copy form?

WIT: I did not send any of them to the office as far as I recall.

CDR Denning: But yet you still have a copy yourself?

WIT: I have a copy of the standing orders. I don't have any copies of the other notes for the particular port calls.

CDR Denning: So the standing orders you just kept a copy for yourself in your own ----

WIT: Yes, sir. I had a copy for reference.

CDR Denning: So those will be very important for us to obtain and we had asked for those previously and hadn't received those yet. So thank you for mentioning that. So we talked about the operations manual for vessels. I want to go into a few more specifics regarding the weather profiles. They're not written down specific – it's not specific that we've found in the cargo securing manual or the safety management system, but a brief section in the emergency preparedness manual for vessels which is

Exhibit 26, in section 9.7 of that particular document on page 163 it simply states, cars, trucks, trailers and containers must be adequately and securely lashed to avoid any movement under anticipated weather conditions. That's as much as it says about hurricane or storm lashing. Is there any other reference that you can think of besides your notes, besides your standing orders that speak to hurricane lashing or storm lashings?

WIT: Any other reference? Not that I recall.

CDR Denning: So how are the expectations of the Chief Mate communicated specifically to the Stevedores?

WIT: You would discuss with the Stevedores what you wanted done. When I first came aboard, I believe it was the El Morro you would go down and discuss with each Stevedore. There's a header on each deck what your expectations were as far as lashing, putting parking brakes on, things of that nature.

CDR Denning: And what were your expectations when anticipating heavy weather on the El Faro?

WIT: My expectations were that the lashing and the cargo manual was followed, the cargo securing manual. And I believe one time on the El Morro we were expecting possible weather on the beam, that never ended up happening. And I had called down and asked for heavy weather lashing, additional lashing. And I was informed by the head of the Longshoreman that they already do that. After that I had found a document on board the vessel that referred to, you know heavy weather lashing and the heavy weather lashing locations.

CDR Denning: So we had heard from previous testimony during the first hearing, and you just eluded to it when you talked about storm lashings you said they already do that. And we've heard some sort of conflicting testimony in that regard that they, that the Stevedores always have done storm lashing?

WIT: When I called and asked for it to be done I was told that they always do it as a precaution because as the cargo is being rolled onto the ship sometimes the last piece of cargo is coming an hour or so before we take the ramp off and then you're getting underway. If it was something that was waited on and waited to do until the last minute then it may delay sailing of the vessel. So it was something that they did routinely.

CDR Denning: Can you describe that what you believe they did routinely?

WIT: They put extra lashings in the heavy weather locations for the document that I've seen.

CDR Denning: And the heavy weather locations are what locations?

WIT: On the outboard sides of 2nd deck. I believe it was cargo hold 3A. Any cargo that was near a watertight door I believe it was. And then there was an elevator that would load cargo up and down from 3rd deck to the tank top or the 4th deck. Any cargo that was loaded next to that as well had extra lashings.

CDR Denning: So certain locations that you just mentioned had extra lashings regularly?

WIT: Yes, sir.

CDR Denning: And was that your – as you're underway you conduct rounds of the cargo spaces and inspect the lashing, correct?

WIT: Yes, sir.

CDR Denning: Did you observe those extra lashings?

WIT: Yes, sir.

CDR Denning: So can you explain just why you felt like you needed to ask for it and then were told that they already do that? You would have already observed that, correct?

WIT: That I said was when I first joined the El Morro.

CDR Denning: Thank you.

WIT: That was my first week on board the ship.

CDR Denning: Understood. Thank you for that clarification. Next I would like you to turn to Exhibit 109.

CAPT Neubauer: Commander Denning, while you're turning to Exhibit 109 I have a couple follow up questions on that last thread. Sir, was it your experience when you first asked about the storm lashings when you were on the El Morro that they were not being done?

WIT: No it was not my experience that they were not being done. I didn't – I did not know it was, I just came aboard the vessel and I had asked the question.

CAPT Neubauer: And what time frame was that, sir?

WIT: I don't recall, sir. That was when I signed on the El Morro.

CAPT Neubauer: Can you give a general year?

WIT: I think 2014 I joined that vessel.

CAPT Neubauer: And then after you mentioned that you found a document to verify the storm lashings. Do you remember what that document was?

WIT: I don't think it was a document that verified it, but it was a document that described, it just was labeled I think it was El Class lashing if I recall properly. It had 4 tabs, maybe 5 tabs on it. I believe it was an excel file. And in it was described the containers and the lashing for that. The RO-RO lashing. And then it said heavy, I believe it was heavy weather lashing or RO-RO heavy lashing. And then there was a page that had highlighted on it all the positions, the positons went by number basically. And so it had the positons highlighted where the extra lashing was put or to be put.

CAPT Neubauer: Thank you.

CDR Denning: So do you have Exhibit 109 in front of you?

WIT: Yes, sir.

CDR Denning: So if you would please refer to page 6. I'm going to ask you a few questions about that particular photograph. In that photograph you'll see a typical roll on, roll off container on a chassis with a ROLOC box secured to the deck using chains. So that's my first question. The cargo securing manual refers to both chains and wires and it speaks to the breaking strength and things of that nature. Were chains used exclusively or did you sometimes use wire rope securing?

WIT: It was chains and binders.

CDR Denning: And the crossing scenario that you see here in that photograph, is that common or is that sort of a rare ----

WIT: It would depend on the cargo securing manual. There was ways to lead the lashings. There was lengths that the lashing should be kept under. I think it was maybe 4 feet or less. Depending on the location of D Rings you would lead the lashings in a different direction if I recall properly.

CDR Denning: And if you had seen while you were inspecting the cargo securing, if you had seen this particular scenario is there anything about this that you would ask them change? The Stevedores.

WIT: Not to this specific picture.

CDR Denning: Maybe you can use this photo to explain to us just your typical inspection what you look for when you inspect cargo securing. What are your priorities and what did you focus on and what errors would you ask them to fix? The Stevedores.

WIT: Well if there was any lashing that you did not – that was lose you would get the foreman on the deck and have him come with you and you would show it to him and they would have somebody tighten it. Usually they would tighten it right there with you or with one of the officers present. Just things of that nature. If you found anything that was lose, lead in the wrong direction possibly you would have it fixed and addressed.

CDR Denning: And what would you describe as the – as a wrong direction?

WIT: Well that depends on where the cargo is loaded, sir, and the location of the D Rings.

CDR Denning: Can you give us one example perhaps?

WIT: Not really.

CDR Denning: Are you aware of lashing points and buttons, buttons and D Rings ever being tested on board El Faro?

WIT: I'm not aware of any testing program.

CDR Denning: So if you could refer please to Exhibit 40 which is, beginning on page 150 is Appendix 18. It's Exhibit 40 page 150.

WIT: Yes, sir.

CDR Denning: So Appendix 18 is, it appears to be a place for certificates to be stored in the binder. If you look at the next few pages basically this is the end of the cargo securing manual.

WIT: Yes, sir.

CDR Denning: Page 151 says test certificates for single base sockets. Then the next page is test certificates for double based sockets. Test certificates for double pad eyes. Test certificates for D Rings and so forth. So this appears to be blank headers within the cargo securing manual to provide a place to store certificates. Did you ever see certificates in the copy of the cargo securing manual on board?

WIT: I do not recall seeing them in the manual on board.

CDR Denning: Also Captain Hearn during his testimony earlier this week mentioned a tool that was used by the crew when he was on board these vessels to inspect the insides of the buttons. And he described it as a pin from the manufacturer of the ROLOC box that would be inserted into the pin, you know for some sort of on board inspection by the crew. Did you ever use a tool like that or see a tool like that being used?

WIT: I have not used one or seen one, sir.

CDR Denning: Moving to the above deck cargo, the containers stored on deck. I would like to – I would like you to refer to Exhibit 40 page 116 please. And there's a diagram on that page that shows the lashing rods for the container cargo on deck. And it shows a single, they call this a single lash arrangement is how it's labeled here. That – can you explain to us how that lashing rod is connected to the 2nd tier containers?

WIT: The lashing rod is connected to the bottom points on the 2nd tier container.

CDR Denning: And when you're carrying 3 tiers of containers or 4 or 5, did you ever, on the El Faro did you ever utilize a longer lashing rod in order to connect to the bottom of the 3rd tier?

WIT: No, sir.

CDR Denning: Have you ever been on board El Faro when a Coast Guard inspection has taken place?

WIT: I may have been.

CDR Denning: You don't specifically recall?

WIT: I don't specifically recall. I've gone through lots of Coast Guard inspections over my years sailing.

CDR Denning: And during any of those inspections whether on El Faro or any other vessel, did the Coast Guard inspectors ever ask questions regarding cargo securing?

WIT: I've never been asked by a Coast Guard inspector specifically about cargo securing.

CDR Denning: Did they ever – did you ever witness them observing cargo securing taking place?

WIT: They've been on the ship, I've seen them walking around the decks. I don't know what they're observing. I can't speak for that.

CDR Denning: Did you ever observe them reviewing the cargo securing manual or any other cargo securing procedures while they were on board during that inspection?

WIT: No, sir.

CDR Denning: Did they ever ask you or any of the crew that you witnessed whether cargo was being secured in accordance with the cargo securing manual and other policies?

WIT: Not that I recall.

CDR Denning: They simply didn't address this issue, correct?

WIT: I've never been asked by any Coast Guard official about lashing or cargo securing.

CDR Denning: Thank you. And same question for ABS surveys. You've been on board for ABS surveys, correct?

WIT: Yes, sir.

CDR Denning: Have they ever asked questions regarding cargo security?

WIT: Not that I recall.

CDR Denning: Securing I mean, not security. How about did you ever witness them observing cargo securing?

WIT: They as well would walk around the vessel, but as far as what they were looking at I can't specifically tell you.

CDR Denning: And did they – did you ever witness them observe – reviewing the cargo securing manual while on board?

WIT: Not in my presence that I recall.

CDR Denning: They never asked you any – they've never asked you whether it was being secured in accordance with procedures?

WIT: No, sir.

CDR Denning: And then same questions for when the vessel is undergoing SMS audits. We've been told that Captain John Lawrence and maybe some other from shore side will at times conduct a SMS audit. Did they ever look into cargo securing and whether it was being done in accordance with procedures?

WIT: I don't recall, sir.

CDR Denning: Regarding CargoMax we've already heard from other witnesses the process by which shore side personnel entered the information into CargoMax, deliver the paperwork to the vessel along with an electronic media thumb drive so that you can load that load case into your shipboard computer. So I'm not going to revisit that entire process with you, but that's your understanding of the process, correct?

WIT: That's my understanding of the process.

CDR Denning: Did you ever find errors in that loading load case after it was presented to you?

WIT: Very rarely departing Jacksonville, very rarely. And 1 time in San Juan there were errors but we did not leave the dock until we addressed the errors.

CDR Denning: That was in San Juan?

WIT: Yes.

CDR Denning: So specific to Jacksonville you said rarely, very rarely.

WIT: Maybe once or twice and it was usually a 20.2 entered in as a weight instead of a 20.4.

CDR Denning: So how did you address those errors?

WIT: When you went back and you would go through the provided paper, bay plan that had every container and every weight and you would adjust it on the CargoMax.

CDR Denning: And then what would you do with that updated information?

WIT: Well that would be your final printout that would then be put in bridge log.

CDR Denning: Now is this before getting underway or after?

WIT: Occasionally the thorough final box by box was done after we undocked, but you always looked at it prior to undocking.

CDR Denning: And then once you uncovered the errors how did you notify shore side that you had found the errors?

WIT: I would call Don Matthews via cell phone.

CDR Denning: And so was it – you dealt primarily with Don Matthews shore side, correct?

WIT: Yes, sir.

CDR Denning: Did you in your experience on the El Faro as Chief Mate did you ever have an occasion where Ronald Rodriguez was filling in for Don Matthews?

WIT: Yes, sir.

CDR Denning: How often did that occur?

WIT: Not often.

CDR Denning: So let's say in the year preceding the loss of the El Faro how many times would you say in the Jacksonville port call you dealt with Ronald Rodriguez instead?

WIT: I don't recall exactly how many times, sir. But it was not often, it was rare. Don was usually there.

CDR Denning: And when Mr. Rodriguez filled in did you notice any significant differences in the way that they approached that particular operation and task?

WIT: No, sir. It was the same process. They would come on in the morning, you would discuss operations, all day long you would keep in touch with them as to what's going on as far as them updating the cargo and the stability program. And then he would bring it down to the ship just like Don did. He would go get the drafts fore, midships and aft with them. And then he would go up on board verify the stability and get underway.

CDR Denning: Did you always find that Mr. Rodriguez was as available as you needed him to be?

WIT: Yes, sir.

CDR Denning: Did you ever have any difficulty communicating with Mr. Rodriguez?

WIT: No, sir. If I called he answered. Same thing with Don Matthews.

CDR Denning: I think that concludes my questioning on cargo securing. Thank you Captain.

WIT: You're welcome.

CAPT Neubauer: Captain just a couple follow up questions before we go to the NTSB. You mentioned on the EL Morro that you witnessed meetings with the Stevedores on the various decks, is that correct? Before departure.

WIT: Yes. As far as what meetings are you discussing?

CAPT Neubauer: I believe you said you would meet with the Stevedores just on each deck just to observe some of the loading and talking about the loading.

WIT: If there was lashing issues also, yes.

CAPT Neubauer: Did those meetings continue when you shifted to the El Faro?

WIT: Yes. You always talk to the header on each deck.

CAPT Neubauer: Thank you. I just wanted to make there wasn't a discontinuation of that process.

WIT: Understood.

CAPT Neubauer: At this time I would like to shift to the NTSB. Mr. Kucharski do you have any questions?

Mr. Kucharski: Yes, good afternoon Captain, Captain Thompson.

WIT: Good afternoon, sir.

Mr. Kucharski: Yes I do. Just as a preliminary Captain Thompson would you say that the cargo securing manual was your primary document for determining if proper securing of cargo onboard the vessel?

WIT: For securing cargo?

Mr. Kucharski: Yes.

WIT: Yes.

Mr. Kucharski: Was there any other tool that you used for proper securing of cargo and stack weights or anything like that?

WIT: CargoMax.

Mr. Kucharski: And what section particularly in CargoMax?

WIT: I believe – well when you plugged in the weights on the containers in CargoMax you would have strengthens and margins and lashing margins that would show up at the bottom. If they were colored that means you were exceeding them. There was a reference to it I believe in the CargoMax manual as well.

Mr. Kucharski: Okay, great. That's preliminary. I have some more detail questions on the container build out, I think that's what it was called. Exhibit 40 again page 102 please.

WIT: Yes, sir.

Mr. Kucharski: And page 102, actually page 101 starts off it says Appendix 7, specification of portable securing devices. Do you see that?

WIT: Yes, sir.

Mr. Kucharski: Okay. And would you kindly then go back to it, 102 again and look at reference number P7? It's called trailer lashing.

WIT: Yes, sir.

Mr. Kucharski: Would that be a barrel binder used on the chains to tension that?

WIT: It looks like it, yes, sir.

Mr. Kucharski: Was there any kind of tool that was used to determine the tension on that barrel binder?

WIT: I'm not sure what you're referring to as far as tool.

Mr. Kucharski: Torque, to measure the torque to tell it was tightened to the proper specification.

WIT: Not that I recall.

Mr. Kucharski: Have you ever seen any specifications for those barrel binders to tell you what it should be torqued to? How much it should be tightened?

WIT: I do not recall.

Mr. Kucharski: Do you know what happens if you overtighten that barrel binder?

WIT: My understanding would be if you over tighten it you can break it.

Mr. Kucharski: Thank you. You mentioned you also looked at CargoMax for the stack weights and the lashings on the containers, is that correct?

WIT: Yes, sir.

Mr. Kucharski: Do you know if those calculations, prior to this incident were approved by Class?

WIT: I believe CargoMax is approved by Class. I do not know if those specific calculations inside of that program were approved or were not approved. I believe CargoMax was approved for stability.

Mr. Kucharski: Okay, thank you. In your opinion were the lash points on the over the road trailers sufficient or adequate to secure those trailers?

WIT: Can you explain that in more detail? I mean the trailer itself, or?

Mr. Kucharski: Yeah, the securing points on the trailers themselves. Did you ever see the lashings, the hooks into the trailers?

WIT: I believe they were adequate.

Mr. Kucharski: And you mentioned using the cargo securing manual as your main source to determine if the cargo was properly secured?

WIT: Yes, sir.

Mr. Kucharski: How did you determine if the lash points and the angles of the lashings were adequate?

WIT: If the lash points and the angles were what?

Mr. Kucharski: Were adequate to secure that cargo.

WIT: You would refer to the cargo securing manual and lash everything based on the cargo securing manual.

Mr. Kucharski: Okay. Are there any angles mentioned in the cargo securing manual that the lashings should have?

WIT: There's angles mentioned, I believe there's – if the ROLOC box is not sitting straight on the button that's at a 30 degree angle you also have to have additional lashings. I can't recall everything off the top of my head exactly how it was going. You know I mean that was a while back and I've been trying to learn everything for a new vessel.

Mr. Kucharski: Okay. Would it help you looked at the manual and saw the general instructions on securing of wheeled vehicles at page 37?

WIT: I can look at it, yes, sir.

Mr. Kucharski: Specifically item 4 talks about 45 degree angle. Item number 4 also talks about the minimum of 4 foot lead.

WIT: I don't think I'm on the same page as you, hold on.

Mr. Kucharski: Okay. 37 it's section 6.2 of Exhibit 40 is entitled securing wheeled vehicles to the ship. And then there's a list of 7 items. It talks about leads and ----

WIT: Yes, okay, I see that.

Mr. Kucharski: You see it now?

WIT: Yes, sir.

Mr. Kucharski: Take your time, take your time. I realize it's a lot to look at, but I had hoped that you had probably looked at this before.

WIT: Yes, I've seen this.

Mr. Kucharski: Okay, great. So item number 4 talks about angles between the lashing and the deck. How did you determine if – did you look at the actual lashings out there? Did you know that they were 4 foot leads minimum and the angles too?

WIT: Well 4 feet, I mean you know what 4 feet is. And as far as the exact angle we were not using any measuring device to measure the angle.

Mr. Kucharski: Okay. Do you – the 45 degree angle, okay, do you know what that was for? I mean was it for sliding or tipping or fore and aft movement of the trailer?

WIT: 45 degree angle I believe would be for keep the trailer from moving side to side.

Mr. Kucharski: Are there any other angles specified in this manual for tipping or moving fore and aft?

WIT: I believe there was.

Mr. Kucharski: And was it in this section here for the wheeled vehicles to the ship?

WIT: I don't recall. I would have to reread the entire manual.

Mr. Kucharski: Okay. A basic question. What's considered on that vessel, what was considered standard cargo, semi-standard and non-standard?

WIT: What are you referring to?

Mr. Kucharski: Okay. Let's go to the very beginning of this manual, okay. And it's on page 7, okay, definitions. And at the bottom of 7 it talks about standardized cargo, semi-standardized cargo and non-standardized cargo.

WIT: Okay.

Mr. Kucharski: And that standardized cargo would be containers, is that correct?

WIT: I believe so.

Mr. Kucharski: Okay. And the semi-standardized cargo it mentions such as vehicles and trailers at the bottom of that. And the vessel carried different size trailers, is that correct?

WIT: Yes, sir.

Mr. Kucharski: Do you know which one of those types was considered the standard – uh semi-standard, what size? Would you carry like 20 footers, and you see mentioned in here 53 footers and 40 foot ----

WIT: I don't recall which size was considered semi-standardized off the top of my head.

Mr. Kucharski: Thank you. You mentioned that you graduated from college in 1996?

WIT: Yes, sir.

Mr. Kucharski: Did you have any formal training on the use of a cargo securing manual for securing cargo?

WIT: In college? Not that I recall.

Mr. Kucharski: Did you have an subsequent to your graduation training for the say the use of the cargo securing manual for securing cargo?

WIT: Every vessel I've been on has a cargo securing manual of some kind. And the Chief Mates would get you involved with it, explain it to you, teach it to you, so I've had experience with cargo securing manuals.

Mr. Kucharski: Any formal training?

WIT: Formal? No, sir.

Mr. Kucharski: School, union schools?

WIT: Not that I recall.

Mr. Kucharski: Please look at Exhibit 40 pages 137 to 150. It starts at 137 and it's Appendix 17.

WIT: Okay.

Mr. Kucharski: I'm sorry. When you're ready to go. Just tell me, no rush.

WIT: Okay.

Mr. Kucharski: And this is determine your advance calculation method for non-standardized cargo?

WIT: Correct.

Mr. Kucharski: Have you ever performed this calculation or seen this calculation performed in your time as sailing as Chief Mate?

WIT: I personally have never performed it.

Mr. Kucharski: Have you ever seen anyone else perform that?

WIT: No, sir.

Mr. Kucharski: In your time sailing on the El Faro did you ever see off button stows?

WIT: Off button? Are you referring to the deck sockets where the ROLOC boxes would go?

Mr. Kucharski: Yes, sir, yes, sir.

WIT: Yes.

Mr. Kucharski: Do you know if that would be considered a semi-standard or non-standardized stow?

WIT: I don't recall off the top of my head, I would have to go back and look.

Mr. Kucharski: Thank you Captain Thompson. Captain Neubauer, for cargo securing those are my questions, thank you.

CAPT Neubauer: Okay. Captain we're getting close to lunch. I would like to do a quick round of questions with the PII's. And then are you available to come back after lunch and continue?

WIT: Yes. I have to sail Isla Bella tonight at 1900. So I would like to be back on board if possible by 1600.

CAPT Neubauer: Yes, sir, we can do that.

WIT: Okay.

CAPT Neubauer: I anticipate about an hour when we come back from lunch.

WIT: Understood.

CAPT Neubauer: At this time we'll go to the PII's. Tote do you have any questions?

Tote Inc: No, sir.

CAPT Neubauer: ABS?

ABS: No, sir.

CAPT Neubauer: Mrs. Davidson?

Ms. Davidson: Yes a few, real quick. Captain we've heard a lot about experience but we haven't talked about what the timing it takes to be a Captain. I want to run through this very quickly with you. Starting from going to college. Sunni Maritime is a unique college you spent about 10 ½ months there, correct?

WIT: Yes, sir.

Ms. Davidson: So you do your freshman year, you go to school for a year and then you get on a training ship, correct?

WIT: Correct.

Ms. Davidson: And you do that for sophomore year and junior year, correct?

WIT: Yes, sir.

Ms. Davidson: And then at the end of the 4 years you take a license, correct?

WIT: Yes, sir.

Ms. Davidson: So the 4 years that you're at Sunni Maritime College you're sole focus is to be an officer on a ship when you're in the deck program, correct?

WIT: Yes.

Ms. Davidson: And it's similar when you're in the engineering program, correct?

WIT: Yes.

Ms. Davidson: And then you graduate and you sit for your license, correct?

WIT: Yes.

Ms. Davidson: And that's a 4 day process, correct?

WIT: Yes.

Ms. Davidson: And then hopefully you get on a ship, right? You sail as Third Mate, correct?

WIT: Yes.

Ms. Davidson: And it takes a minimum of 365 days at sea before you can even sit for your Second Mates ticket, right?

WIT: I believe that is the requirement.

Ms. Davidson: And then you sit for your Second Mates license and how long is that test?

WIT: It's another 4 day exam if I recall.

Ms. Davidson: And then you try to look for a Second Mates job, correct?

WIT: Yes, sir.

Ms. Davidson: And again 365 days minimum before you can sit for your Chief Mate's ticket, correct?

WIT: Yes.

Ms. Davidson: And how long is that test for Chief Mate?

WIT: That's another 4 day exam.

Ms. Davidson: And then you hopefully get a Chief Mates job and you sail for 365 days minimum before you could get your Masters ticket, right?

WIT: Correct.

Ms. Davidson: And how long is that test for?

WIT: Now it's one combined test, otherwise it would have been a 4 day test as well.

Ms. Davidson: And as you sit here today can you tell the board, or general public that it's common for officers to sail below their license, correct?

WIT: Yes, sir.

Ms. Davidson: So for example on the El Faro there were times where there was actually two Masters on board, correct?

WIT: Yes, sir.

Ms. Davidson: Two Chief Engineers, correct?

WIT: Yes, sir.

Ms. Davidson: When did you get your Master's ticket, what year?

WIT: I don't recall exactly, sir.

Ms. Davidson: And after 5 years do you still have to go back to get another issue of that Master's ticket?

WIT: Yes, sir. You have to complete sea time and then resubmit to get your license renewed.

Ms. Davidson: So even as the Master you still have oversight by the Coast Guard after 5 years?

WIT: Yes, sir.

Ms. Davidson: And when you're in Jacksonville loading cargo what's the Third Mate's duties?

WIT: Third Mates is usually standing a watch where he's down on deck watching the cargo ops.

Ms. Davidson: What about the Second Mate?

WIT: Same thing.

Ms. Davidson: What about the Chief Mate?

WIT: Same thing.

Ms. Davidson: And you've sailed as Master aboard the El Faro when she had to do cargo ops in Jacksonville?

WIT: Yes, sir.

Ms. Davidson: And what are the duties of a Master when she's in port?

WIT: Well in port you're responsible, as I discussed earlier for everything, the trim and stability to the way the ship's loaded. But mostly in port you're signing crew members on and off, signing standbys on and off, dealing with office visitors, things like that.

Ms. Davidson: ABS surveys?

WIT: If there was an ABS survey or a Coast Guard survey, yes, sir.

Ms. Davidson: So the Master is just as busy as the other officers while in port, correct?

WIT: Yes, sir.

Ms. Davidson: Last question for you. If I wanted to get to the cargo holds underneath, the underneath cargo holds, can I gain access through the living space?

WIT: Are you referring to the accommodation house?

Ms. Davidson: Yes.

WIT: And going where?

Ms. Davidson: And I want to go into the cargo holds?

WIT: In which vessel would this be?

Ms. Davidson: On the El Faro.

WIT: I believe if you went down the ladder well in the accommodation house you can go to a centerline ladder well that would go down into the engine room. If you walked forward in the engine room on the port side you can get into cargo hold 3D if I recall correctly.

Ms. Davidson: And what about from deck side? If I went out to the deck near the containers, is there an access way into the holds?

WIT: On main deck?

Ms. Davidson: Yes.

WIT: You would have to climb down a ladder well to 2nd Deck. And then to get in the actual holds you would have to open up scuttles.

Ms. Davidson: No further questions.

CAPT Neubauer: Herbert Engineering?

HEC: No questions.

CAPT Neubauer: Captain I just had one follow up question I had forgot to ask. Can you estimate the cumulative time you had together with Captain Davidson for the course of your duties?

WIT: I would have to look at my discharges. But I spent quite a lot of time with Captain Davidson, sir.

CAPT Neubauer: Would you estimate like over a few months?

WIT: Yes.

CAPT Neubauer: Or even to the point of a year?

WIT: It could be close to a year.

CAPT Neubauer: Thank you. At this time the hearing will recess for lunch and reconvene at 1:30.

The hearing recessed at 1241, 20 May 2016

The hearing was called to order at 1331, 20 May 2016

CAPT Neubauer: The hearing is now back in session. Captain Thompson I just want to remind you that you do remain under oath from this morning.

WIT: Yes, sir.

CAPT Neubauer: And for the information for everyone present in the record. We're going to shift the schedule a bit. We're going to do a clarification is now from this morning's testimony. And then we're going to release you for the time being, Captain Thompson. And then potentially recall you at a later date. And then we're going to start up with the ABS witnesses after we do the clarifications. So at this time Captain Thompson it's my understanding that you want to clarify a point made during your earlier session.

Counsel: Yes. Thank you Mr. Chairman. We wanted to point out that in MBI Exhibit 109 page 6, which is the photograph that you showed Mr. – Captain Thompson before, our understanding is that is a photograph taken from the El Yunque and having looked at it more Captain Thompson wanted to clarify some of his comments on that photograph.

WIT: On this photograph I don't know what point in particular the cargo would have been at as far as the lashing. That could have been the only two chains on there at the time or there could have been more. But what I see with this picture is you have the two chains going to a single D Ring and that wasn't the standard protocol on the vessel. Now if you didn't have a D Ring in an area where you can put it you can compensate by adding additional lashings other locations on the trailer. But like I said from this picture I can't see if there is additional lashings or not.

Counsel: And that's all we have.

CAPT Neubauer: Thank you. Before we move on to the next witnesses, is there any points of – are there any points of clarification that we need to make based on this morning's testimony?

Tote Inc: None from Tote, Captain.

ABS: No points Captain.

HEC: None from Herbert.

Ms. Davidson: No, sir.

CAPT Neubauer: Mr. Kucharski.

Mr. Kucharski: Yes just for Captain Thompson. Captain Thompson on that photo that we're looking at could you make sure – is that a D Ring it's going into, into the deck?

WIT: It – let me look at it again, sir.

Mr. Kucharski: I mean can you tell from that picture what deck that's on?

WIT: That picture looks like a clover leaf, sir. And the clover leaf would be on 3rd deck on the El Yunque I believe. I did Port Mate over there.

Mr. Kucharski: Thank you.

CAPT Neubauer: And I do want to clarify for the record that was taken on the El Yunque.

WIT: Excuse me?

CAPT Neubauer: That picture was – It's confirmed to be on the El Yunque. Are there any further clarifications? Mr. Fawcett.

Mr. Fawcett: Do you know if that photograph, sir, was taken after the loss of the El Faro?

WIT: I do not know.

Mr. Fawcett: Thank you, sir.

CAPT Neubauer: Captain Thompson we are now complete with your testimony for today. However I anticipate that you may be recalled to provide additional testimony at a later date. Therefore, I'm not releasing you from your testimony at this time and you remain under oath. Please do not discuss your testimony or this case with anyone other than your counsel, the National Transportation Safety Board or members of this Coast Guard Marine Board Investigation. If you have any questions about this you may contact my legal advisor Commander Jeff Bray. And I want to thank you again for coming in between your shifts on a vessel. It's much appreciated by the board. At this time the hearing will recess and reconvene at 1:40.

The hearing recessed at 1335, 20 May 2016

The hearing was called to order at 1341, 20 May 2016

CAPT Neubauer: The hearing is now back in session. Before we begin one administrative note from the last witness. Do any of the PII's have any issues with the testimony received from Captain Thompson?

Tote Inc: No issues, Captain.

Ms. Davidson: No issues.

HEC: No issues.

ABS: No issues, sir.

CAPT Neubauer: Okay, thank you. We will now hear testimony from Mr. SureshSuresh Pisini and Mr. Dan Cronin with ABS.

LCDR Yemma: Sir, would you please stand and raise your right hand? A false statement given to an agency of the United States is punishable by a fine and or imprisonment under 18 United State Code Section 1001, knowing this do you solemnly swear that the testimony you're about to give will be the truth, the whole truth and nothing but the truth, so help you God?

WIT 1: Yes.

WIT 2: Yes.

LCDR Yemma: Thank you.

CAPT Neubauer: Good afternoon gentlemen. Each question presented by the board this afternoon is directed to both of you unless otherwise noted. However, in the interest of clarity for the court reporters and to the best of your ability please have one person respond to each question. And if you would like to transition between each

other during a question, please make the transition clear for the court reporter. I'm going to start with Lieutenant Commander Venturella. Oh we're beginning with Doctor Stettler.

Witness 1 is Mr. Dan Cronin. Witness 2 is Mr. SureshSuresh Pisini.

Mr. Stettler: Good afternoon Mr. Cronin, Mr. Pisini.

CAPT Neubauer: I'm sorry Doctor Stettler. Lieutenant Commander Yemma is going to ask some basic background questions. My mistake.

LCDR Yemma: Thank you Captain. Mr. White can we start with you, please state your name and spell your last for the record?

ABS: Jerry White, W-H-I-T-E, Hill Rivkins, LLP.

LCDR Yemma: Thank you, sir. And Mr. Pisini can you also please state your name and spell your last for the record?

WIT 2: My name is, first name is sSuresh and my last name is Pisini, P-I-S-I-N-I.

LCDR Yemma: Thank you, sir. And can you also tell the board where you're currently employed and what your position is?

WIT 2: I'm currently employed with American Bureau of Shipping in Houston, Texas. And my current rank is manager, structures and statutes group in the ship engineering department.

LCDR Yemma: And what are some of your general responsibilities in that position please?

WIT 2: I just missed it. Can you repeat that question please?

LCDR Yemma: Sure. What's some of your general responsibilities in your current position?

WIT 2: I work in the structures and statutes group, for the engineers now. And I'm responsible for the plans review performed by the group and ensure that the review performed is in line with the ABS Rules and statutory requirements.

CAPT Neubauer: One moment please. Can you speak a little more slowly, sir? The court reporter's having trouble.

WIT 2: Sure.

LCDR Yemma: Thank you, sir. Can you describe some of your prior work experience please?

WIT 2: I graduated, I have an undergraduate degree in mechanical engineering. I got the undergraduate degree in 1988. And I worked in the merchant navy for about 10 years working with Mobil shipping company limited. And when I quit Mobil shipping I quit as a first class assistant engineer. After that I worked in Keppel Shipyard Singapore as a licensed project manager primarily looking after tankers being converted to floating production storage units and also repairs of ships that come to the shipyard. I worked in Keppel Shipyard for about a year and a half. And after that I went to University ofMichigan and I got a degree, graduate degree in naval architecture and marine engineering. I graduated in December 2004. And I joined ABS in April 2005 as an engineer. [In audible]. And currently I head the structures and the statues group.

LCDR Yemma: Thank you, sir. Mr. Cronin. Can you please state your full name and spell your last for the record?

WIT 1: My name is Dan Cronin, last name spelled, C-R-O-N-I-N.

LCDR Yemma: And where are you currently employed and what is your position?

WIT 1: Sure. I currently work at ABS. I'm the Vice President of Class standards and software in the corporate technology group.

LCDR Yemma: And can you describe some of your general responsibilities in that position?

WIT 1: Sure. So our group oversees the development, maintenance, quality control of rules, standards and software developed by ABS.

LCDR Yemma: Can you also describe some of your prior relevant work experience please?

WIT 1: Sure. I began with ABS in 1997 as a plan review engineer in the structures group in the ship engineering department. I was in that position until 2005 when I was promoted to the managing principle engineer of the ship's structures group. I worked in that position until 2009 when I shifted to ABS Singapore. I returned to ABS technology in Houston in 2011 where I worked for two years until 2013 when I became the director of the ship engineering department. I was in that position for about 9 months. Then about 2 years ago I became Vice President of engineering for ABS Americas. And then in February I shifted back to corporate technology.

LCDR Yemma: Thank you gentlemen. Doctor Stettler.

Mr. Stettler: Thank you. Good afternoon.

WIT 2: Good afternoon.

Mr. Stettler: We know it's a little unusual as Captain Neubauer mentioned to have both of you answering questions at the same time. So Lieutenant Commander Venturella and I will be asking you a series of questions in a number of different areas. And what we'll try to the best we can to direct them, I know there's a significant amount of overlap

in your histories. Some of the question will be general in terms of structural groups, structures group activities. And some will be directed specifically at the El Faro dating back to the mid 2000's Mr. Cronin when you were a principle engineer. So some of those questions should obviously be directed towards you. So I'll try to – the two of us will try to do that when we get to those questions. As I mentioned we'll be asking a series of questions in several different categories. There will basically be three lines of questioning. The first line will be general roles and responsibilities, specifically of the structures group. Plus discussion of structural documents and assessments, so basically what the structures group does. And then we'll do a round for the board and the NTSB and the PII's to ask follow up questions. And then we'll come back for another set of topics on loading manuals, cargo securing manuals. And then there will be one final topic area and that is strength and cargo securing software. Mr. Cronin I would also like you at the end of those topics we'll have a chance for the board and the NTSB to ask you some questions specifically about your time as Vice President of engineering in terms of your interaction with other departments and divisions at ABS. As I mentioned we'll take at least one probably two breaks during these questionings.

Okay. I'll start by discussing some general rules and responsibilities and ask you, and we'll start with Mr. Cronin to discuss, you talked a little about your history. If you could talk a little bit more about your – you said you were at the structures group for a number of years, perhaps talk a little bit about your history with the El Faro and her sister vessels were the Ponce Class vessels, how much work you did on those vessels and maybe describe that a little bit for us please.

WIT 1: Sure. So starting around 2006 I was involved on El Faro scantling reassessments is the primary item I was working on. Would you like me to go into the scantling reassessments?

Mr. Stettler: We'll get to the details shortly.

WIT 1: For some of the sister vessels, again I believe it was some modifications carried out. Those were all existing vessels so in general it was minor modifications and possibly some scantling reassessments on the sisters as well.

Mr. Stettler: Were you also involved in any of the conversion that 2005, 2006 conversion from RO-RO to RO-RO or CON-RO, were you involved in the structural assessments associated with that conversion?

WIT 1: So I was managing principle engineer of the engineers that did that review and reported up to me. But the review engineer and the supervisor or the verifier was not me.

Mr. Stettler: You did sign some of those documents as managing principle, is that correct?

WIT 1: The scantling reassessments certainly. I don't believe for the modification I did sign it. But I apologize for not recollecting.

Mr. Stettler: Thank you. Mr. Pisini if you could discuss your connection with the El Faro and the Ponce Class vessels please.

WIT 2: "I was in the structures group at the time the scantling reassessments were performed. However, the scantling reassessments were performed by the shipping department. I was working in the group. But I was not directly involved in any of the scantling reassessments performed on El Faro or any of the sisters. The one review

that happened in my group when one of the engineers was assigned some of the modification drawings. But I think it was in September or October 2015, prior to the incident and those reviews have not been completed because of the incident. So that's the extent of my involvement for the reviews related to El Faro and the sisters.

Mr. Stettler: Thank you, and we'll get into, as I mentioned get into a little more detail here shortly. Could you, and Mr. Cronin we'll just start with you, could you discuss some of the general roles and responsibilities of the structures group? In particular looking, or what types of documents you review, analysis you performed at the group now and the engineers in the group and if there are any other products or services that the structures group provides within ABS or externally?

WIT 1: Sure. So the primary responsibility is structural plan review of ships. For the most part the Houston Ship Engineering Department deals with larger vessels over 90 meters. We do a number of new construction reviews as well as existing vessels. Sometimes there will be vendor submittals that may deal with hatch covers or other miscellaneous structure components. Within the ship engineering department structures group there is also a finite element analysis that can be carried out. It's common for ABS to do detailed advance analysis on SafeHull vessels. We did a number of FEA's on barges. And another service that's carried out by the structures group is supporting thecondition assessment program, which is related to oil tankers.

Mr. Stettler: Could you briefly describe how the structures group fits into overall ABS and whether or not that has changed over the last, let's just say 15 years or so?

WIT 1: Sure. So the ship engineering department has had a large structures group, going back to 1997 when I was there it has always been in the Houston ship engineer

department. Which currently is headed by a director that reports to the Vice President of engineering. There has been changes in the managing principal engineers that head that group over time. And since it is a large group at different times it reported to either a single two or three managing principal engineers.

Mr. Stettler: Thank you. Just for clarification the term managing principal engineer is that essentially the same as the person who heads the structures group or is there another role there?

WIT 1: Yes, yes it is.

Mr. Stettler: Okay, thank you. So that's the official title of the position?

WIT 1: Correct.

Mr. Stettler: Thank you. I would like to ask you to explain some of the regulatory, and just for framework for the public and for the board, explain the applicable regulatory and Class requirements associated with structural plan review activities that you do. You know we know there are regulatory requirements and we know there are Class requirements. If you could outline those for us and just in terms of the scope of your work please.

WIT 1: Sure. So the primary reviews are carried, or the bulk of the reviews are carried out to the ABS rules. ABS has comprehensive number of rule books that cover steel vessels, barges, different vessel types. So most of the structure requirements and criteria are developed by ABS with involvement from other parties. The Ship Engineering Department, structures group also has responsibility for a number of statutory reviews including structural fire protection, review of life saving appliances, cargo securing manuals, and those are the [in audible]. The loading instruments,

loading manuals related to strength also come under the group. The applicable requirements for structural fire protection, lifesaving appliance reviews are typically SOLAS. However, we may be authorized to do a review on behalf of the Coast Guard under alternate compliance program in which case the ACP supplement would be applicable. And there are certain reviews that are carried out to the U.S. Coast Guard C.F.R.'s.

Mr. Stettler: Thank you. And we'll have some additional questions about the ACP supplement a little bit later. Are there any other National or International, or U.S. or International regulations that apply? You mentioned SOLAS. A load line convention. Are there any other regulations or conventions that apply?

WIT 1: Sure. So we may also carry out reviews to certain requirements from MARPOL, COLREGS requirements. Again typically to the IMO requirements. Those are the primary ones. Within IMO there are other conventions that the fire test procedures go in that covers structural fire protection, lifesaving appliance, code for IMO may also contain some requirements. But the primary documents, but the primary documents are SOLAS, the ACP supplement and the C.F.R.'s.

Mr. Stettler: Okay. You mentioned the ACP program. Are there any other programs? We've discussed NVIC's or vessel inspection circulars. Are any of those that apply to the structural review in terms of delegation from the Coast Guard?

WIT 1: Sure. So ABS can also be delegated to do work, structure reviews on behalf of the Coast Guard under NVIC 10-82. That is reserved for new construction and major modification. It could be used for minor modifications where requested and authorized by the U.S. Coast Guard.

Mr. Stettler: Generally based on El Faro, let's talk specifically about the El Faro, could you provide a brief description of some of the regulatory and Class requirements that would have applied or did apply to the El Faro? And this could go to either one of you to discuss. In recent years.

WIT 2: as far as the statutory requirements for the El Faro, SOLAS is applicable. And when it was originally built, it was built under 10-82, so NVIC 10-82 was applicable. At the time of construction and NVIC 10-82 was applicable at the time of modifications when it was lengthened in 1992/1993. NVIC 10-82 was also applicable at the time when the vessel was converted to a container carrier containers in 2005/2006. And the vessel was enrolled into ACP inDecember 2010. Since December 2010, NVIC 2-95 is applicable. So these are the applicable statutory requirements for the El Faro.

Mr. Stettler: Does, a question of clarification. You mentioned the vessel was built under NVIC 10-82 I believe you said.

WIT 2: That's correct.

Mr. Stettler: What year was 10-82?

WIT 2: Oh, I'm sorry. Yeah, at the time of modifications 10-82 was applicable. Not at the time of construction. Sorry, thanks for the correction.

Mr. Stettler: Thank you. Okay. I would like to shift into general structural documents. So a little more detail now. Could you discuss some – the different types of documents that you review under plan review and maybe discuss a typical vessel? And we can use the El Faro as an example, but it doesn't necessarily have to be the El Faro. But just a general ocean going large cargo vessel. What types of plan review activities would you conduct during a lifetime of that vessel?

WIT 1: Okay. Daniel Cronin, I'll start on this one. So the primary plans that are reviewed, the main structural drawings typically include the midship drawing, which is a cross section view of the vessel. It shows all the longitudinal effective structure. Also that drawing can also include details of transverse watertight bulkheads, tank bulkheads, etc. In the main scantling plan package we typically have decks and profiles. The decks will show the plan view of each of the decks including the main deck. Profile view may show any longitudinal bulkheads, transverse bulkheads, etc. And then the shell expansion will show the shell of the vessel from keel up to springer plate. Those are the main structural drawings. There are a lot of other structural details that are covered by rules. So miscellaneous plans including say ramps, ramp floors, crane foundations, other miscellaneous foundations for large concentrated loads or equipment would be submitted. Current requirements require a loading manual be submitted. A loading manual will include details of the loading of the vessel along with still water bending moments, shear forces along the length of the ship. We review the rudder. We review forward end details, bulwarks, hand rails, etc. It's quite an extensive list. Is that enough.

Mr. Stettler: Yeah. Just cargo securing manual would also be on there I assume?

WIT 1: Yes. The cargo securing manual.

Mr. Stettler: We'll discuss that and the loading manual separately. And then we'll also discuss some modification. So I assume we could add to that list, any structural drawings associated with modifications. So we'll discuss that shortly. And thank you. You're doing an excellent job of kind of explaining for the general public what is involved in structural – structural design or plan review. I would like to ask you to extend that a

little bit and talk a little bit about some of the analysis that you do. You mentioned plan element analysis. As part of those plan review activities I believe the structures group also goes through a series of structural adequacy checks or analysis. Could you discuss some of those?

WIT 1: Sure. So a finite element analysis is basically an approach to analyze a structure that developed as computing power increased. So when, so when you say 1973, 1975 a finite element analysis was not in regular use. ABS developed a SafeHull program approximately 1995. Which actually made a finite element analysis mandatory for certain vessel types. The procedures and approaches have been refined and revisited over the years. But what it does it's basically a finite element analysis is a model of the structure. It includes details on the plate thickness, the geometry, the size of stiffeners and each support girder. The model is then loaded up with appropriate loads. You may include local loads such as tank pressures, external hydrostatic pressures, you know fixed point loads to frames, etc. And you may also include global loads such as longitudinal strength, longitudinal bending moments and shear forces. Before finite element analysis was mature and commonly used the engineers primarily depended on hand calculations to assess the structural adequacy of the vessel. So for example the 1973 ABS steel vessel rules have prescriptive requirements for plate thickness, the size of stiffeners that includes section modulus calculation, longitudinal strength, checks, welding checks, etc.

Mr. Stettler: Buckling?

WIT 1: Yes absolutely.

Mr. Stettler: I know, if you have some additional to add that would be good.

WIT 1: Sure. Would you like me to explain how buckling was considered?

Mr. Stettler: Yeah, if you were. I was just going to ask you if you could just – Captain did you have something?

CAPT Neubauer: I just want to make – you're kind of talking at the same time. I just want to make sure. That's difficult for the court reporter.

Mr. Stettler: Yes, sir. If you could Mr. Cronin just discuss real briefly the – I know section modulus and buckling analysis get done periodically during a vessel's life. Could you discuss when that is required and maybe when that was done last for the El Faro.

WIT 2: So your question is related to longitudinal strength of the vessel during the life of the vessel, is that right?

Mr. Stettler: Yes it is.

WIT 2: So longitudinal strength was first checked at the time of the construction. That's when the vessel was built. And any time the vessel has changed during the course of the modifications. When I say the vessel has – if the vessel is lengthened or the vessel is broadened or the vessel is deepened the longitudinal center has to be tested. Your question is specific to the El Faro or for any vessel?

Mr. Stettler: Just in general any vessel.

WIT 2: Yes. Whenever the vessel's dimensions are changed we perform longitudinal strength assessment, such as lengthening the vessel, broadening the vessel, deepening the vessel. Let's say perhaps some heavy weights are added, then yes in that case longitudinal strength assessment is to be performed. Depending on how much weight is added.

Mr. Stettler: Thank you. Shortly we'll discuss the scantling reassessment questioning and I'd like to come back and revisit that. Could you discuss, Mr. Pisini just in general terms the process that the structures group uses to review structural submittals, structural drawings?

WIT 2: Yeah. Whenever we get structural drawings, we are -- we have internal processes within ABS, and the drawings usually come to the managing principal engineer. The managing principal is the head of the structures group. And the drawings -- if they come from other engineers or other groups, they're directed to the managing principal engineer. And the managing principal engineer identifies which process needs to be applied to those drawings, and then he identifies who else is certified in the process. And, accordingly, he assigns the drawings. And our process instructions clearly detail what procedures to follow, what rules are to be applied, and what is the criteria to be used. The process clearly details that, and it is -- we also have a check sheet just in case, if the engineer misses something in the process instruction, it is caught in the check sheet. At times, it happens that – the engineers that are certified in the process are busy performing other reviews or some other urgent jobs, then in those cases, in order to train and the less experienced engineers in the group, the drawings will be assigned to the less experienced engineers with a verifier who is certified in the process. So the verifier provides the guidance to the engineer who is not certified in the process so there is sufficient oversight in performing the review. And this is the process we follow when performing all the structural reviews, not only for structural reviews, any review that we perform, this is the process we follow.

Mr. Stettler: Much of the structural review Mr. Cronin mentioned is done under to satisfy ABS that -- the class rules. Does the process vary depending upon whether or not there is a delegation program associated with a particular vessel? Specifically, a NVIC in the case of the *El Faro*, and the ACP, more recently. Are there any variations or changes to that process based on that delegation program?

WIT 2: Yes. First of all, when the drawings are assigned to a specific facility -- when I say facility, it's a ship. So we have – we have -- we go into our system and then check what is the flag administration. If it is a U.S. flag, then we also see what level of authorization we have, whether it is a review under NVIC 10-82, or whether it's a review under the ACP program. So then, accordingly, we perform the review.
In addition to the class process, we also have process instructions with the flag administration. So we also review those -- that particular drawing if it is applicable. If there are any applicable flag requirements, those are also applied. So both the class reviews as well as the flag administration reviews are captured during the plan review through our internal processes and check sheets.

Mr. Stettler: I believe Mr. – we discussed this with Mr. Gruber. There is a -- Coast Guard does perform oversight on the delegated plan review activities. Could you discuss that very briefly, please, for the structures group?

WIT 2: Yes. So this is specifically applicable to U.S. Coast Guard vessels which are enrolled in the 10-82 and 2-95. So I'll go first with the 10-82, the process we follow for 10-82. So while performing the review for the vessels that are on the 10-82, we perform the review for class and the applicable U.S. Coast Guard requirements. And then once the review is completed -- so a notification is sent to the U.S. -- to the MSC, then we

have the process, how -- how the notification has to be sent. In addition, we also forward copies of the drawings and the letter to the local OCMI under 10-82. So usually our point of contact is the surveyor. He tells us who the local OCMI is. That is the process we are to follow. And then we get in contact with the local OCMI, and we forward a set of drawings and the letter to him. So at that point, the review's complete for 10-82. And under ACP 2-95, we follow the same process. We check what are the applicable requirements for class, and we also check what are the applicable requirements for U.S. Coast Guard under 2-95. Once the review is completed, we send a notification to MSC within -- within five business days, I think. How many?

WIT 1: 14.

WIT 2: I don't know the specific period of time. I don't remember that off the top of my head. So we notify the U.S. Coast Guard. And if that particular review is picked up for oversight, we get a notification from MSC requesting the drawings. And we send those drawings to them, to MSC, and they perform the review. And they send the response to us in the form of a letter, and the letter is sent via email most of the cases, and at times, we get it by mail; by the regular mail. So depending upon the findings, if there is an action, or there is no action if there are no findings. So we document that in our system whenever we get an oversight letter from the U.S. Coast Guard.

Mr. Stettler: Thank you. Mr. Cronin, perhaps this goes back a few years, perhaps you could address this. For the *El Faro*, there were a few occasions where prior approval of structural drawings on other Ponce-class vessels was used as the basis for approval of some of the *El Faro* structural drawings and some other documents. Could you discuss

whether or not there are any special requirements or where the -- where the authority to do that type of referral basis or approval basis lies?

WIT 1: Sure. So, ultimately, the review engineer and the supervisor need to make sure that the structure complies with all applicable requirements. Where the structure is similar from one vessel to another, some -- often times, naval architects may base their submittals on approvals that were originally done for a sister or a similar vessel. We can then review, make sure that the assumptions remain to be -- remain appropriate, and, if so, approve those drawings on the basis of the analysis calculations that were previously done. We do have process instructions that deal with what's called extension of approval. It is oftentimes used for entire new construction projects, and the process instructions do talk about making sure that the appropriate requirements, statutory and class, have been checked, based on differences between the two vessels, year of build, et cetera.

Mr. Stettler: I'd like to ask a follow-on question about similar vessels. We're all -- well, many of us are very familiar with the idea of a sister vessel -- actually, why don't I ask you if you could please define what the difference between a sister vessel and a similar vessel would be.

WIT 1: Okay. That's a very good question, and the answer's probably going to be a little bit different depending on what discipline you're dealing with. So I think in the strictest terms, sister vessels need to be built under the same contract. So even if there are several vessels built to the same set of structural plans, they may not be sisters, depending on the contract date. When we deal with stability, a lot of the information is clearly defined in terms of when lightship studies or inclining experiments may be waived, and there are a lot of well-defined definitions for that.

On the structure side, I don't believe that the definitions are as well-defined, but, certainly, it is common for a series of vessels to be built to the same set of structural plans. And then, you know, as those vessels may be modified over time, the vessels may become similar as opposed to sister. But, ultimately, most vessels are probably not true sisters in all aspects.

Mr. Stettler: And a follow-up to that, I know that the -- Sun Shipbuilding had a fairly sizable number of vessels that were very similar to the *El Faro* in many ways in terms of their structure, and some of them were lengthened differently and modified differently over the years. For vessels of that type, similar, we'll call them, what's in the process? You mentioned you have process instructions that would guide the engineers toward using or extending those structural reviews to -- to another vessel. Is there any kind of gap analysis or a requirement to look at the types and specific details of those differences before an extension would be allowed?

WIT 1: Sure. Are you asking about a conversion, or are you asking about, say, minor modifications that may have been carried out to the vessel? Can you clarify it specifically? Because our process instruction -- the most thorough process instruction that deals with this is related to new construction vessels.

Mr. Stettler: Okay. So let's talk about a conversion. In the case of a conversion like, you know, adding container structures, for example, to the vessel, where, perhaps, the load line increases as part of that conversion, what would guide the reviewing engineer to be able to, by extension, approve the structure of that conversion based on another vessel?

WIT 1: So, in general, the process instruction that I would expect the engineer to use would be related to, say, miscellaneous structural plans. And so that check sheet includes general requirements that need to be checked related to the strength of plating, stiffeners, main supporting members, longitudinal strength, materials of construction, welding, et cetera. So, in general, I would expect that the engineer would go through each of those particular items and make a determination based on what was submitted, whether or not the previous analysis and structural plans remain applicable to the new vessel -- or to the other vessel undergoing modification.

Mr. Stettler: Is there any kind of – I don't want to use the term peer review, but supervisory review on that decision, that review process, by the engineer?

WIT 1: Absolutely, yeah. Every review done by ABS engineers, every approval has both a reviewer and a verifier. Suresh explains -- explained that, at least, partially. So, yes, there would be two reviewers, at least one of whom would be required to be certified in the process instruction.

Mr. Stettler: Okay. Thank you. I'd like to briefly discuss -- you mentioned this earlier. In 2005, 2006, the *El Faro* underwent a conversion that was not deemed a major conversion by the Coast Guard Marine Safety Center, but, nonetheless, they removed a spar deck, added some main deck container structure to carry containers on the main deck, added some main deck stiffening, and also added some fixed ballasts in the ballast tanks. And, actually, Exhibits 240 -- or, excuse me, 140 or 144, are -- you know, these are the – these are the structural drawings associated with that conversion. I'm not going to ask any specific questions about those drawings, but just as a reference, those are the four or five drawings that refer to that conversion that were

reviewed by ABS. So basically what I'd like to ask is related to my previous question. Under what basis were these particular conversion documents or drawings approved? Were they approved on a basis on their own? In other words, was the structure reviewed separately, or were they by extension from a sister vessel?

WIT 2: These drawings were reviewed in the 2005, 2006 time frame, and the review was limited just to the structure in way of the containers. So they performed an analysis and they submitted analysis to us. They used the static loads, and then they found some failures. They proposed modifications, and then they submitted another analysis showing -- with the modifications, showing that the structure is adequate. So we used the rules, the current rules at that time, whether it was 2005 or 2006 rules were applied as far as the rules. But the review was limited just to the underdeck structure in way of the containers.

Mr. Stettler: I believe along with that conversion was a 2-foot increase in the -- in the load line. Was there -- was there a new longitudinal bending assessment, bending and buckling assessment done as part of that review process? And, if so, what was the basis for that approval?

WIT 2: Yeah. The review was limited to the underdeck structure in way of the -- in way of the container foundations for the particular drawing that has been submitted. But we have not been able to locate any calculations that were submitted by the designer or performed by ABS to say that longitudinal strength was performed. But, however, the still water bending moment, the hogging still water bending moment, was still 500,000-foot long tons, and that has not been exceeded. In the subsequent loading conditions that we have seen -- even though I've seen the loading conditions from the

CargoMax after the conversion where they provided the strength and the stability information. However, the CargoMax was approved only for the stability and not for longitudinal strength. So when I looked at those conditions, it's -- those conditions were developed after the vessel was converted to container carrier, and the hogging still water bending moment was not exceeded. If I'm not mistaken, there is at least a 45 percent margin from that condition to the maximum.

Mr. Stettler: So the -- you mentioned 500,000-foot long tons.

WIT 2: Yes. In a hogging condition, yes.

Mr. Stettler: And that is the allowable bending moment?

WIT 2: Allowable still water bending moment.

Mr. Stettler: Could you discuss what -- just for the record, what that is? Is it the same in hogging and sagging, and what -- where does that come from? What's the origins of that number for a vessel like the *El Faro*?

WIT 2: When the vessel was built in 1975, the proposed still water bending moment was 500,000-foot long tons in a sagging condition and also in a hogging condition. And that remained the same until the time of lengthening the vessel in 1992 and 1993. And sometime during the scantling reassessments, 2000 -- after 2007, we received request for the scantling reassessment of the main deck, the sagging moment was reduced from 500,000 to 388,000 tons. So that is the -- that is the sequence in which the still water bending moment carried through. But then in 2006, 2007, somewhere around that time frame when the scantling reassessment was requested, the sagging moment was reduced to 388,000.

Mr. Stettler: Mr. White?

ABS: I think Mr. Cronin would like to add something.

Mr. Stettler: Sure.

WIT 1: So Suresh was explaining, the 500,000 is the design still water bending moment. The actual operational still water bending moment is generally expected to be well below that. When the vessel was lengthened, we received a number of loading conditions that were generally accepted to comprise the envelope of loaded and ballast conditions, and it was a reasonable margin between the maximum still water bending moment in operation, which I believe was about 458,000, and the design still water bending moment, the 500,000. So -- so -- and we've also confirmed that the full envelope of loading conditions for the vessel was originally designed to -- was -- the vessel was hogging in all of those conditions. There was no sagging moments, which -- which is expected and normal for a fine form vessel like this.

Mr. Stettler: Could you clarify – you used the term "maximum design bending moment." Could you differentiate that from what is – we refer to the allowable bending moment, which shows up in the CargoMax program and the ship review form.

WIT 1: Okay. So the maximum design still water bending moment is what the engineering calculations are based on, and, actually, that's synonymous to the allowable still water bending moment. Yes, same thing.

Mr. Stettler: Thank you. And we'll touch base on the -- on the scantling reassessment here in a moment. I just wanted to clarify what the bending moment was. Actually, let's do it right now. Could you maybe discuss -- so in 2007, 2008, Mr. Cronin, you said one of your first duties, I believe, as the principal engineer of the structures group was to oversee that scantling reassessment. I'd like you to start, if you would, by discussing,

you know, what's the purpose of a scantling reassessment, and, you know, basically, why is it -- why are they permitted, and then, maybe, how are they reviewed and approved by ABS?

WIT 1: Sure. So the ABS surveyor is doing a number of structural assessments -- or, I would say, he's surveying the vessel with the assistance of a gauging company. As the vessels age, as the coating condition may degrade, the extent of surveys, the extent of gaugings increase. So around 2006, the vessel -- the surveyor -- a gauging company identified with the surveyor some instances of substantial corrosion. The way the surveyor confirms that the gauged thicknesses of the structure is acceptable is that Part 7 of the steel vessel rules have a table of allowable wastage. For most structural members, the allowable wastage is 25 percent. As the gaugings show the structure approaches 75 percent of that, we pay more attention. And substantial corrosion is defined as a thickness reading that is between 75 percent of allowable, but does not exceed the allowable wastage. Any time substantial corrosion is identified, those areas are required to be gauged annually and surveyed annually. So there is quite a bit of focus by the surveyor in these areas. I believe between 2006 and 2011, the vessel was surveyed 12 times by ABS and a lot of attention was given to these areas. I understand in 2011, substantial corrosion was all addressed, and there were no incidents of substantial corrosion found in the 2011 survey report. The scantling reassessments is basically an option that the owner working with ABS survey and ABS technical has to address areas that have wastage. Again, it's wastage within the allowable limits. And so the typical allowable wastage is based on the as-built thickness of the structure. Whatever shows on the plan is used by the surveyor to assess the allowable wastage.

There is the option for an owner to reassess or request that ABS technical reassess the structure. There's several ways that may be done. Many of the scantling reassessments here are incidents where additional reinforcement was proposed in areas of substantial corrosion. So once additional structure is added, in this case, I believe brackets were added quite frequently, it changes the load-bearing capacity of the structure. Engineering, ABS technical, can then go and confirm that the reinforced structure continues to have sufficient strength in order for it to remain in service. And it can also allow the substantial corrosion value to be reset at a different -- a different value. Scantling reassessments may also be carried out using finite element analysis or by assessing structure to the latest rules.

Mr. Stettler: Are there cases when the vessel owner may request scantling reassessment based on a use of a thicker gauged plating than perhaps what is in the design and the drawings? I believe that might've happened in the case of the *El Faro*. Can you address that?

WIT 1: Yes. So the ABS process instruction for gauging reviews allows the reassessment to be carried out in accordance with the rule requirements in effect at time of construction or the latest rule requirements. So, of the scantling reassessments, the scantling reassessment of the main deck is the one that primarily looked at the structure in accordance with the latest rules. In 1973, the ABS rules had requirements for longitudinal strength, local scantlings, empirically-assessed buckling, et cetera. And in 2007, the longitudinal strength requirements changed. Well, before -- before 2007, but by 2007, the longitudinal strength requirements had changed. And so the scantling reassessment of the main deck was carried out in accordance with the latest

requirements. It also considered the operational profile of the vessel in that the vessel was primarily trading in a hogging condition so that the main deck remained in tension. This basically allowed the structure to be reevaluated to the latest requirements and new allowable wastage assigned. That scantling reassessment was done approximately 2007, 2008, and, again, by 2011, each of the areas of substantial corrosion had been addressed.

Mr. Stettler: I believe, and Mr. Pisini mentioned a few minutes ago, that in conjunction with that, there would be reduction in the allowable bending moment and sagging condition. Could you discuss that?

WIT 1: Sure. So the original design was based on a still water bending moment in both the hog and the sag of 500,000 long ton feet. However, for a vessel of this type, it will almost exclusively sail with only hogging still water bending moments. So the naval architect who had submitted the scantling reassessments request proposed to limit the sagging still water bending moment to something in the order of 380,000. Based on our review of discussions with the naval architect as well as loading conditions of the vessel that were submitted for our review, it was agreed that that was a reasonable assumption. Recently, we've done some longitudinal strength studies, basically to determine whether the vessel could even practically be loaded in such a way to have a sagging moment approaching at 388. And, in general, we don't believe the vessel can be loaded in that manner. She'll be predominately hogging.

Mr. Stettler: So what was the benefit of reducing that in terms of, did that allow the naval architect to reduce those -- some of those scantlings so that they could correspond to that lower sagging bending moment, or what was the benefit?

WIT 1: Yes. The main deck rule required was reassessed. And, per our policies, the allowable wastage and substantial corrosion could be set based off of the reassessed rule-required thickness.

Mr. Stettler: Is that based on the buckling of the main deck, or was there some other criteria for that that drove that change?

WIT 1: So what controlled the requirements?

Mr. Stettler: Yeah. So, you know, in the sagging condition, the main deck would be under compression.

WIT 1: Correct.

Mr. Stettler: You know, why would you want to reduce your allowable bending moment unless you could take advantage of that in some way? So what was the -- what was the advantage to the design, or the naval architect, in that case?

WIT 1: So the scantling reassessment that was submitted did consider longitudinal strength, buckling, and local rule requirements. The reassigned, reassessed values were based on the latest rules in recognition of the hogging and sagging operational conditions of the vessel, and, again, the tendency of the vessel to exclusively hog. So the ABS rule requirements have changed over time. In 1973, there was less computing power, and so the requirements tended to be a little bit more coarse. Scantlings tended to be a little bit heavier. Over time, the requirements changed, and, in this case, a more specific analysis of the still water bending moments, hogging and sagging, led to a reassessed rule value for the -- for the main deck.

Mr. Stettler: Okay. Thank you. In 2014, there was a fructose tank installation on the *El Faro* that involved installing a number of ISO frame-mounted tanks in their cargo hold

decks. And I'd like to ask you, was the installation of those tanks reviewed and approved by the structures group at ABS?

WIT 2: Yes.

Mr. Stettler: Okay. And what -- could you outline the types of analyses or the review that you did to approve that?

WIT 2: Yeah. We received a request with the drawings. And the drawings that we received are primarily the underdeck structure in way of fructose tanks and in association with analysis. So they submitted the drawings of the underdeck structure in way of the fructose tanks and they also submitted an analysis. We performed a review of the analysis in association with the drawings, and we found the structure adequate in way of the fructose tanks.

Mr. Stettler: So you did a deck-loading assessment; would that be fair to say?

WIT 2: That's correct. And these fructose tanks were in the bottom.

Mr. Stettler: Right. Our understanding is that those tanks were spot-welded or welded intermittently to the deck, so they were – the frames were mounted -- or welded to the deck. So they were a permanent installation in the sense that they were welded; is that correct?

WIT 2: Yes. They are -- they are welded to the deck, but I don't know that they are continuously welded or intermittently welded. So I need to look into the structural drawings to confirm that.

Mr. Stettler: Okay. Along with those tanks went a piping system and pumps and some other supporting equipment. So the question is, did you -- did you consider whether or

not an update to the trim and stability book would be required based on that conversion or that modification?

WIT 2: Yeah. We have not seen –we've not been able to locate any calculations in the trim and stability booklet where the fructose tanks have been included. But the engineer that actually performed the review, was a really experienced engineer.

And then when the fructose tanks were installed, they were installed right in the bottom. The review was just limited to the underdeck structure in way of the -- in way of the fructose tanks. And we have not seen any -- any loading manual or trim and stability booklet with updates later on.

Mr. Stettler: Okay. And a similar question, I would assume, for the cargo securing manual. It was not addressed in there, as well, I believe.

WIT 2: Can you repeat that question?

Mr. Stettler: Yes. I assume the same would be true of the cargo securing manual; there was no update to the cargo securing manual to account for those tanks?

WIT 2: Yeah. Regarding the question about changes to the cargo securing manual, I have not seen any changes on the cargo securing manual, but the cargo securing manual that we have was -- the last one was approved, I think, back in 2006, if I'm not mistaken. I need to go back and check the records. So at that time there were no fructose tanks in the cargo securing manual. And I also – I don't think that fructose tanks would be shown in the cargo securing manual because they are welded to the deck.

Mr. Stettler: Okay. Thank you. We'll follow up with that shortly. You -- Mr. Pisini, you mentioned a little while ago, in 2015, there was some modification work going on the *El Faro* in preparation for the West Coast trade. And I believe you said – stated that you

had been reviewing some drawings on that. Could you discuss that, what the structures group was doing when -- I believe you said at that time of the loss -- ABS suspended work on that? Could you discuss that in a little more detail, please?

WIT 2: Sure.

Mr. Stettler: What was going on and what your interaction with the vessel operator was during that time?

WIT 2: Okay. Yeah. I do not recall any interaction with the vessel operators, and I also do not know whether these modifications were for the specific trade. We received a set of drawings with the correspondence. I have not read the correspondence because the drawings were assigned by the managing principal engineer and the other engineers. But the list of drawings that I have seen, as far as the structurest were all related to ramp modifications and davit modifications. I'm not
sure whether the davit is for the rescue boat or is for the ramp. But, definitely, we received some structural drawings for the underdeck structure in way of the davits and some structural drawings for the ramp modifications. There were about five or six drawings that we received. We were -- I think for one or two drawings, we were -- we almost completed the review, but, eventually, those were not sent back to the client because of the incident.

Mr. Stettler: Do you know the time frame when you received those drawings?

WIT 2: I don't recall on top of my head, but if you want me to make a guess, I can. Probably the first or second week of September is when we received the drawings, of last year.

Mr. Stettler: Is it a requirement or would you normally expect to receive and approve – view and approve drawings for things like which foundations and the like prior to the work being executed?

WIT 2: Yes. In an ideal scenario, that is always the case. That doesn't happen most of the time. We always like to have the – not only us, even the owners and the designers, they like to have the design completed prior to performing the modifications. In most of the cases, both of them go simultaneously. The construction goes on and we receive the drawings. And then we approve the drawings and send it. But, yes, we do see, many times, the drawings are being submitted ahead of actual construction.

Mr. Stettler: Is that in any way a violation of class rules or any other requirements?

WIT 2: None that I know of.

Mr. Stettler: Thank you. Mr. Cronin, you look like you're ready to say something here. Thank you.

CAPT Neubauer: Dr. Stettler, I have a continuation on that question.

Mr. Stettler: Sure.

CAPT Neubauer: Since the work could be ongoing, is a copy of the plans provided to your survey department?

WIT 2: Can you repeat the question please?

CAPT Neubauer: Since there's a possibility that the work could be ongoing when you receive the plans, do you coordinate with your surveyors to ensure that they have the plans to supervise the work?

WIT 2: Yeah. Depending upon what level of modifications are being performed, whether it's a new construction, major modification, or existing vessel modifications.

If it is a new construction, major modification project, we know who the surveyor is. And our current system allows access to the engineering drawings to our survey offices. We used to send scanned drawings to the surveyor, but we do not -- we do not do that anymore; that's because the surveyors have access to the same system. Where we have design and drawings, they have the same level of access, so they can review the drawings for an ongoing project. But, whereas, for the -- one of the modifications where they have to modify down the construction, the davit, or maybe they want to add a winch, so they get the design approved, approved by engineering, and then they take the approved drawings. Depending upon which of the modifications are being performed or are going to be performed, they contact the local survey office ahead of time, because once the modifications are made, it has to be surveyed -- the modifications have to be surveyed by our ABS surveyor. So the owners will actually contact the local survey office, and the local -- and they will also send them a copy of the drawings. During this time, the owners make a request to make a surveyor available to witness the modifications. And that is how the existing modifications go most of the times. And in some cases, the vessel goes to the yard. And then if it is very minor in nature, the surveyor approaches us saying that these modifications are being performed and these are the modifications, can you review the drawings and send us your report. So we do a quick turnaround in those cases, and then we send the drawings back to our surveyor. I also wanted to clarify that the drawings -- if the arrangements and if the structure, they are in compliance with our rules, we -- the drawings can be approved by us prior to the modifications being performed. Yeah. We approve the drawings even before the modifications are performed. If the drawings are in compliance with our rules,

we do approve them. We put an approval stamp on the drawings and then we send it back to the designers. Did I answer your question?

CAPT Neubauer: Yes, sir. But one follow-up question. If I understand your testimony correctly, the drawings come to you from an existing vessel for a minor modification. It doesn't necessarily get shared with the surveyors at the time you receive it. So during the approval process, the company would have to submit a separate set to the surveyors to give them awareness of that. Would that be a fair assessment?

WIT 2: That's -- that's correct. Depending on whether it is a major modification and the modifications are currently taking place, or if modifications are minor in nature and these modifications are happening at a future date, your assessment -- what you're understanding is correct.

CAPT Neubauer: When you immediately -- upon immediate receipt of the plans, do you do a preliminary assessment to see if the modification is going to be minor or significant in nature?

WIT 2: Yeah. Depending upon them -- if we get drawings just for -- just for a winch foundation and still it's not the winch, there is no clear line drawn whether it is a major modification or a minor modification. It's all -- it's based on -- based on the judgment. So if the -- if the modifications are – when I say minor in nature, if the modifications are one or two, are limited to just one or two items, one or two, it depend on the ship, we can register them as minor in nature. If they're doing it for 30 or 40 drawings, I mean, those are significantly -- they're definitely not minor modifications.

CAPT Neubauer: Thank you, sir. That clarifies in my mind. One additional question, though. Why did ABS stop sharing or allowing the sharing of all plans between your office and the surveyors? Was there a reason?

WIT 1: So if I may answer that. So our procedures for working with the surveyors have changed over time. We currently have an electronic system for plan review and archiving called 02E. Our surveyors have a system, 02K, that allows them to access all O2E engineering drawings. Stats are assigned that correspond to the vessel that they are assigned a work order for. I do not know whether the surveyor can view drawings that have not yet been approved through that system, but they certainly have access to all approved drawings. We could clarify after this, but I suspect that they would at least be able to see the title of the drawing that had been submitted into our 02E system and assigned for a specific vessel.

CAPT Neubauer: Thank you, Mr. Cronin. If you could come back to the Board at some point, I'd like to know if they have -- if they can see the title of the drawing or have access to the full drawings before approval, the surveyors; if they can view the 02E drawings. Is that correct?

WIT 1: Yes, sir. We'll clarify that, Captain.

CAPT Neubauer: Thank you. Dr. Stettler, I'm going to go back to you.

Mr. Stettler: Thank you, Captain. Yeah, I just have a couple of final questions on this topic area related to structural drawings. You discussed a number of different types of structural drawings including deck drawing – deck frames, midships construction, and some others. Is there any process at any point in a ship's life to validate or verify, via

survey, the actual dimensions of the as-built condition of the vessel comparing to those structural drawings that are approved at some point in the vessel's life?

WIT 1: So during new construction of the survey –

Mr. Stettler: Or modification.

WIT 1: Sure. Yes, so the surveyor is required to review the modifications or survey the modifications in accordance with the approved plans. So there are plans that are developed at a new construction, there are plans that are developed at any of these modifications, and the surveyor has access to those. We do ask -- or the surveyors do ask the owner to advise whether there have been any modifications to the vessel. And that request is made, I believe, at each attendance by the surveyor.

Mr. Stettler: Perhaps that was an unfortunate choice of words on my part to use the term "survey." What I'm asking is whether or not they actually take measurements of the precise locations of the offsets or the shell plating in the dry dock when the vessel's being constructed or modified to verify that those locations in the drawing matches the as-built condition. Is there anything in the ABS process in terms of the drawing approval that follows up to confirm that those drawings, as drafted, match the – or the as-built condition matches the drawings?

WIT 1: So my general understanding of the survey process is that, yes, the surveyor confirms the thicknesses, depth, dimensions of the structure. There's some tolerances that are defined and permitted, but, you know, I don't have full details of what the surveyor does and does not check.

Mr. Stettler: Thank you. And, similarly, the lines drawing and the connection between the lines drawing and the structural drawings, is there a -- is there anything in the ABS

process – first of all, does the structures group review lines drawings during the vessel's lifetime?

WIT 1: So, typically, no. The lines plan is not an item that is approved by the structures group. It is used in calculations of stability and tonnage. I hope that answered the question.

Mr. Stettler: It does, in the sense that you do not do any comparison between the lines drawing or the structural drawings; is that correct?

WIT 1: In general, that's correct, yes.

Mr. Stettler: And what about the general arrangement drawing; does the structures group at ABS have a role in reviewing or approving or otherwise review of the general arrangement drawing of a vessel, either at new construction or throughout the vessel's life?

WIT 1: Sure. So a general arrangement drawing typically is not stamped approved; however, there are a number of items shown on the general arrangement that the structures group may review, including, say, means of escape, dead-end corridors, other arrangements type of requirements. So it is common at new construction to review the general arrangements, but it is not a drawing that is typically required by the ABS class rules to be approved each and every time it's updated.

Mr. Stettler: Thank you. Captain, I have no further questions on this topic. I turn it over to you and the Board for further questions.

CAPT Neubauer: Lieutenant Commander Venturella.

LCDR Venturella: Good afternoon, gentlemen.

WIT 2: Good afternoon.

LCDR Venturella: I just have a couple of follow up questions. For the first question, I'll direct it at Mr. Pisini, but if it's appropriate that Mr. Cronin answer, please, just let us know. We spoke earlier about the 2005, 2006 conversion of *El Faro*. I believe that was the one where there was a 2-foot change in draft; is that correct?

WIT 2: That's right.

LCDR Venturella: And you said that there was just an underdeck structure evaluation performed; is that correct as well?

WIT 2: That's correct. The underdeck structure was evaluated for the containers. And, also, I -- when I was reviewing the -- I have not been able to find any calculations for the -- for the *El Faro*, but then I found the calculations performed for the similar vessels, *El Yunque*, where similar modifications was performed, and the side shell scantlings were reviewed for the increase in draft, and they found the side shell scantlings satisfactory.

LCDR Venturella: Did you perform a buckling assessment post that change or since the sinking or anytime recently?

WIT 2: Yes. First incident, we did perform a buckling assessment.

LCDR Venturella: What specific information is needed to evaluate the risk of buckling per the ABS rules or any IMO guidance?

WIT 1: Sure, sure. Okay. So buckling is a common failure mode for steel structures. In general, the vessel in the seaway acts much like a beam. So for a vessel of this type, it's common for the bottom to be in compression and the deck to be in tension. So going back in the ABS rules, buckling has been empirically addressed, probably from the start. But, certainly, in 1973 rules, there were equations for the bottom plate thickness that specifically addressed buckling for a transversely-framed structure.

It's an equation that for transversely-framed vessels was applicable up to a scantling length of 750 feet. That same equation was applied to the length of the vessel, and it was confirmed that the bottom shell had sufficient buckling capacity to comply with the 1973 rules.

LCDR Venturella: Mr. Cronin, can you tell me which variables are involved in that equation for a buckling assessment?

WIT 1: Sure. So the 1973 rule, I believe, has variables for stiffener spacing for the length of the vessel, and those filter through to give you the required thickness. There -- I don't have the equation in front of me here as well. There may also be, in the depth -- would you like me to pull it up? I think we may have it as an exhibit, the 1973 ones.

LCDR Venturella: We don't need that right now, but maybe we can come back to that if it's necessary.

WIT 1: Okay.

LCDR Venturella: But I would assume that, in general, the spacing of the frames, the thickness of the plate and the bending, would have an effect on buckling; right?

WIT 1: The hog bending? Is that what you're referring to?

LCDR Venturella: Yes.

WIT 1: Yes, it does. The actual still water bending moments are not included in the 1973 formula. Buckling equations changed over time. 1989, IACS adopted Unified Requirement S11A, which specifically considers the still water bending moments and the wave-induced bending moments in the buckling equations.

LCDR Venturella: Thank you. So if you had a Class 1 structural failure in buckling of a vessel that ABS had done the structural review for, at what time would you consider another vessel to be a similar vessel for the purpose of a buckling assessment? Would it have to do with the criteria or the variables involved in that analysis? Do the vessels have to be identical?

ABS: Just to clarify, you know, we've gone over this in the prior hearing. So to the extent your question is directed at the *Lurline* and the buckling that was detected in the *Lurline*, ABS doesn't characterize buckling as a Category 1 failure, which you've suggested. That's not an ABS term. The *Lurline* is not a sister vessel to the *El Faro*. And if you'd like him to address what his assessment of buckling is on the *El Faro* and what formulas can be used, he can do that. If you're looking to contrast as to why the *Lurline* is not applicable to the *El Faro* and the reason for that failure, he can do that too. But is this -- are we back to whether the *Lurline* is a sister vessel of the *El Faro*?

LCDR Venturella: No, sir. I'm actually not trying to call them sisters. It's just a – much as you said, sir, I'm trying to understand at what point we call them similar, not sisters, but similar for the purpose of doing a new structural assessment on a vessel. And to explain -- you know, I will ask that you just go ahead and look at Exhibit 15, which is the *Lurline* buckling analysis done in 2008. The *Lurline*, while not a sister, was a Sun Shipbuilding Ro-Ro, a roll-on/roll-off vessel, of similar length. And is this something that ABS structures group has looked at in terms of the similarity of the bottom structure and the similarity of the vessel?

CAPT Neubauer: Can I rephrase the question just to simplify it? Does ABS consider the *Lurline* to be a similar vessel to the *El Faro*?

WIT 1: At new construction, I would say, yes. But at this point the vessels are significantly different. The *Lurline* was lengthened to be at least 30 feet longer than *El Faro*. The length of the vessel is a significant parameter for all of these structural calculations or generally all of the structural calculations. So I would not consider them to be similar or sister vessels.

LCDR Venturella: Okay. And that's based on the length of the vessel, is a determining factor in that determination?

WIT 1: Yes.

LCDR Venturella: So just to clarify – I want to make sure I understand. Did you -- so if they have the -- a similar thickness, frame spacing, and design still water bending moment, then, despite that, the length of the vessel being different makes them not similar anymore? Is that correct? Like, let me give you -- let me try to be specific. If the bottom plate on one vessel and another are the same thickness, if the transverse frames are the same dimensions and same spacing and the design still water bending moment is still the 500,000-foot long tons, the only difference is the 30-foot change in length that is noticeable in the area of a buckling casualty. Would it not be similar?

WIT 1: So there's a lot of other items at play here. The wave induced, the bending moments, is affected by the length of the vessel. That term is a squared term, so a 30-foot, let's say, a 10 percent increase in the length would lead to a 20 percent increase in the wave-induced bending moment.

LCDR Venturella: Thank you. I'll drop this issue. But –

CAPT Neubauer: Wait. I think the record is clear on this issue, I mean, because from the last hearing and this one, it's not considered to be a similar vessel, did not spur any extra reviews by ABS. Is that a fair assessment?

WIT 1: So that's a fair assessment. I believe, separately, we did exchange emails, Lieutenant Commander Venturella.

ABS: Just to be clear -- you know, we've revisited this, you know, probably a half dozen times, but just to be clear for the sake of the record, Dan Cronin directed a response to Lieutenant Commander Meskun on December 21, 2015, by email concerning any concerns the Coast Guard had on buckling, any relationship of the *Lurline* to the *El Faro*, the application of the formulas, and the misapplication by the Coast Guard of the buckling criteria to the *El Faro* in comparison with the *Lurline*. There was a similar explanation as to the corrosion on the *Lurline*, and why the analysis or the comparison was not valid. And we'd be pleased to provide it to you, provide it to the MBI, at this time.

CAPT Neubauer: Sir, we'll take those records and just close the matter at this point.

ABS: Thank you.

LCDR Venturella: And just separate from that, though, you did do a buckling analysis post casualty; is that correct?

WIT 1: That is -- that is correct.

LCDR Venturella: And can you summarize the results, please?

WIT 1: Sure. So post casualty, ship engineering departments obtained a copy of the gauging report, did an analysis in accordance with the currents, Part 3 steel vessel rules, which are in line with this IACS Unified Requirement S11. The gauged scantlings

were input into that formula to determine the -- both the working stress as well as the critical buckling stress, and the vessel in the as-gauged condition assuming the still water bending moment of 500,000 passed that UR S11 check. And I'd go a little further to even say that the IACS UR S11 buckling check is intended to be a design formula. It is not intended to assess corroded structures. So I believe that the calculation done in November 2015 was quite conservative.

LCDR Venturella: Thank you. Can you be a little more specific, though, in terms of how much did it pass by on the buckling analysis that you did?

ABS: MBI Exhibit 107 includes the buckling analysis performed in November 2015 on the *El Faro* based on gaugings that were obtained in 2011.

WIT 1: So, again, for the *El Faro*, the buckling formulas contained in the 1973 rules for plate thickness requirements in the 1973 rules were different from those in IACS UR S11A – or UR S11. When the IACS requirements came out, there was no requirement to make that retroactive to existing vessels. So the applicable requirements to -- for the *El Faro* were the new construction formulas, or the formulas contained in 1973, and then the corroded structure is assessed against the allowable wastage tables in Part 7. So we have a -- we did carry out buckling assessments in accordance with the UR S11A, which contained a number of conservative assumptions and actually had a number of different results depending on whether a still water bending moment of 500,000 was used, or a still water bending moment closer to what we expected the vessel was operating at. It passed all of those checks.

LCDR Venturella: For clarification, the exhibit number provided, it's not working for us. What exhibit number did you say?

WIT 1: It says 167 on the bottom of the page.

LCDR Venturella: 167, okay.

ABS: Do you want to take a break to review the exhibit?

CAPT Neubauer: Do you have any more questions on this line?

LCDR Venturella: I just have one other slight question, but -- I can move to that real quick.

CAPT Neubauer: Actually, we've been going longer than an hour. The hearing now will recess and reconvene at 3:35.

The hearing recessed at 1519, 20 May 2016

The hearing was called to order at 1535, 20 May 2016

CAPT Neubauer: The hearing is now back in session. Lieutenant Commander Venturella, you said you have a couple more questions on the line?

LCDR Venturella: Yes. Thank you, Captain. Thanks for bringing the Exhibit 167 to our attention. Exhibit 167 appears to be the *El Faro* hull girder section modulus analysis carried out post casualty; that's correct? On Page -- it's Page 3 of Exhibit 167, there's a table there, Table 1.2. It's the buckling verification results, and I'm just going to read a little bit of the table and then ask you a question about it. The critical and calculated stresses at deck and bottom are presented in Table 1.2. It says: Deck at maximum bending moment. It gives a ratio of .914 or 91.4 percent, as I understand it, bottom maximum bending moment, .981 or 98.1 percent. Bottom at actual bending moment, the ratio was .771, so 77.1 percent. Can you confirm that those ratios are the proximity to the critical buckling stresses?

WIT 1: So I would say that this calculation was carried out in a conservative manner. The calculated strengths or the working stress was calculated based on the as-gauged section. Again, the IACS UR S11 requirements are a design formula, and the working stress is calculated based on the as-built hull girder section modulus. But, yes, the ratio reported is the ratio between the working stress and the critical buckling stress. The critical buckling stress, I'm sorry, is calculated here based on the as-gauged scantlings as well. So, yes, the ratio is .77 and .98; however, there were conservative assumptions incorporated in this calculation.

LCDR Venturella: Thank you. No further questions.

CAPT Neubauer: At this time, I'd like to go to the parties in interest for any questions. Tote?

Tote Inc: No questions.

CAPT Neubauer: ABS?

ABS: Yes. Thank you, Captain. Just have a couple of things to clarify. Mr. Cronin, could you just, for the sake of the record, provide your academic background? I think we omitted that in the introduction.

WIT 1: Okay. I earned an engineering degree in civil engineering from Cooper Union in 1997. I obtained a professional engineer license, State of Texas, 2002, and I have an MBA from the University of Houston, 2004.

ABS: In addition, we discussed the approval process with regard to drawings. There was some conversation concerning the submission of drawings for a conversion. And just to clarify, under the ABS processes, if an owner is looking to make a conversion or

a change, can you advise whether or not the drawings need to be approved before the actual work is conducted?

WIT 1: Sure. For any work that affects the scope of class requirements, the drawings are required to be submitted to engineering, approved, and passed through our attending surveyor for him to attend the vessel.

ABS: And would it be fair to say that the surveyor or the passing of the drawings to the surveyor is done via computer system and the surveyor only has access to the drawings when they are approved?

WIT 1: Yes. The current practice is that our computer systems between engineering and survey are linked, and the surveyor does not have full access to view the drawings until the drawings are approved or published. They may be published, resubmission required. In which case, I believe the surveyor would have access as well.

ABS: And, as a general matter, as far as the structure of the *El Faro*, is there anything particularly relevant to the concept of buckling and the structure of the *El Faro*, including its transverse spacing?

WIT 1: Sure. So the *El Faro* has a bottom structure that's transversely framed. Between the shell and the inner bottom, there are solid floors that are basically full plates appropriately stiffened. On the *El Faro*, they're spaced every 33 inches. The 1973 ABS rules would require solid floors be spaced approximately every 12 feet. So there is significant additional steel in the inner bottom structure.

ABS: And would that reduce any susceptibility to buckling?

WIT 1: Yes. The buckling equations are empirical formulas that developed over time, based on typical or the rule-required arrangements where the vessel is stiffened. So, in

this case, since the vessel will have additional transverse strength for the bottom structure, it would help the buckling. Absolutely, it would provide additional strength.

ABS: And in connection with the MBI Exhibit 167, the hull girder section modulus that was conducted by ABS in November 2015, did the analysis confirm that the vessel had sufficient longitudinal strength in accordance with class rules?

WIT 1: Yes. The vessel exceeded the longitudinal strength in buckling requirements, both in effect in 1973 as well as the latest requirements in 2015.

ABS: We discussed structural reassessments and the opportunity for an owner to submit data for a structural reassessment, and, more specifically, the reassessments given to the *El Faro* from 2006 to 2009 in order to eliminate any substantial corrosion. Could you, again, for the purposes of the public and the MBI, explain what substantial corrosion means as an ABS-defined term, and whether or not the vessel exceeded any allowable wastage requirements?

WIT 1: Substantial corrosion indicates that the steel has wasted to within 25 percent of the permissible value, or, for example, if the permissible allowable wastage is 25 percent, when the structured waste is 17 percent, it's considered to be substantially corroded. However, substantial corrosion is only used or only -- if the wastage exceeds the allowable, it would not be considered substantial corrosion. Any wastage that exceeds the allowable needs to be addressed. The primary way of addressing wastage in excess of the allowable is through steel renewals. Throughout this process, I understand that there were significant steel renewals carried out, especially at the special -- time of special survey in 2011; after which, the surveyor recorded that there was no substantial corrosion on board *El Faro*.

ABS: So, again, in 2011, substantial corrosion aboard the *El Faro* was not found on special survey Number 7, and that was due to the reassessments, renewal, reinforcements, and replacements of structure over the time frame from 2006 to 2011; is that correct?

WIT 1: Yes, that's correct.

ABS: Nothing further.

CAPT Neubauer: Mr. Cronin, just one follow-up on that subject. The reinforcements that were done to beef up some of the hull structure, did that add steel to the vessel?

WIT 1: Yes, sir. Brackets were added in places. I believe some rider plates or additional flanges were added to the structure.

CAPT Neubauer: Were there any other types of doubler's added or extra plate?

ABS: Captain Neubauer, we'd be in a position to address each of the reassessments. And my only suggestion is, perhaps, we wait until the reassessments are discussed by Mr. Stettler. In addition to the structural side and the analysis of reassessments from a strength perspective, there's a corresponding survey side that details what repairs, what reinforcements or renewals were put into the vessel. So Mr. Cronin is on the structure side. He analyzes the structure for strength, but there is a corresponding survey function where the repairs would've been made.

CAPT Neubauer: Okay. I understand. The only question I had, could that potentially add weight to the vessel, in your opinion, Mr. Cronin?

WIT 1: Yes. However, the amount of weight added due to the reassessments would be fairly -- would be minor in comparison to weight tracking that may be considered for lightship weight and stability properties.

CAPT Neubauer: Thank you. Mrs. Davidson, do you have any questions?

Ms. Davidson: No, sir.

CAPT Neubauer: Herbert Engineering, do you have any questions?

HEC: No questions.

CAPT Neubauer: At this time, I'd like to ask, does the NTSB have any questions? Okay. Then we will start a new line of questioning on cargo securing. And, Lieutenant Commander Venturella, you're starting that?

LCDR Venturella: As stated by the captain, we will be addressing the cargo securing manual with this next line of questioning. At first, we'll just discuss some general questions about the review of cargo securing manuals, but then we will get into the specific cargo securing manual for the *El Faro*. Who would be best to address the questions on the cargo securing manual?

WIT 2: Yeah, I will take it.

LCDR Venturella: Okay. Mr. Pisini, what is the purpose of a cargo securing manual?

WIT 2: Can I look at exhibit?

LCDR Venturella: Yes. Exhibit 40 is the *El Faro*'s cargo securing manual. That's what you're looking for?

WIT 2: Yes.

LCDR Venturella: Okay.

WIT 2: The purpose of the cargo securing manual is to provide guidance to the master and the crew on board, on board the vessel, with respect to the proper stowage and securing of cargo throughout the voyage. That's the primary purpose of the cargo securing manual.

LCDR Venturella: And I see that you got that answer directly from the cargo securing manual. Is that standard language from a regulation or a guidance such as the codes?

WIT 2: Yes, I think so. Yes. That comes directly from the code.

LCDR Venturella: Okay. What are the exact regulatory or class requirements for a vessel to have a loading manual? Or, sorry, I went back to the wrong question. Sorry. What are the regulatory and class requirements for a vessel to have a cargo securing manual?

WIT 2: Yeah. Any vessel that has to comply with SOLAS is required to have a cargo securing manual, and *El Faro* is -- is required to comply with SOLAS. So cargo securing manual is required for this vessel.

LCDR Venturella: What exact regulation in SOLAS or a code might apply?

WIT 2: I don't recall the exact regulation number, but it is in Chapter 6 of SOLAS.

LCDR Venturella: Okay.

WIT 2: And the guideline, without looking at the cargo securing manual, comes from the MSC circular. I think it is 1353 now, if I remember off the top of my head, and the time the cargo securing manual was developed for the *El Faro*, I think it was MSC Circular 745.

LCDR Venturella: Has that circular been incorporated into the cargo securing code, Cargo Stowage and Securing Code?

WIT 2: That's correct.

LCDR Venturella: Are there any Coast Guard NVICs that you're aware of, Navigation Vessel Inspection Circulars that might apply to cargo securing manuals?

WIT 2: I don't recall the number, but, definitely, there is -- there is a U.S. Coast

Guard circular that actually refers to the same IMO document that is in the circular.

LCDR Venturella: Do you recall what the applicability of the cargo securing manual requirement is in terms of the vessel type, age, and dimensions?

WIT 2: Can you rephrase your question, please?

LCDR Venturella: Sure. You mentioned that the cargo securing manual was a requirement of SOLAS. Is there a particular applicability of that SOLAS regulation that requires a vessel to have a cargo securing manual?

WIT 2: You mean, particularly from a specific year or based on the –

LCDR Venturella: What vessels have to have a cargo securing manual?

WIT 2: It's currently all vessels. I think -- I need to look at the regulation to look at exemptions -- exceptions made. Technically, all -- vessels that carry cargo as a liquid in bulk, they're not required to have a cargo securing manual. But I need to -- to give you a correct answer, then I need to look at the regulation.

ABS: Do you want him to refer to the regulations?

LCDR Venturella: Do you have it available?

ABS: We'd have to go on the Internet.

LCDR Venturella: Okay. Let's -- we'll move on.

WIT 2: If we have SOLAS on something, I can pull it out.

LCDR Venturella: We'll just move on without looking. So there's the Cargo Stowage and Securing Code, and you also have an ABS guide that I found, ABS guide for certification of container securing systems. What is the difference between those two documents in terms of their impact on the required content and calculations in the cargo securing manual?

WIT 2: As far as the ABS guide for container securing, complying with the guide for container securing, ABS guide for container securing is optional. If they request a notation, then they have to comply with the guide. But the cargo securing manual has to be developed in accordance with the IMO code. And if they request a notation, in addition to complying with the IMO code, they have to comply with the ABS guide.

LCDR Venturella: So it would be correct to say that the ABS guide is voluntary and the Cargo Stowage and Securing Code is the requirement?

WIT 2: That is right.

LCDR Venturella: Okay.

WIT 2: And just to add more, the ABS guide for container securing is only for securing the containers, yeah.

LCDR Venturella: Thank you. Can you please describe the content of a cargo securing manual for a vessel like the *El Faro*?

WIT 2: The format of the cargo securing manual is clearly defined in the IMO code. Actually, it has got general requirements followed by portable securing devices. They actually have to define what are the portable securing equipment that they carry on board the vessel, giving specific details of each portable securing equipment that they carry. Just to give you an example, they have to give the name of the manufacturer, they have to give the number, they have to give the safe working load, they have to give the braking strength for each of the portable securing equipment that they carry. And that is one section. And they also have another section which actually covers the fixed securing devices. They have to give the location -- first, they have to give the fixed securing equipment that is being used to secure the cargo, and with specific locations

throughout the ship. In other words, they have to include a plan clearly showing where the fixed securing devices are installed on the ship. Yeah. And, also, they have to give the properties -- same details as what they give for the portable securing devices, like who the manufacturer is, what is the safe working load, and what is the braking strength.

And then they have to have a section for maintenance, for carrying out maintenance. And then they have to include all the test certificates; test certificates for all the portable securing gear as well as the permanent -- permanent securing gear that is installed on the ship. And, also, specific guidance on the cargo -- the IMO code has about 12 annexes. It clearly details, when you carry this type of cargo, what are the securing agreements we have to use. So I think on the *El Faro*'s cargo securing manual, they have used three or four specific sections, and they included -- incorporated it into the cargo securing manual. So, in other words, the master has to follow the instructions given in those three or four sections. For instance, if they carry containers, it gives a detailed procedure of how to secure the containers. If they carry vehicles and autos, it clearly details how the lashing has to be made. So it gives clear guidance as to how the equipment has to be secured on the deck -- secured on the inspector decks. So this summarizes what are going to be there in the cargo securing manual. And the process is very well detailed in the -- in the IMO document. It is -- it gives guidance -- it's called Guidelines for Developing the Cargo Securing Manual.

LCDR Venturella: Thank you for that explanation. Can you explain how ABS conducts their review and approval of a cargo securing manual? And when you speak of that, can you actually address whether it's just the content that's reviewed or if calculations are

validated, such as the lashing margins and various calculations contained within a book of this sort?

WIT 2: Is your question in general, or specific to the *El Faro*?

LCDR Venturella: Specific to -- I would say -- I would say it's a general question, and then we're going to go into the *El Faro* after that.

WIT 2: So it varies -- it varies from designer to designer, how they submit that information. So what we generally do whenever we get a cargo securing manual for a review -- and as I explained to you previously, the managing principal engineer looks into who is certified in the process; he assigns to an engineer with a verifier. And then the process instruction clearly details what process -- what are the steps to be checked. And also we have a check sheet. And the process instruction leads us to the IMO code where it clear -- where it basically directs them to go to the IMO -- the IMO code that we just – the guidelines for developing a cargo securing manual. They verify whether the contents are in accordance with the code or not. And they also identify – at times, they include all the -- all the 12 sections, 12 annexes from the code specifically stating that if they carry that kind of cargo, they follow the guidelines of that particular annex. And some of the designers, if they know what specific cargo they're going to carry on the particular vessel, they do not include all the 12 annexes. They include maybe three or four annexes, or maybe five annexes, depending upon if they are -- if they know for sure which cargo they want to carry throughout the life of the vessel, they include only those sections. And that gives the guidelines to the master. And in addition to that, Annex 13 in the code gives a sample calculation. They perform one of those sample calculations; at times, one, and, at times, they perform two. And that sample calculation is either a

spreadsheet, in a spreadsheet format, or at times they just submit the calculations and include it -- include it in the cargo securing manual. And we duplicate those calculations. We perform the calculations on our own and verify whether those calculations are correct or not. And they also include blank spreadsheets of the same calculations. So that way, the master or the chief mate can follow the same guidelines as what was approved by us. So that way, they can actually calculate -- they can actually assess how much of -- how many securing devices are required to secure the cargo.

LCDR Venturella: So you mentioned it's guidance for the master. I imagine it's similar to a trim and stability booklet; should be something that can stand alone as guidance. Is that correct?

WIT 2: That is correct.

LCDR Venturella: So in that case for a vessel like the *El Faro* that has a very complicated cargo loading -- very different possibilities with container or Ro-Ro loading, how is it possible to produce the necessary container lashing margin examples and things like that that they can use, or is it -- is it a lot of hand calculations?

WIT 2: *El Faro* carries containers on the deck and they carry Ro-Ro -- Ro-Ro cargo below the decks. When I say Ro-Ro cargo, they carry vehicles, trucks, and autos. So they're actually included in a section related to -- the *El Faro*'s cargo securing manual has a section related to the carriage of Ro-Ro cargo. The crew or the chief mate, whoever is assigned to perform the work, they have to follow the guidelines, and they can use the spreadsheet to perform -- to perform the calculations and to see what -- how many lashes are required for the equipment. And as far as the containers are concerned, if they have -- in general, not for the *El Faro* – if they have chosen -- they

have to submit what is called a container securing manual. They actually give the stack weights of all the containers and how they're going to load. They usually submit two or three different -- different conditions of containers, of container stack weight, based on the -- based on the routes that the vessel is going to ply, and then that information is submitted to us. And then we perform the lashing calculations. And when they're submitted to us, they give all the information to us; what kind of twist locks they used and whether the stacks are -- if there's two or three stacks, they -- continue to the lashings. If there's more than three, they use -- they use two or three lashings at times, and then we perform a calculation of those and then we say that for this specific condition, the lashing arrangement is adequate. And then if there is a deviation from that, they should come back to us. And -- but in case of *El Faro*, I've not been able to find a document like that, whether that's -- maybe it was submitted, but I've not been able to find that kind of a document, whether it was submitted to us or not. But as far as the securing is concerned, the guidance that is there in the cargo securing manual should be sufficient for them to estimate how many lashings are required for the containers. It is -- it is laborious because they have to run multiple calculations to do it.

LCDR Venturella: And we will get into a little more specific on the *El Faro* version of that, but that was good for that question. Could you turn to Exhibit 192, please? Exhibit 192 is the Coast Guard Navigation and Vessel Inspection Circular 10-97, which is Guidelines for Cargo Securing Manual Approval, dated 07 November 1997. Navigation Vessel Inspection Circular 10-97 provided guidelines to assist operators in meeting the December 31st, 1997, deadline for having a cargo securing manual in accordance with 46 CFR 90 and SOLAS. Is this something you're familiar with?

WIT 2: Yes.

LCDR Venturella: Do you know if this document was referenced in reviewing the cargo securing manual for *El Faro*?

WIT 2: Can I take a look at the other exhibit to see the letter?

CAPT Neubauer: Yes, sir. Take your time.

WIT 2: I think the letter is not included as an exhibit. I need to look at the letter to confirm that.

LCDR Venturella: Okay. We can move on.

WIT 2: Sure.

LCDR Venturella: Without going into the document in its entirety, do you know if it was accurate to say that as of December 31st, 1997, that U.S. flag cargo vessels applicable to SOLAS would have a cargo securing manual? Is that something you'd be familiar with, or?

WIT 2: Just to be clear on what you asked -- so to rephrase your question, are the vessels built prior to 1997 have to -- have to have a cargo securing manual?

LCDR Venturella: Yes, sir. I'm trying to bring us back to the *El Faro*. I'm trying to see, were vessels that were existing in 1997 required to have a cargo securing manual on that date?

WIT 2: Yeah, I need to look at the SOLAS regulations to confirm that to you. I'm not sure about the date of applicability.

LCDR Venturella: Can you turn to Exhibit 193, then? Exhibit 193 is an ABS letter dated January 20th, 2006, to Herbert Engineering with a subject: Approval of cargo

securing manual *S.S. El Faro*. Was this the approval letter for the most recently reviewed *El Faro* cargo securing manual?

WIT 2: Let me look at the letter and I'll answer. You said Exhibit 193?

LCDR Venturella: 193.

WIT 2: Yes, this is the latest approval letter we have.

LCDR Venturella: In the paragraph starting: This is to certify that the cargo securing manual -- do you see that paragraph?

WIT 2: Yes.

LCDR Venturella: Okay. Within that paragraph, it mentions proof of compliance with Regulations VI or 6/5.6, and 7/5.6 of the 94 Amendments to the International Convention for the Safety of Life At Sea, or SOLAS. So it incorporated the 1994 SOLAS amendments. That looks similar to the references from the NVIC we were just looking at, 10-97, which also referenced the same citations. Do you know at the time of this review – and I guess the review was done in 2006 -- if it incorporated the amendments that were done in May 2002 that would've changed part of the cargo securing code?

WIT 2: Yeah. I need to look into my notes to confirm that.

LCDR Venturella: Are you familiar with a 2002 revision to Annex 13 of the Cargo Stowage and Securing Code?

WIT 2: Yes.

LCDR Venturella: Let me make sure I heard you right. You said you are familiar with it?

WIT 2: Yes, I am familiar.

LCDR Venturella: Do you recall what changes happened in 2002?

WIT 2: I do not recall. I'd have to look into the document.

LCDR Venturella: What is non-standardized cargo, and do you know whether *El Faro* would've been likely to carry it?

ABS: Do you want him to review the provision of SOLAS or a definition of non-standardized cargo, or are you looking to have a definition read from the manual?

LCDR Venturella: Non-standardized cargo is a standard term in the Cargo Stowage and Securing Code, and so I thought it would be in his knowledge base as a reviewer.

WIT 2: Yeah. So I can look into the document, into the cargo securing manual to give you exactly -- yes. To answer your question, non-standardized cargo is carried on the *El Faro*, but to give you the -- what exactly non-standardized cargo is, I have to look into the definition to see -- to confirm that. And I can look at the cargo securing manual.

LCDR Venturella: Let's do this. Can we go to the *El Faro*'s cargo securing manual, Exhibit 40?

WIT 2: Yeah, Exhibit 40.

LCDR Venturella: All right. Let me find a page number for you.

WIT 2: Yeah. Non-standardized cargo is a cargo that requires individual stowage and securing arrangements. Whether non-standardized cargo is carried or not -- I'm not really sure whether *El Faro* has non-standardized cargo or not, and I just -- I need to correct what I said in my earlier statement that *El Faro* has non-standardized cargo. I think the way I understand the non-standardized cargo is, it's some kind of a boat that is being carried, or special equipment that's carried on the ship, and that requires specialized arrangements. So that is non-standardized cargo. And there is a definition

for semi-standardized cargo*. El Faro* does carry semi-standard cargo, and those are basically vehicles, trailers, and autos.

LCDR Venturella: If the Master or the Chief Mate on the *El Faro* was carrying a cargo outside of the scope of standard or semi-standard cargo, so it was nonstandard, is there a method within this approved securing manual to perform calculations?

WIT 2: Yes. In the manual, they have a spreadsheet that's applicable to all kinds of -- all kinds of cargo that they carry on the vessel. And there's also some blank sheets. They can use the blank sheets to perform the calculations.

LCDR Venturella: Were there previous versions of the *El Faro* cargo securing manual reviewed by ABS?

WIT 2: I've not seen another -- another version of the cargo securing manual. The one that we have on file is the one that is still -- that is there as an exhibit now.

LCDR Venturella: So I -- just to confirm, you can't really answer whether the *El Faro* had a cargo securing manual before that?

WIT 2: That's correct. I'm not sure whether they had one or not. I've not seen one.

LCDR Venturella: Is there an effort made in reviewing the cargo securing manual to ensure alignment with any potential duplicated information that may be in other booklets like the trim and stability booklet, such as cargo weights and capacity plans?

WIT 2: Can you repeat the last part of your question? When you said capacity plans and –

LCDR Venturella: Right. There's information in the cargo securing manual which could be repeated in other manuals such as the trim and stability booklet or the loading

manual. Is there an effort made by ABS to ensure alignment and consistency between the manuals on items such as capacities and cargo weights?

WIT 2: The one information that is used for evaluating the forces is a GM. That is -- that is usually taken from the approved trim and stability booklet. And I do not recall any other information that requires an alignment with the trim and stability booklet. But, certainly, we need to refer to some structural drawings, yeah, to verify the weights of the -- the (inaudible) containers, to verify the weights of the stacks and some similar information like that.

LCDR Venturella: Sir, do you consider alignment inconsistency to be a company responsibility like Tote's in this case, or is it a shared responsibility? How would you look at that?

WIT 2: I think it is a shared responsibility.

LCDR Venturella: I'm going to go back to Exhibit 40 once again, *El Faro*'s cargo securing manual, and if you could go to Page 5. On Page 5, the second item down starts with "The information." I'm going to read it off: The information requirements set forth in this manual are consistent with the requirements of the vessel's trim and stability booklet, loading manual, and with the requirements of the International Maritime Dangerous Goods Code. The statement here -- it's a standard statement from the Cargo Stowage and Securing Code, but it does seem to indicate that consistency already exists. Is that checked in any way that you can tell us about?

WIT 2: Yes. To answer your question, when -- you're basically asking consistent information between the cargo securing manual, trim and stability booklet, loading

manual -- and with the IMO code. So you're looking for some -- whether we refer back to all of these documents, when we are a cargo securing manual; is that right?

LCDR Venturella: I'm just asking if there's any methodology within the ABS engineering offices to communicate what -- because the reviews are done separately by different offices to ensure that the -- there's a consistency between them and they work as a team for the operator of the vessel.

WIT 2: Yes. You are right in saying that different offices review these documents. We definitely look at the trim and stability booklet to verify the consistency for sure. And then, as I said before, we also -- we also verify the structural drawings to get the weights. To give you an example is, one is stack weights we get from the -- we cross-check with the structural drawings. And if these reviews are performed by different offices -- let's say the structural review was performed by one office outside of the -- outside of the Americas, and if the stability review was performed by the Americas office, and then if the loading manual review was performed by another office, we have access to all of these documents. And depending on the information provided in the cargo securing manual, and this information is developed – this information is required to cross-check only when we perform the calculations. So, at that time, the engineer would look into all these documents as required to perform his calculations. Does that answer your question?

LCDR Venturella: Yes.

WIT 2: Thank you.

LCDR Venturella: The statement on Page 5 also indicates consistency with the loading manual. Does the *El Faro* have a loading manual?

WIT 2: No.

LCDR Venturella: I do want to turn your attention briefly to Exhibit 8, which is the trim and stability booklet. I know that's not your area.

WIT 2: Sure.

LCDR Venturella: But it's appropriate for comparison purposes.

WIT 2: Exhibit 8?

LCDR Venturella: Exhibit 8. And if you could look at Page 10.

WIT 2: Yes, I'm on Page 10.

LCDR Venturella: Okay. So Page 10 is a diagram used by the operator of the *El Faro* to calculate vertical center of gravity required for a trailer, and it's based on a total weight of the trailer. The chart tops off -- tops out at 75,000-pound trailers. Do you see that? It's -- on the left-hand side of the diagram are the weights.

WIT 2: Yeah, we have the total weight and then -- yes. Total weight and ----

ABS: You're referring to the Y axis on the graph where it says, "total weight of trailer"?

LCDR Venturella: That's correct, sir.

ABS: What's your question?

LCDR Venturella: Do you see, first of all, that the -- the diagram stops at about 75,000 pounds?

WIT 2: Yes, I see that.

LCDR Venturella: If we could go back to the cargo securing manual, Exhibit 40, and in Exhibit 40, we're going to go to Page 112.

WIT 2: Page?

LCDR Venturella: Page 112. On Page 112, it shows a discussion of trailers for various decks within the vessel. And it talks about a 100,000-pound trailer as the heaviest trailer that could be carried on the *El Faro*. How would I make a VCG, or vertical center of gravity, determination for a 100,000-pound trailer I loaded using the cargo securing manual if the trim and stability booklet doesn't go that high?

ABS: Just to be clear, the Table 3 designates certain designations for different trailers; right? Different locations? And your question is with regard to a 75,000-pound trailer?

LCDR Venturella: No, sir. What I'm looking at is in Table 3, it says: For the second deck forward of frame 87, that *El Faro* can carry trailers of 100,000 pounds. So I'm just asking, if I'm the operator of the vessel and I'm loading a 100,000-pound trailer, how would I use the trim and stability booklet to determine the appropriate vertical center of gravity? Is that something you would look at for consistency?

WIT 2: Yeah. The table's actually strength rated to carry trailers of that -- of that weight. So the strength of the decking is just for that -- the strength of the decking is 100,000 pounds. That's what -- that's what the table says.

LCDR Venturella: Okay.

WIT 2: Yeah.

LCDR Venturella: So according to the cargo securing manual, can *El Faro* carry a 100,000-pound trailer?

WIT 2: So, to answer the question, we have to actually verify the structural drawings to see what is the deck rated for. Usually when -- the rating capacity of the deck -- the capacity of the deck is much higher than the weight – weight of the trailers and automobiles that the deck carries. The capacity of the deck is basically the design load.

It's not necessarily that they can carry up to the weight of 100,000 pounds, but it doesn't necessarily mean that they carry 100,000 pounds. The deck is designed to carry that much of load.

LCDR Venturella: I understand. So in this case, I assume the expectation would be the operator would know his limit is based on his trim and stability booklet? Is that the way you would –

WIT 2: That information for – as far as the weight of the deck is concerned? The structural drawings will actually say, what is the decks rated for, and if that is correlated and is shown the engineer that performed the review might have done correlation at the time of the review, if that is true, then, yes. The operator will have this information from us saying that it states that autos and trailers can be carried up to 100,000 pounds on the particular deck.

LCDR Venturella: So I'm going to move on after this question from this topic, but just –

WIT 2: And that is part of frame 87. That is not true in that deck.

LCDR Venturella: Yes, thank you. Would it be fair to say, though, that this isn't the type of thing that is involved in the normal cargo securing manual review, to look at that difference?

WIT 2: That is -- that's correct, yeah.

LCDR Venturella: Okay. Could we go to Page 51 within the cargo securing manual? Exhibit 40, Page 51. And what you see here is a capacity plan that's located within the cargo securing manual, and what I'd like you to specifically look at is -- just to focus on one area of it, is if you look in the vehicle holds, look in Hold Number 1 on the tank top, it indicates five trailers or 17 autos. See if you can get there with me.

WIT 2: Yeah, I'm on Page 51.

LCDR Venturella: Okay. Do you see in Hold Number 1 on the tank top, top of the inner bottom, you have five trailers or 17 autos indicated there?

WIT 2: Yes.

LCDR Venturella: So just keep that in mind. And we're going to go back to the trim and stability booklet now. If we could go to Exhibit 8, and we're going to go to Page 18 within that trim and stability booklet. There's also a capacity plan here. Can you tell me what you see in Hold 1 on the inner bottom there?

WIT 2: What page in the booklet?

LCDR Venturella: It's Page 18, I'm sorry.

WIT 2: Page 18?

LCDR Venturella: Page 18 of Exhibit 8.

WIT 2: Yes, I'm there.

LCDR Venturella: Can you tell me what's on the tank top in Hold Number 1?

WIT 2: It doesn't show anything there.

LCDR Venturella: So this is also not the type of thing that's checked for consistency, a capacity plan?

CAPT Neubauer: Sir, would this be a good break point for a few minutes?

ABS: Yes.

CAPT Neubauer: The hearing will recess and reconvene at 4:40.

The hearing recessed at 1630, 20 May 2016

The hearing was called to order at 1641, 20 May 2016

CAPT Neubauer: The hearing is now back in session. Lieutenant Commander Venturella, can you continue with your line?

LCDR Venturella: Yes. Thank you, Captain. Just to finish out that question really quickly, I just wanted to make sure before we depart from it that you do see the differences between the capacity plan.

WIT 2: Yes, I do see the differences. And the reason for that is, I see that the cargo securing manual was approved in 2006, and the revision indicated on that one is -- says R0. The revision on the general arrangement profile drawing that is shown on the *El Faro* cargo securing manual states R0, but whereas the profile that's shown in the T&S booklet states it's C. And it also appears that -- at that particular location, it also appears that the GA, general arrangement, the profile of the general arrangement, is from the *El Yunque*, and -- and at that particular location, the *El Yunque*, they have fructose tanks, and probably they don't -- there is not enough room to put any autos there, or any vehicles at that particular location. And, also, the other thing I want to say is, whatever numbers that are given there is the maximum capacity that that particular deck can carry. They may not actually carry that many vehicles or autos.

LCDR Venturella: Thank you for that clarification. Moving on to a different question though. In 2014, the fructose tanks were installed in the same forward holds.
Can you tell me what you think the impact would be to a cargo securing manual or capacities within those four holds when fructose tanks were added?

WIT 2: Yeah. When we performed the review of the underdeck installation of the fructose tanks, we performed a review for the underdeck structure in way of the fructose tanks. And, later on, we performed a longitudinal assessment taking the last loading

condition for the *El Faro* from Jacksonville to San Juan, and we actually input the fructose tanks, the weights of the fructose tanks, as point loads and the specific locations that the fructose tanks were installed on the *El Faro*. And we took the LCGs and VCGs approximately based on the structural drawings, based on the location of the structural drawings, and we input those values into the last loading condition. And when we did that, we found that the actual – the load line displacement was exceeded, so we actually removed the contents of the freshwater tanks at that -- located around the same location. I think the freshwater tanks are Number 1 and Number -- Number 1 and Number 2, or Number 1 port and starboard double bottom freshwater tanks. We took the contents of up to 640 tons of those tanks and then that gave enough room to put the fructose tanks. And we found that the still water bending moment have not been exceeded. And that's been shown as an exhibit, as one of the exhibits -- as one of the exhibits. And later on, we realized that because specifically they have not been listed as fructose tanks, they had been listed as trailers and autos. And when we actually looked -- took a closer look at the -- at the loading conditions. So we see that, at those specific locations, some weights have been input, 100 tons, 120 tons. So we could correlate that those are the weights of the fructose tanks. But if you actually read the legend in the loading condition, it doesn't call as the fructose tank. It calls as autos and trailers, yeah. So, in other words, I mean, there's basically -- when the vessel actually sailed from Jacksonville to San Juan, so the weight of the fructose tanks were actually included in there, but we still went there on top of it to put those extra weights, and we still found that the still water bending moments and shear forces were not exceeded.

WIT 1: And just to also clarify a little bit, you know, the -- the results of this sensitivity analysis was that the weight of the fructose tanks changed the still water bending moment by about 3 percent. That would have an effect on the stresses or the total bending moments only about 1½ percent.

ABS: Just for the -- just for the sake of the record, those calculations were submitted to the MBI. They've been marked as MBI Exhibit 168.

LCDR Venturella: Thank you. Based on the analysis performed, would you say that the cargo securing manual did not require a review, then, or an update? Just to clarify. I just want to clarify that.

WIT 2: Yeah, I don't think the cargo securing manual requires an update. That's because the fructose tanks are permanently attached to the deck.

LCDR Venturella: Okay. If we could go back to Exhibit 40, the cargo securing manual, and within there, I'm -- I want you to go to Page 112.

WIT 2: Yeah, before we -- before we go there, I just want to clarify one thing, one question that came up earlier in the last session. About -- regarding the code that we are showing about the VCGs for the trailers, where the code actually shows a limit of 700,000 pounds. You have the code on Page 10 of the T&S booklet?

LCDR Venturella: I'm on Page 10.

WIT 2: Yeah, just give me a minute. I'm not able to find it. I actually saw the note during the break. It actually says for – for weights that are not -- that exceed -- that are not shown in the graph, the VCGs need to be estimated separately. There is actually a note in one of -- I'm not able to find it right now, but there's actually a note in the T&S booklet.

Tote Inc: We believe that's on Page 9, right before the chart.

LCDR Venturella: I see it. For clarification, it's on Page 9, Number 4.

I think that's the one you're talking about?

WIT 2: Yes, that's right. The VCGs of trailers, other than the standards shown on Page 10, must be estimated.

LCDR Venturella: Thank you for that clarification. Okay. If we could go back to the cargo securing manual, Exhibit 40, Page 112. On Page 112, can you go to Table 2, which is the design deck loads?

WIT 2: Yes.

LCDR Venturella: Were these design deck loads used in the evaluation done after the fructose tanks were added? Was it a similar analysis?

WIT 2: Yeah, this cargo securing manual was approved around the time when the fructose tanks were installed. In order for you to -- for me to answer the question whether those weights have been considered or not, I would need -- we need to go back and check. I do not have access to those calculations performed at that time, because a review was performed by an engineer at that time. It was performed by a different engineer at that time.

LCDR Venturella: Okay. Thank you. And just to make sure I heard you right, Exhibit -- it was -- 168 was the analysis; is that correct?

ABS: That's correct.

LCDR Venturella: Thank you. We'll just review that.

WIT 2: Okay.

LCDR Venturella: And one last question. Within Exhibit 40, Appendix 13 -- I'm going to give you a page number -- Page 121 provides typical stack weights in pounds with two different GMs and different varieties of stacks; various, 3 high, 2 high, some homogeneous. Can you comment on how an operator would use this book in loading the *El Faro* if the container loading they were doing wasn't specifically mentioned in one of these examples? Is there something you can point to in the manual?

WIT 2: Yeah, there is -- there is a spreadsheet for the lashings. They can -- and also there is -- there is -- one of the annexes actually gives guidelines how to secure the containers. They can use the guidelines in the cargo securing manual to actually -- to see whether the lashings are adequate or not.

LCDR Venturella: And you believe that's in the manual; correct?

WIT 2: That's correct.

LCDR Venturella: Okay. No further questions, Captain.

CAPT Neubauer: Mr. Kucharski, do you have any questions?

Mr. Kucharski: Yes, Captain, I do. Thank you. Mr. Pisini, Mr. Cronin, Mr. White, good afternoon.

WIT 2: Good afternoon.

Mr. Kucharski: Just some general questions, and mine are all going to be related to the cargo securing manual. Can you give us an idea of how many cargo securing manuals you, Mr. Pisini, have looked at since you've been at ABS? Just give us an approximate idea.

WIT 2: Yeah, I have maybe seen 25 or 30 cargo securing manuals.

Mr. Kucharski: 20 –

WIT 2: 25 to 30 cargo securing manuals, and maybe about seven or eight container securing manuals.

Mr. Kucharski: Thank you. Were test certificates provided with the cargo securing manual submission for approval?

WIT 2: Test certificates have to be included for all the portable securing gear as well as the fixed securing gear. They have to accompany the cargo securing manual.

In the absence of -- they may not have test certificates with all of them. We don't -- we do include a statement in the letter stating that for the equipment that does not have a test certificate, a test certificate has to be procured and included in the manual, and when new equipment is purchased, they have to get the test certificate along with the new equipment, and that needs to be included in the cargo securing manual.

Mr. Kucharski: Thank you. And so I understand, I think Commander Venturella asked about the standard of review and the calculations for the cargo securing manual. So were -- all the calculations provided to you from Herbert Engineering, were they all reviewed by your team?

WIT 2: That's correct.

Mr. Kucharski: And the calculations for sufficiency of standard and semi-standardized cargo, that would include everything; correct?

WIT 2: Can you repeat that question, please?

Mr. Kucharski: The calculations were reviewed for sufficiency of both the standard and semi-standardized cargo; is that correct?

WIT 2: Whether they have been submitted or not? Actually, there is -- in the cargo securing manual, there is a spreadsheet that was developed to perform the lashing

calculations, and there is an example calculation performed. And then they have some blank sheets. They can follow the same procedure as what is there in their example calculation to perform the calculations. But specific calculations have not been submitted to ABS. They just submitted -- in the cargo securing manual, they have included a spreadsheet with one example calculation, or maybe two, I don't recollect, and they have -- a blank spreadsheet is included. So it is expected that whoever is performing, either the chief mate or -- or the other deck -- deck officers that perform the calculations of the lashing, that they are expected to use that spreadsheet to evaluate the amount of lashings that are required for whatever cargo it is.

Mr. Kucharski: And when you say "spreadsheet," are you talking about the advanced calculation method in Appendix 17 for the spreadsheet?

WIT 2: I don't remember the appendix number, but it's there at the end of the manual.

Mr. Kucharski: Right. Okay. Thank you. Were container certificates for the 48- and 53-foot containers provided to ABS for the calculations or in support of the calculations for the stacking weights of the 48 and 53 footers?

WIT 2: Your question is whether calculations have been submitted to ABS?

Mr. Kucharski: Negative. Were container certificates -- I'm sure you're aware that a 48 and a 53 is not an international-type container for international shipment. So were there – normally containers have some kind of a plate on them that shows the stacking weight or the maximum stacking weight on the container. So what I'm trying to understand is, if the 48 and the 53 footer, if those had certificates submitted with them for review, to see what the stacking weights permissible on them were.

WIT 2: Yeah, we usually – we usually get certificates for the securing gear, but not for the containers themselves. At least from the container securing manual that I have performed, I have not seen test certificates for containers themselves.

Mr. Kucharski: So how would you ensure that the containers, especially for the 58 -- 53 and the 48 footers were able to go ahead and – were sufficiently made or built to support the stack weights on them? How would you ensure that that happens?

WIT 2: Yeah, I need to look into that. I don't have a correct answer for that, whether it is required to have a certificate for the individual containers or not. I would have to go back and check it.

Mr. Kucharski: Okay. Thank you. And would you be the department -- these were asked for in document requests. Would you be the particular department that would provide those? Would your department be the ones to provide that?

WIT 2: Provide the certificates?

Mr. Kucharski: Yes, sir. The certificates for those particular -- the 48 and the 53 footers?

WIT 2: I didn't follow your question. If you can repeat it, please.

Mr. Kucharski: Well, I just wanted to make sure your department was the proper department to ask that request of.

WIT 2: That's correct.

Mr. Kucharski: Thank you. Please -- Exhibit 40, we're going to look at that again, please, and Page 102, Item P7. It's a table -- it's in a table there. It's called Trailer Lashing, and then the manufacturer model is Patterson at T-2 tensor.

WIT 2: Yes, we have P6, P7.

Mr. Kucharski: Just P7, sir.

WIT 2: Okay.

Mr. Kucharski: Were there any specifications submitted to you -- to ABS as far as the proper tensioning on those? I want to make sure that they were properly tensioned.

WIT 2: I'd have to look into the manual and check what certificates were submitted to us.

Mr. Kucharski: Do you have any experience with these barrel-type or screw-type tensioners?

WIT 2: When you say experience, experience in using them, or whether I've seen them before?

Mr. Kucharski: Yes. You've seen them before?

WIT 2: I'm familiar with them, but I'm not familiar with these based on my operational experience, or whether I've seen it in any other container securing manuals or cargo securing manuals, I'm not sure. But I've definitely heard of those.

Mr. Kucharski: Okay. Thank you. Okay. I apologize in advance. I'm going to ask you a question or two on the fructose tanks, but it's regarding securing.

WIT 2: Okay.

Mr. Kucharski: Would you please look at Exhibit 14. That's, I believe, a diagram of the fructose tank installation for the *El Faro*. It's a drawing, has an ABS stamp of approval on it.

WIT 2: Yes, I'm on Exhibit 14.

Mr. Kucharski: Okay. Great. Does this have any securement information for those fructose tanks that you can see?

WIT 2: Yeah, this is an arrangement drawing. And if I'm not mistaken, this arrangement is not -- has got the pipings -- the piping drawings shown, so it's -- it was reviewed by our systems group.

Mr. Kucharski: Okay. And would you be able to comment on there being any baffles in there, in those tanks, and what baffles would be used for?

WIT 2: Based on the information shown on this drawing, I do not see any baffles inside the tanks.

Mr. Kucharski: Okay. Thank you. And do you believe that there are other drawings for the actual installation or securement to the deck of those tanks?

WIT 2: Yes.

Mr. Kucharski: And we understand from Mr. Gruber's testimony that these were not included in the lightship weight?

WIT 2: That's correct.

Mr. Kucharski: So if they're not included in the lightship weight, would they be considered cargo? You know -- and I'm looking towards the cargo securing manual. I'd like to ask a question about that. Would it be considered cargo if it's not in the lightship weight?

WIT 1: In general, there's different definitions for cargo versus lightship, depending on whether you're dealing with stability issues or cargo securing issues. The foundation securing of the fructose tanks was reviewed separately. The foundation and the welding was reviewed by the structures group. Since the foundation included full welding, you know, securing, using loose gear is not required.

Mr. Kucharski: I'm sorry, your statement was secured -- securing, using loose gear. Are you talking about the lashings, the -- not permanent lashings? Is that what you're referring to?

WIT 1: Yes, correct. Yes.

WIT 2: These fructose tanks are permanently welded to the deck, and they do not require any additional lashings.

Mr. Kucharski: Okay. Great. So it wouldn't require an advanced calculation for non-standardized cargo. That's what I'm looking for.

WIT 2: That is correct.

Mr. Kucharski: Okay. Back to standard, semi-standard, and non-standardized cargo. The standardized cargo, can we agree, that's the containers; is that correct?

WIT 2: Yes.

Mr. Kucharski: And I believe you said the semi-standardized cargo would be trailers and vehicles -- such as trailers and vehicles; is that correct? I think it's on Page 7 of the ----

WIT 2: So let me go back to Page 7.

Mr. Kucharski: Thank you. And that's in Exhibit 40.

WIT 2: That's correct. Semi-standardized cargo, vehicles, trailers, and something similar.

Mr. Kucharski: Okay. Great. And what would be considered non-standard – non-standardized cargo? Could you repeat that, please?

WIT 2: Non-standardized cargo is something -- something -- you can say they're carrying some kind of a boat, sometimes they carry boats. And that is considered non-

standardized cargo, because they do not carry that kind of cargo at all the times. It's based on the type of the cargo that they get at that time. So that is one of the examples. And at times, they carry small – small pontoons and small barges, and those can be considered non-standardized cargo, and they require specific lashing arrangements.

Mr. Kucharski: So would you consider a 53-foot trailer or a 60-foot trailer, as long as it's a trailer, it would be considered non – would be considered semi-standardized cargo?

WIT 2: Yes, I think as far as – as far as -- as long as they are vehicles or trailers, they can be considered semi-standardized cargo.

Mr. Kucharski: Okay. Great. Would you look at Exhibit 40 again, Appendix 5, at Page 97? And it's entitled Locations of Fixed Securing Devices in Hold. And please review it, and kindly advise me when you're ready to go.

WIT 2: I'm going to Page 97. I'm on this page, 97.

Mr. Kucharski: Okay. Great. This says – it says, Figure 1 at the very top. It shows the typical stowage arrangement for all trailers. Do you see that?

WIT 2: Yes.

Mr. Kucharski: And you see the location of the Roloc button and the D-rings on there? Do you see those?

WIT 2: Yes.

Mr. Kucharski: Does that look like -- can you tell by looking at that if that's a 40-foot trailer, or some other size?

WIT 2: The D-rings that are around -- around the trailer, those are used for securing the -- they're used for securing the trailer, using the lashings, and the Roloc is some kind of

locking device under the trailer, just to keep -- just to keep the trailer in place. And the lashings that are secured to the vehicles, between the vehicles and between the -- and the -- and the D-rings, in association with the Roloc button, they keep the trailer in place.

Mr. Kucharski: Thank you for that explanation, but I don't believe that was my question. Can you tell by looking at that -- it says typical. Does that look like a 40-foot or 20-foot or a 50-foot -- 3-foot trailer based on tires and the Roloc box and everything else?

WIT 2: It's not shown there. I can't make it out from the sketch.

Mr. Kucharski: Okay. Can you tell me if for the semi-standard cargo, standardized cargo like the trailers, if the locations of the permanent securing devices are evaluated to see if there are ample lashing angles, ample -- or there are fixed securing devices to allow for ample lashing angles to maintain or prevent -- I should say prevent -- tripping, transverse sliding, and longitudinal sliding?

WIT 2: Can you be more specific?

Mr. Kucharski: When you review these calculations, okay, for stowing of the semi-standardized -- I'm talking about the roll-on/roll-off cargo -- okay, do you evaluate them, okay, to make sure that the securing devices, the permanent securing devices like the D-rings, the Roloc box, but mainly the D-rings, to where they secure the lashings to, maintain the proper angles as in the advanced -- do we need to look at the advanced calculation formula, the 17 pages, to see the calculations for -- it shows the angles, table of angles for the lashes, okay, to maintain or to prevent that cargo from tipping and from sliding longitudinally and transversely?

WIT 2: If they provide example calculations, we'd review them. If they -- in case of *El Faro*, I think they provided one or two example calculations. And that was – that spreadsheet was validated, because we have approved the cargo securing manual. So they have to -- the ship staff have to follow the same procedure, and it is for that reason there are blank spreadsheets provided at the end of the -- end of the manual. They follow the same process to evaluate whether the lashings provided are -- that they intend to plan are adequate or not.

Mr. Kucharski: Would we be able to get a copy of the calculations that were provided to you to support that the proper angles for these semi-standardized cargo, that they were sufficient?

WIT 2: Yeah. They have a spreadsheet at the end of the -- they have one sample -- or two sample calculations at the end of the manual with a spreadsheet, and they can – they have -- the ship crew have access to that spreadsheet. So they should be able to calculate on their own. I can -- I can show you where it is in the cargo securing manual.

Mr. Kucharski: Please do.

WIT 2: Can you go to Appendix 17?

Mr. Kucharski: Okay.

WIT 2: Page Number 137 of the Exhibit 40.

Mr. Kucharski: I'm there.

WIT 2: Can you go to Page 144 in the same appendix?

Mr. Kucharski: I'm there.

WIT 2: Yeah. You have advanced calculation method formula.

Mr. Kucharski: Okay. And the advanced calculation formula is for non-standardized cargo, correct? Look at the -- look at the top of that Page 137 that you came to. Do you see where it says advanced calculation method for non-standardized cargo? Do you see that?

WIT 2: Yes, I see that.

Mr. Kucharski: Okay. Great. So let me go back to my question again. I asked about the semi-standard cargo, okay? So would the angles and everything for the -- if you go back to Page 97 and look at those D-rings and everything, would they be -- well, the same calculations -- would you run the same calculations to see if the semi-standard cargo was at the proper D-ring locations for that?

WIT 2: Let me look into the manual, please. Sorry, it's taking a long time. Let me look at another manual.

Mr. Kucharski: And, sir, where I'm heading with this, and I don't want it to be any hype at all, but take a look at -- you know, compare 97 -- at Page 97, look at the D-ring locations there. I mean, I'm just having a difficult time. This is a typical arrangement. It says -- shows the typical arrangement for trailers. Tell me how you would maintain the angles as required in what you said is Appendix 17, okay, the horizontal and vertical angles with the deck to prevent the tipping and sliding of both longitudinally and transversely.

WIT 2: Yeah. Just give me a minute. I'll answer.

CAPT Neubauer: Can you possibly rephrase the question? I'm not sure I understand it.

Mr. Kucharski: Sure, Captain. Looking at Page 97 where the D-rings are on there, okay, and they're located right – almost right next to the trailer. So I'm just having

difficulty understanding, if this is a typical arrangement, how you can maintain the proper angles as required by the advanced calculation method, which is about 17 pages long, okay, but it does have specifications in there, to maintain -- to be able to prevent that trailer from tipping, sliding, or transversely, longitudinally or the whole thing tipping. That's what I'm having difficulty seeing.

CAPT Neubauer: Thank you.

WIT 2: If you go to Page 41.

Mr. Kucharski: I'm there.

WIT 2: Starting from Page 36, it gives the guidelines for stowing and securing of Ro-Ro cargo. So these are the guidelines that the ship's crew are supposed to follow. And when I say they can use the spreadsheet that is there, I'm mistaken. That is for non-standardized cargo. That is for non-standardized cargo. But for Ro-Ro cargo, they can use the guidance given in this particular section to perform the lashings.

Mr. Kucharski: Okay. Great.

WIT 2: And we did not receive any calculations, at least I did not see any calculations that were submitted along with this or along the cargo securing manual, in support of securing the Ro-Ro cargo.

Mr. Kucharski: Okay. Great. That's what I wanted to understand. So looking --

WIT 2: Maybe they were submitted, because the vessel was so old. I'm not -- with the level of access we have, the files that we have, and with the files that we are able to search, I've not been able to locate any additional calculations that have been submitted along with the cargo securing manual.

Mr. Kucharski: Thank you for that answer. Look at Item Number 4 in the -- Page 38, which you mentioned. It talks about the securing of the semi-standardized or roll-on/roll-off cargo. Do you see Item Number 4?

WIT 2: Item Number 4 on Page 38?

Mr. Kucharski: Yes, sir.

WIT 2: Yes, sir, I see that.

Mr. Kucharski: Okay. Great. And that talks about an angle of 45 degrees or less. Do you see that?

WIT 2: Yes.

Mr. Kucharski: Is there any other mention in these -- in these instructions about any other angles, like -- I guess I'm just confused. Is a Roloc -- is a trailer on a Roloc box, is it not subject to the same forces, if you will, and the same possible failures that are caused – to lashing arrangements that are caused by tipping, sliding, you know, longitudinally and transversely? Would it not apply to both semi-standard and non-standardized cargo?

WIT 2: The Roloc boxes actually provide -- take most of the load. They keep the vehicle in place. And the lashings, in association with the D-rings, they actually -- in addition to the Roloc boxes, they actually keep the vehicle in place. I don't know. Did that answer your question?

Mr. Kucharski: It certainly does. And my last question on this is, the Roloc box, was that -- was it envisioned that such should be on a button to properly secure that cargo?

WIT 2: I've not seen a Roloc box to answer that question. Your question is whether the lock -- was there some button?

Mr. Kucharski: You can go back to that diagram on Page 97. It shows the position of a button there, and then further in the manual shows the Roloc box and how it's attached to a button. I think they may call it something else. I'll get the exact language of the button. It's ----

WIT 2: Can you repeat your question now?

Mr. Kucharski: Yeah. Do you see on Page 97, that same diagram where it shows Roloc button? Do you see that?

WIT 2: Yes, sir.

Mr. Kucharski: So is it envisioned that that -- for this to properly be secured, it must be on a button? And, actually, the general instruction's on Page 37. The very first one says: Trailer shall be secured to the deck using Roloc boxes and lashings. Do they need to be unbuttoned to meet the requirements of securing semi-standardized cargo?

WIT 2: You said Page 37?

Mr. Kucharski: Yeah. That's what you had brought me to before. General Instructions 6.2.1, it says: Trailers shall be secured to the deck using Roloc boxes and lashings. So secured to the deck, do they need to be on the button to meet the requirements, lashing requirements, of the semi-standardized cargo?

WIT 2: I'm not sure, sir.

Mr. Kucharski: I guess I might just have one slight follow-on question. How about the orientation of that Roloc box? Does it matter whether it's allowing fore and aft along the longitudinal axis of the trailer and the trailer's in alignment of the longitudinal axis of the vessel? Does it matter?

WIT 2: The trailers are usually -- are usually placed in the longitudinal, the forward and aft direction. The trailers, the long trailers, they're usually positioned in the forward and aft direction. And your question is, how is the Roloc box positioned? Is it positioned in the forward and aft direction or is it positioned in the transverse direction?

Mr. Kucharski: Yes, and does it make a difference?

WIT 2: The way the Roloc box is positioned, does it make a difference? Is that what your question is?

Mr. Kucharski: Yes, sir. If it is not in alignment with the fore and aft direction of that, as you said, the trailer's aligned fore and aft -- I believe we have pictures where these are backed in and some of them are not aligned fore and aft. Those were taken from the *El Yunque*. Would that make a difference in whether it was properly secured or had the ample securement on it?

WIT 2: I'm not sure of the operations. I think this is probably an operations -- for an operations person to check.

Mr. Kucharski: I'm asking not for operations, but for cargo securing, would it make a difference, in your opinion, if that Roloc box was not fore and aft along the alignment of the trailer and the vessel, or if it was sideways somehow? Would it make any difference, in your opinion, the securing?

WIT 2: Just give me a minute, please.

CAPT Neubauer: Just to make sure I understand the question, too, are you saying, is it okay per the cargo securing manual to reverse the direction of the trailer?

Mr. Kucharski: No, sir. I'm saying the -- just the Roloc box, okay, if it's not -- the Roloc box pivots on that trailer, okay. If it's not straight in alignment with it, if it's angled when

it comes into a stow position, is it properly secured, or can it be -- you know, is it properly secured per the cargo securing manual when they lock it in position?

CAPT Neubauer: Thank you.

WIT 2: Yeah, from the arrangements that are shown, that are shown in the manual, the Roloc box should be oriented in the same direction as the -- as the vehicle.

Mr. Kucharski: Thank you, Mr. Pisini, gentlemen. Captain, that concludes my questions. Thank you.

CAPT Neubauer: Thank you. Let's go to the parties in interest at this time. Tote, do you have any questions?

Tote Inc: No questions, Captain.

CAPT Neubauer: ABS?

ABS: Yes. Just to clarify and go back to Exhibit 167 on the buckling verification, there was a comment from one of the examiners with -- concerning the ratio and the percentages that are set forth in Table 1.2 on Page 3 of Exhibit 167. Mr. Cronin, with regard to the actual sailing condition of the *El Faro* when it departed Jacksonville, can you explain the significance of the bottom at actual bending moment that's contained at the last entry in the table?

WIT 1: Sure. There were several ratios that were calculated, and the buckling ratio calculated based on the still water bending moment on final voyage, came up to a ratio of .77.

ABS: And as far as the bending moment that the vessel sailed with, is that reflected in that entry? So would it be accurate to say when the vessel sailed, the -- the percentage -- it was given 77 percent of what the actual bending moment would allow?

WIT 1: So the still water bending moment in the final voyage was 280,000-ton feet compared to an allowable or permissible still water bending moment of 500,000. So the ratio's going to be even lower than the 77 percent. And, again, that 77 percent number is based on a conservative application of the IACS UR S11 formulas for buckling.

ABS: Nothing further.

CAPT Neubauer: Mrs. Davidson?

Ms. Davidson: No questions.

CAPT Neubauer: Herbert Engineering?

HEC: No questions.

CAPT Neubauer: We have one more line of questioning. In the interest of time, are you okay to continue? We'll try to make it a brief line.

WIT 2: Yes.

CAPT Neubauer: Lieutenant Commander Venturella will start.

LCDR Venturella: We're just going to briefly go over the loading manual, and then I'm going to pass it to Dr. Stettler, and Dr. Stettler will go over a little bit of the software application. Can you give me just a general summary of what your group does at ABS in terms of reviewing loading manuals?

WIT 2: Yes, sure. So my group performs the review of the loading manuals for new construction vessels and -- for all kinds of new construction vessels. And also when there are revisions to the loadings manuals, the request for an approval, and we also perform those reviews. So, in other words, new construction, major modification, and when there are revisions to the loading manual because of the modifications, and at times, they change -- they change the version of the software, or sometimes they make

some minor upgrades to the capacity tables. And, because of that, they don't revise the loading manuals in sending them to us. And we do the reviews they forward to us.

LCDR Venturella: Can you tell me if the *El Faro* was required to have a loading manual?

WIT 2: The *El Faro* is not required to have a loading manual based on the year built.

LCDR Venturella: Are you aware if the *El Faro* had a loading instrument or stability -- loading software?

WIT 2: The *El Faro* is not required to have a loading software, but I do know that the vessel had a stability software.

LCDR Venturella: Without a loading manual, how would a vessel operator generally assess their loading and the longitudinal strength of the vessel? How would ABS recommend this be done in practice?

WIT 2: When the vessel was built, there was a proposal for a still water bending moment of 500,000 based on operating conditions. So there was a range of loading conditions submitted to us and -- out of which, the maximum still water bending moment was 500,000. It was proposed by the naval architect to us. And the rules -- based on the applicable rules at that time, loading manuals are required only for oil carriers and bulk carriers, and loading manuals are not required of a vessel of this type, because the loading is uniform. Our rules also state that whenever a range of loading conditions are to be submitted in the form of curves, when the loading is non-uniform. So usually, for a vessel of this class, what is *El Faro*, which is -- which is a roll-on/roll-off vessel and the weight is loaded, the load distribution is usually uniform. And then the -- yeah. And then the Master can take a look at the conditions that the Master has. Is the loading

conditions that were there at the time of – since construction when the maximum still water bending moment was 500,000, and, also, when the vessel was lengthened, the still water bending moment was also 500000-foot long tons. And, again, when the vessel was -- when the vessel was converted to container carrier, at that -- around that time, the scantling reassessment for the main deck was performed, and even at that time, the hogging moment was limited to 500,000-foot long tons. So throughout the life of the vessel, the longitudinal strength in a hogging condition remained 500,000-foot long tons. And as far as the guidance is concerned, that is the guidance -- the Captain can use that as a guidance, and as for the operational guidance, ABS doesn't give any operational guidance to the master of the vessel.

WIT 1: If I could also just clarify, the range of loading conditions only approach about 458,000 long tons. The 500,000 was the design, or allowable still water bending moment. So there was a margin between what the vessel operated at and the max limits of the design.

LCDR Venturella: So would it be correct in saying that the belief is there's been enough conservative assumptions put in place that the Master doesn't have to monitor the bending moments with frequency?

WIT 1: So for a vessel of this type, there's only a -- generally, a limited number of configurations a vessel can be loaded at; ballast, full cargo load. Those were accounted for in the range of loading conditions considered. So unless -- if there was an unusual loading condition being proposed, the necessity to monitor still water bending moments is limited.

LCDR Venturella: I'm going to pass it to Dr. Stettler now.

Mr. Stettler: Just a quick follow-up on that. You said -- mentioned even after it was converted to a container carrier vessel, load-on-load-off. It sounded like you implied that the vessel still could not exceed, in a loaded condition, its allowable bending moment. Is that what you just told me?

WIT 2: Yeah. That's right. Let me clarify. So when -- around the same time the vessel -- when the vessel was -- the vessel was converted to container carrier in 2005 and 2006. I think in 2006, 2007, or maybe around the same time frame, the main deck scantling reassessment was performed, and at that time the hogging moment was still limited to 500,000-foot long tons, but the sagging moment was reduced to 388,000. So throughout the life of the vessel, the hogging moment was -- the hogging moment remained the same, and based on the fine form of this vessel and the way these vessels are loaded, the vessel will always be in a hogging condition. It will never be in a sagging condition.

Mr. Stettler: But in a hogging condition, are you claiming that the vessel could not be loaded with containers such that they would exceed the allowable bending moment in hogging?

WIT 2: We have a loading condition that was submitted along with the CargoMax. The CargoMax, I know that it's not been approved for strength purposes. It was approval condition, it was near full displacement with the containers. And we found that the still water bending moment is much lower than -- much lower than the allowable still water bending moment -- it was around 57 or 58 percent. And we have also, as stated in the last – the final loading conditions from Jacksonville -- Jacksonville to San Juan, where the containers -- where the vessel had about 6,000-ton vessel containers on the deck,

and the maximum still water bending moment in that condition was 55 or 60 percent. So we are quite comfortable that even when the containers, especially those carrier containers,

the maximum hogging still water bending moment of 500,000 would not have been exceeded.

Mr. Stettler: Would there be anything that would keep the vessel master, the folks loading the vessel, from loading empty containers in the center base and full containers in the end base, in the transition to load?

WIT 2: I missed the first part of it. Can you repeat your question, please?

Mr. Stettler: Like an oil tanker, I mean, it's always possible for a -- in the loading sequence to improperly load the vessel while the vessel's being loaded. Is there anything on a container vessel that would keep that from happening?

WIT 1: I don't believe that there's any specific guidance to the master; however, it would be a matter of judgment and good seamanship. And I do -- I understand we don't have them right here, you know, the 73 rules (inaudible) – require unusual loading conditions to be assessed.

Mr. Stettler: So just to circle back to the original question, or one of the original questions was, when would a loading manual be required for a container vessel or a similar vessel such as a Ro-Ro, combined Ro-Ro container vessel? Who would make that decision?

WIT 2: You mean if the vessel was built now, or –

Mr. Stettler: Yes.

WIT 2: If a vessel was built now and it was more than -- if it is longer than a certain limit, I'm not sure what the limit is, I think it is 61 meters -- all vessels are required to have loading manuals. That's the current regulations. To answer your question, if *El Faro* was built today, the vessel will definitely require a loading manual and a loading program.

Mr. Stettler: In 2005 and 2006 when the vessel was converted to a container vessel, had that been deemed a major conversion, might that have required a loading manual?

WIT 1: So the vessel is still classed by ABS as a vehicle carrier, as a vehicle carrier that carries container cargo as well. When a major conversion determination is made, certain other requirements are put in place, but that would -- it was not considered a major conversion at that time.

Mr. Stettler: Okay. With that, I'll move on to software, which is related. We've heard from some previous testimony that the *El Faro* utilized stability and loading software, CargoMax, which has come up a number of times, which is one of the common -- there's a number of these software packages that are used for both stability and loading instruments, which has been mentioned. In addition to providing stability calculations, we've -- it's also come up that CargoMax provides calculations of vessel longitudinal bending, or strength, and cargo loading and securing support, including stack weights, tier weights, and lashing margin calculations. So my question relates to the review, the requirements for review and approval of such software if they are being utilized on board the vessel. So I'll first call your exhibit -- or your attention to Exhibit 016, which is the ABS -- referred to as the CargoMax approval letter, but it's really -- the subject is Stability Review. So this letter is the most recent approval letter for CargoMax to be

utilized as a stability instrument. And as mentioned in previous testimony, including Mr. Gruber, Note 6 on the second page states specifically that the Submittal Item 1 was reviewed for stability aspects only. So just to confirm with that, has CargoMax installed on board the *El Faro* ever been reviewed for strength calculations or cargo loading and securing calculations?

WIT 2: The CargoMax was not reviewed for longitudinal strength purposes. That's because a loading program for strength purposes is not a requirement based on the year this vessel was built. I've not seen the program, so I cannot confirm that, whether the program has container securing calculations.

Mr. Stettler: Okay. To your knowledge, has CargoMax ever been reviewed and approved for cargo securing functions for any vessel?

WIT 2: No, I have not seen so far. All the CargoMaxes that I have seen in the last ten years were the request for approval for strength and stability.

Mr. Stettler: Has ABS reviewed other software packages for -- and approved them for their use for cargo securing -- cargo loading and securing, including calculations to support the cargo securing manual?

WIT 2: Yes, we did.

Mr. Stettler: Could you discuss the -- both regulatory and class requirements for review and approval of software for longitudinal strength and cargo securing functions?

WIT 2: For longitudinal strength, for review of CargoMax for longitudinal strength, we have an IMO document, and we also have internal process instructions to review the software, both for strength and stability purposes. I will cover how we performed the review for strength purposes. When they submit the software to us, along with the

software, what we get is vessel information booklet. It comes with some sample load cases, and as per our internal process instructions, the sample load cases must have one full load condition, one full ballast condition, one partial ballast condition, and one partial load condition, and one load condition where the maximum still water bending moment is reached. Maximum in the sense, they have to come up with the loading condition where the still water bending moment is between 95 percent to 105 percent of the level of -- so they perform all these -- they submit these four or five different loading conditions along -- along with the software. And then, in addition to that, they -- we compare that output -- we put the same loading conditions into a different software, like HECSALV, or if the loading manual is done, using GHS. So we see the item loading conditions, and if I think the loading conditions are not there, we request the submitter to submit these test loading cases with -- using a different software, and then we actually compare both outputs to see how close it is to each other. So as long as the results are within 5 percent of each other, we confirm that the software is accurate. So that is the -- that is the procedure we follow for the approval of a loading program for strength purposes.

Mr. Stettler: Is there any validation of the actual calculation that occurs, or is it simply a comparison with specific cases?

WIT 2: Yeah, the comparison itself is a validation process, because the same data is input -- the same input data is input into two different softwares, and then we compare the output from both the softwares. It is -- it is equivalent to we inputting the soft -- we're inputting the same data into two different softwares and getting the output. So it's doing it the -- the designer itself submits those -- those test conditions using different software to us. And then we compare both outputs and then we have all of that in our spreadsheets to verify the accuracy.

Mr. Stettler: Okay. Thank you. For cargo securing software that you do review and approve, how is that software reviewed?

WIT 2: We have guidelines if it is a container securing software. So we have guidelines of the container securing guide. But it's not mandatory for the owners to comply with the guide. They have to comply with the guide if they request for the notation. And if they request for the notation, we have guidelines in our ABS guide for container securing. It actually gives detailed guidance of how to -- what needs to be submitted in order for us to approve the container securing software. But as far as the cargo securing part is concerned, the spreadsheet that I have seen is the Excel basis spreadsheets, and whereby you can actually input all the parameters and then you can evaluate how many lashings are required. So it depends -- depending upon the weight of the vehicle, and the way it is oriented, the software gives four lashings or five lashings or appropriate lashings. Then, accordingly, the number of lashings that can -- we can establish how many lashings are required. So we have -- we have a typical set of cases, and then we see that the program is giving -- giving correct outputs. And, at times, we also perform a hand calculation to ensure the spreadsheet is giving correct results. And once we approve that, then that spreadsheet can be used.

Mr. Stettler: So once you've reviewed and approved a software application for either strength or -- and/or container loading and lashing, you basically, I think, had stated that you would compare a number of cases, compare outputs, using the same inputs. How do you -- how are you ensured that there are no bugs in the software such that a user on the ship will get -- you know, in terms of quality control in the software? Is there a

process for ABS to maintain configuration control of software that is installed on vessels?

WIT 1: So for the loading instrument, the longitudinal strength check, the approved test conditions, which contain several loading conditions, are to be on board the vessel so that the surveyor can periodically check that the onboard instrument continues to match the test cases that were reviewed by engineering.

Mr. Stettler: But what about conditions that are not test cases? Is there a process to receive bug reports and the like, and control with the software vendor in terms of quality control of the software, configuration control, that type of thing?

WIT 1: For later revisions of the software?

Mr. Stettler: Yes. So, in other words -- I mean, every software has bugs; right? So how are those bugs identified -- once the software is installed on the vessel, how are those bugs identified, head back to the software vendor, and the configuration control maintained in the software?

WIT 2: It's for that reason we compare using a different software. If there is a bug in one software and if there is no bug in the other software, the readings are not going to be consistent. So the programs that we usually see -- I mean, I've been reviewing programs for the last 11 years. In the last one, two years, ever since I became head of the department, I've not been doing it, but in the last nine years, I myself have performed the review of the loading programs. And my experience is, they're always within 2 percent of each other. And they were -- there were cases where we have seen that the differences are high, then we went back to the designer saying that the program

is not accurate, and they actually fixed it. If is there a bug in the software, they found it and they fixed it.

Mr. Stettler: I have no further questions on this, Captain.

CAPT Neubauer: Mr. Roth-Roffy? Are there any further questions from the Board? Go to the PIIs. Tote, do you have any questions?

Tote Inc: No questions, Captain.

CAPT Neubauer: ABS?

ABS: No questions.

CAPT Neubauer: Mrs. Davidson?

Ms. Davidson: No questions.

CAPT Neubauer: And, finally, Herbert Engineering?

HEC: No questions.

CAPT Neubauer: Mr. Pisini and Mr. Cronin, you are now released as witnesses at this Marine Board of Investigation. Thank you for your testimony and cooperation. If I later determine that this Board needs additional information from you, I will contact you through your counsel. If you have any questions about this investigation, you may contact our Marine Board Recorder, Lieutenant Commander Damian Yemma. And before we adjourn, do any of the PIIs have any issues with the testimony that we just received?

Ms. Davidson: No, sir.

Tote Inc: No issues.

HEC: No issues.

ABS: No, sir.

CAPT Neubauer: The hearing is now adjourned and will reconvene on Monday, May 23rd, at 9:00 a.m.

The hearing ajourned at 1803, 20 May 2016.